International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 6 Issue 7, November-December 2022 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Effect of Usage of Information Technology on Information Services in Rwanda Tourism Sector: A Case Study of Volcanoes National Park, Rwanda Development Board

Nyirigira Jean

Mount Kenya University, Rwanda

ABSTRACT

The purpose of this study was to assess the effect of usage of information technology on information services in Rwanda tourism sector. It was carried out in Volcanoes National Park as a case study, with the following objectives; To determine the aspects of information technology infrastructure used in Volcanoes National Park, Rwanda Development Board; To assess the usage of information technology for information services in Volcanoes National Park, Rwanda Development Board; and to determine the effect of usage of information technology on information services in Volcanoes National Park, Rwanda Development Board. The study design used was a descriptive case study. The target population was 19, 105 tourists and 180 employees of Volcanoes National Park, from which a sample size of 392 tourists and 122 employees were selected using Yamane's formula. The sampling techniques used were simple random sampling and census respectively. Simple random sampling was used on tourists because they had the same level of information. For employees, census method was used to select Managers and ICT staff, whereas the rest of the employees were selected using simple random sampling technique. Data collection was done using questionnaires and interview guides. Collected data was analyzed using tables, weighted means, standard deviation and percentages, frequencies, and regression analysis. The data analysis tool that was used in this study was Statistical Package for Social Sciences (SPSS) version 19. The study found that, 100.00% of respondents indicated that the usage of cellular phones and the usage of RF tracking were two types of aspects (technologies) which are used very frequently.However, only 68.85% of respondents indicated thatcomputers network environment were very frequently used and 77.04% of respondents indicated GPS/GIS technology as frequently used. Concerning the usage of information technology for information services, 100% of respondents indicated a very good use of information technology for online park booking, Online, customer care, Hotel Booking, Transport booking.Despite a very good use of IT in providing services in volcano National Park tourists indicated that Emergency services were moderate as indicate by 75.50% respondents. Meanwhile for health care services 43.60% of respondents indicated it as not effective.The study showed R equal to 0.737, this point out that there was a very strong positive multiple correlation between independent variables including usage of GPS/GIS, usage of cellular phone (GSM), usage of RF tracking devices, usage of VHF Radios, usage of internet/websites, usage of computers and networks and the dependent variable (information services). The study also revealed that R^2= 0.543, which meant that 54.3% of total variation in y could be explained by linear relationship between x and y and the remaining total variation of 45.7% was unexplained. This correlation was generally described as acceptable one. The recommendations for Volcanoes National Park, Rwanda Development Board with findings are suggested that the information technology should not only be used as tool for information services, they should also be viewed as practical tools of information technology within Rwanda Development Board which should use to enhance their information services. Rwanda Development Board should train the employees of Volcanoes National Park on the important of information technology on information services.

How to cite this paper: Nyirigira Jean "Effect of Usage of Information Technology on Information Services in Rwanda Tourism Sector: A Case Study of Volcanoes National Park, Rwanda Development Board" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-6 | Issue-7, December 2022, pp.542-572, URL: www.ijtsrd.com/papers/ijtsrd52374.pdf

IJTSRD52374

Copyright © 2022 by author (s) and International Journal of Trend in Scientific Research and Development Journal. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0) (http://creativecommons.org/licenses/by/4.0)

1. INTRODUCTION

This chapter presents the background of the study which explains generally what the study is about. It also covers the study problem which provides context for the study, gives the objectives of the study deliverables. It also points the study questions, significance of the study, limitations of the study and the scope of the study and organization of the study.

1.1. Background of the Study

Rwanda, the land of a thousand hills, is a center for Africa with nature's best paradise. It is one of the friendliest countries, renowned for its comfortable facilities, fine food and rich cultural heritage. Being among the safest and friendliest of African capitals, Kigali City is blessed with a moderate high altitude climate that belies its tropical location. It is conveniently located within high altitude climate that belies its tropical location (RDB, 2012).

The country's security and stability have attracted visitors to be strong in seeing and enjoy the various attractions (RDB, 2013). Rwanda is one of the only two countries in the world in which mountain gorillas can be visited safely. Gorilla tracking, in the Volcanoes National Park, attracts thousands of visitors per year, who are prepared to pay high prices for permits (RDB, 2012).

Tourism is one of the fastest-growing economic tools and became the country's foremost foreign exchange earner in 2011. In spite of the genocide's legacy, the country is increasingly perceived internationally as a safe destination; A couple of events and tourism sites revealed in 2013 had generated an investment boom in the tourism sector to $217.7 million, from January to October, compared to $210.5 million generated in 2012.

From January to September 2013, Rwanda hosted 824,238 visitors, an increase of 7 per cent compared to the same period in 2012 where 768,221 people visited. As tourism revenues have been increasing over the years, from US$ 148 million in 2010 to US$ 282 in 2012. The direct contribution of travel and tourism to Gross Domestic Product in 2012 was 3.1 per cent of total GDP. The total contribution was 7.4 per cent of Gross Domestic Product and Rwanda Development Board projects. Tourism industry contribute more than 15 per cent of Gross domestic product (GDP) by 2020 as reported by World Bank, 2012.Tourism sector lines first in 2012 regarding investment attraction. Significant (though inconsistent) amounts of foreign direct investment received by Rwanda between 2001-2012 ranged between 1 per cent and 41 per cent of total foreign direct investment. The tourism sector has benefited in terms of employment generation according to World Travel and Tourism Councils (2013), travel and tourism sector directly supported 54,000 jobs (2.6 percent of total employment in Rwanda) and its total contribution to employment was equivalent to 135,800 jobs (6.4 per cent of total employment). Out of the total number of employees in the tourism sector, male employees account for 70 per cent and female 30 per cent (World Travel and Tourism Council, 2013).

The accelerating and synergistic interaction between technology and tourism in Rwanda has brought fundamental changes in the industry and the perceptions of Tourism in Rwanda. Adoption of new technologies has reshaped the entire process of tourism service development, management and marketing, as well as entire tourism industry as a whole. Due to the increasing impact on efficiency and effectiveness of tourism. ICT has been used in making booking, programming tourist visits and providing relevant information about tourism features (RDB, 2013).

Volcanoes National Park located in northwestern of Rwanda borders are Virunga National Park in the Democratic Republic of Congo, Gahinga Gorilla National Park in Uganda. It is home to five of the eight volcanoes of the Virunga Mountains (Karisimbi, Bisoke, Muhabura, Gahinga and Sabyinyo), which are covered in rainforest (Philip & Booth, 2001).

Volcanoes National Park was first gazetted in 1925, as a small area bounded by Karisimbi, Bisoke and Mikeno, intended to protect the gorillas from poachers. It was the very first National Park to be created in Africa. Subsequently, in 1929, the borders of the park were extended further into Rwanda and into the Belgian Congo, to form the Albert National Park. A huge area of 8090 km², run by the Belgian colonial authorities who were in charge of both colonies. In 1958, 700 hectares of the park were cleared for a human settlement.

After the Congo gained independence in 1960, the park was split into two. Upon Rwandan independence in 1962 the new government agreed to maintain the park as a conservation and tourist area. Despite the fact that the new republic was already suffering from overpopulation problems, the park was halved in area in 1969. Between 1969 and 1973, 1050 hectares of the park were cleared to grow pyrethrum. The Volcanoes National Park became a battlefield during the Rwandan Civil War, with the park headquarters being attacked in 1992. The research centre was abandoned, and all tourist activities (including visiting the gorillas) were stopped. They did not resume again until 1999 when the area was deemed to be safe and under control. There have been occasional

infiltrations by Rwandan rebels from the Democratic Forces for the Liberation of Rwanda (FDLR) in subsequent years. But these are always stopped quickly by the Rwandan army and there is thought to be no threat to tourism in the park (ORTPN, 2004).

Situated in the far northwest of Rwanda, the Volcanoes National Park protects the steep slopes of this magnificent mountain range-home. The rare mountain gorilla- and the rich mosaic of mountains ecosystems, which embrace evergreen and bamboo forest, open grassland, swamp and heath. The Chief Park Warden is the manager; the Volcanoes National Park management depends on five strategic areas including: Anti-poaching and regular monitoring of the park and its key biodiversity, behavior research veterinary research and health care, regulated tourism, strategic partnerships for local development involvement of local communities in conservation, trans-boundary collaboration efforts (ORTPN, 2004).

1.1.1. Rwanda Development Board (RDB)

Rwanda Development Board (RDB) is a national institution dedicated solely to development of Rwanda, was established by the government of Rwanda by organic Law No 53/2008/of 02/09/2008.RDB is situated and headquartered in Gasabo District of Kigali City at Gishushu near Rwanda's Parliament and Ministry of justice on the road to Nyarutarama.

Rwanda, having been destroyed by the devastating genocide of the Tutsi of 1994, is actually committed to rebuild itself with a knowledge based economy, fuelled by investment, human capital development, and vibrant private sector.

RDB was created to accelerate these efforts by injecting a business mentality into government and creating the conditions for the private sector, to grow: create jobs, and expand opportunities for all Rwandans.RDB comprises by different departments, including tourism and conservation (RDBT&C) department which is made up former Rwandan's Office of Tourism and National Parks (ORTPN) (see Appendix VII). The department is charged with the responsibility of marketing tourism in Rwanda. It carries out marketing, sensitization and development of tourism in Rwanda.RDB also takes the lead in attracting and facilitating investment and enhancing the business environment, as a foundation for economic growth (RDB, 2012).

The vision of Rwanda Development Board is to transform Rwanda into a dynamic global hub for business, investment, and innovation. The mission of Rwanda Development Board is fast tracking economic development in Rwanda by enabling private sector growth. All departments of RDB use internal ICT communication as a tool of information services by sharing information using exchange mail platform, RDB intranet platform, department file servers to share file across division/departments, and Skype for business (Lync) for instant communication (RDB, 2014).

This study was generally about investigated how usage of information technology affects information services in Rwanda Tourism Sector. Towards this end, Volcanoes National Park within establishment of Rwanda Development Board, was considered as a case study.

1.2. Statement of the Problem

Tourism industry by its nature greatly depends on information services. Due to high touristic potential and capacity, US Tourism represents a fast growing sector of the economy. This strategic sector however, still has to deal with the natural phenomenon of climate and weather. Thus, as part of US natural resource, this problem of climatic change appears as a great challenge that even the evolution of the technology doesn't the strongest indicator of Tourism activities (Ceron& Dubois, 2003).

The world are making their final assessment of the UN Millennium Development, which global leaders agreed upon in the features. The ICT revolution has driven global development in a good way. Technological progress, infrastructure deployment, and falling prices have brought unexpected growth in ICT access and connectivity to billions of people around the world development. ICT help the world in achieving future sustainable development goals as the world moves faster and faster towards a digital society (Ceron& Dubois, 2003).

In Africa, the decisions in the areas of investment, marketing and operation of the tourism enterprises appear to be critical to the tourism industry. The key issue for all concerned is to recognize that the development decisions made by them do have wider economic consequences for Africa. The major challenge is the need to develop human resources, particularly indigenous personnel, both for reasons of delivering quality services for tourists, as well as enhancing general skills of the local workforce. There are problems facing the local tourism industries in Africa that are characterized by a large number of small and medium-sized tourism enterprises (SMEs). Although SMEs serve useful functions in tourism (e.g. the development of linkages, providing personal service, etc), but for most of them, life is a daily struggle, with many of them operating at the margin of survival. They also lack the requisite experience to

run tourism business along modem management principles (Dieke, 2000).

In East Africa, only few companies have the ability to cover the costs of exhibiting by themselves in big travel exhibitions like the Nordic travel fair in Finland. From the statistics kept by the travel fair organizers, only few East African companies have been participating in this exhibition due to a number of reasons, ICT Visions into Reality in east Africa tourism sector, the time has come for East Africa's long heralded ICT revolution to start delivering results that improve the quality services (Dieke, 2000).

Rwanda is a rural country with about 90% of the population engaged in agriculture, regional instability. Both DR Congo and Burundi that border Rwanda have experienced

Considerable difficulties. This gives rise to a series of risks, notably damage to the Virunga ecosystem outside Rwanda and armed insurgency into Rwanda. While these risks cannot be fully mitigated, the current problems in DR Congo requiring a peace keeping force are a very considerable distance to the north of Rwanda. Furthermore it is difficult to envisage a more damaging regional crisis than experienced during and after the Rwandan war and the Virunga ecosystem survived that period largely intact, Information and Communication Technology is a central engine to driving Rwanda's transformation to a knowledge based economy, a fact Rwanda has acknowledged by allocating a budget to ICT - as a percentage of its GDP (Butynaski, 1997).

Most of the tourism services are located at distant places and ICT is considered important in handling this problem so as to see how best to use Information Technology and help to provide the information in tourism. The customers are not able to receive immediate services online during registration or confirmation of their bookings (Choi &Sirakaya, 2006).

Preliminary investigations were done on availability of similar studies using different libraries in various universities in Rwanda, Google scholar and other databases. It concluded that not much information exists particularly with respect to Rwanda. The research problem was an analysis of the effect of usage of information technology on information services in Rwanda tourism sector, by considering the case of Volcanoes National Park.

1.3. Objectives of Study

The study was guided by a general objective, which was supported by specific objectives.

1.3.1. General Objective

The main objective of this research was to assess the effect of usage of information technology on information services in Volcanoes National Park in Rwanda.

1.3.2. Specific Objectives

A. To determine the aspects of information technology used in Volcanoes National Park, Rwanda Development Board.
B. To assess the usage of information technology for information services in Volcanoes National Park, Rwanda Development Board.
C. To determine the effect of usage of information technology on information services in Volcanoes National Park, Rwanda Development Board.

1.4. Research Questions

A. What aspects of information technology were used in Volcanoes National Park Rwanda Development Board?
B. To what extent was information technology used for information services in Volcanoes National Park, Rwanda Development Board?
C. How did the usage of information technology affect information services at Volcanoes National Park, Rwanda Development Board?

1.5. Significance of the Study

The study would be beneficial to tourists through the usage of better IT services provided to them. Stake holders in travel and tourism sector would have to adopt new strategies that can affect usage of Information Technology on Information Services in Rwanda. The general public, Rwanda Revenue Authority (RRA) Together with future investors in the tourism industry would use the knowledge of this research to know the effect of usage on information services in Rwanda tourism. The Government of Rwanda would make decisions and policies related to the development of tourism through ICT. Future researchers in the field of tourism and ICT would refer to the knowledge generated from this study for reference in order to widen their understanding the effect of usage on information services in Rwanda tourism.

1.6. Limitations of the Study

The study was limited to Volcanoes National Park due to time and financial constraints, other national parks were not covered. Data obtained from this study was taken to be a representative of such parks within Rwanda Development Board. The nature of the degree course pursued confined the study to information and communication technology and its effect on information services with Volcanoes National Park, Rwanda Development Board.

1.7. Scope of the Study

The scope of this study covered the usage of information and communication technology within the tourism sector of Rwanda.

1.7.1. Content Scope

The study focused on the effect of usage of information technology on information services in Volcanoes National Park. It also touched on various factors concerning ICT usage in the tourism sector of Rwanda.

1.7.2. Geographical Scope

The study was carried out in Volcanoes National Park, Rwanda Development Board, located in Kinigi Sector, Musanze District of the Northern Province of Rwanda, where the Volcanoes National Park main office is located. (See Appendix VI)

1.7.3. Time Scope

The research was carried out in accordance with the time frame prescribed for Master's degree research, within Mount Kenya University.

1.8. Organization of the Study

This study contains five different chapters. The first chapter concerns introduction and presents presenting the significance of the study, problem statement as well as limitation and the objectives of the study. The second chapter deals with the review of literature related to past studies. Chapter three gives a clear understanding of the research methodology adopted for the study. Chapter four is about the analysis of data. It focuses on presentation of findings and their interpretations. Chapter five contains major research findings, summary of the study, and ultimately conclusion and recommendations of the study.

2. REVIEW OF RELATED LITERATURE

Introduction

This chapter presents the review of literature related to past studies in relation to the effect of usage of information technology on information services in Rwanda tourism sector.

2.1. Theoretical Literature

Theoretical literature provides a structure for the investigation of this study. There is a notable agreement in the literature that a set of external environmental as well as internal organizational factors plays a crucial role for tourism organizations when adopting and integrating ICT. The literature explicitly highlights the theoretical propositions concerning a set of factors influencing the usage of ICT among tourism sector. The study area labeled tourism sectors deals with the concepts of climate and tourism. Climate invokes the concept of weather that it is defined as the accumulation of daily and seasonal weather events over a long period of time. Tourism embraces the concept of recreation, that it is the practice of travelling for recreation (Buhalis, 2002).

2.1.1. Usage of ICT in Tourism

The Information Communications Technologies (ICT) plays a major role in tourism, travel and hospitality industry. The Integration of ICT in the tourism industry is an essential for success of tourism enterprise. ICT facilitates an individual to access the tourism products information from anywhere any time. Tourism enterprises can also reach the targeted customers across the globe in a single click on the keypad after emergence of mobile computers, web technologies etc. The purposive sample of 112 managers of tourism, travel and hospitality enterprises in India were surveyed through a questionnaire with the Managing Directors, Directors, General Managers, Team Leaders and Senior Managers. The study explores the business development, revenue generation, minimization of cost and reaching the customers (Anand, 2013).

Effective and high-speed ICT infrastructure and software applications in the tourism and hospitality industry are crucial for tourism development. ICTs allow customer - management relations and supply chain management to be combined into a single source that facilitates a variety of operations - product selection, ordering, fulfillment, tracking, payment and reporting to be performed with one easy-to use tool. ICTs ultimately cut costs by enabling the provider to be in direct contact with the consumer and also impact employment through the need for required maintenance of ICT equipment. Management within tourism companies use ICTs to undertake a range of tasks that enhance the efficiency of employees in the workplace, notably online reservations. The development of ICTs has also led to changes in demand and supply. A higher demand for flexible, individualized options and quality of information has personalized leisure and tourism behavior, a consequence of increased ICT use. Through new technology and social and economic ratings (e.g., social media platforms like Facebook, Twitter, blogs) customers have the ability to share information and research ratings on destination, quality of service in hotels and restaurants and environmental and social conditions. Number of hotels (e.g., Marriot Hotels and Resorts, Ritz Carlton Hotels, Hyatt Hotels and Resorts) have strengthened their brand image and communicate directly with their customers by posting links to a press release or promoting new package through Twitter (Anand, 2013).

Furthermore the most important advantage of ICT is both availability of information to the increasing number of people and reduced production cost due to

increased efficiency. Knowledge is created, shared, and widely accessible. Interested market participants share information, specifications, and production process beyond national borders, and thus contribute to greater transparency resulting in lower prices. At the same time, ICT enables companies to have access to a number of markets and to use global supply chains in a simple and acceptable way (Iris, 2012).

2.1.2. E-tourism

Is the digitisation of all the processes and value chains in the tourism, travel, hospitality and catering industries that enable organisations to maximise their efficiency and effectiveness (Buhalis, 2002). ICTs provide unique opportunities for innovative organizations to redesign tourism products to address individual needs and to satisfy consumer wants. ICTs have also become part of the core product, especially for business travelers who now expect certain facilities to be available during their trip. The internet and the World Wide Web have revolutionized the promotion and communication functions of tourism. ICTs can reduce commission costs. Expedia, eBookers, emerge and gain a significant market share, propelling a reinter mediation in the distribution channel (Anand, 2013).

2.1.3. E-Tour Operators

Tour operators need constantly to interact with all their partners, including accommodation and transportation principals, ICTs are also critical for the distribution of tour operators' packages. The introduction of the Internet, Intranets and Extranets as strategic tools has as strategic tool has a number of benefits for tour operators. The co-ordination and exchange of timely information is important because it allows tour operators to co-ordinate activities, to resolve potential problems and to ensure that customer requirements are communicated to all principals delivering the tourism product (Buhalis, 2002). Tour operators need constantly to interact with all their partners, including accommodation and transportation principals, ICTs are also critical for the distribution of tour operators' packages. The introduction of the Internet, Intranets and Extranets as strategic tools has as strategic tool has a number of benefits for tour operators. The co-ordination and exchange of timely information is important because it allows tour operators to co-ordinate activities, to resolve potential problems and to ensure that customer requirements are communicated to all principals delivering the tourism product. Strategically, ICTs play a critical role for tour operators. For example, Kuoni allows consumers to alter their tourism package online and to build their own itinerary by making it possible to extend the trip, change accommodation, meal plans and add value – added services such as car rentals, scuba-driving lessons.

However, it is quite evident that tour operators will need to shift their focus from the information provision and the reservation mechanism to a strategic role of adding value to the product and the process. Tour operators will therefore need to re-assess their core values and identify specific market segments that they can satisfy in the future (Anand, 2013).

2.1.4. E-Destinations

Destination management System (DMS) have been used to integrate the entire tourism supply at the destination (Buhalis, 2002). Their contribution to strategic management and marketing is demonstrated by their ability to integrate all stakeholders at destinations and to reach global market. DMS offering innovative information and sometimes facilitating reservations. Destination Integrated Computerized Information Reservation Management Systems (DICIRMS) address entire range of needs and services required by both tourism enterprise and consumers for specific destinations. DICRIMS provide the info structure for communications and business processes between all stake holders, including consumers, principals, distributors and destination marketing organizations (Anand, 2013).

2.2. Empirical Literature

Information technologies transcend all functions of strategic and operational management. As information is the lifeblood of tourism, ITs provide both opportunities and challenges for the industry. Despite the uncertainty experienced in the developments of IT in tourism, the only constant will be change". Increasingly, organizations and destinations, which need to compete, will be forced to compute. Unless the current tourism industry improves its competitiveness, by utilizing the emerging ITs and innovative management methods, there is a danger for exogenous players to enter the marketplace, jeopardizing the position of the existing ones. Only creative and innovative suppliers will be able to survive the competition in the new millennium (Cunningham &MacGregor, 2000).

A continuous business process re-engineering is proposed in order to ensure that a wide range of prerequisites such as vision, rational organization, commitment and training are in place, so they can enable destinations and principals to capitalize on the unprecedented opportunities emerging through ICT (Bandow, 2001).

2.2.1. Aspects of Information Technology Used In Tourism Sector

A large number of countries depend on tourism for their economic growth. A recent study done for DFID concluded: While poor countries only command a minority share of the international tourism can make a significant contribution to their economies. World Bank, (2002) world Travel and Tourism Council (WTTC) Wharton Economics is currently optimistic about the prospects for tourism growth in the world. Khan (2002), Tourism is an important sector in the economy contributing around 10% to worldwide GDP, projected to rise to nearly 11% by 2014 (World Tourism Council, 2004). Tourism was one of the first sectors to embrace Information Technology (IT). IT is crucial to the tourism industry and its success. IT has bought with it a number of changes and challenges that affect business and tourism. IT developments that have taken place with respect to the tourism industry are over viewed in this paper. Challenges they pose for the sector and tourism operators generally are also identified.

Advances in electronic-based information and communication technologies (ICTs) are rapidly transforming social and economic conditions across the globe. As the cost of ICTs continues to fall and their capabilities increase, their applications are becoming even more vital to all sectors of the economy and society. Developments and continued growth in ICT and its application in the tourism sector have empowered the tourism consumer and are driving significant change within the tourism industry (Ceron& Dubois, 2003).

The increasing spread and uses of ICT create new opportunities for countries to harness these technologies and services to promote social and economic development and human justice. Given the growing importance of technology in all organizational functions and areas, organizations can either adapt to technological changes or will have to face a decline in their organizational viability. This article is concerned with the administration of ICT in tourism regional planning and the concept of organizational change (Borrill& West, 2005).

The research explored areas of ICT literacy, and concludes that a number of challenges must be addressed if the full benefit of the use and application of ICT in tourism.

The article draws the attention of all the stakeholders in the tourism sector to the need to support and promote ICT as the most effective tool for tourism regional planning, tourist information access and dissemination as well as the tourism regional development participants need for organizational change (Choi &Sorakaya, 2006).

Touristic promotional activities through ICTs and especially the Internet are today managed by governments and particular businesses. Governments take necessary measures to encourage private sector organizations to play the role of promoters of their country as a touristic destination. Because ICTs have transformed the touristic sector globally and offered a variety of new opportunities for its development during the last ten years, governments also rely on particular businesses in enhancing their tourism sectors through the employment of innovative technological tools in order to persist in the global competitive arena. Numerous countries seek strategic and operational hardware, software, and networking technological benefit tools for the development of their touristic sectors. For example, understanding the economic gains, that could result from their touristic sector through ICT (Benbasat&Barki, 2007).

2.2.2. Usage of Information Technology for Information Services in Tourism Sector.

The aim of this study was to explore the way ICT affects business processes and service delivery along with the interaction with strategic issues. The impact of ICT on the daily operations of tourism is difficult to measure directly. Of necessity, the research had to use qualitative methods to take account of the fact that impact, in this instance, Cannot be simply counted but needs to be described and illustrated in examples. In this research the impact of ICT was examined from the perspective of the tourism destination' General Managers, since they have the responsibility for coordinating tourism, they were the key informants (Anderson &Carletta, 2008).

The advent of Information and communication technology (ICT) has had a paramount impact on tourism. The effects of this revolution continue to change the nature of contemporary tourism on a day-to-day base. The globalization of information, open innovation, better access, and collaboration in a generation of information and technological convergence, have all contributed to the design of a new scientific paradigm (Cheng, 2009).

Consumer habits have radically changed with new technology, namely the travel consumption habits and the search of information.

Storytelling is an intrinsic part of human existence. It allows us to make sense of our environment. It also enables us to pass on information, culture and values. Native Transmedia storytelling projects are a natural evolution from the traditional story projects and have been applied successfully in industries like

entertainment and marketing. However the result of this type of projects remains to be studied within the tourism industry (Bjørn&Ngwenyama, 2010).

The overall goal of this research is to understand the impact of the use of transmedia storytelling techniques in the tourism sector worldwide, particularly in Porto's tourism industry and at the same time to develop a technological product that can be adapted to tourism in other parts of the world (De Jong &Elfring, 2010).

2.2.3. Effect of Usage of Information Technology on Information Services in Tourism Sector

According to a research carried out by Barbera (2009), Tourism is a dream factory. Destinations are the theatres in which tourism dreams are brought to life, molded into unifying themes and stage managed as events. What are potential sources of growth in tourism? Possible answers include increasing the share of the sector; in particular the ratio of consumer expenses on tourism services and products or increasing the relative market shares of a region to any other regions. Moreover the proliferation of ICT in tourism has facilitated the growth of related employment in the ICT sector. The reflection on business models addresses all issues to some degree: the focus on value propositions highlights the attractiveness of tourism products to consumers. However, an analysis of the influence of specific value propositions on consumer behavior and more specifically their willingness to allocate an increasing part of their budget to tourism services is beyond the scope of this analysis (Logan, 2012).

Sustainable tourism is a heavily researched concept but in reality there has been limited implementation of the principles and practices of sustainable tourism for destinations. Adopting a destination focused perspective; this thesis presents research which expounded Information and Communication Technology (ICT) as a new and innovative approach to sustainable tourism development that is computer-supported sustainability.

Literature review revealed that there was no specific study focusing on the uses and applications of ICT for sustainable tourism development despite the mention and benefits of doing so.

The conclusion of this study clearly identifies that destination manager's sophisticated application of ICT to sustainable tourism is the next logical and practical step they can take in making sustainable tourism a workable reality for their destinations. This research is the building block for prospective research in the ICT-sustainable tourism domain. Future research avenues would be to use the results presented to determine the suitability, applicability and feasibility of the ICT-based tools/applications presented for destination managers. This existing research can be used to develop more coordinated approach to theory development and engage in more empirical research to address tourism challenges with regards to use ICT for sustainable tourism development (Shah& Corley, 2006).

Effective and high-speed ICT infrastructure and software applications in the tourism and hospitality industry are crucial for tourism development. ICTs allow customer - management relations and supply chain management to be combined into a single source that facilitates a variety of operations - product selection, ordering, fulfillment, tracking, payment and reporting to be performed with one easy-to use tool. ICTs ultimately cut costs by enabling the provider to be in direct contact with the consumer and also impact employment through the need for required maintenance of ICT equipment. Management within tourism companies use ICTs to undertake a range of tasks that enhance the efficiency of employees in the workplace, notably online reservations. The development of ICTs has also led to changes in demand and supply. A higher demand for flexible, individualized options and quality of information has personalized leisure and tourism behavior, a consequence of increased ICT use. Through new technology and social and economic ratings (e.g., social media platforms like Facebook, Twitter, blogs) customers have the ability to share information and research ratings on destination, quality of service in hotels and restaurants and environmental and social conditions. Number of hotels (e.g., Marriot Hotels and Resorts, Ritz Carlton Hotels, Hyatt Hotels and Resorts) have strengthened their brand image and communicate directly with their customers by posting links to a press release or promoting new package through Twitter (Buhalis,2002).

2.3. Critical Review and Identified Research Gap

The study critically reviewed existing literature and identified the gap that needs to be filled by the research. According to Cunningham & MacGregor (2000), information technologies prevail all functions of strategic and operational management. As information is the lifeblood of tourism, ITs provide both opportunities and challenges for the industry. Despite the uncertainty experienced in the developments of ITs in tourism, the only constant will be change. Increasingly, organizations and destinations, which need to compete, will be forced to compete. The authors never related information technology on tourism service provision; they needed to have provided information showing exactly how information technology facilitates provision of services in tourism hence creating a knowledge gap

that this research seeks to close by providing such information.

Borrill and West (2005), mentioned that the increasing spread and uses of ICT create new opportunities for countries to harness these technologies and services to promote social and economic development and human justice. Given the growing importance of technology in all organizational functions and areas, these opportunities and functions need to have been applied in tourism service provision. So as to exactly show how ICT contributes to tourism service provision. This resulted in knowledge gap that this research will cover by providing the relevant information.

Cheng (2008), revealed that the advent of Information and communication technology (ICT) has had a paramount impact on tourism. The effects of this revolution continue to change the nature of contemporary tourism on a day-to-day base. The globalization of information, open innovation, better access, and collaboration in a generation of information and technological convergence, have all contributed to the design of a new scientific paradigm. The author never specified what exact impact ICT has on tourism, the exact impact need to have been clearly shown relating to provision of services in tourism industry. It is this knowledge gap created that this research sought to cover. After analyzing manual system and technology system there was gap in verification of information. It was in that framework a survey in comparing these two systems were conducted.

2.3.1. Identified Research Gap

Previous studies focused on the usage of ICT in tourism such as Cheng (2008), but did not specify its usage in National parks. They also overlooked the aspects of information technology used in tourism. Therefore this was the identified gap that the study intended to fill particularly in the case of Rwanda, where the published materials in this area of tourism left out the effect of usage of information technology on information services. Therefore the above mentioned gaps are the area that were covered through this study.

2.4. Theoretical Framework

These theories ICT include: the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Ahmed &Ammar 2013).

2.2.1. Theory of Planned Behavior (TPB)

The theory of planned behavior (TPB) was developed by Ajzen in 1988. The theory proposes a model which can measure how human actions are guided. It predicts the occurrence of a particular behavior, provided that behavior is intentional. The model is out lined in the Figure 2.1 and represents the three variables which the theory suggests will predict the intention to perform a behavior. The intentions are the precursors of behavior. It has been applied to studies of the relations among beliefs, attitudes, behavioral intentions and behaviors in various fields such as advertising, public relations, advertising campaigns and healthcare. The theory states that attitude toward behavior, subjective norms, and perceived behavioral control, together shape an individual's behavioral intentions and behaviors, see Figure 2.1. The theory of planned behavior is a theory which predicts deliberate behavior, because behavior can be deliberative and planned (Gregory, 2011).

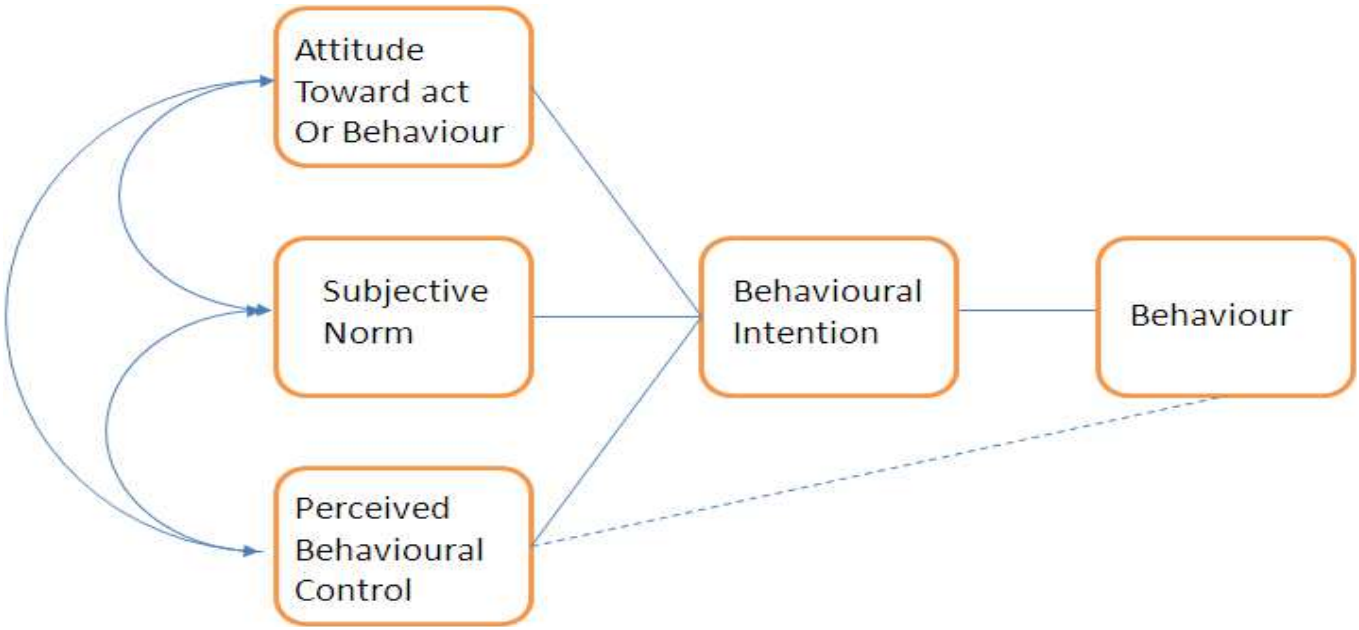


Figure 2.1: Theory of Planned Behavior
Source: (Ajzen, 1991)

2.2.2. Theory of Reasoned Action (TRA)

The TRA is a general social psychology theory that has been successfully used to predict a variety of behaviors, such as voting, eating at fast-food restaurants and condom use. It proposes that an individual's behavior is determined by one's intention to perform a behavior, which is jointly determined by one's attitude toward the behavior and the subjective norm about the specific behavior (Anderson &Carletta, 2007). The theory of reasoned action introduced first by Fishbein in 1967 provides a model that has potential benefits for predicting the intention to perform a behavior based on an individual's attitudinal and normative beliefs (Gregory, 2011). It attempts to explain the relationship between beliefs, attitudes, intentions and behaviour, (see Figure 2.2). According to the theory of reasoned action, the most accurate determinant of behaviour is behavioural intention. The direct determinants of people's behavioural intentions are their attitudes towards performing the behaviour and the subjective norms associated with the behaviour. Attitude is determined by a person's beliefs about the outcomes or attributes of performing a specific behaviour (that is, behavioural beliefs), weighted by evaluations of those outcomes or attributes. Bandow (2001), defines attitude toward behavior as an individual's evaluative affect about performing the target behavior. One's attitude toward the behavior is determined by the perceived outcomes the perceived consequences, effort required, and cost of performing the specific behavior multiplied by the evaluation of those consequences. Subjective norm is the person's perception that most people who are important to him think he should or should not perform the behavior in question. Subjective norm focuses on the influence of other people in the surrounding environment on the individual's intention to perform a behavior. This construct is determined by the perceived expectations of specific referent individuals or groups and by the person's motivation to comply with those expectations. Collectively these two constructs impact behavioral intention, defined as an individual's subjective probability that he will perform some behavior, such that when one's attitude toward the behavior is more positive and the social norms about performing the behavior are stronger, the person forms a stronger behavioral intention to engage in the behavior see Figure 2.2 (Cunningham &MacGregor, 2000).

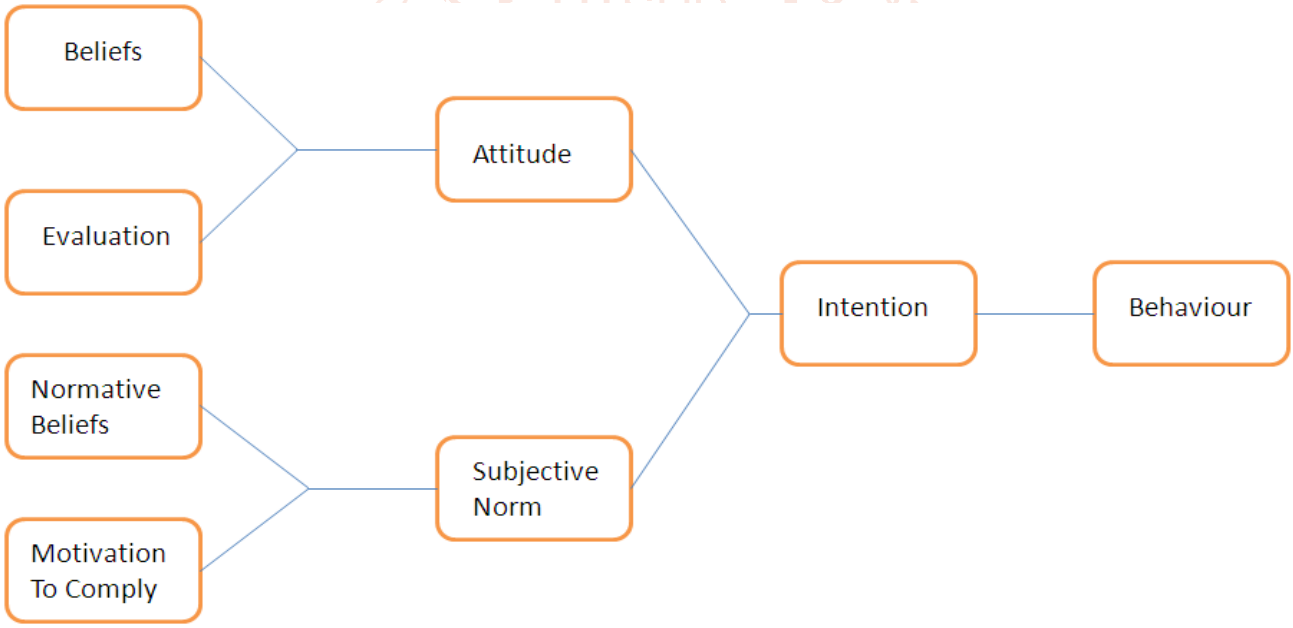


Figure 2.2: Theory of Reasoned Action
Source: (Gregory, 2011)

2.2.3. Technology Acceptance Model (TAM)

TAM was tested and adopted across a wide range of information system applications such as key office applications (e.g., Spreadsheet, Lotus 1-2-3, Word Perfect, Word, Excel) ; communication technologies (e.g., emails, voice mail, customer dialup system, and Fax) ; database systems; microcomputer; workstations; telemedicine technologies; and Internet–related IS applications (e.g., www information services, online services, virtual workplace systems, digital libraries). TAM based studies were also conducted in many organizations in various cultures (e.g., American financial institute, Canadian integrated steel company, accounting firms, public hospitals in Hong Kong, investment banks, …etc). The validation phase of TAM took two directions; one was to validate TAM's PU & PEOU instruments to prove their psychometric properties and the other was to validate the causal links among TAM component constructs. The extension phase also was divided into two parts; one was for the extension of the two major constructs (PU & PEOU) while the other was about incorporating relevant variables as important antecedents of the two constructs PU & PEOU (Han, 2003).

The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it, notably:

Perceived usefulness: This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance".

Perceived ease-of-use: Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Park, 2009).

TAM has proven to be a theoretical model in helping to explain and predict user behaviour of information technology. TAM is considered an influential extension of theory of reasoned action (TRA), published by Ajzen and Fishbein in 1980. Davis and Davis, Bagozzi, and Warshaw in 1989 proposed TAM to explain why a user accepts or rejects information technology by adapting TRA. TAM provides a basis with which one traces how external variables influence belief, attitude, and intention to use (see Figure 2.3). Two cognitive beliefs are posited by TAM: perceived usefulness and perceived ease of use. According to TAM, one's actual use of a technology system is influenced directly or indirectly by the user's behavioral intentions, attitude, perceived usefulness of the system, and perceived ease of the system. TAM also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use (Park, 2009).

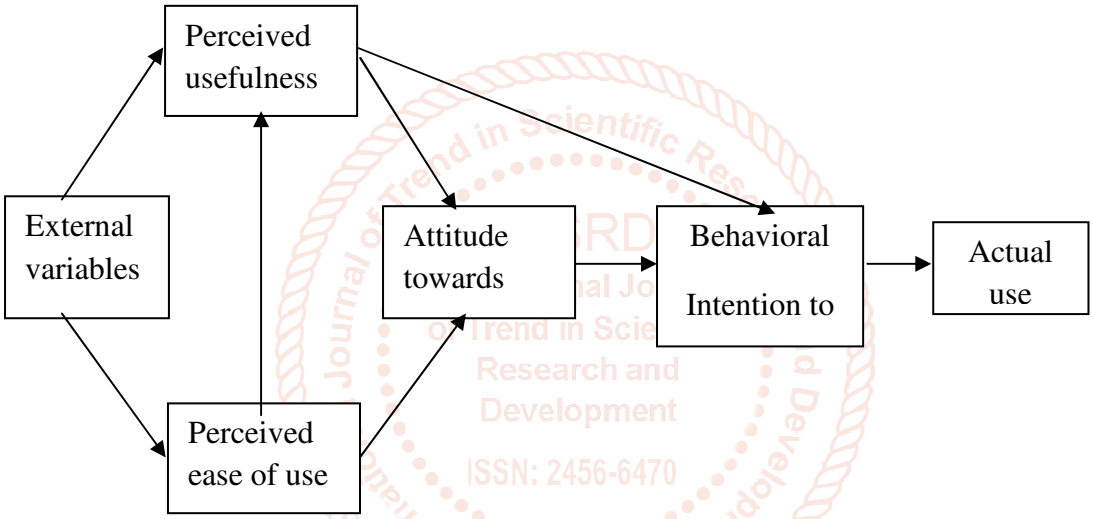


Figure 2.3: Original Technology Acceptance Model (TAM)
Source: (Park, 2009)

Finally, behavioral intention impacts system use, defined as an individual's actual direct usage of the given system in the context of his or her job In addition to the direct path from PEOU to attitude, the model proposes that perceived ease of use is an antecedent of perceived usefulness (see Figure 2.4). The rationale for each link in the model is discussed. Davis asserted that perceived usefulness and ease of use represent the beliefs that lead to such acceptance. Perceived usefulness is the degree to which a person believes that a particular information system would enhance his or her job performance i.e., by reducing the time to accomplish a task or providing timely information. Perceived ease of use is the degree to which a person believes that using a particular system would be free of effort. Two other constructs in TAM are attitude towards use and behavioral intention to use. Attitude towards use is the user's evaluation of the desirability. The TAM and web usage employ a particular information systems application. Behavioral intention to use is a measure of the likelihood a person will employ the application. Tam's dependent variable is actual usage. It has typically been a self-reported measure of time or frequency of employing the application (Davis, 1989).

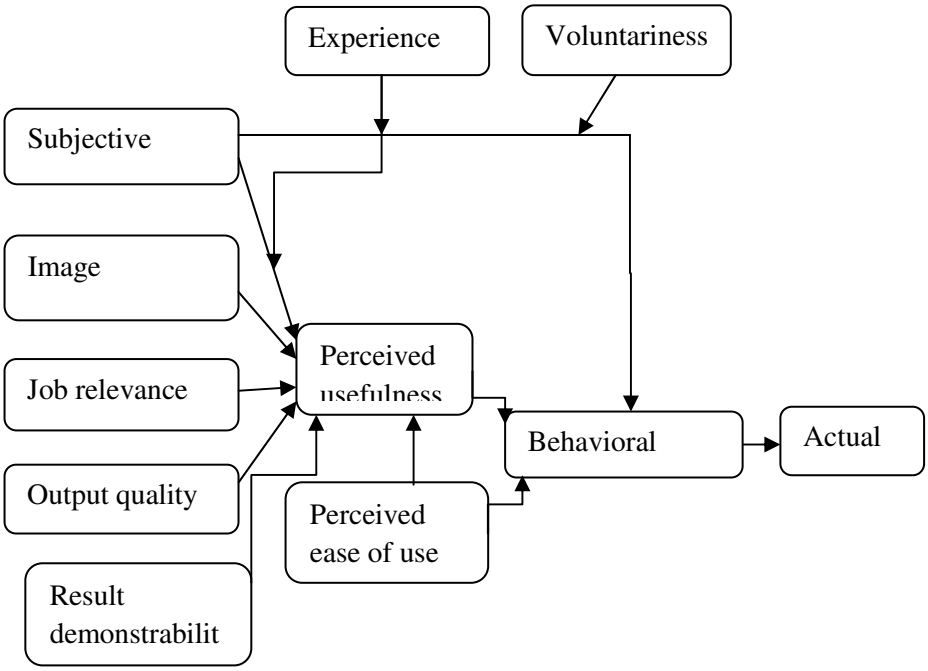


Figure 2.4: Technology Acceptance Model (TAM 2)
Source: Venkatesh& Davis (2003)

2.2.4. Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a technology acceptance model formulated by Venkatesh and others in User acceptance of information technology: Toward a unified view. The UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. The theory holds that four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions; being the first three direct determinants of usage intention and behavior, and the fourth a direct determinant of use behavior. Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behavior. The theory was developed through a review and consolidation of the constructs of eight models that earlier research had employed to explain information systems usage behavior (theory of reasoned action, technology acceptance model, motivational model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, model of personal computer use, diffusion of innovations theory, and social cognitive theory (Venkatesh and Bala, 2008).

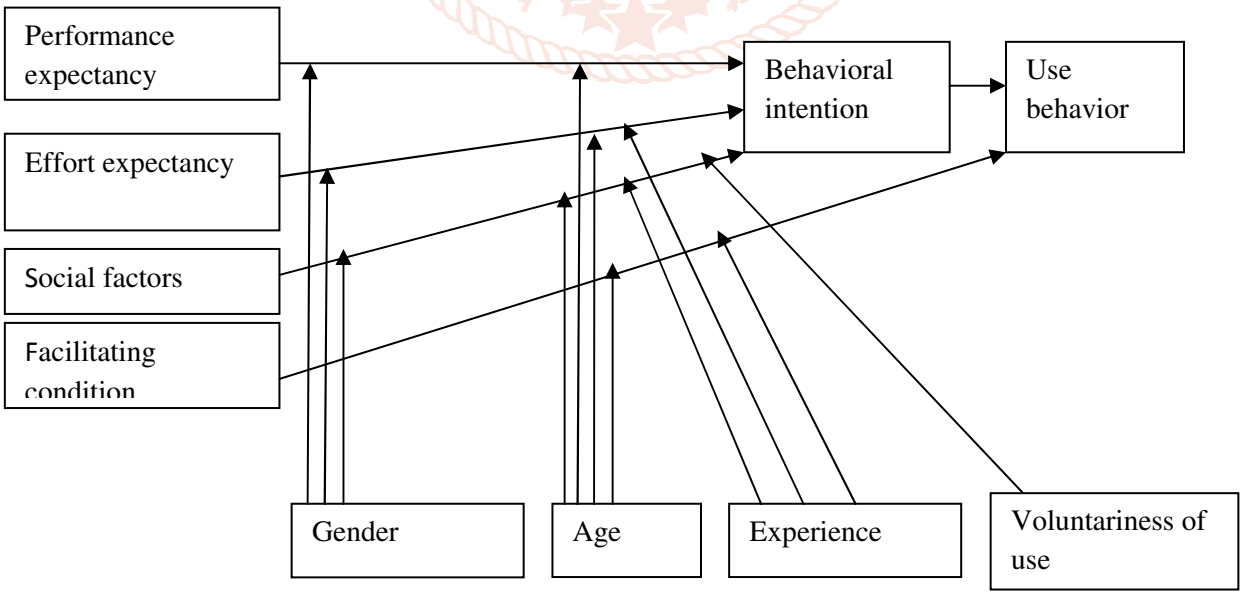


Figure 2.5: UTAUT Model
Source: Venkatesh& Morris (2003)

Three years later, in 2003, Venkatesh et al. developed an aggregated model of eight models that were used to explain the technology acceptance behavior. The new model called the unified theory of acceptance and use of technology (UTAUT) is discussed in section (2.11) Sun & Zhang (2006) proposed an extension to TAM and

suggested ten moderating factors identified and categorized into three groups: organizational factors (voluntariness and the nature of task/ profession), technology factors (technology complexity, individual versus group technologies, and the purpose of using technology: work versus entertainment oriented) and individual moderators (intellectual capacity, cultural background, gender, age and experience). These factors' effects are to be studied within 31 the user technology acceptance model.

Refer to the diagram in the text. The UTAUT model consists of four constructs: Performance Expectancy: The degree to which the individuals believe that the use of the technologies will results in performance gains. This may also be viewed as the perceived usefulness of the technologies. Effort Expectancy: The ease of use of the technologies. Social Factors: The extent to which the individuals believe that important others believe that they should use the technologies. Facilitating Conditions: the perceived extent to which, the organizational and technical infrastructure required for the support of the technologies, exists. The model also includes four moderating variables: age, gender, education and voluntariness of use (Venkatesh& et al, 2003).

In the UTAUT model, performance expectancy, effort expectancy, and social factors have direct effects on behavioral intention, which along with facilitating conditions have direct effects on use behavior. The effects of interactions of each of performance expectancy, effort expectancy and social factors with each of age and gender; interactions of experience with each of effort expectancy and social factors; and an interaction of voluntariness of use and social factors on behavioral intention are also included. Finally, there are effects of interactions of age and facilitating conditions and experience and facilitating conditions on use behavior (Venkatesh, 2003).

2.5. Conceptual Framework

Conceptual framework shows the relationship that exists between the study variables and the factors from the environment that can affect such a relationship.

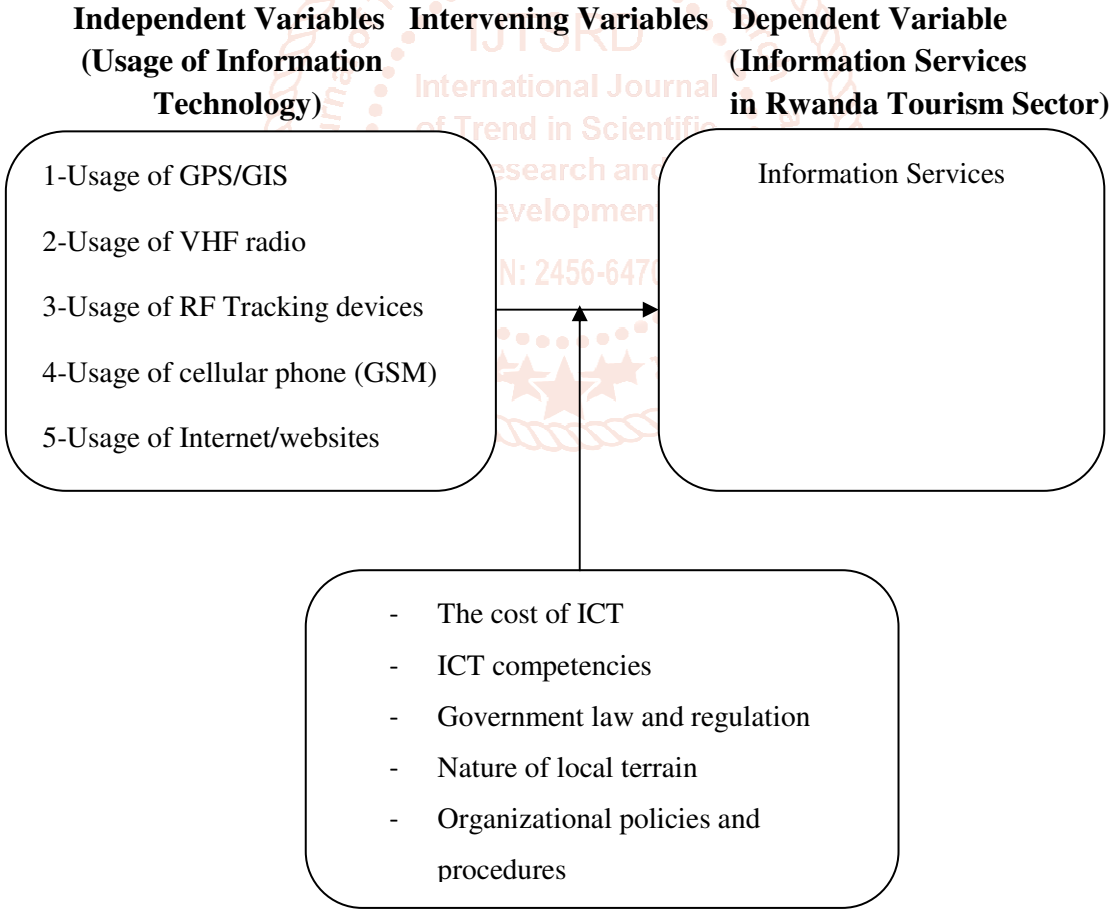


Figure 2.1: Conceptual framework
Source: preliminary interpretation

2.5.1. Independent Variables

1. Usage of GPS/GIS

Usage of Global Positioning System (GPS) was conceived in 1960 under the auspices of the U.S. Air Force, but in 1974 the other branches of the U.S. military joined the effort. The first satellites were launched into space in 1978. The system was declared fully operational in April 1995. The Global Positioning System consists of 24

satellites, that circle the globe once every 12 hours, to provide worldwide position, time and velocity information. GPS makes it possible to precisely identify locations on the earth by measuring distance from the satellites. GPS allows you to record or create locations from places on the earth and help you navigate to and from those places. However in tourism industry GPS is the most tool used by trackers and guides including tourist. It helps staff in Volcanoes National Park to indicate their coordinates and exact position in the park and show the location of animals such as Gorillas, Monkeys, birds etc family for visit.

GIS is a basic technology tools for comprehending geography and making intelligent decisions. GIS organizes geography data so that a person reading a map can select data for a specific project or task. The basic ways that GPS technology can interact with or be integrated into GIS. The levels of integration associated with these vary from a disparate connection, whereby data is transferred between a GPS system and a GIS system, through to a very tight level of integration, whereby GPS technology is totally embedded directly within GIS application software. A geographic information system (GIS) is a computer-based tool for mapping and analysing spatial data.

In tourism industry such as Volcanoes National Park, GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps. These abilities distinguish GIS from other information systems and make it valuable to a wide range of public and private enterprises for explaining events, predicting outcomes, and planning strategies. GIS is considered to be one of the most important new technologies, with the potential to revolutionize many aspects of society through increased ability to make decisions and solve problems (Harrington, 1999).

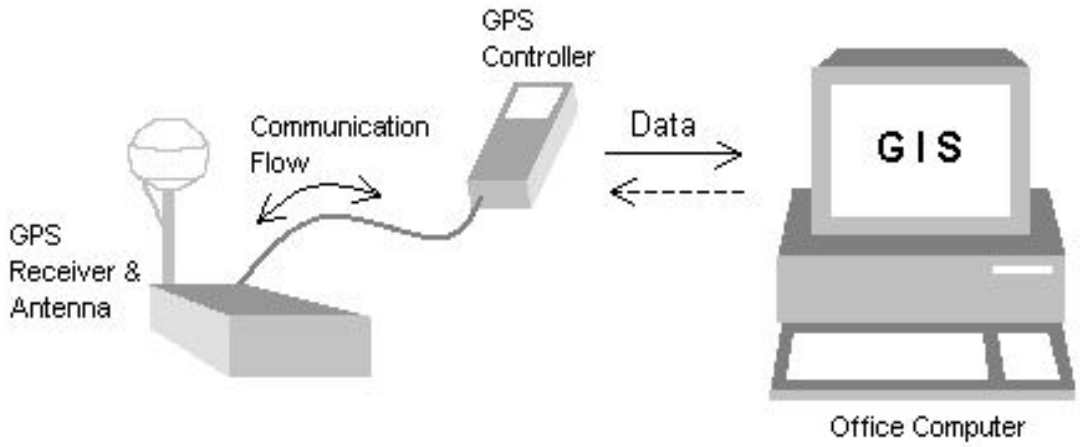


Figure 2.2: GIS/GPS
Source: Harrington (1999)

2. Usage of VHF Radio

A two-way radio is a radio that can both transmit and receive (a transceiver), unlike broadcast receiver which only receives content. A two-way radio (transceiver) allows the operator to have a conversation with other similar radios operating on the same radio frequency (channel). Two-way radios are available in mobile, stationary base and hand-held portable configurations. Hand-held radios are often called walkie-talkies, hand-talkies, or just hand-held. Two-way radio systems usually operate in a half-duplex mode; that is, the operator can talk, or he can listen, but not at the same time. A push-to-talk or Press to Transmit button activates the transmitter; when it is released the receiver is active. Mobile or cellular telephone is an example of a two-way radio that both transmits and receives at the same time (called full-duplex mode). It uses two different radio frequencies (channels) to carry the two directions of the conversation simultaneously (Dalkir, 1993). Usage of VHF Radio is one of the communication equipment mostly used in the park by Trackers, Park security guards, Guides where it facilitate them to communicate each other in the park.

Figure 2.3: VHF
Source: Dalkir, (1993)

3. Usage of Radio Frequency (RF) Tracking Devices

Is the wireless use of electromagnetic fields to transfer data, the purpose automatically identifying and tracking tags attached to objects. The tags contains electronically stored information, some tags are powered by electromagnetic induction from magnetic fields produced near the leader, others types collect energy from the interrogating radio waves and act as a passive transponder (Robin, 2008).

Figure 2.4: RF Tracking Device
Source: Robin (2008)

For many years the only ways to track was to simply follow and observe the movement and habits of an animal or to capture an animal and put a tag on it and hope that at some time in the future that some animal would be recaptured. Radio frequency (RF) technology is more and more adopted in a wide range of applicative scenarios. In many cases, such as the tracking of small-size living animals for behaviour analysis purposes, the straightforward use of commercial solutions does not ensure adequate performance. Consequently, both RF hardware and the control software should be tailored for the particular application (Robin, 2008).

Today scientists have new tools to help them, determine how animals move and how they use their environment. Radio tracking technology determines exactly where animals are at any moment in time and often what that animal is doing. The data collected from tracking devices can also determine the day to day movement of animals, the size of animal's home range, what other animals share an animals range and the types of habits an animals uses. Once the radio transmitter is placed on the animal, it begins transmitting a signal to a radio antenna and receiver. In order to locate an animal using VHF radio tracking must be close enough to the animal with the radio antenna so they can pick up the signal from radio transmitter on the animal (Robin, 2008).

Usage of tracking device is enabling an effective localization and tracking of animals such as Gorillas, Monkey, and Birds in Volcanoes National Park when veterinary Doctors are planning to treat them and is the most used in the Parks.

4. Usage of Cellular Phone Global System for Mobile Communications (GSM)

GSM (Global System for Mobile communication) is a digital mobile telephony system that is widely used in Europe and other parts of the world. GSM uses a variation of time division multiple access and is the most widely used of the three digital wireless telephony technologies GSM. GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency band. Is based wireless network technology developed is used most throughout most of the world. GSM make use of SIM Card to identify the user's account, the use of a SIM Card allows GSM network users to quickly move their phone number from one GSM phone to another by simply moving The SIM Card (Harrington, 1999).

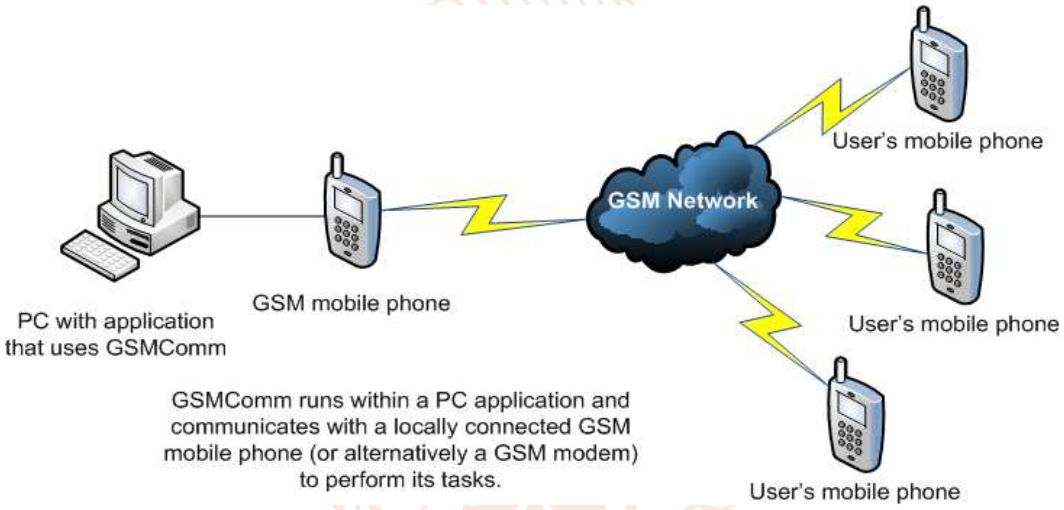


Figure 2.5: GSM
Source: Harrington (1999)

Cellular is one of the fastest growing and most demanding telecommunications applications. Today, it represents a continuously increasing percentage of all new telephone subscriptions around the world. Currently there are more than 45 million cellular subscribers worldwide, and nearly 50 percent of those subscribers are located in the United States. It is forecasted that cellular systems using a digital technology will become the universal method of telecommunications. By the year 2005, forecasters predict that there will be more than 100 million cellular subscribers worldwide (Harrington, 1999).

Usage of Cellular Phone of Cellular Phone is the most wireless communication system tool used in the park to facilitate communication between Volcanoes National Park main office and Trackers/Guides including among tourists in the park.

5. Usage of Internet/Websites

Use of the Internet by travellers to plan and book their trips continues to grow at a rapid rate. In the United States, according to the Travel Industry Association (TIA 2007), more than 75 million online travelers used the Internet in 2006 to get information on destinations or to check prices and schedules. From 1999 to 2006, online booking showed a remarkable double-digit growth for four consecutive years, with a spectacular 58% growth in 2001, followed by a 25% growth in 2002. While growth of the online traveler market has slowed, the number of online travelers who actually use the Internet to plan trips has remained relatively stable. A majority (67%) of online travelers say they consult the Internet to get information on destinations or to check prices or schedules (Petan, 2008).

Not surprisingly, nearly all online travel planners say that some of the trips planned on the Internet in the past year were for pleasure, vacation, or personal purposes. Three in ten say some of the trips planned on the Internet were for business or convention purposes. For online travel planning, online travel agency websites (such as Microsoft Expedia, Travelocity, or Priceline), search engine websites, and company owned websites (airlines, hotels, etc.) are the most popular types of websites used. A majority of online travel planners also use destination websites. Online travel planners do a variety of trip planning activities on the Internet (Petan, 2008). Usage of internet/websites in Volcanoes National Park is the first source of information Tourists and travel agents on a potential destination for themselves or their clients. They use e -mail for fast, efficient and inexpensive communication to have their questions answered and their impressions confirmed. Also internet/websites are used for online visa application in Volcanoes and Est-Africa region as quick solution for travelers and tourists.

6. Usage Computers and Networks

Is a telecommunications network which allows computers to exchange data. In a computer networks, networked computing devices pass data to each other along network links (data connections). The connections between nodes are established using either cable media or wireless media. Computer networks are a collection of computers and others devices that are connected together by communication channels for sharing information and resources. The most popular information network is the internet, Computer and communication work together (Anderson, 2007).

Usage of computer and network hardware and software leads to improved service provision through linkage of destinations, provision of services to tourists and tracing tourism products such as hotel booking, transport booking for park visit and access of website. However, their other factors from the environment like the cost of ICT, limited professionalism in ICT and the nature of the area that may affect the usage of ICT in tourism service provision.

Computer network are used at Volcanoes National Park for internal management of process, eg LAN and may be connected to other networks, eg RDB, RRA, Immigration etc.

Figure 2.6 : Wide Area Network
Source: Anderson (2007).

2.5.2. Dependent Variables

1. Information Services

An Information Service is a service which provides (serves) data/knowledge/information about tourism. Information services are key actors in providing unhindered access to essential resources for economic and

cultural advance. In doing so, they contribute effectively to the development and maintenance of tourism. Information services are any service intended to provide information for a tourist, or assist them in finding information. These information services include Game tracking, research services, Venue and accommodation, booking, transport arrangement visa information (Lewis, 1995).

2.6. Summary

The literature was reviewed relating to the effect of Information Technology usage in service provision in the tourism services. The price of ICT access was sound to continue to falling due to technological advances, market growth, and increased competition, a trend that is especially important in allowing people in developing countries to take full advantage of ICT services. ICT allows destinations to improve online presence (visibility and participation to Internet market) and off line connectivity (collaboration, clustering as well as inter sector linkages among local public and private tourism and developmental benefits of ICT, destination's management activities must be redefined and new ICT-enabled organizational models developed.

3. RESEARCH METHODOLOGY

Introduction

This chapter presents the research design, the target population of the study and the sample size, the chapter further mentions the sampling techniques that were used to select the sample size. Sources of data, data collections instruments are also presented. The study further presents the methods which were used to present, analyze and interpret the collected data.

3.1. Research Design

The study used a descriptive case study research design to examine the effect of information technology on information services in Rwanda tourism sector. This was due to the fact that several employee and tourists was sampled. According to Kothari (2004) a descriptive study is concerned with finding what, where and how of a phenomenon.

3.2. Target Population

The targeted population of this study was 180 employees and 19,105 tourists visiting Volcanoes National Park yearly according to 2013 yearly reports of Volcanoes National Park.

3.3. Sample Design

Due to the fact that the population was big, sampling was necessary to study, the population by selecting a manageable size so as to effectively collect their views and in order to accomplishment the study objectives.

3.3.1. Sample Size

The sample size for tourists was calculated based on Yamane's simplified formula for determining a sample size formula (Yamane, 1967).

$$n = \frac{N}{1 + Ne^2}$$

Where, n= the sample size
N = the size of population
e= the error of 5 % (0.05)

For employees of volcanoes national park

$$n = \frac{175}{1+175(0.0025)} = 122$$

For tourists visiting Volcanoes National Park

$$n = \frac{19105}{1+19105(0.0025)} = 392$$

The sample size of the study was 392 respondents selected from the total population.

3.3.2. Sampling Procedure

A process used in statistical analysis in which a predetermined number of observations were taken from a larger population (Shah & Corley, 2006). The methodology used to sample from a larger population depends on the type of analysis being performed. For this study, a sample of respondents was selected using stratified simple random sampling.

Table 3.1: Total Population, Sample Size and Sampling Techniques

Category Target population	Sample size	Sampling technique
Managers 2	2	Census
ICT staff 3	3	Census
Other employees 175	122	Simple random
Tourists 19,105	392	Simple random

Source: Preliminary data

3.4. Data Collection Instruments

The study used primary data. These are data obtained from instruments that the researcher used to collected data. The study used questionnaires containing both open and closed ended questions containing questions related to the objectives. Interviews were held with managers and ICT staff of Volcanoes National Park because they are likely not to have sufficient time to complete the questionnaires.

3.5. Validity and Reliability

The study pretested the research instruments to ensure that they were valid and reliable enough to collect the required data. Pretesting was done on part of respondents who was express their views on the questions set in the instruments. In addition to pre- testing, it was ensured that the set questions were directly related to the objectives of the study.

3.6. Pilot Study

A pilot study, pilot project or pilot experiment is a small scale preliminary study conducted in order to evaluate service delivery, time, cost, adverse events, and affect size (statistical variability) in an attempt to predict an appropriate sample size and improve upon the study design prior to performance of a full-scale research project.

The pilot study was carried out on 10 respondents including 4 employees and 6 tourists visiting Nyungwe National Park to verify reliability and validity of instruments. After the pilot study, the data collection instruments were adjusted to remove ambiguous and poorly constructed on inefficient questions.

Table 3.2: Cronbach's Alpha Test

Cronbach's alpha	Value	No of items
Use of ICT in tourism	0.617	3
Information services	0.822	2
The effect of ICT on tourism services	0.894	3

Source: Preliminary data

The reliability according to Cronbach alpha coefficient was considered to be satisfactory due to calculated values above 0.5 for each section. This meant that the data collection tool was suitable for collecting the data it was designated for.

3.7. Data Collection Procedure

The study collected data from both primary and secondary sources. The primary sources of data were the employees of Volcanoes National Park and Tourists visiting Volcanoes National Park. The study administered instruments to respondents who included employees and tourists of Volcanoes National park after telling them the research purpose. Respondents were requested to express their views on the issues raised in the questionnaire. Respondents who managed to give their views on spot do so while to others that was busy; the study used interviews which include short and precise conversation with respondents.

3.8. Data Analysis and Reporting

The collected data was presented in table low form using frequencies, percentages, weighted means and standard deviations.

$$\bar{x}_{\omega} = \frac{\sum wx}{\sum w}$$

x is the repeating value
w is the number of occurrences of x (weight)
$\bar{x}_{\omega}$ is the weighted mean

Statistics can be understood as a set of tools that involves the study of methods and procedures used for collecting, classifying, and analyzing data.

Analysis and interpretation of the conceptual framework of the study was based on the multiple regression analysis of the views given by respondents. Data was analyzed using Statistical Package for Social Sciences (SPSS version 19). In general, the multiple regression equation of Y on X_1, X_2, …,X_k is given by:

$Y = b_0 + b_1 X_1 + b_2 X_2 + \ldots\ldots\ldots + b_k X_k + \varepsilon$

Y Is the dependent variables, b_0, $b_{1\ldots}.b_x$ are constants, $x_1,x_2,x_{3\ldots}x_k$ are independent variables, ε is the error term. This stochastic regression model is a mathematical representation of the conceptual Framework. The interview guides were analyzed qualitatively using content analysis.

3.9. Ethical Considerations

The study made sure that the questions set were clear and understandable to the respondents, interpretation and analysis of the collected data was done without any bias. A cordial relationship was maintained with respondents. Respondents' views were used only for academic purposes and respondents assured that information given during the course of the study was accorded maximum confidentiality.

3.10. Summary

In summary, this chapter gives out clear understanding of what research is. It also acts as a guideline for conducting any research project since it shows steps and procedures of doing research project. This research project cover research design, the target population, the sample design, the sample size, sampling procedure, data collection instruments, validity and reliability, pilot study, data gathering procedure, data analysis and reporting, ethical considerations.

4. RESEARCH FINDINGS AND DISCUSSION

Introduction

This chapter is concerned with analysis of data, interpretation of the findings and their presentation. The data was analyzed using the Statistical Package for Social Science (SPSS) version 19. Frequencies and percentages were used to display the results which were presented in tables.

4.1. Demographic Characteristics of the Respondents

Tables 4.1 presents a summary of the information on the demographic characteristics of the respondents, especially information pertaining to gender of respondents, age bracket, levels of education obtained, and experience of the respondents. Demographic characteristics of respondents involved the staff of Volcano National Park but not the tourists as their characteristics most of the time keep changing.

Table 4.1: Background of Respondents

		Frequency	Percent
Gender	Male	74	60.66
	Female	48	39.34
	Total	122	100.0
Age of the respondents	31 – 40	50	40.98
	41 – 50	35	28.69
	51 years and above	37	30.33
	Total	122	100.0
Level of education	Diploma	30	24.59
	Bachelor's degree	84	68.85
	Master's degree	8	6.56
	Total	122	100.0
Experience	Less than 1 year	11	9.02
	2 – 4 years	9	7.38
	5 – 7years	30	24.59
	8years or More	72	59.01
	Total	122	100.0

Source: Field data

Table 4.1 shows that 74 (60.66%) respondents were males while 48 (39.34%) of the respondents who answered to the questionnaire were females.

Table 4.1 also shows that 50 (40.98%) of the respondents who answered to the questionnaire were aged between31 and 40. In addition 35 (28.69%) of respondents were aged between 41 and 50 years old, and finally 37 (30.33%) were 51 years and above.

Regarding the highest level of education obtained, 30 (24.59%) of the respondents have Diploma, 84 (68.85%) of respondents have bachelor's degree and 8 (6.56%) of the respondents have Master's Degree.

Finally Table 4.1shows that the majority of the respondents 72 (59.01%) have worked in the Volcanoes National Park for 8 years or more;30 (24.59%) respondents have worked between 5 and 7years. Meanwhile9 (7.38%) of the respondents had worked in the Volcanoes National Park between 2 years and 4 years and 11 respondents (9.02%) have worked in Volcanoes National Park Less than 1 year.

4.2. Presentation of Findings from Questionnaires

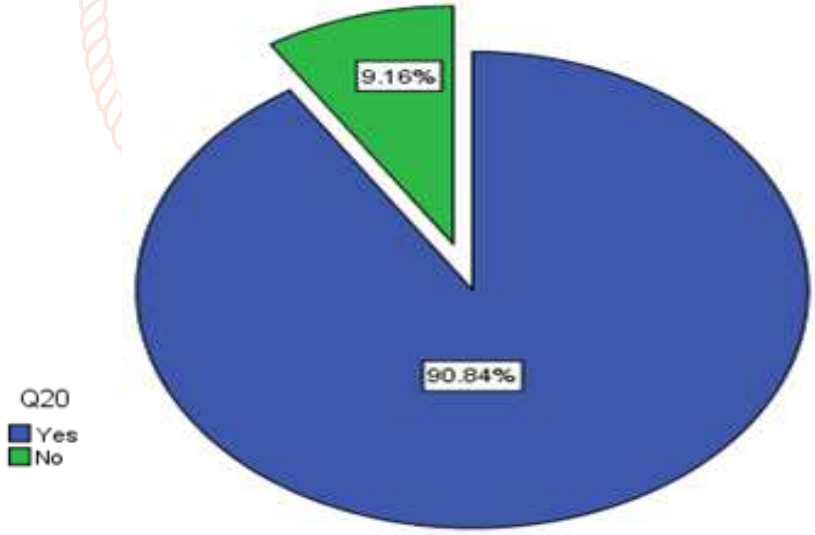
Questionnaires were distributed to the staff as well as to tourists of Volcanoes National Park. A simple size of 122 for employees and 392 for tourists were used to collect data. During the data collection 165 questionnaires were distributed to the employees and 430 questionnaires were distributed to the tourists. This was done to ensure that the sample size was met. It was expected that some of the respondents (employees and tourists) would fail to complete the questionnaires. During questionnaire analysis process, data were obtained on organizational activities that support the information technology. Data was obtained based on main services provided by information technology.

In staff questionnaires respondents were asked to indicate the area of Volcanoes National Park in which ICT is used. The results of 100 % of respondents indicated that the ICT is used in linkage of destination service, provision of services to tourists and tracing tourism products.

4.2.1. Aspects of Information Technology Used in Volcanoes National Park, Rwanda Development Board

The first objective of the study was to determine the aspects of information technology used in Volcanoes National Park, Rwanda Development Board. Questions were about the aspects of information technology used in Volcanoes National Park.

Figure 4.1: Use of Information Technology Aspects in Volcanoes National Park



Source: Field Data

Figure 4.1 indicates the use of information technology aspects in Volcanoes National Park. It shows that the frequency of 111, represented by 90.98% agreed that they use information technology aspects in Volcanoes National Park. The frequency of 11 represented by 9.02% disagreed that they do not use information technology aspects in Volcanoes National Park. Therefore it indicated that the majority of the staff use information technology aspects.

Table 4.2: ICT Usage Documentation in Volcanoes National Park

	Frequency	Percent
Yes	120	98.36
No	2	1.64
Total	22	100.00

Source: Field data

Table 4.3 indicates how ICT usage documentation helps employees in information services in Volcanoes National Park; (98.36 %) 120 respondents out of 122 agreed that the documentation of ICT usage help them for information services. However 2 of respondent did not find any help in ICT usage documentation.

Table 4.3: Aspects of Information Technology Used in Volcanoes National Park, Rwanda Development Board

	N	Very frequently	Frequently	Moderate	Not frequently	Very infrequently	WTD Mean	STD
		5	4	3	2	1		
Usage of GPS/GIS	122	28 (22.96%)	94 (77.04%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	4.23	0.422
Usage of VHF radio	122	83 (68.00%)	39 (32.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	4.68	0.468
Usage of RF Tracking devices	122	122 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	5.00	0.000
Usage of cellular Phones	122	122 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	5.00	0.000
Usage of Internet and Website	122	101 (82.80%)	21 (17.20%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	4.83	0.379
Usage of Computers Network environment	122	84 (68.85%)	30 (24.59%)	8 (6.56%)	0 (0.00%)	0 (0.00%)	4.62	0.607

(STD<0.5: Respondents responses crowded around the weighted mean),
(SD >0.5: Respondents responses dispersed on the responses)
Source: Field data

$$\text{Weighted mean} = \frac{\sum(weights * observed frequencies)}{\sum observed frequencies}$$

A. Usage of GPS/GIS

The view of respondents regarding the use GPS/GIS information infrastructure in Volcanoes National Park lies between Very frequently and frequently, with a weighted mean of 4.23. The standard deviation of 0.422 indicated that respondents werecrowded around the weighted mean.Table 4.2 showed that the majority of respondents 94 frequently used GPS/GIS as an Information technology tool, Whereas 28 respondents answered that they use GPS/GIS very frequently.

B. Usage of VHF radio

The view of respondents regarding the use VHF radio in Volcanoes National Park indicate between Very frequently and frequently, with a weighted mean of 4.68. However the standard deviation of 0.468 indicated that respondents are crowded around the weighted mean. This was proved by83respondentswho argued that they use VHF radio very frequently and 39 respondents who frequently use the technology.

C. Usage of RF Tracking Devices

The majority respondents' opinions regarding the use RF Tracking devices indicate between Very frequently and frequently, with a weighted mean of 5.00. The standard deviation of 0.000 indicated that respondents are crowded around the weighted mean.The number of 122 respondents showed that they use RF tracking devices very frequently.

D. Usage of Cellular Phones

Table 4.2 indicates that the rate of usage of cellular Phones is very frequently as shown by 122 of the respondents. This indicated that all of the respondents use cellular Phones very frequently. The majority respondents' opinions showed that they use cellular Phones are very frequently, with a weighted mean of 5.00. However the standard deviation of 0.00 indicated that respondents are crowded around the weighted mean.

E. Usage of Internet and Website

Table 4.2showsthat the usage of internet and website was very frequently and frequently as shown by101 and 21 respondents respectively. This indicated that the best part of respondents use internet and website very frequently. Therefore the majority respondents' opinions regarding how frequently they use internet and website fell betweenvery frequently and frequently, with a weighted mean of4.83. Meanwhile the standard deviation of 0.379 indicated that respondents are crowded around the weighted mean.

F. Usage of Computers Network Environment

The majority respondents' opinions regarding how frequently they use Computers Network environmentindicate between Very frequently and frequently, with a weighted mean of 4.62. Table 4.2 indicates that 84 respondents use computers network environment very frequently while 30 respondents use it frequently. However the standard deviation of 0.607 indicated that respondents are dispersed on the responses.

4.2.2. Usage of Information Technology for Information Services in Volcanoes National Park, Rwanda Development Board

The second objective of the study was to assess the usage of information technology for information services in Volcanoes National Park, Rwanda Development Board. Four items were included in the questionnaire comprising the dimensions of usage of information technology for information services in Volcanoes National Park. The questions were about the assessment of information technology in Volcanoes National Park.

Table 4.4: Assessment of Usage of Information Technology for Information Services in Volcanoes National Park, Rwanda Development Board

	N	Very good	Good	Moderate	Bad	Very Bad	WTD Mean	STD
		5	4	3	2	1		
online park booking	122	122 (100.0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5.00	.000
Customer care	122	122 (100.0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5.00	.000
Hotel Booking	122	122 (100.0%)	(0%)	0 (0%)	0 (0%)	0 (0%)	5.00	.000
Online Transport Booking	122	122 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5.00	.000

(STD<0.5: Respondents responses crowded around the weighted mean),
(STD >0.5: Respondents responses dispersed on the responses)
Source: Field data

Table 4.4 provides a summary of usage of information technology for information services in Volcanoes National Park, Rwanda Development Board. It involves calculation of weighted means for 5 point Likert scale where the weights are as follows: 5= very good; 4=good; 3= moderate; 2= bad; 1= very bad.

Concerning the usage of information technology for information services all 122 respondents indicated a very good use of information technology for online park booking, online hotel booking, customer care, online transport booking. This was proved by a weighted mean of 5.00. The standard deviation of 0.000 indicated that respondents were crowded on the weighted mean.

Table 4.5: Tourists Assessment of Information Services in Volcanoes National Park, Rwanda Development Board

Type	N	Very effective 5	Effective 4	Moderate 3	Not effective 2	Very Ineffective 1	WTD Mean	STD
Tracking of wild	392	38 (9.70%)	72 (18.40%)	142 (36.20%)	140 (35.70%)	0 (0%)	3.02	0.965
Arranging transport	392	52 (13.30%)	314 (80.10%)	11 (2.80%)	8 (2.00 %)	7 (1.80 %)	4.01	0.636
Hotel Booking	392	102 (26.00%)	262 (66.80%)	19 (4.80%)	3 (0.80%)	6 (1.50%)	4.15	0.675
Arranging Food	392	146 (37.20%)	246 (62.80%)	0 (0%)	0 (0%)	0 (0%)	4.37	0.484
Accommodation	392	48 (12.20%)	157 (40.10%)	185 (47.20%)	2 (0.5%)	0 (0%)	3.64	0.698
Emergency services	392	4 (1.00%)	48 (12.20%)	296 (75.50%)	44 (11.20%)	0 (0%)	3.03	0.525
Security	392	333 (84.9%)	51 (13.00%)	8 (2.00%)	0 (0%)	0 (0%)	4.83	0.428

Health care services	392	0 (0%)	46 (11.70%)	145 (37.00%)	171 (43.60%)	30 (7.70%)	2.52	0.865
Making fundamental Transaction	392	71 (18.10%)	128 (32.70%)	164 (41.80%	29 (7.40%)	0 (0%)	3.61	0.741

(STD<0.5: Respondents responses crowded around the weighted mean),
(STD >0.5: Respondents responses dispersed on the responses)
Source: Field data

Table 4.5 shows the view of tourists regarding the information services provided at Volcanoes National Park.

A. Tracking of wild

The majority of respondents' view regarding the tracking of wild service provided by volcanoes National Park, lied between effective and moderate. This is demonstrated by the mean of 3.02. The standard deviation (STD) of 0.965 indicated that respondents were dispersed in their answers. Meanwhile 142 respondents out of 392 considered the service moderate.

B. Arranging transport

The majority of respondents' opinions regarding the service of arranging transport lied between effective and moderate with a weighted Mean of 4.01. This was confirmed by 314 of respondents who indicated that arranging transport service is effective whereas 52 respondents indicated it as very effective. However the standard deviation (STD) of 0.636 indicated that respondents were fairly dispersed in their answers.

C. Hotel Booking

The majority of respondents' impression regarding the service of Hotel Booking lied between very effective and effective as indicated by a weighted mean of 4.15. From the total number of 392, 102 respondents argued that the service was very effective while 262 indicated the service as effective. Nevertheless the standard deviation (STD) of 0.675 indicated that respondents were fairly dispersed on their answers.

D. Arranging Food

The majority of respondents' view regarding the service of arranging food lied between very effective and effective; this was demonstrated and confirmed by a weighted mean of 4.37. The standard deviation (STD) of 0.484 indicated that respondents were crowded around the weighted mean. Out of 392 respondents, 246 indicated that the service was effective while 146 indicated that the service was very effective.

E. Accommodation

The majority of respondents' opinions regarding the service of accommodation lied between effective and moderate with a weighted mean of 3.64. The standard deviation (STD) of 0.698 indicated that respondents were dispersed on their answers. Out of 392 respondents, 157 indicated that the service was effective while 185 indicated that the service was moderate.

F. Emergency services

The majority of respondents' opinions regarding the emergency services lied between effective and moderate, as shown by a weighted mean of 3.03. Out of 392 respondents, 296 indicated that emergency services were moderate while 48 argued that the services are effective. The standard deviation (STD) of 0.525 indicated that respondents were quite dispersed on their answers.

G. Security

The majority of respondents' attitude, regarding the security service provided, lied between very effective and effective. This is confirmed by a weighted mean of 4.83. The standard deviation (STD) of 0.428 indicated that respondents were fairly crowded around their weighted mean. Meanwhile 333 respondents out of 392 indicated that the service was effective while 51 indicated that the service was very effective.

H. Health care services

The majority of respondents' impression regarding the Health care service lied between moderate and not effective with a weighted mean of 2.52. This was proven by 145 respondents who argued that health care services provided were moderate and 171 who argued that the services were not effective. However the standard deviation (STD) of 0.799indicated that respondents were dispersed on their responses.

I. Making fundamental Transaction

The majority of respondents' view regarding the service of arranging transport lied between effective and moderate with a weighted mean of 3.61. Out of 392, 128 respondents acknowledged that the transactionwas

effective while 164 respondents argued that the transaction was moderate. However the standard deviation (STD) of 0.741 indicated that respondents were dispersed on their answers.

4.2.3. Effectiveness of Information Technology on Information Services in Volcanoes National Park, Rwanda Development Board

The third objective of the study was about the effect of information technology in information services in Volcanoes National Park, Rwanda Development Board. Seven items were included in the questionnaire comprising the dimensions of effect of information technology in information services in Volcanoes National Park, Rwanda Development Board.

Table 4.6: Effect of Information Technology on Information Services in Volcanoes National Park, Rwanda Development Board

	N	Very Effective	Effective	Moderate	Not Effective	Very ineffective	WTD Mean	STD
		5	4	3	2	1		
Usage of GPS/GIS	122	102 (83.60%)	20 (16.40%)	0 (0%)	0 (0%)	0 (0%)	4.84	0.372
Usage of VHF radio	122	110 (98.36%)	12 (1.64%)	0 (0%)	0 (0%)	0 (0%)	4.90	0.299
Usage of RF Tracking devices	122	90 (73.80%)	32 (26.2%0)	0 (0%)	0 (0%)	0 (0%)	4.74	0.442
Usage of cellular phones	122	122 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5.00	.000
Usage of Internet and Website	122	83 (68.00%)	39 (32.00%)	0 (0%)	0 (0%)	0 (0%)	4.68	0.468
Usage of Computers Network environment	122	73 (59.80%)	49 (40.20%)	0 (0%)	0 (0%)	0 (0%)	4.60	0.492

(SD<0.5: Respondents responses crowded around the weighted mean),
(SD >0.5: Respondents responses dispersed on the responses)
Source: Data field

A. Usage of GPS/GIS

The opinion of the respondents regarding the effect of the usage of GPS/GISas tools in information technology for information services was between very effective and effective, with a weighted mean of 4.84. The standard deviation of 0.372 indicated that respondents are crowded on their responses. Table 4.5 shows that from a total number of 122, 102 respondents noted that the usage of GPS/GIS for information services is very effective and 20 the respondents indicated the usage of GPS/GIS as effective.

B. Usage of VHF Radio

The 110 respondents showed that the usage of VHF Radios is very effective while 12 indicated its usage as effective. This meant that the view of the respondents lied between very effective and effective, with a weighted mean of 4.90. The standard deviation of 0.299 indicated that respondents are crowded on their responses.

C. Usage of RF Tracking Devices

The view of the respondents regarding the effect of Usage of RF Tracking Devices, as tools in information technology for information services of Volcanoes National Park, lied between very effective and effective with a weighted mean of 4.75. The standard deviation of 0.442 indicated that respondents' responses are crowded around the weighted mean. In Table 4.5, 32 respondents indicated that, the usage of RF tracking devices was effective whereas90 of the respondents answered that the usage of RF tracking devices was very effective.

D. Usage of Cellular Phones

The view of all respondents regarding the usage of cellular phones lied on very effective, with a weighted mean of 5.00. The standard deviation of 0.000 indicated that respondents' responses were crowded around the weighted mean. Meanwhile Table 4.5 indicated that all 122 respondents argued that, the usage of cellular phones and the usage of internet/website are very effective as tools of information technology.

E. Usage of Internet and Website

Out of 122, 83 respondents showed that the usage of internet and website was very effective while 39 indicated its usage as effective. This meant that the view of the respondents lied between very effective and effective, with

a weighted mean of 4.68. The standard deviation of 0.468 indicated that respondents are crowded around their mean.

F. Usage of Computers Network Environment

The view of the respondents on the usage of computers network environment was between effective and very effective as shown by a weighted mean of 4.60. A standard deviation of 0.492 indicates that respondents were crowded around the weighted mean. From Table 4.5,73 respondents indicated that the usage of computers network environment was very effective and 49 respondents indicated its usage as effective.

G. Multiple Regression Analysis

Multiple regression analysis was used to predict the value of a variable based on the value of two or more other variables. The variable which was to be predicted was called the dependent variable. The variables used to predict the value of the dependent variable were called the independent variables. Multiple linear regression attempted to model the relationship between several explanatory variables and a response variable by fitting a linear equation to observed data.

$Y = b_0 + b_1 X_1 + b_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + b_k X_k + \varepsilon$

Independent variable: X_k, and Coefficient: b_k, Unknown factor: ε, and Dependent variable: Y.The regression coefficient b_k is also called the partial regression coeficient because b_k represents the contribution of X_k to the response variable Y after it has been adjusted for the other predictor variables (Chatterjee and Hadi, 2006).

Assume that: Y: information services

X_1: usage of GPS/GIS, X_2: usage of cellular phone (GSM), X_3: usage of RF tracking devices, X_4: usage of VHF Radios, X_5: usage of internet/websites, X_6: usage of computers and networks.

Table 4. 7: Multiple Regression Analysis Model

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B		Std. Error	Beta	
(Constant)	0.430			0.129	0.903
Usage of GPS/GIS (X_1)	0.031	0.053	0.112	0.581	0.586
Usage of cellular phone (GSM) (X_2)	0.093	0.040	0.511	2.311	0.069
Usage of RF Tracking devices (X_3)	1.665	0.417	0.610	3.996	0.010
Usage of VHF Radios (X_4)	0.205	0.55	0.780	3.372	0.001
Usage of Internet/websites (X_5)	0.483	0.59	0.350	6.102	0.000
Usage of computers and networks (X_6)	0.460	0.55	0.109	2.087	0.040

a. Dependent Variable: information services (y)

Predictors: (Constant), usage of GPS/GIS, usage of cellular phone (GSM), usage of RF tracking devices, usage of VHF Radios, usage of internet/websites, usage of computers and networks.

b. Dependent Variable: information services

Source: Field data

The model has the following equation:

$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + \varepsilon$

$Y = .430 + .031 X_1 + .093 X_2 + 1.665 X_3 + .205 X_4 + .483 X_5 + .460 X_6 + .456$

Y (information services) =0.430+ 0.031 (Usage of GPS/GIS) + 0.093 (Usage of cellular phone (GSM) + 1.665 (usage of RF tracking devices) +0.205 (usage of VHF Radios) +.483 (usage of internet/websites) +0.460 (usage of computers and networks) + 0.456

Table 4.8: Summary of Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.737	0.543	0.405	0.456

a. Predictors: (Constant), usage of GPS/GIS, usage of cellular phone (GSM), usage of RF tracking devices, usage of VHF Radios, usage of internet/websites, usage of computers and networks. b. Dependent Variable: information services

Source: Field data

Table 4.7 provides the *R*, R^2, adjusted R^2, and the standard error of the estimate, which can be used to determine how well a regression model fits the data.

The linear correlation coefficient called R indicates the strength between two variables. When R is close to 1 the linear correlation is described as strong positive thus the correlation is positive. When R is close -1 the linear correlation is described as strong negative thus the correlation is negative. The R-squared value, denoted by R^2, is the square of the correlation. It indicates the proportion of variation in the dependent variable that can be attributed to the independent variable. R-square indicates also the amount of variance in the dependent variable that can be explained by the model.

From Table 4.7, the output of R which is equal to 0.737, indicates a strong positive multiple correlation between the independent variables (usage of GPS/GIS, usage of cellular phone (GSM), usage of RF tracking devices, usage of VHF Radios, usage of Internet/websites, usage of computers and networks), and the dependent variable (information services). The study also revealed that $R^2 = 0.543$, which meant that 54.30% of total variation in y could be explained by linear relationship between x and y and the remaining total variation of 45.70% was unexplained. This correlation was generally described as acceptable one.

4.3. Interview Guide for Managers

Interview was conducted first to the managers of Volcanoes National Park, Rwanda Development Board. The interview was conducted for the purpose of getting qualitative information

Q1. Responsibility of manager in the organization.
The managers said that their responsibilities in Volcanoes National Park are: Toguarantee a safe, well-maintained park facility through the efforts of a properly supervised and trained staff; to provide an efficient operation that stays within budget constraints and which assures fiscal control and accountability; to provide park visitor service and promotes usage through positive community relations; to develop local partnerships and volunteer programs and aggressive marketing efforts; to assume natural resource protection and environmental education as a manager of park operations and visitor programming; to analyse financial information and operational requirements in order to plan, prepare and manage the park's operating budget.

Q2. ICT policy of Volcanoes National Park.
The managers indicated that Volcanoes National Parks possess ICT policies aimed at developing competitiveness in the national parks. They also prepare their employees to appreciate, increasingly understand and make most effective use of new technologies such as GPS/GIS, GSM, RF Tracking devices, VHF radios, internet/ website, computers and network.

Q3.Advertisement of the company through Google search engine.
Managers indicated that Volcano National Park is advertised through google search engine with the help of their own website or through RDB.

Q4. Facebook (social media) is an effective medium of promoting tourism industry.
Managers indicated that social media in general are more or less effective. In addition to that Volcano National Park does not use any social media.

4.4. Interview Guide for ICT Staff

Secondary the interview was also conducted to the ICT staff of Volcanoes National Park, Rwanda Development Board.

Q1. ICT staff responsibilities in the organization
ICT staff revealed that their main responsibilities are: Provide the ICT skills to the staff, evaluate critically the impact that ICT has on the staff, ensure that data is effectively stored/backed up, oversee the maintenance and replacement of hardware, ensure that software is up to date, ensure that the perimeter of the network is secure and not open to attacks from outside.

Q2. Provide technical support in the organization
ICT staff highlighted that they offer technical support by providing ICT skills to the other staff, overseeing the maintenance and replacement of hardware, ensuring that software is up to date.

Q3. Improved technology with updated website presence will increase your business potentiality.
ICT employees acknowledged that updated website will increase the business in Volcanoes National Park. They stated that updated information on the website help tourist aware of their businesses.

Q4. Internet (Bandwidth) speed used in Volcanoes National Park.
ICT staff stated that, Volcanoes National Park use Wi-Max internet connection of 128kbps of bandwidth.

Q5. Implementation of ICT policy in Volcanoes National Park.
ICT staff specified that,aregular inspection of the system is conducted in order to implement ICT policy.

Q6. Carting for security of data.
ICT staff identified security mechanism such as username and password, firewall, backup, up-to-date anti-virus are deployed in the network of volcanoes national park offices.

Q7. Insurance that IT facilities remain user friendly despite fast changing technology.

Interviewees stated that the staff are trained to understand easily the use of ICT facilities and also are motivated to use them.

4.5. Summary of Research Findings

This chapter presented the analysis and interpretation of data collected for this study. It provided demographic characteristics of sampled respondents, aspects of information technology used in Volcanoes National Park, Rwanda Development Board. Furthermore it coveredusage of information technology for information services in Volcanoes National Park, Rwanda Development Board and effect of information technology on information services in Volcanoes National Park, Rwanda Development Board. Finally it provides interviews conducted on managers as well as ICT staff.

5. SUMMARY OF FINDINGS, CONLUSION AND RECOMMENDATIONS

Introduction

This chapter provides a summary of most critical subjects covered in the study such as the aspects of information technology used in volcanoes national park, Rwanda development board, the usage of information technology for information services in volcanoes national park, Rwanda development board, the effect of usage of information technology on information services in volcanoes national park, Rwanda Development Board. It provides the conclusion and recommendations which are based on findings in line with research objectives. Finally it presents suggestions for further study.

5.1. Summary of Findings

This summary covers the aspects of information technology used in Volcanoes National Park, usage of information technology for information services in Volcanoes National Park, and the effect of usage of information technology on information services in Volcanoes National Park.

5.1.1. Aspects of Information Technology Used in Volcanoes National Park, Rwanda Development Board

The first objective was to determine the aspects of information technology used in Volcanoes National Park. All respondents (100.00%) revealed that the usage of cellular phones and the usage of RF tracking devices were the aspects (features of technology) which were used very frequently. Meanwhile other aspects such as usage of internet and website, andVHF radio were also used very frequently as shown by 82.80% and 68.00% respectively. However, only 68.85% of respondents indicated the usage of computers network environment as very frequently used. Finally 77.04% of respondents indicated GPS/GIS technology as frequently used.

5.1.2. Usage of Information Technology for Information Services in Volcanoes National Park, Rwanda Development Board

Concerning the usage of information technology for information services, 100.00% of respondents indicated a very good use of information technology for online park booking, Online, customer care, Hotel Booking, Transport booking.

In Volcano National Park all technologies in place were used very effectively; 83.60% of respondents noted that the usage of GPS/GIS for information services was very effective. In addition computers network environment were used very effectively as indicated by 59.80%ofrespondents.Finally100.00% of respondents argued that, the Usage of cellular phones was also very effective tools of information technology.

Despite a very good use of IT in providing services in Volcano National Park tourists indicated that emergency services were moderate as indicate by 75.50% respondents. This went also to health care services which were indicated as not effective by 43.60% of respondents.

5.1.3. Effect of Usage of Information Technology on Information Services in Volcanoes National Park, Rwanda Development Board

The last objective was to determine the effect of usage of Information Technology on information services in Volcanoes National Park, Rwanda Development Board. The multiple regression analysis was performed to determine the relationship between the independent variable and the dependent variable.

R column represents the value of R, the multiple correlation coefficient. R can be considered to be one measure of the quality of the prediction of the dependent variable; in this case, information services. A value of 0.737 indicates a strong positive multiple correlation between the independent variables (usage of information technology) and the dependent variables on the (information services) in the Rwanda Tourism Sector. In determining this relationship it was also found out that the Coefficient of Determination R^2=0.543. This meant that 54.3% of the variability in the dependent variables was attributed to the stochastic model developed and 45.7% was due to factors beyond the control of the study.

5.2. Conclusions

The study was carried out to address the following research objectives: Determine the aspects of

information technology that are used in Volcanoes National Park, Rwanda Development Board, to assess the usage of information technology for information services in Volcanoes National Park, Rwanda Development Board, to determine the effect of usage of information technology on information services at Volcanoes National Park, Rwanda Development Board. The study found that, 100.00% of respondents indicated that the usage of cellular phones and the usage of RF tracking were two types of aspects (technologies) which are used very frequently. Meanwhile other aspects such as usage of internet and website, andVHF radio were also used very frequently as shown by 82.80% and 68.00% respectively. However, only 68.85% of respondents indicated thatcomputers network environment as very frequently used and 77.04% of respondents indicated GPS/GIS technology as frequently used. Concerning the usage of information technology for information services, all 122respondents indicated a very good use of information technology for online park booking, Online, customer care, Hotel Booking, Transport booking. However tourists indicated that emergency services were moderate as indicate by 296 (75.50%) respondents despite a very good use of IT in providing services. This went also to health care services which was indicated as not effective by 171 (43.60%) of respondents. Finally, a value of R equal to 0.737 indicates strong positive multiple correlation between independent variables and dependent variables. The coefficient of determination (R^2) equal to 0.543 therefore is (54.30%). As a result there was a strong positive correlation relationship between usage of information technology on information services in Volcanoes National Park in Rwanda.

5.3. Recommendations

In the short term it is recommended to RDB to:
Increase the level of sensitization among management and employees of Volcanoes National Park, Rwanda Development Board on the importance of usage of information technology in enhancing information services.

In medium term it is recommended to Volcanoes National Park, RDB to:

1. Upgrade Information technology to the latest version.
2. Give all the tour guides access to technology and continuous training as it improves.
3. Use interactive internet technologies in marketing the different tourist destinations in Rwanda to the East Africa, Africa and international Community.

In long term it is recommended to RDB to:

1. Use heavily Technology in processing the single Visa application as the East Africa Community agreements.
2. Law of Rwanda should be modified to accommodate single Visa application by tourist.
3. RDB should enact a policy of updating information and communication technology frequently and subjecting all its employees for continuously training.

5.4. Suggestions for Further Study

Based on the problems met through this study more work should be carried out in the future, in the area of information technology in order to improve services.

1. Being a case study, a more general study in future, should be carried out among other National Parkssuch as Akagera and Nyungwe National Parks.
2. A study needs to be carried out on how the changing information technology infrastructure affects service delivery in tourism sector in Rwanda.

REFERENCES

[1] Adam, D., Nelson, R., and Todd, P. (1992) Perceived usefulness, ease of use, and usage of information technology: A replication. *Management Information Systems Quarterly*, 16 (2) 227-247.

[2] Allen, B., &Reser, D. (1990). Content analysis in library and information science research. *Library & Information Science Research*, 12 (3), 251-260.

[3] Ajzen, I. (1991)/. The Theory of Planned Behavior. *Organizational behavior and Human Decision Processes,* 50 (1), 179-211.

[4] Anand B. (2013). The Role of ICT in Tourism Industry. *Journal of Applied Economics and Business*, 1 (4), 67-79.

[5] Anderson, A. &, Carletta, J. (2007). Virtual team meetings: An analysis of communication and context. *Computers in Human Behavior,* 23, 2558-2580.

[6] Aubert, B. & Kelsey, B. (2003). Further understanding of trust and performance in virtual teams. *Small Group Research*, 34, 575 – 619.

[7] Bagozzi, R.P. (2007). The legacy of the technology acceptance model and a proposal fora paradigm shift, *Journal of the Association for Information Systems,* 8 (4), 244–254.

[8] Bandow, D. (2001). Time to create sound teamwork. *The Journal of Quality and Participation, 24, 41 –47.*

[9] Barbera, E (2009) Mutual feedback in e-portfolio assessment: *an approach to netfolio*

system British Journal of educational technology, 40 (2), 342-357.

[10] Barki, H. and Hartwick, J. (1994) Measuring User Participation, User Involvement, and User Attitude, *MIS Quarterly,* 18 (1), 59-82.

[11] Benbasat, I.; Barki, H. (2007), Quo vadis, TAM?, *Journal of the Association of Information Systems,* 8 (4), 211–218.

[12] Bjørn, P. &Ngwenyama, O. (2009). Virtual team collaboration: Building shared Meaning, resolving breakdowns and creating translucence. *Information Systems Journal,* 19, 227-253.

[13] Borrill, C. & West, M. (2005) The psychology of effective team working. In N. Gold (Eds.). *Teamwork. Multidisciplinary perspectives.*162 (2), 12-20.

[14] Bramwell, B. & Lane, B. (2009). Economic cycles, times of change and sustainable Tourism. *Journal of Sustainable Tourism*, 17 (1), 1-4.

[15] Buhalis, D. (2002), Information technology and tourism: trends and developments, *Tourism Studies of Catalonia*, 6 (10), 21-26.

[16] Butynaski, T.M. and J. Kalina (1997), Gorilla Tourism:A Critical Look. *Africa Biodiversity Conservation Program*, 8 (6), 1-47.

[17] Ceron, J. & Dubois, G. (2003). Tourism and sustainable development indicators: The gap between theoretical demands and practical achievements. *Current Issues in Tourism.*6 (1), 54-75.

[18] Chatterjee, S. and Hadi, A. S. (2006). *Regression Analysis by Example (4th ed.).* New York: John Wiley & Sons, Inc.

[19] Chau, P. & Hu, P. (2002). Examining a Model of Information Technology Acceptance by Individual Professionals: An explanatory study. *Journal of management information system*, 1 (8) 191- 229.

[20] Cheng, A. (2008). Communication and conflict in virtual teams. International Section A: *Humanities and Social Sciences*, 69 (5-A), 1868.

[21] Choi, H. &Sirakaya, E. (2006). Sustainability indicators for managing community Tourism. *Tourism Management*, 27 (6), 1274-1289.

[22] Cohen, S. & Gibson, C. (2003). *In the beginning: Introduction and framework.* San Francisco, CA: Jossey-Bass.

[23] Costa, A. &Taillieu, T. (2001). Trust within teams: The relation with performance effectiveness. *European Journal of Work and Organizational Psychology*, 10 (3), 225–244.

[24] Costa, A. (2003). Work team trust and effectiveness. *Personnel Review*, 32 (5), 605 – 622.

[25] Cunningham, J. &MacGregor, J. (2000). Trust and the design of work: *Complementary constructs in satisfaction and performance. Human Relations,* 53, 1575-1591.

[26] Dalkir, Y.R., and Lee, M.C. (1993). Radar studies of lightning-induced plasmas with potential applications to radio communications and space surveillance. *Radio Sci*., 28 (10), 39-47.

[27] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13 (3), 319-340.

[28] Davis, F. D., Bagozzi, R. P., &Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science,* 35 (8) 982-1003.

[29] De Jong, B. &Elfring, T. (2010). How does trust affect the performance of ongoing teams? The mediating role of reflexivity, monitoring, and effort. *Academy of Management Journal*, 53 (3), 535 –549.

[30] Dieke, Peter U. C. (2000), *Tourism and Africa's Long-Term Development Dynamics, In The Political Economy of Tourism Development in Africa*. Elmsford, NY: Cognisant.

[31] Foster, A. (2004). A nonlinear model of information-seeking behavior. *Journal of the American Society for Information Science & Technology*, 55 (3), 228-237.

[32] Gayar, O. & Fritz, B. (2006). Environ mental management information system (EMIS) For sustainable development: a conceptual overview. *Communications of the Association for Information Systems*, 1 (7), 756-784.

[33] Harrington, A. (1999). Integration (GPS) play a Major role in (GIS) data maintenance.*geo World, daneilsontodd (ed) Arlington Heights:* Adams Business Media 8,146-175.

[34] Hsieh, H. F., & Shannon, S.E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15 (9), 1277-1288.

[35] Iris M. (2012). The Impact of Information and Communication Technology (ICT) as a Key Factor of Tourism Development on the Role of Croatian Travel Agencies. *International Journal of Business and Social Science,* 3 (24), 152-159.

[36] Koufaris, M. (2002). Applying the technology acceptance model and flow theory to Online consumer behavior. *Information Systems Research*, 13 (2), 205-223.

[37] Laundry, B& Hartman, S. (2006). Measuring student perceptions of blackboard using the Technology acceptance model. *Decision Sciences*, 4 (1), 87-99.

[38] Lee, A. (1991) Integrating Positivist and Interpretive Approaches to Organizational Research. *Organization Science*, 2 (4), 342-365.

[39] Lewis, G. L. (1995). *The Internet and Library and Information Services: A Review, Analysis, and Annotated Bibliography.* Unpublished Master'S Thesis. University of Illinois, USA.

[40] Logan, K. (2012), January 23). Adapt or die, *the enduring rule of innovation*. Retrieved January 12, 2015 from:www.fastcompany.com/1810048.

[41] Mansell, R. (2001) Digital Opportunities in the Missing Link for Developing Countries ,*Oxford Review of Economic Policy*,17 (2), 282-295.

[42] Mayring, P. (2000). Qualitative content analysis. Forum. *Qualitative Social Research*, 1 (2), 10-21. Retrieved July 28, 2008, from http://217.160.35.246/fqs-texte/2-00/2-00mayring-e.pdf.

[43] Office of Tourism and National Parks (2004). *Plan d'aménagement de Gestion du Parc National des Volcans.* Draft2.Kigali:Author.

[44] Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*, *12* (3), 150–162.

[45] Patton, M.Q. (2002). *Qualitative Research and Evaluation Methods*. Thousand Oaks, CA: Sage.

[46] Petan, I. C. (2008). *The Tourism Industry and the Use of Internet*. Published Master's Thesis. Universitatea Romano Americana.

[47] Philip, B. & Booth, J. (2001). Rwanda: *The Bradt Travel Guide.* Guilford, USA: The Globe Pequot Press Inc.

[48] Robin, G. O. (2008). The automation in support of factory integration**.** *Office of Robotics and Computer Integrated manufacturing*, 3 (7), 677-678.

[49] Rwanda Development Board (2012). *Highlights of Tourism Arrivals in Rwanda* January-December, 2012.

[50] Schamber, L. (1991). *Users' Criteria for Evaluation in Multimedia Information Seeking and Use Situations.* Published Ph.D. dissertation, Syracuse University.

[51] Shah, S. & Corley, K. (2006). Building better theory by bridging the quantitative – Qualitative Divide, *Journal of Management Studies* 48 (3), 1821-1835.53-78.S

[52] Sun, H., and Zhang, P. (2006). The role of moderating factors in user technology. acceptance. *International Journal of Human-Computer Studies*, 5 (3), 64 (2)

[53] Venkatesh, V. and Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Science*, 39 (2), 273-312.

[54] Venkatesh, V. & Davis, F. D. (2003). User acceptance of information technology towards Aunified view: *MIS quarterly,* 27, 425 -479.

[55] Venkatesh, V., Morris, M.G, Davis, F.D, and Davis, G.B. (2003). User Acceptance of Information Technology: *Toward a Unified View, MIS Quarterly*, 27, 425-478.

[56] World Travel and Tourism Council (2013). Travel and tourism: *Economic impact for Rwanda*. Retrieved November 11, 2014 from: www.worldtravel.com/tourism-council-data-2013.