EFFECTS OF PEOPLE-TECHNOLOGY INTERACTIONS ON SERVICE INNOVATION IN STAR RATED HOTELS IN NYERI COUNTY

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A Thesis Submitted to the Graduate School in Partial Fulfilment of the Requirements for the Award of the Degree of Master in Hotel Management of Chuka University

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DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been presented for an award of a diploma or conferment of a degree in any other University.

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Recommendation

This thesis has been examined, passed and submitted with our approval as University supervisors.

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DEDICATION

I dedicate this work to the Almighty God for giving me life, love and care. I also dedicate it to my parents the late Peter Akoko and Eunice Akoko who have been supportive both spiritually and financially. Lastly, I dedicate this work to my supervisors and members of the Department of Environment Studies and Resource Development for their guidance and moral support.

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ABSTRACT

Recently hotels have incorporated technologies to enhance profitability realized through efficiency in operation, reduced cost of production and improved service quality. Developed countries have integrated people and technology in their hotel systems but there is insufficient information in many developing countries. Developing countries such as Kenya have majorly focused on the determinants of technology adoption and installation of a well-established technological system. While interaction of people and technology is reported to improve the overall operations in Kenyan hotels, research has not adequately shown their specific impacts on service innovation. The objectives of the study were to determine the effects of Employee-Hotel Information System interaction on Service innovation and to determine the effects of Customers-Social Media Interaction on Service Innovation in Nyeri County Star Rated. This study was guided by the theory of people-technology interaction. The study used descriptive cross-sectional research design while targeting 1006 customers and 335 employees derived from bed capacity and human resource data of selected star rated hotels in Nyeri County. Purposive and Convenience Sampling techniques were used to select a sample of 278 customers and 178 employees of star rated hotels in Nyeri County. Primary data was collected by the use of semi-structured questionnaires that were administered to the employees, and customers in the selected hotels. Reliability of the data was tested by use of Cronbach's alpha at $\alpha \geq 0.70$. Data was analyzed by use of Statistical Package for Social Scientists Software (SPSS) version 25. Descriptive statistic such as percentage was incorporated. Categorical Regression and Exploratory Factor Analysis were used to test the relationship of variables. Significant levels were sought at $\alpha \leq 0.05$. The results for Employee-Hotel Information System revealed that usage level of Electronic Point of Sale System ($p=0.001$) had a great influence on Service innovation in Nyeri County. The usage level of Reservation System ($p=0.771$), Rooms Management System ($p=0.447$), Mobile Device Technology ($p=0.717$), Biometric Technology ($p=0.600$) and Virtual Reality ($p=0.136$) had an insignificant influence on service innovation. The result for Customer-Social Media Interaction indicated that Usage of WhatsApp ($p=0.001$), Facebook ($p=0.001$) and Twitter ($p=0.030$) had a direct influence on service innovation. The Usage of Instagram ($p=0.586$), Website ($p=0.124$) and Email ($p=0135$) had insignificant effect on service innovation in Nyeri County. The study concludes that most hotel management had invested on the Facebook, WhatsApp, Twitter and Electronic Point of Sale System that led to significant contribution to service innovation. The results showed that most of the hotels in Nyeri have adopted certain level of technology for their operations and this has enabled increased service innovation in the form of timely delivery, development of more features of food and beverage products.

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LIST OF ACRONYMS

EPOS:	Electronic Point of Sale System
GDS:	Global Distribution Systems
HIS:	Hotel Information System
ICT:	Information Communication Technology
IMS:	Internal Message Services
IT:	Information Technology
KNBS:	Kenya National Bureau of Statistics
MDT:	Mobile Device Technology
PMS:	Property Management Systems
RMS:	Rooms Management Systems
SMHE:	Small and Medium Hospitality Enterprises
SPSS:	Statistical Packages for Social Sciences
SST:	Self Service Technology
TRA:	Tourism Regulatory Authority
KMO:	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
RS:	Reservation System
VR:	Virtual Reality
NCRM:	New Cost Reduction Measure
HIE	Hotel Interior and Exterior
BT:	Biometric Technology
ANOVA:	Analysis of Variance

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Hospitality industry contributes to the growth of the World GDP by approximately 3.9% while boosting other economic gains across continents. For example, in United States of America job opportunities created have increased to 1,139,000 in 2019 compared to 353,000 in the year 2009 (The US Bureau of Statistics, 2019). The consumption of the hotel products also improved from $116 billion to $8185 billion in the same year arguably because of successful interaction of technology with employees and customers (Deloitte, Doonan, Breen & Crooks, 2021). (Deloitte, 2019).

The relationship between people and technology is constantly evolving, as new technologies are developed and adopted by people. Over time, this relationship has become increasingly complex, as people have become more reliant on technology in their everyday lives (Bailey, Hinds, Leonardi & Von, 2022). Technology has transformed the work, and communicate, and it continues to do so at an ever-increasing pace. As such, the way we interact with technology is constantly changing. In general, people tend to interact with technology in one of two ways: either using it to achieve a specific goal, or using it for entertainment or personal enrichment (Tripathi and Baipai 2021).

Hotels engage in people-technology interaction by investing in mobile apps and online check-in/out systems. They have also created digital concierge services that provide guests with information about the hotel and its facilities, as well as local attractions and restaurants (Bowen, 2016). The rise of social media has also had an impact on service innovation. Guests now expect to be able to share their experiences with their friends and followers online, and they want to be able to interact with the hotel directly through social media.

Hotels have responded to this by making sure that their staff members are trained in social media etiquette and by creating dedicated social media channels for their hotel (Bailey *et al*, 2022). They have also started to offer incentives for guests who share their positive experiences online. The way in that we interact with technology is

constantly changing and this is likely to have a continued impact on service innovation (Chan and Guillet, 2011). As guests' expectations evolve, hotels will need to continue to adapt their services in order to stay ahead of the competition.

The global hotel industry has been increasingly relying on technology to improve operations and guest experience (Yakut 2022). From online check-in and check-out to in-room tablets and apps, hotels are using technology to streamline processes and offer guests a more convenient and personalized experience. There are a few key ways to optimize people-technology interaction in global hotels: Making sure staff are properly trained on new technology (Gaur and Potnis, 2022). Encouraging guests to use self-service options. Using technology to enhance communication. Personalize the guest experience. By following these tips, global hotels can ensure that, their people-technology interaction is seamless and efficient, ultimately providing a better experience for both guests and staff (Bailey *et al*, 2022).

Integrating people and technology involves combination of people element such as customers and technology to add value in form of new ideas (Akroush, Abu-ElSamen, Samawi, & Odetallah, 2013). For effective systems of technology to perform exemplary, the emotional touch of people is required to yield ideas that serve as important opportunities for outshining the competitors (Kauffman, Liu & Ma, 2015). Specifically, hotels that practice the integration of people and technology have realized improvement in their sales revenues. Making effective use of both people and the technology has therefore enabled hotels to create higher product value while supporting their market leadership competitive strategy (Jasonos & McComick, 2017).

People–technology interaction first emerged in United States early 2013 as a concept tested by hoteliers to enable them add value to their products and services through creation of ideas (Kandampully *et al.*, 2016). This was adopted to enhance market leadership in a highly competitive environment. This concept was applied in few chained hotels in US such as Marriott Chain Hotels, Hilton hotels to enable them get a larger market share, and sales return (Akroush *et al.*, 2013).

Marriot Chain Hotels came up with customer-technology interaction system strategies such as provision of a third-party internet services that assisted their customers operate their social media platforms for services such as online booking for their facilities. The third-party internet services were used as mediums for providing feedbacks to customer enquiries (Bailey *et al*, 2022).

Hilton Chain Hotels enhanced an interaction system of employees and technology in Virtual Reality (VR) that is a technology element to equip skills and experience to their new employees and this was to enable them provide the most efficient services (Griffy, Chun and Machen (2008)). The existing employees were exposed through VR as part of their onboard and continuous training to enable them adopt new ways of service operations. Hilton hotels applies People-technology interaction in their mission to be the most hospitable organization in the world by creation of good experience for their guests and also providing opportunities for their employees (Aksoy, Alkire, Choi, Kim, & Zhang, 2019)

However, people-technology interaction systems applied by Hilton and Marriott provided interaction of customers, employees with technology for improving their operations, selectively. For instance, Hilton hotels emphasized on interaction of employees and technology while not incorporating customers while Marriott hotels focused on interaction of customers and technology but not employees (Aksoy, Alkire, Choi, Kim, & Zhang, 2019). Incorporating both customers and employees in their interaction system has arguably improved customers' satisfaction and maximized profit realization.

People-technology interaction has provided an opportunity of engaging and facilitating resources from customers and employees. Through the interaction system, firms have been able to get valuable information such as ideas from employees, feedback from customers that has enabled them build on their strength and improve on their weaknesses (Bilgihan, Okumus, Khal & Joon, 2011). People-technology interaction application in hospitality industry contribute significant amount of revenues to the global market. Most of the hotel owners are coming up with mechanisms such as People-technology interaction model to help in improving their revenues while at the

same time satisfying the needs of their customers and their employees. International Hotel and Restaurant Association (IH&RA) also highlights that revenues realized from interaction system of people and technology can is significant solving the problems related to poverty (IHRA 53rd Annual Conference).

Griffy, Chun and Machen (2008) observe the interface of Self-Service Technology with customers of Hilton Chain Hotels in United States. Self-service technology includes Web-based check-in and Electronic Folio service. Web-based check in enables customers to have a look at the guest rooms and do a self-check in even before arrival at the hotel facility while Electronic folio self service enables customers to access the hotel folios, view and print them at their own time and pleasure (Chan & Guillet 2011). These self-service motivated Hilton Chain hotel customers to consume more products &services because of convenience and this leads to increase in sales volume. This Interface is of great significant as it enables customers to have a feeling of control and enable the hotels to benefit from customer loyalty (Griffy *et al* 2008).

Kim (2016) examines the interaction of customers on hotel tablet apps for the hotels in US by use of TAM model to determine the behavioral intentions. He observes that customers adopt usage of tablet apps based on their perceived ease of use, usefulness and credibility. This enables enhances convenience when accessing hotel services such as booking of rooms, ordering meals and giving their comments concerning how they have experienced the products and services (Bhalla, 2010). Convenience as service quality aspect makes customers to have a repetitive purchase to a particular hotel facility hence increasing the productivity leading to more sales revenues. Tablets apps interface leads to reliability because customers can always access any hotel information from the hotel tablet apps (Bilgihan *et al* 2011).

Use of tablets apps has enabled the hotels in United States to benefit from a continuous innovation that has ranked them better than hotels in other parts of the world. Organizations uses technology for engagement with their customers and employees, utilizing their skills that help to innovate new products and services (Akroush, Abu-ElSamen, Samawi, & Odetallah, 2013). However, the application of this type of interaction is adopted there has been a problem with employees not fully being involved

in different ways such as taking part in decision-making (Bowen, 2016). The hospitality firms have to involve their employees for increased productivity. The interaction system has not been given emphasis by the US hospitality businesses.

In Asian countries the focus of people-technology interaction application has been on hospitality sales delivery improvement. Kamaruddin and Ahmad (2012) conducted a study in Malaysia on interface of Point-of-Sale System (POS) and the Employees in 4 and 5-star hotels, the employees were asked to indicate their level of acceptance and how they perceive usage of POS in carrying out the sales process. The findings showed that positive perception on the usefulness and ease of use of the POS system among the employees will make the sales process simplified (Barnes, 2010).

The sales activities such as menu planning, order taking, actual service of food and beverage, billing and receipt becomes improves in terms of efficiency because of increase speed and minimal time taken to operate them via POS by the employees (Kandampully *et al* 2016). Customer complaints is also reduced as they are able to have value for their money and also find minimal time being wasted before they are served and their bills processed by the employees. The productivity increases because of the efficient workflow with the coordinated service of food and beverage products through the POS (Bhalla, 2010). The interface of POS and employees increases profit margin when the employee's acceptance level to POS is positive.

Selke and Schaar (2015) explain the interface of mobile apps with employees and customers for service delivery improvement in Malaysian Hotels. The interface provides effective communication to customers on the variety of food and beverage products offered preparation method, delivery time and mode, the costs attached to them and any other auxiliary services offered by the hotel (Chathoth, 2007).

Mobile apps have enabled hotels to solve the challenge of communication products to customers because they often have options for all languages This interface improves service delivery process as less time is spent by the front-line employees on each customer because they can access most of the information in the hotel apps hence increase in productivity (Chan and Guillet 2011). Cost of production is reduced; as

fewer frontline employees are needed because the hotel apps reduce workload required to be performed by many employees. Interaction of apps with customers and employees has changed operations of the service sector as it serves as a linkage where all information about the hotel is shared (Kim, 2016).

In Europe, people- technology interaction elements of employees and technology have been used for efficient services in the hospitality operations. Vogiatzi (2015) explain that various hospitality stakeholders in Greece to enhance performance of employees through use of personal characteristics as a determinant of their behaviors to use technology have used ICT (Ismail *et al* 2013). The study showed personal characteristics such as age, experience, education as the determinant factors for adoption of technology. When employee personal characters are all favorable then employees get motivated to use technology to perform their daily tasks such as order taking, billing of guest expenses and folios processing (Lee and Crenage 2018). This increases their speed of work hence able to deliver service to a large number of customers leading to high productivity.

In Africa the employee-technology interaction has been explained for leading to service innovation. Abdelbary (2011) conducted a study on adoption of biometric by employees in Egyptian Five Star Hotel. The study focused on the traits of employees such as convenience, knowledge, safety, security and the information quality as being the determinants of adoption of technology. The findings showed that the interface of biometric technology and employees enhances maximum utilization of employees input because it reduces time wastage. The study also revealed that employees contribute immensely to service innovation through their new ideas inform of their suggestions that can be used to improve on the existing products. However, the study failed to incorporate lower star rated hotels and other elements of people such as customers.

Mwai (2016) conducted a study on influencers of ICT adoption by small and Medium Hospitality Enterprises (SMHE) in Nairobi, Kenya. The study focused on establishing the influence of technology and customer characteristics on the adoption of ICT by small and medium enterprises. The findings showed that technology characteristics

such as types, levels had a greater influence on adoption of ICT as compared to customer characteristics such as age, sex, level of education.

This implies that rapid advancement in technology and increase of customers' demand in relation to flexibility, accessibility, specialization of products and frequent communication will influence the technology adoption by SMHE. Another study conducted by Shirandula and Mwawaza, (2018) revealed that adoption of technology is influenced by socio-economic drivers such as personal characteristics of employees and customers. However, these studies failed to address the interaction levels between the people and ICT.

In Nyeri county people-technology interactions is not much reported. Previous studies have revealed contributions of the people-technology interaction in other counties such as Nairobi, Kisumu and Mombasa. Nyeri County hotels has the potentiality of realizing full interactions of technology and people for service innovation, since it is at the development stage of tourist destination lifecycle (Butler, 2022). There is knowledge gap where insufficient information concerning the interactions of people and technology in the Nyeri county star rated hotels.

1.2 Statement of the Problem

The use of technology in hotels has increased significantly in recent years, but there are still many opportunities for improvement in the way people and technology interact. Interaction of people and technology contribute immensely to the profitability of hotel businesses realized through efficiency in operation, reduced in cost of production and improved service quality. Developed countries have integrated people and technology in their hotel systems but there is insufficient information on the impact of these systems on service innovation. Developing countries such as Kenya have majorly focused on the determinants of technology adoption and installation of a well-established technological system. While interaction of people-technology is reported to improve the overall operations in Kenyan hotels, research has inadequately shown their specific impacts on service innovation. The challenges could be inefficient or inconvenient technology in common areas of the hotel, lack of staff training on how to

use and troubleshoot technology in the hotel, lack of staff available to help guests with technology, lack of clear instructions for guests on how to use technology in the hotel. Currently, hotel staff often rely on technology to communicate with guests, but there are many opportunities for improvement in this area. For example, hotel staff could use technology effectively to communicate with guests about their stay, such as providing information about local attractions or events. Additionally, hotel staff could use technology to manage guest expectations and ensure that guests are satisfied with their stay. This study investigates the effects of people-technology interaction application on service innovations in selected star rated hotels in Nyeri County.

1.3 Objectives of the Study

1.3.1 Broad Objective

The general purpose of this study is to examine the effects of people-technology interaction on service innovations in selected star rated hotels in Nyeri County.

1.3.2 Specific Objectives

i. To determine the effect of customer-social media interactions on service innovations in star rated hotels in Nyeri County.
ii. To determine the effect of employee-hotel information system interactions on service innovations in star rated hotels in Nyeri County.

1.4 Research Hypotheses

$H_0$1. There is no statistically significant effect of customers-social media interactions on service innovations in star rated hotels in Nyeri County.

$H_0$2. There is no statistically significant effect of employees-hotel information system interactions on service innovations in star rated hotels in Nyeri County.

1.5 Significance of the Study

This study reveals people-technology interaction as enabler of various hotel amenities and services designed to make the guest experience more enjoyable. The study help in identifying areas where technology can improve guest experience areas and where it is causing any dissatisfaction. The hotel managers would be in a better position to understand the needs and expectations of their customers based on their interaction with

the social media platforms. The study would also enable hotel owners to know the various ways people use technology and making sure, they integrate their services and facilities with the latest technology. The hotel managers would be able to constantly innovate and improve their services as this will keep them a head of competitors. The hotel owners would benefit in this research by incorporating recommendations of motivating and training of their employees to use the available technologies for service innovation. The integration of Nyeri county hotel employees would benefit by working more effectively when their daily activities are integrated with technology elements. Hotel guests would have better service experiences when the services are offered on time due to people- technology integration. The new features of the food and beverage products like new menus developed is likely to increase the hotels sales revenues thereby enabling Nyeri County government accrue more taxes from the hotels.

1.6 Scope of the Study

The study was conducted in selected 1-4 star rated hotels in Nyeri County. The specific places where the star rated hotels are located include Kieni East, Mathira, Nyeri Central and South, Mukurwe-ini and Tetu. The hotels included White Rhino, Westwood, The Ark and Ibis 2000 Karatina. The study focused on effects of people-technology interactions on service innovation in star rated hotels in Nyeri County. The study area was chosen based on the hotel star ratings by the Ministry of Tourism (fredrick & authority, 2019). The study was conducted between the months of November-December 2020 and extended to July-August, 2021 because of Covid-19 pandemic. Covid-19 pandemic affected the operations of the hotels because of the restrictions imposed by the government that it difficult to get the respondents. The structured questions were administered to the respondents.

1.7 Limitation of the Study

This study was limited by language barrier of the Kikuyu local dialect that is spoken by most of the employees and guests in the study area. This would make it difficult to get information. The study was limited by COVID -19 pandemic because of the new health regulations that limited the accessibility of the hotels to a few customers and employees. These limitations were countered by; Research assistants were chosen from the local community who were well conversant with the kikuyu language to enhance effective

communication with the guest and employees who were majorly composed of the Kikuyu people. COVID-19 limitation were countered by extension of the data collection duration to enable all the employees and resident customers to participate.

1.8 Assumptions of the Study

The study was based on assumption that hotel management were to allow their employees and customers to participate in the research. The study also assumed that respondents were willing to participate and give accurate information. The study was also based on an assumption that there was a coherent environment free from insecurity threats such as terrorism that may prevent respondents from participating in the research

1.9 Operational Definition of Terms

Customer-Social Media: Refers to interactions of customers with the social media platforms such as Facebook, WhatsApp that is provided by the hotel (Lim & Rasul, 2022).

Employee- Hotel Information System: Refers to interactions of the employees with the various Hotel Information Systems such as Reservation systems and Rooms management systems

EPOS: These are systems used to facilitate selling process via electronic mediums in the hospitality sector.

GDS: These computerized network system enables transactions between travel industry, hotels, airlines and travel agencies.

Hotel Information System: Technological Systems used in the hotel operations such as Electronic Point of Sale System, Reservation Systems, Mobile device technology, Self Service Technology and Rooms Management System

Service Innovation: Refers to innovation that is geared towards developing new products or improving features of existing hotel product such as Guest room facilities, Food, Beverages and recreational facilities

ICT: Refers to activities involving computers and other electronic technology.

IMS: Refers to a mechanism of hotels facilitating messaging services to its internal members

Interaction: Combination of two phenomena to get a unique feature for value addition

IT: Refers to the use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all forms of electronic data.

MDT: Is a technology used for cellular communication and its portable

People Technology Interaction: Interaction of people and technology for value addition

People: Refers to members of the organization who are internal and external to the organization i.e. customers and employees.

Property Management System: Refers to systems of operation used to manage various hospitality properties such as hotels, restaurants, resorts, motels and lodges

RMS: Refers to systems that facilitate coordination of hotel guest room activities such as providing room status report and also showing the occupancy percentage of the hotel rooms.

Service Innovation: Refers to coming up with new products or product element, or improving the features of existing products and services.

Social Media: These are media platforms that are used for interactions by customers and hotels, they include Facebook, Whatsapp, Twitter, Youtube, Virtual Reality, email and website

SST: Is a technology that provide an interface linking customers to the hotel services directly without involving employees as intermediaries.

Star Rated Hotels: These are hotels that have attained the full accreditation requirement as spelt out by TRA, (2019).

Technology: Are systems used to help in enhancing efficiency in the operations such as Hotel Information System and Social media

Validity: Is achieving the intention of the instrument of measurements about what they are supposed to measure

CHAPTER TWO

LITERATURE REVIEW

2.1 Organization of the Literature

This chapter reviews the existing literature of people-technology interaction. The researcher will source data from various journal articles search engines such as Scopus, Tandf online, Research gate, Emerald Insight, Elsevier and Science Direct. The articles reviewed were those published from the year 2010 to 2022. The review content was based on the location where the research was conducted: relevant theme ot the topic of study: theory applied: the interaction process evident and the research design used. There was comparison of the work of authors based on contributions, similarities and differences in their work. Strength and gaps were illustrated from the work of previous researchers. The researcher further reviewed theories based on their origin (first author's details), popularity (citation index), foundation of the theory, application in science and its utility of measurement. Theoretical gaps were put into examination by the researcher out of that the theoretical framework was used to develop a conceptual framework.

2.2 Overview of People-technology Interaction

People-technology interaction is a concept that is derived from the combination of people and technology to facilitate creativity and innovation in the hotel industry (Kandampully *et al.*, 2013). People refer to customers and employees whose characters of trust and emotional engagement enables hotel management to reap from their creativity and innovation (Akroush, ElSamen, Samawi, & Odetallah, 2013). Technology element includes aspects such as Hotel Information System (Information Technology), Online Platforms and Social media that have led to emergence of new opportunities to engage and enhance resources. (Chahal & Kumar, 2014).

Interactions of people and technology involve combination of people and technology elements to yield a unique interaction system that adds value of innovation in the hospitality industry (Kandampully *et al.*, 2016). Akroush *et al.* (2013) explain an interaction system of social media and customers in enhancing ease of access and convenient platforms for interaction in hotel sector. Jaakkola and Alexander (2014) acknowledge technology as a means of providing new ways for customer engagement

through online platforms, customer communities and social media. Jaakkola and Alexander (2014) explain that customers use social media to generate content of product, edit, and share among themselves and with service providers for consideration in implementation.

There are various indicators of people-technology interaction in hotels. The indicators include the use of technology by hotel employees, use of technology by guests and the level of integration of technology into the hotel's operations (Bongers, 2021). Hotel employees' use of technology is evident in the use of computers to check guests in and out, to make reservations, and to process payments (Chithradevi, & Nadda, 2022. Guests' use of technology is manifest in the use of the Internet to research hotels, to make reservations, and to check in and out (Lee, Liu & Tseng, 2022). The level of integration of technology into the hotel's operations is evident in the use of technology to manage inventory, to schedule staff, and to track guest satisfaction.

The application of technology an element of people-technology interaction system has been on rise in the Global hospitality industry. Parsons and Oja (2013) explain the utilization of technology in front office division to enhance reservation processes through systems such as Micros Fidelio. They argue that front office systems facilitate online booking of hotel guest rooms by customers at places of their comfort and employees find it easier to process reservation request of a large number of customers because of reduced paperwork and able to access all guest information details in the system (Parsons & Oja, 2013). These systems also link all the functions of front office division together with other hotel sectors. Mihalic and Buhalis (2013) show that effective communication of hotel businesses with most of its stakeholders is enhanced through adoption and use of Information technology.

Radulovic (2013) indicate usage of Global Distribution Systems (GDS) such as Worldspan, Galileo, Amedeus in providing platforms for central reservation of Global hotel room facilities. These systems enable potential customers to access information of various hotels in the world before they make decisions of reservation and booking. Selke and Schaar (2015) also observe that organizations have applied mobile app technology in food and beverage department to provide information such as menu of

the day, cost of menu items, preparation methods and mode of delivery. This has enabled employees to take minimal time in order taking processes, service of menu items. Billing and payment activities is made easier as customers already have access to the cost of items that are provided in the mobile app technology (Selke & Schaar, 2015).

Globally technology application has been common in the hotel industry due to the urge of providing a more personalized services to customers and minimizing paperwork (Mitel (2017). Technological trends aim at reducing customer interaction services to more personalized services. Parapanos and Michopoulou (2022) show mobile technology as the most trending that ranges from mobile keys, mobile payment, mobile check in and improvement in data security and accessibility by most hotels. All these digital techniques are aim at enhancing guest experience.

Agag and Masry (2016) explain emergence of Internal Message Service (IMS) for employees to enable them communicate with one another at the work place. For example, Front office personnel can use IMS to pass information of late checkouts, special requests or emergencies to housekeeping personnel. There is rise of Property Management Systems such as Operas, Micros Fidelis that integrate all the hotel departmental activities to enhance smooth flow of the hotel operations and improve on the accountability.

Mitel (2017) explain these advanced PMS in Front desk has been used to automate hotel services such as guest registration, In house room service. Mitei (2017) argues that these systems assist in customizing hospitality experience for guests and enables access of guest information at the front desk section. Tony and Tse (2013) indicate website creation by most hotels as a trend to aid in advertisement, bookings, making complaints, addressing guest queries and to enable customers contact the hotel staff directly. Rajath (2017) explain emergence of Beacon Points that are posts that uses Bluetooth and Cooperate with Android systems in hotel industry. These Beacon Points transmit messages between hotel and its customers. They are often located at outlets prone to problems such as Spas, eateries and bars (Rajath, 2017).

Wunsch, Lanvin and Dutta. (2019) indicates USA, China, France, United Kingdom, Japan and Singapore as examples of countries leading in Technological advancement and Infrastructures in the world innovation. Pullen (2017) indicates a study done by Oxford University showing 47% of all hotel occupations to be computerized by 2033. This prediction shows clearly the increasing of the technology application in performing certain tasks that were initially done manually. In, 2016 survey of Information Technology expenditure by different classes of hotels revealed middle class leading in spending by 7.3 % followed by upscale hotels at 6.3 % and lastly luxury hotels 5.6% (Adelson, 2016). These spending were geared towards digitization of the facilities to meet the global trend of smart devices for customers' experience and service provider's efficiency.

Parapanos and Michopoulou (2022) investigated the importance of hospitality technology revealing that 54% top world class chain hotels spending resources on technological advancement. The survey put focus on world brand hotels such as Marriot Chain hotels, Intercontinental hotels, Ritz Carlton, Starwood hotels, Hilton worldwide hotels, Raddison hotels, Best Western hotels and Premier Inn. Marriot Chain hotels invested on mobile app called Marriot Bonvoy that was to enable people to search and book any of 6700 Marriot hotel group located in 130 countries, the app also allows mobile check in and use of mobile keys to access the guest rooms (Marriot Hotel Annual Report, 2019).

Starwood hotels have invested in Mobile technology for check in and they have replaced key cards with keyless devices of mobile for their clients (Chahal & Kumar, 2014). Starwood hotels are also striving to enable their guests use their smartphones to access all the hotel services at their own convenience. Hilton group Hotels also enhanced a mobile app for automatic check in and keyless entry for its customers to find ease in accessing guest rooms (Depinto, 2016). Internet world Stats (2015) showed that 3.5 billion of the global people are using internet. This transformation to internet has a direct impact on hospitality industry as the people are the prospective consumers of the products and services.

The global application of technology is increasing at a rapid due to continuous changes in the demand of customers and emergence of new service methods such as self-service by use of technological devices (Lee and Cranage, 2018). For instance, customers no longer need to wait in the long queues to be booked in the hotel but instead have a more simplified booking via the websites of different hotels. Metal keys/Keycards have been replaced by the keyless system of hotel mobile apps hence customers do not find need of walking around the hotel with keys (Sigala, 2011).

These changes have made hotel management think of devising their investment strategies on applying the latest technologies that will deliver satisfaction to their customers and at the same time improving on their sales revenues (Sigala, 2011).. The hotel management are also changing their decision on having few numbers of competent employees rather than a large work force since much human work has been replaced by technology application (Verma and Thakur, 2020). This lowers the cost of production because of fewer wages that are paid to employees.

The leading hotel chain groups in America such as Hilton, Accor and Starwood emphasize on the need of integrating mobile devices with employees to improve on their productivity and guest satisfaction (Heymann, 2015). Jeong *et al.* (2016) explain the adoption of mobile devices by employees in Luxury Hotel Brand in United States. The findings revealed 69% of the employees used mobile device technology to do their work while 31% did not use their mobile devices for work because of inability to operate them.

Marriot Chain group hotels in United States also demonstrated an interaction of people and technology by coming up with a 3rd party internet services as a linkage with their customers to provide them with an online booking services for reservation (Marriott Hotels Annual Report, 2019). These studies have contributed to technology adoption by the American hotels. Both studies are addressing factors influencing adoption by customers and employees. The studies are addressing elements of interaction system separately. The studies explain adoption of technology to the benefits of certain people but not all of the people comprised in the interaction system.

Hotels in Asian countries such as China, India, Japan, South Korea, Malaysia, Thailand have sought innovation through the discovery of robots, affordable mobile devices, mobile apps, online shopping, virtual reality and e-commerce. Mckinsey Report (2015) indicate rapid growth of technology like Alibaba that links the whole continent hence facilitating growth in ecommerce that have also incorporated hospitality industry. Azdel, Mohd, Bakhtiar, Kamaruddin and Noor (2012) analyzed the usage level of ICT applications in Room division and Food & Beverage departments by the employees of hotels in Kuala Lumpur, Malaysia. Results showed employees level of usage high in the Room Division department where there was faster checking in/out and being done immediately. The Food and Beverage department reported low level of usage because of the employees using them only for cost control.

Liu, Hung and Wang (2019) conducted a study on determinants of self-service technology adoption and its implementation in China hotels. The results showed most of the hotels employees are still rigid to let go the traditional forms of service that customers find to be unfamiliar. These studies touch on what contributes to technology adoption by the various stakeholders. Acceptance among all the stakeholders is a common issue for the successful adoption. Both studies touched on specific element of the interaction.

Wunsch, Lanvin, and Dutta (2019) revealed some African countries leading in technological advancement and good infrastructures that is South Africa, Egypt and Nigeria. Other countries are also on the trend of improving on their technology due to increase demand by the global market. Awusiedu, (2019) examined the effective usage of ICT by employees and manager's perception in Kumasi Metropolis Hotels, Ghana. The study aimed at assessing attributes of ICT adoption. The study results reveal that even though ICT is adopted and use by the hotel employees it has not been fully embraced and its maximum level of usage is not yet achieved. The hotel managers also indicated that few employees who in some cases embraced ICT enabled them to enjoy benefits of ease to accessing information and improve productivity.

Said and Azizan (2013) conducted a study on factors affecting e-commerce adoption Libyan hotels. The findings showed that effective policy formulation and

implementation as the main factors of consideration. However, in Egypt, Adelbeary (2011) explain that employees resist a particular technology if they find it of no beneficial to them. These studies are focused on technology adoption. The need for successful adoption of technology is the common ground. The studies are addressing on different aspects for example one is addressing on what leads to acceptance while the others address what hinders adoption and policies. These studies are not informing on strategies for customers' adoption of technology and yet they are key interaction system element.

In Kenya technology adoption is evident in the 40% increase of 4-5 star rated classified hotels in 2019 as compared to 18% in 2018. This is according to the East Africa Classification Criteria that indica ICT adoption by hotels as one of the factors considered for the higher star ratings (Fredrick & Authority 2019). Several hotels mostly in Nairobi, South Rift and Coastal hotels were awarded for adoption of internet services, online booking, and electronic point of sale systems.

Mwai (2016) examines customer characteristics on the adoption of ICT by small and medium hospitality enterprises in Nairobi. The study sought to get information in regard to customer characteristics on adoption of the ICT. The results revealed that technology characteristics such as its type and level greatly determine the adoption and usage by customers. Technology characteristics is preceded by customer characteristics such as age, sex and level of education.

Otieno, Ouma and Omondi (2016) investigated on the influencers of ICT adoption by Kenyan hotels. The researcher involved a multiple of case studies to get the ICT adoption determinants. The results revealed Organizational characteristics, market characteristics, technology characteristics and perceived benefits as the main determinants of ICT adoption. These studies contribute to knowledge of ICT adoption in hotels. Both have a similarity of looking at the successful adoption of ICT. Mwai (2016) is narrowed to customer characteristics while Otieno *et al.* (2016) looks at the broader aspect of determinants. The studies assume the employee element on the adoption.

There is lack of understanding on how technology is used to improve the guest experience. Many hoteliers are still using technology that is outdated or that does not offer the features that guests want. This can lead to a poor guest experience and a decline in hotel businesses.

2.3 Effects of Customer-Social Media Interactions on Service Innovation

Customers are external members of the organization. Recently customers were not interacting with other customers about their experience with hotel products but today they interact and share their experiences with each other through the social media (Gligorijevic & Luck, 2012). Kaplan (2010) defines social media as a platform for interaction through that individuals and members of community's share, suggest desired services improvements and strategize to revise user generated content. Andrew (2014) outlines some of the popular social media platforms such as Facebook, Twitter, LinkedIn, YouTube and Instagram. Other social media networks include Google, WhatsApp, and websites.

Social media networks are used by hospitality industry to link with its prospective customers. Weinberg and Pehlivan (2011) explain Facebook as a platform the hotel management uses to bring its customers together so that they share their experiences, likes and photographs. The hotels use Facebook to trace consumer's preferences, their attitudes towards a product and use the information to introduce products that suit the customer's preferences. Leung *et al.* (2013) indicate twitter as a good marketing tool by the hotel because of its popularity in sharing short information to a large number of people within a particular time. Chans and Gillet (2011) explain use of YouTube as platform for trading where the hotel engages their customers for specific initiative to enhance a personalized experience to them. Choudhury and Harrigan (2014) show that social media platforms helps to capture customer's valuable information such as their preferences that create unique experiences and personalized services. The hotel can use this kind of linkage to improve on their existing products or innovate new products.

Constantinides, Amo and Romero (2010) assert that social media can be used by customers to generate online information about products and services then edit and share with organization for implementation. In hotel sector service innovation covers

improvement in offerings that is consumed by customers such as food &beverage products/service, accommodation services and any other offerings meant to improve guest experience (Nhepera, 2017). Hotel customers interact with each other through social platform during that they share their experiences of the hotel products. The customers use Facebook and twitter to engage in activities such as e word of mouth, providing feedback for new product development (Sigala, 2011). These activities influence the knowledge of prospective customers to consume the hotel services and also improve their perception on hotel brands.

Social media and customer interactions have a great influence on service delivery improvement because of the comments and suggestions provided by customers in the social media platforms. The suggestions provided by customers is applicable in restructuring service design by the hotel management. Garrido and Lockett (2016) conducted a study on the benefits of social media usage in Spain and United Kingdom hotels. The study assessed the significance of customers sharing their experiences of the hotel services via social media platforms such as Facebook and twitter. The results showed hotels using social media gaining customer knowledge in regard to their likes and preferences. This enables hotels to develop service that meets the needs of individual customers and this improves the success of service delivery. Baird and

Parasnis (2011) explain a study on impacts of social media and customer relationship management in USA. The study findings revealed that social media has become popular among firms enabling customization of their services such as online hotel booking to meet specific customer needs. The study concludes that unique service experience to customers is enhanced through meeting their demands as suggested in the social media platforms.

Bitiktas & Tuna (2020) estimates Global usage of social media to reach 3.02 billion of active monthly users by 2021 and this will have an impact on the consumption of social media content for hospitality industries. Facebook has been leading with 2.5 billion users of the world population followed by YouTube at 2.0 billion, WhatsApp 1.6 billion, Instagram 1 billion, Google with 430 million and twitter having 330 million (Ibrahim, 2021). Culnan *et al*. (2010) explain that these applications have been adopted

by most hospitality firms to enhance partnership with their customers and to enable them offer their comments that can assist the hotels to improve on service delivery.

Social media application in Europe is quite popular in sales and marketing department of hospitality and the usage level is estimated to be 59% of the population (Statista, 2019). Inversini, and Masiero (2014) conducted a study on social media and online travel agent's usage in selling rooms online at Ticino hotels in Switzerland. They factored online room selling strategies on the social media platforms but less effort being put on customer perspective. The study found out that the strategies that enhance online room selling process such as hotels updating their room availability in the social media platforms have attracted customers to book rooms online. The findings also outlined determinants of social media booking that includes its popularity, hotel information accessibility, convenience to customers and data management.

O'Connor (2010) conducted a study of social media online reviews of 100 London hotels on the Trip Advisor list to assess consumers concerns and their impacts on hotels products. The study sought to address the challenge of negative reviews by customers that is a hindrance to innovation. The findings showed that location of hotel, size of the room, good service and hotel cleanliness as the major concerns for consumers and attract positive review. O'connor (2010) affirm that customers' suggestions via comments to the 100 hotels in the Trip advisor list promotes transformation of guest room facilities to meet customer needs. Little attention has been given to interaction of customers and social media. TomDieck, Jung, Kim and Moon (2017) affirm the determinants of social media acceptance by customers in luxury hotels of United Kingdom. They assert the challenge of organizations just focusing on the need of social media acceptance without looking at the customer attributes. The findings showed that social media ease of access, trust and influence affects the acceptance by customers.

Social media has majorly been used in America for marketing of the hotel products and for online booking. Phelan, Chen, and Haney (2013) explain Facebook use as an effective tool for marketing and online booking of the hotel rooms in Texas, USA. The study attempts to address the interaction that is limited by little focus on customer for co-creation. They assert that Facebook usage by hotels varies for example some hotels

use it for customer engagement facilitation while others for posting hotel information. The study showed customer engagement and Hotel information on Facebook pages arguably influences service innovation. The 76% of the hotels studied interacted with customers via comments and enquiries on their stay at hotel rooms that later translated into service recovery and fitting the rooms with updated technology. The 24% of the hotels did not interact with customers via Facebook hence could not experience innovations.

Agnihotri, Dingus, Hu and Krush (2016) ascertain social media influence on customer satisfaction in hotels of Ohio and Miami states in USA. The study showed that customers get motivated when they receive important communication by the sales persons in the social media platforms and when their enquiries are immediately responded to by the organization. Agnihotri *et al.* (2013) argues that new and useful information generated by the customers inform of comments are useful in developing better room packages that suit consumers demand in terms of cost and quality. The research is however limited by just focusing on the effects of interaction but not the causes that encourages co-creation.

In Asia several studies have been done on social media utilization in marketing and selling of hotel products. Hsu (2012) conducted a study on how Facebook is used as eMarketing strategy by Six Taiwan Hotels in China. The study assessed the reactions of customers to updates provided at the Facebook by the hotels. However, the information of acceptance of Facebook by customers is not revealed to encourage co-creation that could result from interaction. The results revealed that customers often like and post comment on updates while giving positive experience and avoiding negative comments. Hsu (2012) ascertain that the information provided by the customer assists the hotel marketing department to know the room facilities, food and beverage product that are not attractive to clients to improve them or introduce new ones.

Chan and Guillet (2011) ascertained the social media websites effects on marketing performance in Hong Kong hotel industry. The challenge of customer involvement for successful interaction with social media was affirmed. Social media sites such as YouTube, Twitter and Facebook of 67 hotels were put to investigation. The results

showed that customers were not facilitated with encouraging social media sites where they could share their views (likes and dislikes) for co-creation with the hotels. For example, YouTube was used by hotels to show culinary skills to customers but customers involvement not factored. Co-creation encourages innovation since customers express themselves on what the hotels should adopt for service improvement (Kandampully *et al.*, 2016).

Africa has experience exponential growth in social media usage for better customer service. Mhlanga and Tichaawa (2017) conducted a study of social media influence on customer services in South African restaurants. The interaction challenge of little focus on customer involvement is also ascertained in this study. The result showed that social media platforms such as Facebook, Instagram and YouTube influences customers experience in food and beverages products. The influence was attributed to the platforms allowing visually appealing pictures and videos of products, the platforms being more conversational and customers being able to express themselves (Buscal, 2015; and Barnes 2010). These influencers of customer experience via the social media encourages service innovation as customers generate content of food products and share with the organization for consideration in the implementation process.

Mhizha, Nyaruwata, Munyanyiwa and Mandebvu (2015) examined the adoption of social media platforms by small and medium Hospitality Enterprises (SMHE) in Harare, Zimbabwe. This study attempted to address the challenges of social media adoption that makes it difficult for interaction to be realized. The study revealed that most of the SMHE were not gaining much from service innovation of social media because of poor connectivity and this made prospective customers not to access the platforms. Mhizha *et al.* (2015) show government intervention of installing good infrastructures for strong connectivity to encourage both hotel and its potential customers to access social media. This enables hotels to make aware their rooms, food and beverage products to customers via the social media platforms that increases sales revenues. The hotel brand image improves because of customers like and positive comments when satisfied by the products and services (Buscal, 2015)

In Kenyan hospitality sector Social media has been mainly applied in hotel marketing sector for branding purposes. Nyairo (2016) conducted a study of social media usage effects on equity brand building among 3-star hotels in Nairobi. The strategies of interaction limitation are evident with only social media given focus but less focus on customers. The findings showed that social media builds equity brand to hotels through provision of regular updates, building a lasting relationship with customers and participation in social media activities. Nyairo (2016) explain that these equity brand factors are influential on service innovation as they encourage customers to share their views with the hotel management in regard to food, beverages and room facilities elements to be improved. This study faces limitation of being confined to branding but not to encourage co-creation of customers with the organization.

Omodho (2019) observed that brand awareness by customers is facilitated through social media marketing among hotels in Kisumu. The study holds that responses to consumer enquiries in both Instagram and Facebook platforms leads to increase in brand awareness while twitter lead with interactive activities hence suitable for innovation. However, there are challenges associated with social media adoption in Kenya such as hotels having few followers in the platforms and Minimal updates of the hotel information provided in the platforms (Kuikka, & Äkkinen. 2011), these challenges are minimized by having regular updates in the platforms concerning hotel products and services. These measures enable good relations of hotels and its customers leading to co-creation.

The various service levels evident in the customer-social media interaction includes core value, actual service and augmented service (Kotler, 2005). Augmented service such as customer experience and information sharing has resulted from the interaction of customers in the social media platforms (Garrido & Lockette, 2016; O'Connor 2010). Core value of service has been addressed through different sales activities in the social media platforms such as online booking that enhances convenience to customer (Phelan *et al.*, 2013). Marketing activities and brand image enhancement has manifested in the social media and customer interaction as a form of actual service (Buscal, 2015).

The previous authors have shown service innovation that have been developed such as major service, major process, product line extension, process line extension, supplementary service, service improvement and style changes (Kotler, 2005)). Customers in the Facebook and Instagram platforms (Agnihotry *et al* 2013 have facilitated major and supplementary service innovation through the implementation of new service design suggestions. The style changes of business operations such as conducting online booking in the social media platforms as opposed to the manual booking that used to happen in the past (Phelan *et al*., 2013).

Despite the customer- social media interaction leading to service innovation of various levels. The specific levels of innovation being developed have not been given attention and also most of the studies doesn't give the level of interaction of customers and social media that is likely to lead to service innovation.

2.4 Effects of Employees-Hotel Information System Interactions on Service Innovation

Employees are internal members of the organization who assist in the production and provision of services to the clients in a way that is defined by the management (Gruman & Saks, 2011). Employees involve those dealing directly with the customers or frontline service personnel such as food and beverage service personnel and front office personnel. The other group of employees are regarded as back office employees who deal indirectly with customers such as kitchen production team and Housekeeping personnel (Gruman & Saks, 2011). Hotel Information System (HIS) is an element of IT that involves systems of Information supporting sequential procedures for collection, analyzing and storage of data for the day-to-day operations of the hotel business (Jang *et al* 2006). HIS applied in hotels include Front Office Systems, Interface systems, Back office systems and Restaurant & Banquet Management System (Kim *et al*., 2010).

Hotel Information System requires the input of employees to enable its operations. HIS also has a great influence on employees' attitude, morale and productivity at workplace (Dusan, 2014). Chiu and Ananzeh (2012) asserts that HIS is not distinguished from hotel operations, customer services, strategic planning and control of cost. They explain that these activities are facilitated by employees and made efficient through interactions with HIS Masa'deh, Alananzeh, Algiatheen, Ryati, Albayyari, and Tarhini, (2017)

explain the interaction of employees and mobile applications an interface of front office system to offer quick services such as faster registration process of customers in the hotel. This form of HIS also boost the morale of employees as they are able to register a large number of customers at a particular time.

Interaction of employees and Hotel Information System adds value to the final service delivered to customer in ways such as faster order taking, prompt registration and guest check-in (Kandampully *et al.*, 2016). Bazazo and Alanzeh (2016) affirm that Hotels would only realize benefits of HIS adoption when employees have a positive perception and acceptance of HIS in the organization. They explain that employees are often enshrined in the system through a continuous training on the HIS systems that enhances their familiarity with the hotel service operations. Empowerment of employees has also been done through constantly involving them in decision making concerning HIS functionality and their actualization. Venkatesh and Davis (2000) observes that even when proper system is put in place as mandatory for use and the users (employees) perceive it differently in terms of usage then it may not be effective.

Alananzeh (2014) Highlights some of the benefits of integrating HIS and employees to be cost reduction, boosting employee's morale and improving service delivery due to smooth flow of operations that is enhanced. Barjaktarovic (2013) argues that interaction of employee and HIS is not only important in cost reduction but also in decision making by the hotel management because of consolidated information. Cacic (2010) also explain that HIS enables employees to generate innovative ideas that act as a competitive advantage against other organizations that are not using HIS. These innovative ideas are used in the organization for improving the nature of existing hotel products such as menu, recipes, room facilities, recreational facilities, food and beverage products.

Various studies in America have focused on adoption of HIS technologies. Lee and Crenage (2018) conducted a study on service failure by use of Self-Service Technology (SST) an interface technology in US hospitality sector. The study examined employees' contributions to service failure with SST. The findings revealed challenge of SST failure on the employee that is attributed to inadequate training of the employees and

failure to hire qualified personnel. According to Lee and Crenage (2018) the service failure is addressed through employee training on HIS operations and Hiring of competent personnel.

These strategies to counter Service failure are found to be working for Hilton Chain Hotels in US that introduced a Virtual Reality a form of HIS to impart knowledge and skills to their new employees (Hilton Hotel Annual Report, 2019). Griffy, Chun and Machen (2008) reports that the performance of sales and revenues is increased because of training offered to employees that enhances smooth operations of the HIS hence minimizing service delay that causes dissatisfaction to customers.

In Asia electronic point of sale system has been adopted as a strategy for improving service delivery in hotels. Kamaruddin and Ahmad (2012) conducted a study to ascertain service delivery improvement through the Interface of Point-of-Sale System (POS) and Employees in Malaysian 4 and 5 star rated hotels. They reported employee's acceptance level and usage as key determinant for successful adoption of POS by hotels. They also indicated employee's resistance as a barrier for POS adoption and that it can be mitigated through employee motivation and involvement in decision making. Bowen, (2016) also argues that employee empowerment and involvement in decision making enhances organizational goal achievement of Customer satisfaction. He asserts that customer satisfaction leads to higher sales revenue.

Ko, Pei and Tsai (2016) explain that perception of employees is a key determinant for HIS adoption in Taiwan Hotels, China. They affirm that perception of employees is influenced by attitude, self-efficacy, and subjective norms that greatly impact on their behavioral intention for HIS adoption. Employee's Positive perception of HIS is likely to provide a co-creation environment that encourages innovation through creative thinking (Kandampully *et al.,* 2016). The hotel management have a great influence on employee positive perception through involvement and empowerment (Bowen, 2016)

In Africa most of the studies focused on HIS adoption. Abdelbary (2011) explain the significance of adopting Biometric interface technology by employees in Egyptian hotels. The study observes that employees are hardly involved in the policy formulation

for biometric technology usage hence seeing it as a form of punishment. However, through employee's engagement and involvement in biometric adoption there is reduction of time wastage (Abdelbary, 2011). The study assert that reduction of time wastage enables the hotel management to exploit the effort and time of employees at the work place hence making them fully engaged in various innovative ways.

Awusiedu (2019) argues that HIS adoption and usage by employees for efficient service delivery is dependent on employees' positive attitude as revealed in hotels of Ghana. The study affirms the challenge of less effort being put by hotel management to impact on employees' positive attitude for successful adoption. Managers asserted that HIS adoption is relevant as it leads to accessibility of information, increase in productivity and making work easier (Awusiedu, 2019).

In Kenya studies have shown HIS adoption in some sectors of the hotel industry. Chirchir, Nyaoga, Tanui and Njenga (2019) conducted a study to ascertain operational efficiency yielded by Electronic Point of Sale System (EPOS) hotels in Nakuru County. They reported faster data processing and higher tracking speed as the EPOS contributing factors to operational efficiency. The study gives less attention to employees who are operating EPOS systems to enhance efficiency. Bowen (2016) highlights employee engagement and involvement as key for successful implementation of organizational policies. Employee involvement also enable them to freely express their innovative ideas that are useful in brand extension, product features improvement and development.

Shirandula and Mwawaza (2018) observe the drivers that are likely to influence adoption of HIS by employees in Nairobi. The study attempts to address the challenge of resistance that hinders the successful adoption of HIS by employees in the hospitality sector. They revealed that socio-economic drivers such as personal characteristics of employees such as attitude and perception are key determinants for acceptance and usage of HIS in hotels. Shirandula and Mwawaza (2018) argues that the hotel management that positively influences their employees to HIS adoption are guaranteed of reaping higher sales revenue through various form of new ideas that was generated for service innovation and profitability.

Service levels of core value, actual and augmented have been addressed through innovative ideas of employees that are influenced by using HIS (Cacic, 2010). These innovative ideas are often used to actual service of accommodation facilities that provides core benefits of comfortable stay. Other actual service enhanced with the innovative ideas include; menus, recipes, food and beverages. Alananzeh (2014) highlights the core value of boosting employees by use of the HIS as they are involved in the decision making.

The service innovation developed by interaction of employees-HIS interactions may include major service, major process, product line extension, process line extension, supplementary service, service improvements and style changes (Kim & Han (2022). Service improvement innovation is developed by faster data processing and higher tracking speed of services by employees using EPOS (Chirchir *et al.* (2019). Bowen (2016) demonstrates evident of service improvement enhanced through employee engagement and involvement leading to their motivation hence ready and willing to deliver good services to customers. Virtual Reality used in imparting knowledge and skills to new employees leads to development of supplementary service innovation because of the service blueprint enhanced (Crenage, 2018).

While the interactions of employee and HIS leads to service innovation, some innovation levels are not well addressed in the previous research. This has not enabled full realization of service innovation since it has 7 levels (Kotler, 2005)

2.5 Theoretical Framework

This study was guided by the theory of People-Technology Interaction that was proposed by Kandampully *et al.* (2016) to show the benefits of creativity and innovation. The theory is derived from the extension of Service theory (Bowen, 2016) that focused much on the service provider empowerment to offer better services to customers. The theory is also founded on the service marketing theory (Zeithaml, Bitner and Gremler, 2006) that shifted the focus from the service provider to consumer perspective. People interaction technology explain how technology and people are combined to add value through co-creation.

People Technology-Interaction theory is founded on two theories; Service theory and practice that emphasized the need of empowering employees to offer customers good services (Bowen, 2016). Service theory aimed at equipping the employees with all they need to offer efficient services. The other theory is service-marketing theory that shifted the focus from employee's role status to customer perspective for creating value (Zaithaml *et al.*, 2006). Technology gained momentum in service marketing theory to substitute most of the roles played by employees. Kandampully *et al.* (2016) then came up with people-technology interaction theory to bridge the gap that was created by service theory and marketing theory to enhance a co-creation that entails combination of both people resource and technology for innovation.

The elements of Kandampully *et al.* (2016) theory include; People, Technology, Co-creation, Creativity and Innovation. People comprises of customers and employees of the organization, technology entails Information Technology (HIS) and Social media. Technology itself cannot work as it requires the support of people to operate and it reveals the potentiality of people by enabling them to do what they could not do before. Co-creation is enhanced through people collaborating or participating to enhance value addition for themselves or others (Sarmah & Rahman, 2018). Appropriate service climate and supportive service culture facilitate a conducive environment for people to be creative and innovative. The theory prospers when both employees and customers are empowered by the organizations they are associated to. Empowerment can be in form of various kind of motivations such as Involvement, Training, and Loyalty programs being organized by the organizations.

Kandampully *et al.* (2016) theory is applied by hospitality practioners to facilitate a company culture and appropriate service climate. This encourages people to apply the available technology for innovation for example; hospitality firms can encourage a culture of allowing customers in their social media platforms to suggest designs of product/service they would like to be served and this will encourage innovation (Sarmah, Kamboj & Rahman, 2017). Hospitality managers provides appropriate service climate to their employees such as freedom of using smartphone at workplace when not attending to guests, this motivates guests to be creative in coming up with

trending service methods that deliver good experience (Kamboj & Gupta, 2020). Scholars are also able to apply the theory in building their literature work as it encompasses impacts of people combination by use of technology for innovation. T is uncommon with previous scholars who just dwell on individual aspect such as customers.

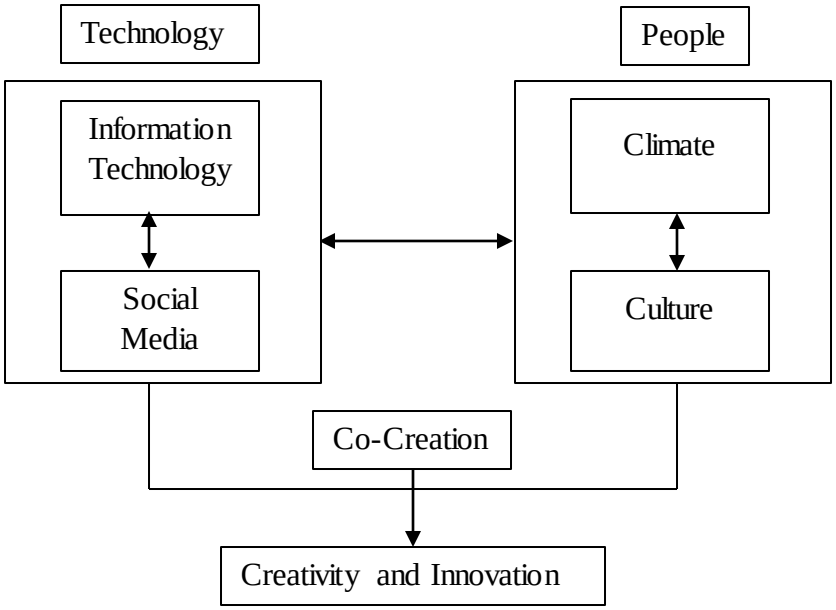

Figure 1: People Technology Interaction (Kandampully *et al.*, 2016)

This theory is quite popular in hospitality literature as it has been cited by many researchers that includes Sarmah and Rahman (2018). Akgunduz, Alkan and Gok (2018), Lee and Crenage (2018) among other authors. Most of these researchers applied the concept in explaining the result of co-creation and innovation through customers or employees using effectively the adopted technologies by the various hospitality sectors.

Sarmah and Rahman (2018) applied Kandampully *et al* (2016) s idea to explain psychological variables affecting customer participation in service innovation for Indian Hotels. They observed that psychological variables such as customer innovativeness, participative behavior, ability and their interlinking possess higher driving power for service innovation. This relationship of variables is applicable in planning and implementation of a successful co-creative service innovation as articulated in the Kandampully *et al* theory.

Lee and Crenage (2018) used the idea of Kandampully to measure the Self-Service Technology (SST) failure in consideration of employees and hospitality policies factor. They observed that SST failure is attributed largely by hotel policy failures as compared to employee's failure and customers is likely to blame the management team for improper policies. The proper policies of empowered service climate and supportive service culture as shown in the Kandampully is suggested as a remedy for service failure.

Ferndandez, Vijande and Sanchez (2020) in their study of drivers of service innovation success in Spain Hospitality industry. They support Kandampully *et al* idea by assessing on employee training, involvement and empowerment as internal marketing practices as the drivers of service innovation success. They assert that Frontline employees training, involvement and empowerment increases their commitment and satisfaction thereby motivating them to engage in service innovation processes.

Akgunduz, Alkan and Gok (2018) utilized Kandampully *et al* concept to explain perceived organizational support (POS) and proactive character on work meaning and creativity of employees in Turkey hospitality sector. They observed that both organizational support perception and proactive character have significant impact on the work meaning and creativity of employees. Employee creativity is a core element of the Kandampully *et al*'s theory while organizational support is core in terms of the service climate and culture.

The strength of this theory is that, it brings on board all the elements of people combination (customers and employees) and technology that can serve as a strong competitive strategy when adopted by hospitality firms. This is because appropriate service culture and service climate such as Employee freedom to use internet at workplace when not attending to guests encourages creativity. Customers also being allowed to send video content of suggestions showing their preferred service/product designs in social media platforms is a company culture that encourages innovation.

The theory however fails to include the supply side that entails hotel management because they play an integral role such as providing the appropriate service culture and

climate in the organization. The researcher customized this theory to fit the study by incorporating people, technology, creativity and innovation. A variety of parameters, indicators, measurement indices and scale were used. This enabled the researcher to use the theory as a practical tool for measurement that allowed for further quantification of data sought in the current study. This is shown in Table 1.

Table 1: Summary of Measurement Parameters, Indicators, Measurement Indices and Measurement Scale

Measurement Parameters	Indicators	Measurement indices	Measurement Scale (1-5)
People	Customers	Customer perception, customer expectations, skills of using the machine system and coordination with employees.	Strongly agree, Agree, Undecided, Disagree, Strongly Disagree
	Employees	Tasks assigned, styles of working, time taken to complete a task, difficulty in working, independency levels, coordination levels through activity sampling, job measurement.	Very low, Low , moderate , High, Very High
Technology	Social Media	Facebook, WhatsApp, Twitter, Website, Email,	Very High, High, Moderate, Low, Very low
	Information Technology (HIS)	Self Service Technology, Virtual Reality, Biometric Technology, Mobile Device Technology, Rooms Management Systems, Electronic Point of Sale System	Very High, High, Moderate, Low, Very low
Co-creation	Creativity and Innovation	Major innovation, major product change, product line extension, process change, supplementary change, service improvement, style change,	Most effective, very effective, effective, less effective, least effective
		New features of rooms, food& beverages, Advanced room facilities, Hotel interior &exterior design transformed, New personalized services, Changes in delivery time, improved financial accountability, additional booking, democratic work style	Very High, High, Moderate, Low, Very low

Source: Adapted from Kandampully *et al.* (2016) and modified by the author.

2.6 Conceptual Framework

The Independent Variable of the study include people-technology interaction while the dependent variable is service innovation. People-technology interaction was broken down into customer-social media and employee-hotel information system interaction. Service innovation was broken down into; new product development, cost reduction measures, timely delivery of service etc. The Intervening variables are demographic factors that include Level of education, gender, age and attitude.

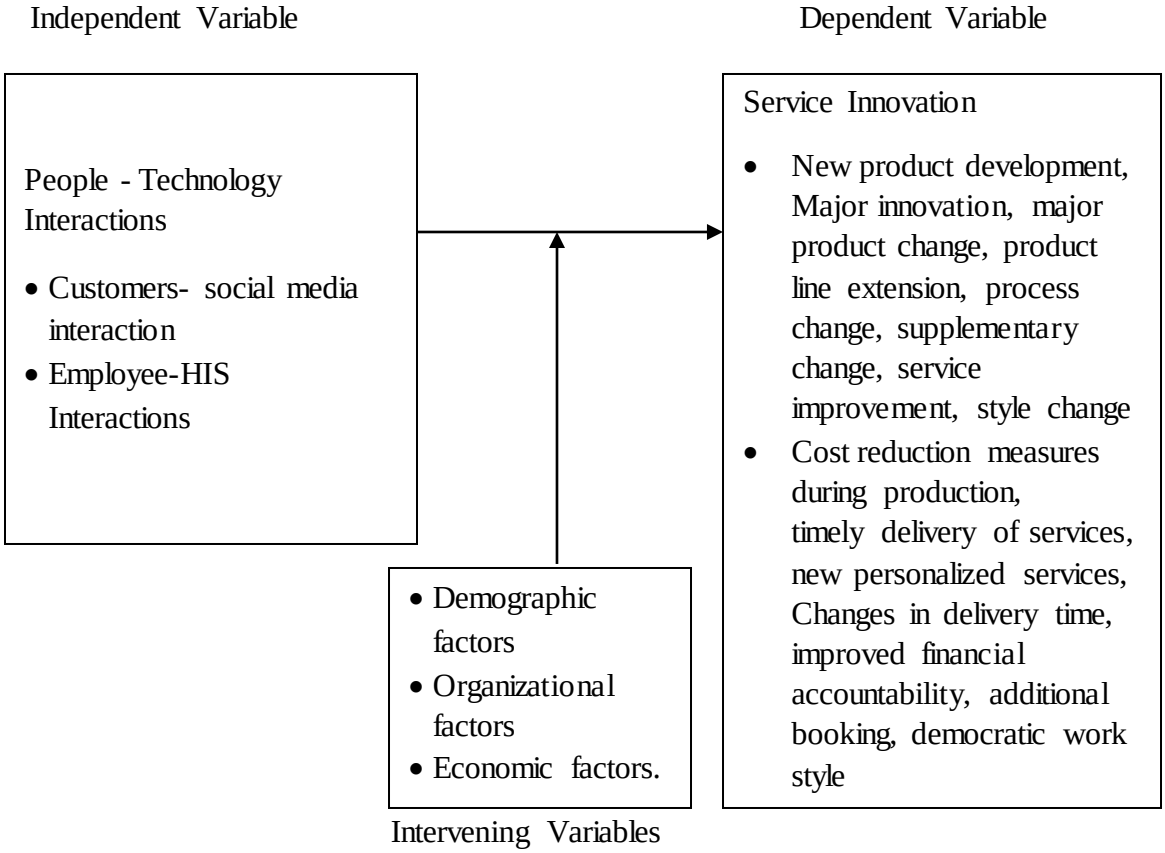

Figure 2: Conceptual Framework

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Study Area

The study was carried out in Nyeri County that covers an area of 2361KM². Nyeri County is found in the central region of Kenya and located in the South west of Mt. Kenya. The County lies between latitudes 0°24' and 0°11' S of the equator and longitudes 36°41' and 37°13'E, it is situated 5188 meters above the sea level. The main economic activities include agriculture, local trade and tourism. Nyeri County has experienced growth in hospitality business due to the need to support the experience of guest stays while visiting attractions in the county. The major tourist attraction sites are Mt. Kenya National Park, Aberdare National park, Mau Mau Caves, Dedan Kimathi Shrine, historical Italian War Memorial Church and Gikondi Parish among others. The main star rated hotels in Nyeri county are White Rhino, Aberdares Country Club, Green Hills, Westwood, Outspan, Serena Mountain Lodge, Giraffe Ark camp, The Ark, Ibis Hotel Nyeri and Ibis 2000 Hotel Karatina. These hotels have incorporated technologies such as Hotel Information System and Social media platforms. The hotels have also facilitated internet access facilities such as WIFI within the guest rooms and hotel compounds. The hotels have professionally qualified operative staff attaining the 40% least requirement of certified employees for star rating award (Fredrick & Authority 2019). The map of study area is in Figure 3.

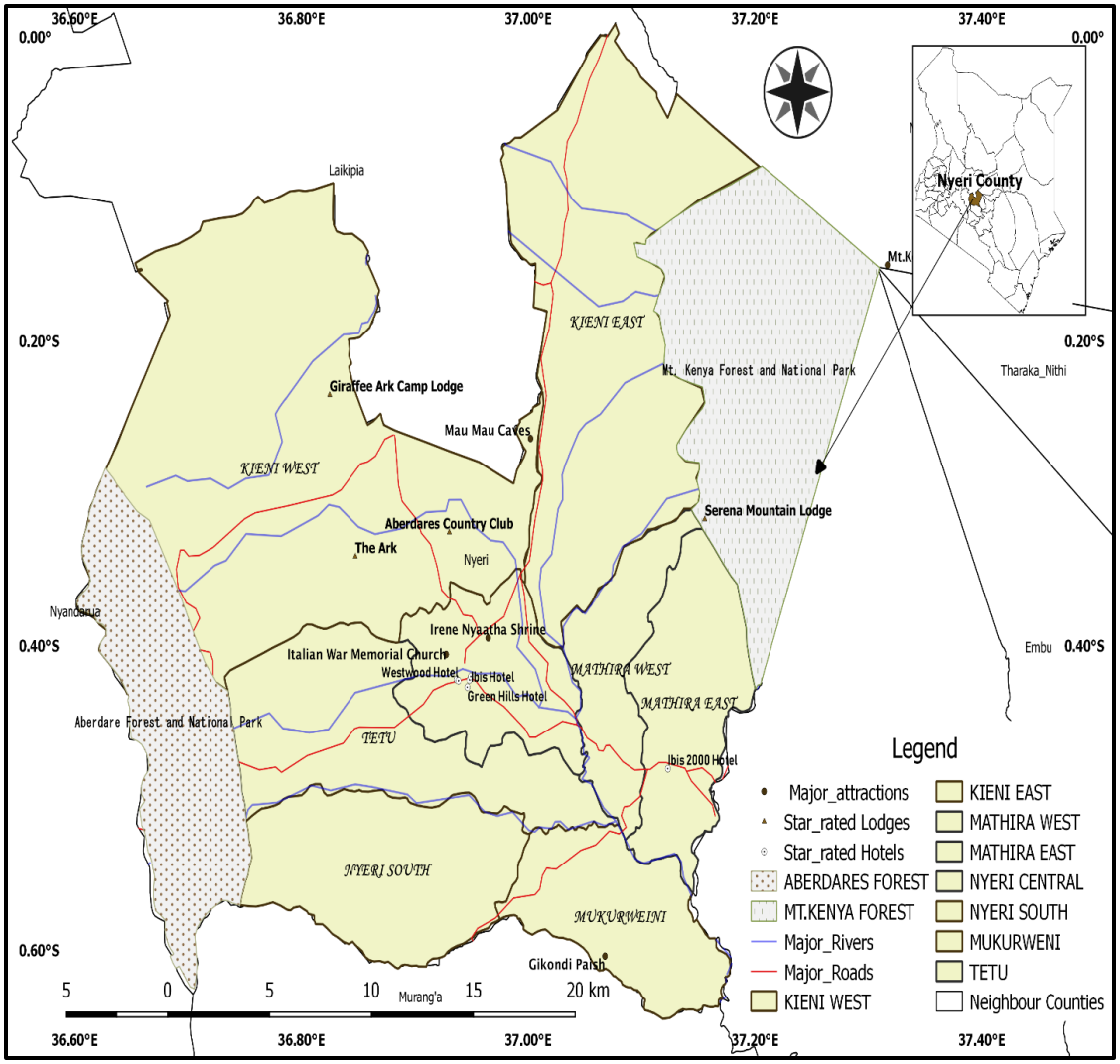

Figure 3: Map of Nyeri County, Kenya

3.2 Research Design

This study used descriptive cross-sectional survey research design. Descriptive cross-sectional survey enabled capturing of quantitative and qualitative data to test for significant relationship of people-technology interaction and service innovation in Nyeri County (Kothari, 2004). This design was effective since it enabled capturing of data from employees of different levels of operation and at the same time.

3.3 Target Population

The target population was the 10 star rated hotels and the total number of customers and employees in Nyeri County. Total number of customers was 1006.The no. of customer was obtained from the total number of bed capacities available in all the star

rated hotels in Nyeri County (Fredrick & Authority 2019). The total number of employees was 335 that was obtained from Human resource data of the selected hotels. The employees involved were the head of departments, supervisors and operational staff. Employees were from the following hotel departments; Front office, Food and Beverage, Housekeeping, Sales and Marketing, Stores and Control and Information technology. These departments were preferred since they are the outlets that uses various technologies for hotel operations.

Table 2: Target Employee and Customer Population

Star rated Hotels	Class	Bed Capacity (Customers No.)Y
White Rhino Hotel	4	128
Aberdares Country Club	4	94
Green Hills Hotel	3	260
Westwood Hotel	3	74
Outspan Hotel	3	93
Serena Mountain Lodge	3	84
Giraffe Ark Camp Lodge Nyeri	3	52
The Ark	2	120
Ibis Hotel Nyeri	2	44
Ibis 2000 Hotel Karatina	1	57
Total	10	1006

Source. (Fredrick & Authority 2019).

3.4 Sampling Procedure and Sample Size

The study involved a purposive and convenience sampling techniques. The 4 classified hotels (White Rhino, Westwood, The Ark and Ibis 2000 Karatina) were purposively selected because they were deemed to have advanced technologies. They also have professionally qualified employees with relevant skills and knowledge required to perform a task and finally these hotels being star rated enables them to attract a wide scope of customers from within the country and outside the country. Convenience sampling was applied to obtain the sample of employees and customers from the hotel establishments. The study considered respondents as having experiences with various types of technological devices adopted by the hotel. The study used a sample size of 278 customers and 178 employees from the 4 selected hotels. The sample size was derived in accordance with Krejcie and Morgan, 1970 using the formula.

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

where,

S= required sample size

X^2= the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N= the population size, N is z value (confidence level) that is taken as 1.96

P= the population proportion having the characteristics that is assumed to be 50 % (0.5)

D= the degree of accuracy expressed as a proportion (0.05)

S= Customers

$$S = \frac{1.96^2 \times 1006 \times 0.5 \times 0.5}{0.05^2(1006-1) + 1.96^2 \times 0.5 \times 0.5}$$

$$S = \frac{966.16}{3.4729}$$

$$= 278$$

S= Employees

$$S = \frac{1.96^2 \times 335 \times 0.5 \times 0.5}{0.05^2(335-1) + 1.96^2 \times 0.5 \times 0.5}$$

$$S = \frac{321.74}{1.7954}$$

$$= 178$$

The required sample size for population was 278 customers and 178 employees. The 278 customer respondents were distributed proportionately according to percentages as indicated in Table 3. The customer's sample size was distributed as follows: 94 for White Rhino Hotel, 54 for Westwood Hotel, 88 for The Ark Hotel and 42 for Ibis 2000 Hotel Karatina. The 178 employee respondents were also distributed proportionately

according to percentages as indicated in Table 4. The employee's sample size was distributed as follows: 61 respondents for White Rhino Hotel, 33 for Westwood Hotel, 56 for The Ark Hotel and 28 for Ibis 2000 Hotel Karatina.

Table 3: Sample Size for Customers per Hotel.

Star rating	Hotels	Target Population	Proportion	Sample size	%Total
1.	Ibis 2000 Hotel Karatina	57	57/379 x 278	42	15
2.	The Ark	120	120/379 x 278	88	31
3.	Westwood	74	74/379 x 278	54	20
4.	White Rhino	128	128/379 x 278	94	34
	Totals	379		278	100

Source: Research Data (2020)

Table 4: Sample Size for Employees per Hotel.

Star rating	Hotels	Target Population	Proportion	Sample size	% Total
1.	Ibis 2000 Hotel Karatina	20	20/128 x 178	28	16
2.	The Ark	40	40/128 x 178	56	31
3.	Westwood	24	24/128 x 178	33	19
4.	White Rhino	44	44/128 x 178	61	34
	Totals	128		178	100

Source: Research Data (2020)

3.5 Data Collection

The researcher and research assistants using a set of questionnaires collected data. The questionnaire was composed of closed ended questions. The researcher through administration of questionnaires collected primary data directly to employees and customers of the 4 selected hotels. The secondary data was collected from journal articles, reports, seminar papers and related books. All the Secondary materials used in the study were all cited and referenced. The researcher sought clearance from Chuka University Ethics Committee before data collection. The researcher also sought authorization and permit from National Council for Science and Technology (NACOSTI) before data collection.

3.5.1 Research Instruments

The researcher used questionnaire as the major instrument for data collection. The questionnaire comprised of an open introductory letter, section A, B and C questions.

Section A questions measured the demographic characteristics of the respondents, Section B determined the effects of people-technology interaction in hotel industry, and Section C measured the level of service innovation that was realized due to interactions of people and technology in Nyeri County. The researcher developed two sets of questionnaires; For the Employees and for the Customers.

3.5.2 Reliability

The reliability of the research instrument was determined using a pilot study by collecting data from 10% of the sample size with similar characteristics in Mombasa County. This helped in determining the consistency and stability of the results. The various types of questionnaires tested same questions that addressed the objectives of the research. The data collected from the pilot test was analyzed using SPSS version 25. A reliability coefficient (alpha) of ≥ 0.7 was accepted (Cronbach, 1951). The reliability coefficient alpha (α) was 0.92 for employees and 0.85 the customers.

3.5.3 Validity of the study Instruments

Face validity was enhanced using title headings that are related to the topic of study and research objectives as indicated in the questionnaires (Appendix I and II). The title headings were in bold form and well shown to the respondents. Content validity was enhanced by designing the questionnaire to address the objectives of the study. The researcher also worked closely with the supervisors and experts in the IT and hospitality industries who systematically and reasonably assessed the variable that the instrument was composed of and made any necessary adjustment.

3.6 Data Analysis

After data collection, questionnaires were organized and coded. Data was analyzed using Statistical Package for Social Sciences (SPSS) software version 25. Descriptive analysis was used and statistical parameters such as means, median and standard deviation were used. Inferential statistics used were Exploratory Factor Analysis and Categorical regression. Exploratory Factor Analysis tested the interrelationship of People-technology variables against Service innovation. Categorical regression showed the influence of people- technology variable indicators on service innovations in selected star rated hotels of Nyeri County. Categorical regression model tested the

extent to that people technology interaction predicted service innovation in hotels. Hypotheses were tested and significant levels sought at $p \leq 0.05$. The results for this study were presented in tables and figures.

Table 5: Summary of Data Analysis

Objectives	Independent variables	Indicator	Index/ Scale	Dependent variable	Indicator	Index Scale		Statistical test
To determine the effect of customer-social media interactions on service innovations in selected star rated hotels in Nyeri County.	People-technology interaction	Customer-social media interaction -Facebook -WhatsApp -Twitter -Email -Website	1-5 scale (very high, High, moderate , low and very low)	Service Innovation	Major innovation, major product change, product line extension, process change, supplementary change, service improvement, style change	1-5 scale (Most effective, very effective, effective, less effective, least effective)		Descriptive statistics, Categorical regression analysis, Exploratory Factor Analysis
To determine the effect of employee-HIS interactions on service innovations in selected star rated hotels in Nyeri County.	People-technology interaction	Employee-HIS interaction - Reservation system -Virtual Reality - EPOS - RMS -MDT -SST	1-5 scale (very high, High, moderate , low and very low	Service innovation	Major innovation, major product change, product line extension, process change, supplementary change, service improvement, style change ,cost reduction measures, new personalized service, new features of food, beverage and accommodation facilities.	1-5 scale (very high, High, moderate , low and very low	Service innovation	Descriptive statistics, Categorical regression analysis, Exploratory Factor Analysis.

Source: Author

General regression model that was used to guide the study

$Y = K + ß\ x1 + ß\ x2 + ε$

Where,

Y-Service innovation

K- A Constant

ß-Regression Weights for each indicator of independent variable

X –People-Technology Interaction

X1- Customer-Social media interactions

X2- Employee-Hotel Information System

ε = Error margin

The analysis for objective 1 used the following model;

$Y = K + ß\ x1 + ε$

Where,

Y-Service innovation

K- A Constant

ß-Regression Weights for each indicator of independent variable

X1- Customer-Social media interactions

ε = Error margin

The analysis for objective 2 used the following model.

$Y = K + ß\ x2 + ε$

Where,

Y-Service innovation

K- A Constant

ß- Regression Weights for each indicator of independent variable

X2- Employee-HIS interactions

ε = Error margin

3.7 Ethical Considerations

The researcher administered the questionnaires upon the respondent's consent and convenient time. Data collected was treated with high confidence and for academic purpose only. The researcher provided valuable information to those who assisted in

data collection such Nyeri county government and the star rated hotels. Secondary data used in the literature review was cited to recognize the various authors. Respondents were given a letter of acceptance for participation in the research that assured them confidentiality. Fidelity was enhanced through presentation of factual data collected.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The researcher and research assistants administered questionnaires to 456 respondents (278 customers and 178 employees). The total filled questionnaires were 172 for employees and 251 for customers in selected star rated hotels in Nyeri County. The response rate for employees was 97% and customers was 90%. The chapter begins with reporting the findings for employees and ends with those of customers. The reliability coefficient alpha (α) was 0.92 for employees and 0.85 for customers.

4.1.1 Demographic Characteristics of Employees

The highest percentage of the employees (43.6%) were in the age bracket of 32-47 years, while the lowest percentage (7.6%) represented the minority of employees who are in the age bracket of 10-25 years. The other employees (36.4%) were in the age bracket of 26-31 years and (12.13%) employees in the age bracket of 48-53 years. (Figure 4).

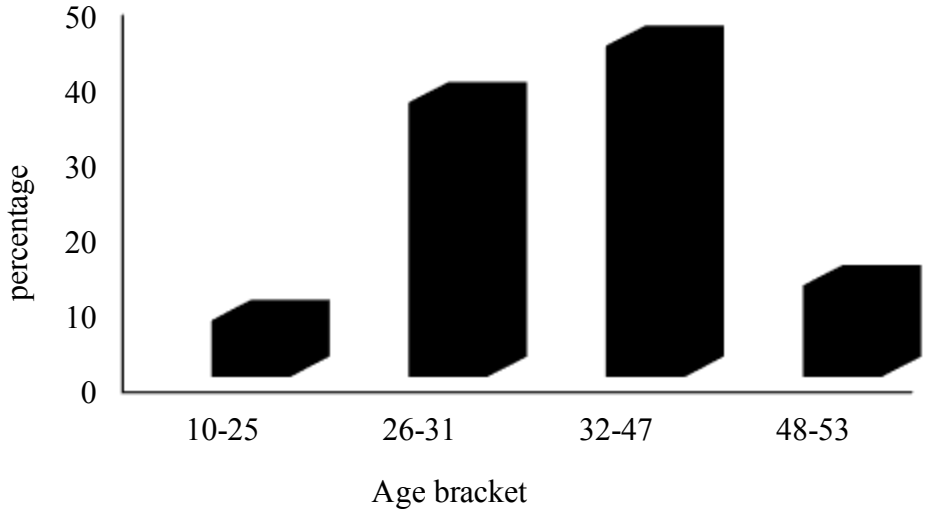

Figure 4: Age bracket of Employees

Education levels of the employees differed where 47% held Technical College Education, 42% held University Education, 9% held Secondary education and 2% held Primary Education levels (Figure 5).

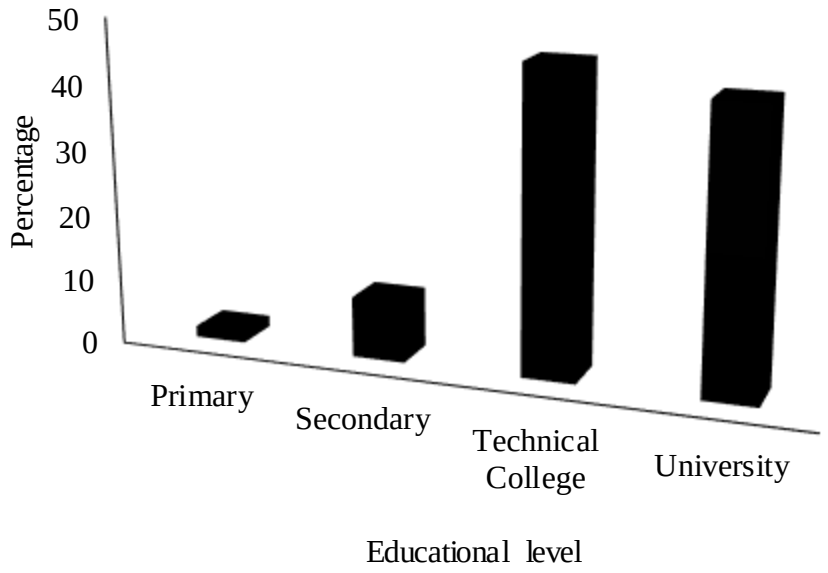

Figure 5: Level of Employee's Education.

The findings in Figure 6 indicated that 42% employees working duration ranged Between 1-4 years, 36% ranged 4-8 years, 14% ranged Above 8 years while 8% of employees work duration was less than 1 year in the hotels.

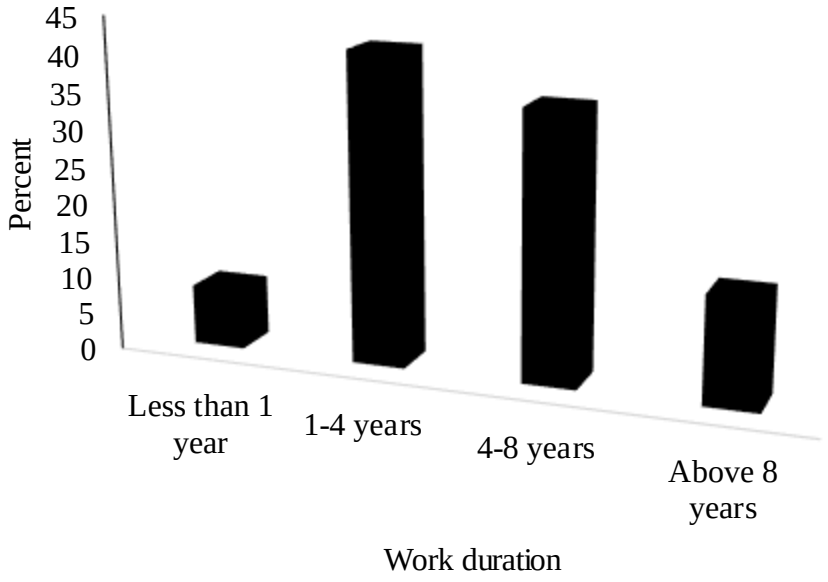

Figure 6: Employee's Work Duration

Majority (32%) of the employees worked in Food and Beverage Department (32%) ,15 % in Sales & Marketing, 13% in other Departments, 12% in Housekeeping, 11% in Stores & Accounts, 10 % in front office, 5% in Information Technology 2% of employees worked in human resource department (Figure 7).

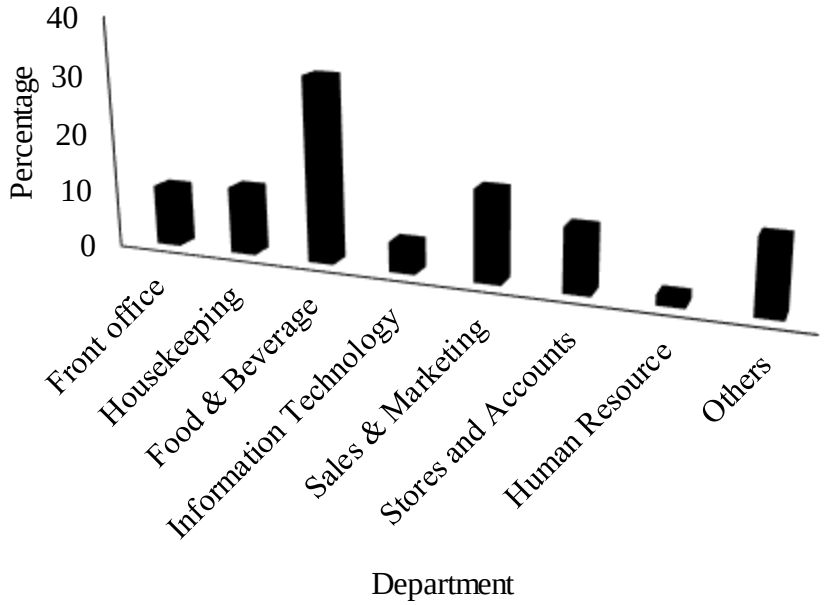

Figure 7: Employees' Department

4.1.2 Effects of Employee-Hotel Information System Interactions on Service Innovation.

Reliability is the accuracy of measurements and was enhanced through a pilot study that tested on the same aspects of the research variables involved. The pilot study results was the same as the main study. Reliability also helped to minimize errors.

4.1.2.1 Reliability Tests

Reliability of the scale used was tested using Cronbach alpha that indicated R score of 0.947. This reliability test result revealed that indicators used in variable measurements could explain 94.7 % of the variance sought. Hotel Information System (HIS) application and Job performance with HIS denoted the independent variable. The dependent variable was denoted by Service innovation level realized. HIS application levels had 6 indicators and scored a Cronbach alpha of 0.878. Job performance with HIS had 5 indicators and scored a Cronbach alpha of 0.900. Service Innovation realized had 8 indicators and scored Cronbach alpha of 0.905. All the reliability tests conducted met the threshold of 0.70.

4.1.3. Factor Analysis for Effects of Employee-Hotel Information System Interactions.

Exploratory Factor Analysis was used to isolate the main factors that affects the employees' interactions with Hotel Information System and to determine the interrelationship of the variables. First normality of the data was tested using Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's test of sphericity. The results were presented using a correlation matrix, KMO and Bartlett's test table and a table of communalities

Results in Table 6 indicate a KMO score of 0.939, that show the variables, satisfied the construct measurement of service innovation. The indicators yielded a variance of 2184.173 of the Bartlett's Test of sphericity at a significance level of 0.001. This indicated that correlation matrix test was adequate and factor analysis applicable for data analysis. KMO and Bartlett's test results showed that there was a relationship among the variables computed.

Table 6: KMO and Bartlett's Test on HIS applicability by employees

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.939
Bartlett's Test of Sphericity	Approx. Chi-Square	2184.173
	Df	171
	Sig.	0.001

The communalities of the HIS interactions with employees was further evaluated. Out of the nineteen indicators; Usage level of Biometric Technology (0.841), usage level of Virtual Reality (0.789) and usage level of Mobile Device Technology (0.718) yielded the highest extraction values. However; Timely delivery (0.561), usage level of Reservation system (0.586) and usage level of Electronic Point of Sale System (0.593) had the lowest extraction values (Table 7)

Table 7: Communalities on HIS Applicability by Employees for Service Innovation

	Initial	Extraction
Usage level of RS	1	0.586
Usage level of EPOS	1	0.593
Usage level of RMS	1	0.693
Usage level of MDT	1	0.718
Usage level of BT	1	0.841
Usage level of VR	1	0.789
Coordination easier	1	0.665
Changed workstyle	1	0.698
Improved workspeed	1	0.704
Achieved salestarget	1	0.663
Improved independency	1	0.654
Product Line Extension	1	0.601
Major Product Change	1	0.622
Transformed HIE	1	0.607
Improved Service	1	0.620
Timely delivery	1	0.561
Developed NCRM	1	0.684
Enhanced SSD	1	0.640
Enhanced democratic style	1	0.674

Extraction Method: Principal Component Analysis.

From the nineteen variables that were considered only three were extracted to represent 66.381% cumulative variance. This means that the factors had a significant effect on results. The remaining sixteen indicators generated total weight of 33.619% hence having insignificant effect on the results. (See Table 8).

Table 8: Total Variance Explained on HIS Applicability by Employees

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.892	52.064	52.064	9.892	52.064	52.064	4.876	25.665	25.665
2	1.585	8.342	60.406	1.585	8.342	60.406	4.733	24.909	50.574
3	1.135	5.975	66.381	1.135	5.975	66.381	3.003	15.807	66.381
4	0.75	3.949	70.331						
5	0.729	3.834	74.165						
6	0.604	3.18	77.345						
7	0.55	2.896	80.241						
8	0.483	2.543	82.783						
9	0.45	2.369	85.153						
10	0.402	2.116	87.269						
11	0.365	1.92	89.188						
12	0.352	1.851	91.039						
13	0.299	1.575	92.615						
14	0.29	1.529	94.144						
15	0.262	1.38	95.523						
16	0.25	1.318	96.841						
17	0.234	1.234	98.076						
18	0.187	0.984	99.06						
19	0.179	0.94	100						

Extraction Method: Principal Component Analysis.

Results in table 9 show that the three factors extracted included: Changed workstyle, achieved sales target and improved independency. These factors contributed significantly to service innovation in Nyeri County hotels at a total weight of 66.381%.

Table 9: Rotated Component Matrix of Employee-HIS

	Component		
	1	2	3
Improved workspeed	0.753		
Changed workstyle	0.730		
Coordination easier	0.707		
Usage level of RMS	0.703		
Usage level of EPOS	0.699		
Achieved salestarget	0.687		
Improved independency	0.675		
Usage level of RS	0.570		
Developed NCRM		0.754	
Enhanced SSD		0.735	
Enhanced democratic style		0.73	
Improved Service		0.706	
Transformed HIE		0.699	
Timely delivery		0.69	
Product Line Extension		0.663	
Major Product Change		0.594	
Usage level of BT			0.842
Usage level of VR			0.789
Usage level of MDT			0.75

Extraction Method: Principal Component Analysis.
3 components extracted

These 19 factors were rotated using varimax method and the resultant values are indicated on the component matrix. Only three factors emerged significant after seven iterations. The result for component 1 showed evidence of eight factors that were related to the levels of service innovation; Improved work speed, changed workstyle, Coordination easier, Usage level of Room Management System, Usage level of Electronic Point Of Sale, Achieved sales target, Improved independency and Usage level of Reservation System.

Component 2 also indicated eight significant factors that include developed NCRM, Enhanced SSD, enhanced democratic style, Improved Service, Transformed HIE Timely delivery, Product Line Extension and Major Product Change. Hotel information System forms such as EPOS directly influenced these factors.

Component 3 had three significant indicators: Usage level of Biometric Technology, Usage level of Virtual Reality and Usage level of Mobile Device Technology. These factors directly influence service innovation because of the interactions with employees.

4.1.4. Categorical Regression on Effects of Employee-Hotel Information System Interaction on Service Innovation

The researcher further conducted categorical regression to determine effects of employee-hotel information system on service innovation with significant levels sought at $p \leq 0.05$. The model was tested and results indicated scores of $R^2=0.55$, $F=24.386$ and $p=0.00$. This show that the model can explain 55% of the variables in service innovation meaning it was robust. This is shown in table 10.

Table 10: Model Summary for HIS level of Application for Service Innovation

Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
0.759	0.575	0.552	0.425

Dependent Variable: service innovation
Predictors: Usage level of RS Usage level of EPOS Usage level of RMS Usage level of MDT Usage level of BT Usage level of VR

The ANOVA scores for the model on indicated scores of ($F= 24.386$) and ($p \leq 0.05$) meaning that the` regression model explained a statistically significant proportion of the variance sought (See Table 11).

Table 11: Regression ANOVA for Hotel Information System

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	98.957	9	10.995	24.386	0
Residual	73.043	162	0.451		
Total	172	171			

Dependent Variable: service innovation
Predictors: Usage level of RS Usage level of EPOS Usage level of RMS Usage level of MDT Usage level of BT Usage level of VR

In Table 12, the results revealed that Usage level of Electronic Point of Sale was the only significant predictor variable ($p=0.001$). The other variables; Usage level of Reservation System ($p=0.771$), Room Management System ($p=0.447$), Mobile Device Technology ($p=0.717$), Biometric Technology ($p=0.600$) and Virtual Reality ($p=0.136$)

were all insignificant. This implied that most star rated hotels in Nyeri county have highly invested in EPOS as compared to the other hotel information system.

Table 12: Regression Coefficients

Usage level	Standardized Coefficients		df	F	Sig.
	Beta	Std. Error			
Reservation System	0.063	0.215	1	0.085	0.771
Electronic Point Of Sale	0.412	0.125	3	10.791	0.001
Rooms Management System	0.135	0.177	1	0.581	0.447
Mobile Device Technology	0.059	0.163	1	0.132	0.717
Biometric Technology	0.091	0.173	1	0.276	0.600
Virtual Reality	0.196	0.138	2	2.02	0.136

Dependent Variable: service innovation

The effect of job performance with HIS on service innovations was also tested. The model fit scores were as follows: R^2=0.52, F=16.543 and p=0.001. This show that the model could explain 52% of the variables in service innovation indicating its robustness. This is shown in Table 13

Table 13: Model Summary for Job Performance with HIS and Effects on Service Innovation

Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
0.745	0.555	0.522	0.445

Dependent Variable: service innovation
Predictors: Coordination easier Changed workstyle Improved work speed Achieved sales target Improved independency

The ANOVA Table 14 indicated that the regression model could explain a statistically significant proportion of the variance.

Table 14: ANOVA for Job Performance with HIS and Effects on Service Innovation

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	95.507	12	7.959	16.543	0
Residual	76.493	159	0.481		
Total	172	171			

Dependent Variable: service innovation
Predictors: Coordination easier Changed workstyle Improved work speed Achieved sales target Improved independency

The scores for coefficients differed where Changed Workstyle (p=0.040) and Achieved Sales Target (p=0.001) were the only significant predictor variables. The other variables; Coordination Easier (p=0.556), Improved Work Speed (0.975) and Improved Independency (p=0.454) were all insignificant (see Table 15).

Table 15: Regression Coefficients showing Job Performance with HIS and Effects on Service Innovation

	Standardized Coefficients		df	F	Sig.
	Beta	Std. Error			
Coordination Easier	0.165	0.279	1	0.347	0.556
Changed Workstyle	0.245	0.138	2	3.139	0.046
Improved Work speed	0.06	0.224	3	0.071	0.975
Achieved Sales Target	0.307	0.131	3	5.541	0.001
Improved independency	0.105	0.112	3	0.877	0.454

Dependent Variable: service innovation

The research finding in Table 12 and 15 suggested rejection of the null hypothesis, $H0_1$ that, there is no statistically significant relationship of Employee-Hotel Information System (HIS) interaction on service innovation in Nyeri County Hotels.

The results agree with Kamaruddin and Ahmad (2012) which investigated effectiveness of Electronic Point Of Sale (EPOS) in service operation of Malysian 4 and 5 star rated hotels. The study revealed EPOS as a better device for faster data processing of food and beverage products on sale. Similar findings were obtained by Chirchir *et al.* (2019) who alluded that usage of EPOS in faster processing of data for operational efficiency in food and beverage service industry. The study found out that EPOS contributes to faster data processing and higher tracking speed for food and beverage service in hotels. Abdelbary (2011) who conducted a study on Biometric Interface Technology affirms the study. He found out that Biometric Interface Technology is very popular for operational efficiency through reducing time wastage by employees.

The current results revealed that HIS form of Electronic Point of Sale System (EPOS) is popular for employee interaction because it enhances changed work style and achieved sales target in Nyeri County Hotels. However, the findings indicated Reservation System, Rooms Management System, Mobile device technology,

Biometric technology and Virtual reality as less popular HIS forms. The less popular HIS forms are caused by rare chances of employee involvement in Nyeri County Hotels.

The study findings of this objective supports the application of people-technology hybrid theory (Kandampully *et al.*, 2016). The results showed that employees (people) in high rated hotels have highly embraced Electronic Point of Sale a form of HIS (technology) in their operations and this would have been because of regular work training and employee motivation. This was observed in high star rated hotels such as White Rhino a 4-star hotel. Therefore, the provision of an appropriate work climate such as employee motivation and training would mean more service innovation. This reveals the impact of people-technology hybrid on service innovation

The results revealed there is an existing interaction of employees with Hotel Information System in Nyeri County. The high star rated hotels have high levels of service innovation reported due to the high level interaction of its employees with the availed Hotel Information System like EPOS, mobile device technologies and Biometric technology. Some of the low star rated hotels like Ibis 2000 have realized less service innovation due to the minimum interactions of employees with HIS technologies. The low rated hotels have inadequate or lack HIS technologies for their operations and most of their employees are not fully exposed to the usage of the HIS systems.

Global hotel chain businesses have shown the application of HIS and employee interactions for enhancing service convenience and innovation. Starwood chain hotels in United Kingdom showed application of mobile device technology to reduce workload to employees as customers get most of the services done by themselves (Chahal & Kumar, 2014). This encourages employees to get involved into more creative and innovative activities during leisure.

Hilton Chain Hotels in United States have fully embraced Hotel Information System usage in their day to day operations (Hilton Hotel Annual Report, 2019). The hotel incorporated a virtual Reality a form of HIS to assist in imparting knowledge and skills

to new employees. Virtual Reality provided opportunities for the innovativeness and productivity of the employees. The Malaysian 4 and 5 luxurious hotels also incorporated EPOS to assist employees in faster processing of food and beverage services, it has enabled hotels also to track all finances hence maximizing on the sales revenues (Kamaruddin & Ahmad, 2012). These hotel chains differ with the study findings in that they have more social media-interaction platforms like use of mobile apps by customers for self-check in and accessing hotel doors without the assistance of employees (Depinto, 2016)

The study findings showed significant usage level in Electronic Point of Sale System for faster food and beverages order tracking and reduce time wastage to customers in most Nyeri county hotels. The results are in line with the Government of Kenya's quality assurance policy that demand most hotels to be standardized and classified by 2030 according to the East African Community classification criteria (GOK, 2010). The findings indicated that majority of the Nyeri County hotels have made an effort in adopting the following technologies; Reservation Systems, Rooms Management System, Mobile Device Technology, Biometric Technology and Virtual Reality.

The past studies affirm the findings on the Employee-Hotel Information system interaction significance on service innovation. For example, a study conducted in Malaysia by Kamaruddin and Ahmad 2012) on service delivery, improvement agrees with the findings. The study results showed a positive interaction of employee and EPOS in yielding service innovation. The findings of a study done by Lee and Crenage (2013) on the failures of Self-Service Technology (SST) in United States of America hospitality sector revealed the SST unpopularity. This is because of employees getting inadequate training on the SST systems, this agrees with the findings that showed SST playing insignificant role in service innovation to hotels in Nyeri County hotels.

Abdelbary, (2017) conducted a study in Egyptian hotels on the significance of Biometric Technology and employee interface and he found out that there is reduction in time wastage by the employees. A study done in Nakuru County by Chirchir *et al.* (2019) also agrees with the findings in Table 12. He explains the interaction of EPOS and employees for faster data processing and higher tracking speed of services. A study

done in Nakuru County by Chirchir *et al*. (2019) also agrees with the findings. He explains the interaction of EPOS and employees for faster data processing and higher tracking speed of services.

Several studies have attempted to address the necessity of service innovation through interaction of hotel employees and Hotel Information System (HIS) (Kamaruddin & Ahmad 2012, Lee & Crenage, 2013; Bowen, 2016; Awusiedo, 2019; Abdelbary, 2017). The results have explained the employee's integration with HIS technologies like Electronic Point of Sale System, Room Management System, Reservation system, Mobile device Technology, Biometric Technology and Virtual Reality applied by Nyeri County Hotels to assist employees to speed up their work, develop more features of their Food & Beverage products.

These results are in agreement with Adelbery (2017) & Bowen, (2016) who argues that interactions of employee-HIS interactions leads to time saving and efficient service delivery. This interaction leads to enhancement of service innovation such as Achieved sales target, changed work style, coordination made easier, improved work speed and Improved independency. The study outcome indicated that usage Level of Biometric Technology, usage level of Virtual reality and usage level of Mobile Device Technology had a strong influence on the service innovation.

However, this finding is in contrary to the findings of Kamaruddin and Ahma, (2012), Chirchir *et al*. (2019) who argues that usage level of Electronic Point of Sale system has a great impact on the service innovation as it allows for online posting of food and beverage orders and also minimizing time wastage. The findings showed a shortcoming of underutilization of some forms of HIS like Reservation System, Rooms Management System, Mobile device technology by hotels in Nyeri county hotels. This could be caused by low investment by hotels on these HIS forms of technologies and employees involvement or inadequate employee training on these systems.

The research finding of the current research is very useful to the hotel industry for increase in their sales revenues through the various levels of service innovation enhanced including; changed work style and achieved sales target (table 15). The

service innovation realized enables hotel employees to work smart towards achieving the set goals of the organization. The results of the study have however revealed several HIS technologies underutilized by the Nyeri County Hotels leading to less realization of the service innovation i.e. changed work style and achieved sales target being the only significant while the other levels insignificant. This could be because of Nyeri County Hotels being at the initiation stage of hospitality growth implying lack of resources to invest in the advanced technologies. Employees may have not been fully involved hence not able to fully adopt all the HIS technologies for their service operations.

4.2 Demographic Characteristics of Customers

The research findings indicated that the largest percentage of the respondents (51%) were males and the lowest (49%) were females. Majority (46%) of customers visited the hotels after every year and the minority (16%) of customers' visit was one time. The level of education of the customers varied where the highest percentage (51%) had university and the lowest (2%) had primary levels of education. 38% had college level and (8%) secondary levels. This is shown in table 16.

Table 16: Education Level of Customers

Education level	Frequency	Percentage (%)
Primary	5	2
Secondary	20	8
College	96	38
University	130	51

The greatest percentage of the customers (34%) were aged between 26 and 31 years, 32% between 32-47 and 48-53 years, 9 % between 10-25 and the lowest percentage (5%) were above 53 years of age (Table 17).

Table 17: Age of Customers

Age	Frequency	Percentage (%)
10-25	23	9
26-31	85	34
32-47	79	32
48-53	52	21
Above 53	12	5

4.2.1 Effects of Customer-Social Media Interactions on Service Innovation

4.2.1.1 Reliability Tests

Reliability of the scale was tested using Cronbach alpha that indicated R score of 0.906. This reliability test result revealed that indicators used in variable measurements could explain 90.6 % of the variance sought. The independent variable was denoted by CB1 (Interaction with social media) and CB2 (customer suggestion on social media). The dependent variable was denoted by CC (effectiveness of social media in service innovation). CB1 that had 6 indicators scored a Cronbach alpha of 0.769, CB2 had 6 indicators scored 0.939 and CC had 6 indicators had a score of 0.871. All the reliability tests conducted met the threshold of 0.70.

4.2.1.2 Factor Analysis for Customer-Social Media Interaction

Exploratory Factor Analysis was conducted to isolate the main factors that affects customer interactions with social media and to determine the interrelationship of the variables. The results indicated that the correlation matrix test and factor analysis models were adequate for the study.

The normality of the data was tested using KMO and Bartlett's test of sphericity. The KMO score was 0.907 thus indicating that the variables satisfied the construct measurement of service innovation. The indicators yielded a variance of 2777.231 of the Bartlett's Test of sphericity at a significance level of 0.001. KMO and Bartlett's test results showed that there was a relationship among the variables that were used (Table 18)

Table 18: KMO and Bartlett's Test on Customer-Social Media Interaction

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.907
Bartlett's Test of Sphericity	Approx. Chi-Square	2777.231
	Df	153
	Sig.	0.001

The results of communalities of Social Media interactions by customer indicators (table 19), revealed that out of the eighteen indicators; Personnel skills improved (0.803), Booking Service improved (0.781) and Improved exterior & exterior design (0.712)

produced the highest extraction scores while Twitter effectiveness (0.354), Instagram effectiveness (0.483) and website effectiveness (0.501) scored the lowest.

Table 19: Communalities of Social Media and Customer Interactions

	Initial	Extraction
Facebook usage	1	0.661
Whatsapp usage	1	0.753
Twitter usage	1	0.510
Website usage	1	0.541
Email usage	1	0.606
Instagram usage	1	0.676
Accommodation Facilities	1	0.761
Food and Beverage improved	1	0.753
Personnel skills improved	1	0.803
Booking services improved	1	0.781
Interior and exterior design	1	0.772
Recreation and entertainment	1	0.744
Facebook effectiveness	1	0.658
WhatsApp effectiveness	1	0.666
Twitter effectiveness	1	0.354
Website effectiveness	1	0.501
Email effectiveness	1	0.591
Instagram effectiveness	1	0.483

Extraction Method: Principal Component Analysis.

From the eighteen variables that were considered, only three were extracted and scored a cumulative variance of 64.521%. This implies that they had a significant effect on results. The other remaining sixteen indicators generated a total weight of 35.479% hence contributed insignificantly on the results (Table 20)

Table 20: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.395	41.081	41.081	7.395	41.081	41.081	4.693	26.073	26.073
2	2.873	15.961	57.042	2.873	15.961	57.042	3.669	20.382	46.456
3	1.346	7.48	64.521	1.346	7.48	64.521	3.252	18.065	64.521
4	0.979	5.442	69.963						
5	0.751	4.172	74.135						
6	0.648	3.6	77.735						
7	0.567	3.148	80.883						
8	0.555	3.084	83.967						
9	0.468	2.598	86.564						
10	0.398	2.211	88.775						
11	0.345	1.916	90.691						
12	0.312	1.736	92.427						
13	0.28	1.555	93.982						
14	0.251	1.393	95.375						
15	0.245	1.362	96.737						
16	0.214	1.187	97.924						
17	0.202	1.122	99.046						
18	0.172	0.954	100						

Extraction Method: Principal Component Analysis.

Results in Table 21 indicated that the three factors extracted consisted of Changed workstyle, Achieved sales target and Improved independency. The factors thus contributed significantly to service innovation in Nyeri County hotels at a total weight of 64%.

Table 21: Rotated Component Matrix for Customer-Social Media Interaction

	Component		
	1	2	3
Personnel skills improved	0.843		
Booking services improved	0.838		
Recreation and entertainment	0.802		
Interior and exterior design	0.781		
Food and Beverage improved	0.778		
Accommodation Facilities	0.700		
Website effectiveness	0.563		
Instagram usage		0.817	
Email usage		0.768	
Website usage		0.690	
Instagram effectiveness		0.679	
Twitter usage		0.642	
Email effectiveness		0.603	
Twitter effectiveness		0.551	
Whatsapp usage			0.814
Facebook usage			0.778
Facebook effectiveness			0.733
Whatsapp effectiveness			0.710

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 6 iterations.

Table 21, presents 18 factors that were rotated using Varimax and three factors emerged after six iterations. The result for component 1 showed evidence of eight factors that were related to the various service innovation; Personnel skills improved, Booking services improved, Recreation and entertainment, Interior and exterior design, Food and Beverage improved, Accommodation Facilities and Website effectiveness.

Component 2 showed seven factors that were related to social media as an interaction site; Instagram usage, Email usage, Website usage, Instagram effectiveness, Twitter usage, Email effectiveness, Twitter effectiveness and WhatsApp usage.

Component 3 showed four factors that were related to usage of social media platforms; WhatsApp usage, Facebook usage Facebook effectiveness, and WhatsApp effectiveness.

4.3 Categorical Regression for Effects of Customer-Social Media Interaction on Service Innovation

Inferential analysis using categorical regression was conducted to determine the effects of customer-social media on service innovation at $p \leq 0.05$. The results revealed that the model was statistically significant, (R^2=0.393, F=10.001 and p=0.001) (table 22). This implied that the model could explain 39% of the variables in service innovation and thus it was robust.

Table 22: Model Summary of Customer- Social Media Interaction and Effects on Service Innovation

Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
0.661	0.437	0.393	0.563

Dependent Variable: service innovation
Predictors: Facebook usage WhatsApp usage Twitter usage Website usage Email usage Instagram usage

The results in Table 23 indicates that the regression model was statistically significant ($p<0.05$)

Table 23: ANOVA of Customer- Social Media Interaction and Effects on Service Innovation

	Sum of Squares	df	Mean Square	F	Sig.
Regression	109.667	18	6.093	10.001	0.000
Residual	141.333	232	0.609		
Total	251	250			

Dependent Variable: service innovation
Predictors: Facebook usage Whatsapp usage Twitter usage Website usage Email usage Instagram usage.

The findings in table 24, indicated that the predictor variables; WhatsApp usage (p=0.001), Facebook usage (p=0.001) and Twitter usage (p=0.030) were significant ($p<0.05$). All the other variables; Instagram usage (p=0.586), Website usage (0.124) and Email usage (p=0.135) were insignificant ($p>0.05$).

Table 24: Regression Coefficients of Customer- Social Media Interaction and Effects on Service Innovation

	Standardized Coefficients		df	F	Sig.
	Beta		Std. Error		
Instagram usage	-0.077	0.142	1	0.298	0.586
Facebook usage	0.374	0.119	4	9.89	0.001
Whatsapp usage	0.219	0.068	4	10.422	0.001
Twitter usage	0.135	0.071	2	3.57	0.030
Website usage	0.135	0.097	3	1.94	0.124
Email usage	0.151	0.113	4	1.775	0.135

Dependent Variable: service innovation

The results on customers' suggestion on service improvement for innovation (table 25), revealed that model was statistically significant (R^2=0.506, F=19.307 and p=0.001). This showed that the model could explain 51% of the variables in service innovation and hence it was robust.

Table 25: Model Summary of Customers Suggestion on Service Improvement for Innovation

Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
0.731	0.534	0.506	0.466

Dependent Variable: service innovation
Predictors: Accommodation Facilities Food and Beverage improved Personnel skills improved Booking services improved Interior and exterior design Recreation and entertainment

The ANOVA table 26 indicated that the regression model could explain a statistically significant proportion of the variance ($p< 0.05$)

Table 26: ANOVA of Customers Suggestion on Service Improvement for Service Innovation

	Sum of Squares	df	Mean Square	F	Sig.
Regression	134.002	14	9.572	19.307	0.000
Residual	116.998	236	0.496		
Total	251	250			

Dependent Variable: service innovation
Predictors: Accommodation Facilities Food and Beverage Improved Personnel skills improved Booking services improved Interior and exterior design Recreation and entertainment

The findings in table 27, indicated that only one predictor variable, booking services improved, (p=0.001) was significant. The other variables; Accommodation facilities (p=0.060), Food and Beverage improved (p=0.546), Personnel skills improved (p=0.943), Interior and Exterior design (p=0.345) and Recreation & entertainment (p=0.070) were insignificant.

Table 27: Regression Coefficients showing Customers Suggestion on Service Improvement and Effects on Service Innovation

	Standardized Coefficients		df	F	Sig.
	Beta	Std. Error			
Accommodation Facilities	0.166	0.105	3	2.509	0.06
Food and Beverage improved	0.103	0.132	2	0.606	0.546
Personnel skills improved	0.035	0.146	2	0.058	0.943
Booking services improved	0.325	0.117	3	7.759	0.001
Interior and exterior design	0.124	0.12	2	1.070	0.345
Recreation and entertainment	0.141	0.086	2	2.695	0.070

Dependent Variable: service innovation

The results are in agreement with Andrew (2014), Choudhury & Harrigan (2014) who asserted that Social Media Platforms are means of interactions for hotels and its customers. They explained various social media platforms such as Twitter, WhatsApp and Facebook usage as popular for enabling interactions between the organization and its customers. Leung *et al* (2013) in their study of social media application in Hong Kong hospitality and tourism sector had a similar finding by affirming Twitter as a popular platform for allowing interaction of customers and improving hotel services. Chain and Guillet (2011) also had a similar idea on website usage as a common platform where hotels post information of their products and services for potential customers to purchase.

The research findings implied the rejection of null hypothesis, $H0_1$ that, there is no statistically significant relationship of customer-social media interaction on service innovation in Nyeri County. The results revealed social media platform such as WhatsApp, Twitter and Facebook being popular for customer interaction and improving booking services while Website, Instagram and email usage to be insignificant. These insignificant social media platforms could have resulted due to less awareness done to customers by the hotels in Nyeri County. This is in agreement with

Hsu & Lun (2012), Phelan (2013), Weinberg & Pehlivan (2011), who had a similar perspective on Facebook platform as being popular to most customers for sharing experiences as compared to other social media platforms. Their findings also revealed Facebook as being significant platform for customer interactions and improving online booking.

The study finding for the regression coefficient of customer-social media interaction suggested the rejection of null hypothesis, $H0_1$ that, there is no statistically significant relationship of customer-social media interaction on service innovation in Nyeri County. The results revealed social media platforms such as WhatsApp, Twitter and Facebook were popular for customer interaction and improving booking services while Websites, Instagram and Email usage are insignificant. These results on social media platforms could have resulted from less awareness done to customers by the hotels in Nyeri County.

The results of effects of customer-social media interaction agree with the theory of people-technology hybrid (Kandampully *et al.*, 2016). The results showed that hotels with high ratings have empowered their customers and fully embraced Technology in their operations. This was evident in high star rated hotels like White Rhino a 4-star hotel. The interaction of these empowered customers and the available social media platforms enables the hotels realize certain levels of service innovation such as improved booking services. This represents the impact of hybrid of people and technology theory.

Most of the hotels in Nyeri County have not realized their full potential in gains of the hospitality industry since they are at the exploration stage of Tourism Area Life Cycle (Butler, 2022). The results showed clearly the potentiality of Nyeri county hotels in experiencing growth through service innovation. The customers have interacted with the hotels by sharing their product experiences via these platforms encouraging service innovation.

The results of regression coefficients for customer-social media interactions reveal an existing interaction of customers with available social media platforms in Nyeri hotel

businesses but minimal service innovation realized. The high star rated hotels such as White Rhino have high levels of service innovation reported because of the good interaction of its customers with their availed social media platforms such as their website page. The low star rated hotels such as Ibis 2000 have realized less service innovation because of the less interactions with customers in their social media platforms. These low star rated hotels have also not put up very active social media platforms for customer interaction. The hotel management responsibility of availing social media platforms, empowerment /involvement of its customer supports service innovation through interaction.

Parapanos and Michopoulou (2022) explain that chain hotels like Radisson hotels, Marriot hotels, Intercontinental hotels, Ritz Carlton, Starwood hotels have fully embraced usage of various social media platforms for service innovation e.g. online booking of their hotels. These hotel chains differ with the study findings in that they have more social media-interaction platforms like use of mobile apps by customers for self-check in and accessing hotel doors without the assistance of employees (Depinto, 2016)

These local findings of Nyeri County are confirmed by other studies done globally, regionally and nationally by various authors. Inversini and Masiero (2013) conducted a study in Switzerland that revealed use of popular social media platforms for online selling of hotel rooms. Tom Dieck *et al* (2017) had similar opinions in their study conducted among Luxury hotels in United Kingdom. A study in South Africa by Mhlanga and Tichaanwa (2017) that agrees with the study findings on use of social media platforms for sharing customer experiences. The experiences are based on the hotel products and services consumed. A national study done in Kisumu by Omodho (2019) on brand awareness by various social media platforms had a slight difference in opinions, it highlighted both Facebook and Twitter as popular social media platforms for customer interactions with hotels. This is in contrary to results for categorical regression that showed Facebook as unpopular for customer experience.

The Nyeri county hotels have attempted to address the need of service innovation through hotel interaction with its customers via social media platforms. The results for

regression coefficients of customer-social media interaction have explained the popular social media platforms such as WhatsApp, Twitter and Websites used by Nyeri County Hotels. This is to interact with its customers for enhancement of service innovation such as Improved online booking. These findings form a basis for future researchers to focus on the interactions of the customers with the various available social media platforms in order to realize various levels of service innovations. The results revealed a challenge of some popular social media platforms in the global arena such as Facebook being uncommon for interaction in Nyeri County hotels. This could be attributed to the inadequate sensitization or lack of awareness to customers.

This study finding is very useful to the hotel industry in enabling them increase their sales revenues through the various levels of innovation realized like improved online booking. Improved online booking leads to faster services in the front office service operations. The study result has however revealed one level of service innovation i.e improved online booking being significant while many other levels that were under study as being insignificant. This could be because of most social media platforms not fully embraced by hotels in Nyeri County.

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CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The study sought to assess the effects of people-technology interactions on service innovation in star rated hotels in Nyeri County. There was need to understand the effects of customers' social media interactions on service innovation and effects of employee-hotel information system interaction on service innovation. This chapter present conclusions and recommendations of the study.

5.2 Effects of Customer-Social Media Interaction on Service Innovation

The results from factor analysis indicated that 3 factors (Facebook 41%, achieved WhatsApp 15% and Twitter 10 %.) had a strong relationship with service innovation. The factors scored Eigen values greater than 1. This show that Nyeri County can equally focus on these factors for maximum service innovation to be realized.

The first categorical regression was used to analyze the relationship existing between the customer-social media interactions and service innovation level. The results revealed that WhatsApp usage (p=0.001), Facebook usage (0.001) and website usage (0.030) had a significant effect on the service innovation. The Instagram usage (0.586), Website usage (0.124) and Email usage (0.135) had insignificant effect on service innovation. These insignificant factors have a positive influence on service innovation but the hotel management have made less awareness for its people to embrace. Regression results indicated that WhatsApp usage, twitter usage and website usage good strategies for adoption by the Nyeri county star rated hotels to achieve maximum sales revenues through service innovation.

The findings for the second categorical regression indicated booking services improved (p=0.001) as the leading factor for service innovation. Most of the customers used social media platforms for suggesting to the Nyeri county star rated hotels to improve on their booking service for their satisfaction. The other variables; Accommodation facilities (p=0.060), Food and Beverage improved (p=0.546), Personnel skills improved (p=0.943), Interior and Exterior design (p=0.345) and Recreation & entertainment (p=0.070) contributed less level of service innovation since most customers were not

commenting on them for improved. The reason that led to their less contribution could be little effort made for awareness by most hotels.

5.3 Effects of Employee-Hotel Information System Interaction on Service innovation

The findings for factor analysis indicated that 3 factors (Changed work style, achieved sales target and improved independency) had a strong relationship with service innovation. These factors had Eigen values greater than 1 changed workstyle 52%, achieved sales target 8% and improved independency 5%. This revealed that among the rating of 18 factors, only the 3 factors had strong influence on service innovation for hotels. This show that Nyeri County can equally put emphasis on these factors for maximum service innovation to be realized.

The results from the first categorical regression revealed that Usage level of EPOS (p=0.001) have a great contribution towards attainment of different levels of service innovation in Nyeri county star rated hotels. Regression also indicated Usage level of Reservation System (p=0.771), Rooms Management System (p=0.447), Mobile Device Technology (p=0.717), Biometric Technology (p=0.600) and Virtual Reality (p=0.136) as the technologies that should be promoted to employees for full adoption in Nyeri County star rated hotels.

The study findings for the second categorical regression revealed that changed workstyle (p=0.040) and achieved sales target (p=0.001) are the most significant variables emanating from interactions of employee and Hotel Information System. These leads to high service innovation. The other variables; Coordination easier (p=0.556), improved work speed (0.975) and improved independency (p=0.454) are the variables to be improved by the Nyeri county star rated hotels. This will in turn leads to increased sales revenues.

5.4 Conclusions

a) The guests/customers

The results for the effects of people-technology interactions on service innovation revealed guest's interactions with the social media directly influencing the service innovation of the hotels. Nyeri County hotels have provided social media networks

such as WhatsApp, Twitter and Websites. These networks have enabled the guests to interact with one another and enabled the interactions with the hotel. Guests have also used these platforms to put suggestions on their expectations of the hotel services. The implementation of these customer suggestions by the hotel management in their daily operations have created service innovation. The innovations realized have increased hotels sales and revenues. Guest satisfaction has been realized since most guests feel involved in the service design.

The results for the other variables like Facebook email and Instagram played an insignificant role in service innovation realization. This could be attributed to the failure of most customers to regard the platforms useful in accessing the hotel services or for interactions with one another. Therefore, the hotel managers in Nyeri County could device mechanisms of creating awareness on the existence of these platforms to their customers.

b) The Employees

Results for the effects of employee-hotel information system on service innovation revealed that there is a level of service innovation realized through interactions of employees and the element of Hotel Information System. The EPOS played a great role in the enhancement of the innovation since most of the employees used it for the sale of food and beverage service. Most of the variables like reservation system, BT, VR, MDT played an insignificant role in the innovation realization. The reason could be that most of the employees have minimal interactions with those systems.

c) The Hotel owners/managers

Results from both customer and employees' interactions with the technologies revealed that service innovation level could be realized and the hotel management would be able to realize an improvement in sales revenues. The findings further revealed that the hotel owners/managers who have invested in the modern technologies such as EPOS, Twitter, WhatsApp, and website realized various levels of service innovation such as improved coordination of work, timely delivery. This was evident in most of the 3 and 4 star rated hotels that were under investigation in Nyeri County.

d) The County /National Government

The findings revealed that most of the hotels that were under study in Nyeri county ranging from the lower star rated to higher star rated had good policies of investing on modern technology and trained personnel in their operations. These policies were generated by the Kenyan government in liaison with the other East African countries to guide on the criteria for star rating. Modern technology and trained personnel policies is evident in all the hotels like White Rhino, The Ark, Ibis 2000 and Westwood that were under study. The policy has enabled them realize service innovation and earn qualification for the star rating ranking.

5.5 Recommendations

Based on the above conclusions the study recommends the following;

i. Hotel owners should motivate their people to interact well with the modern technologies that they have adopted to increase their hotel sales revenues
ii. The hotel management should provide enough social media platforms for their customers to interact among themselves and to the hotel by giving their suggestions on their expectations of the products and services
iii. Employees in the hotel should utilize the advanced technologies provided by the hotels for the day to day operations since it would improve their working styles and leads to service innovation
iv. The national/county government should come up with policies to enhance effective interactions of the people and technologies in the hotels to improve on their sales.
v. The hotel management should create awareness on their existing technological platforms to all their stakeholders in order to ensure involvement of everyone in the development of hotel through service innovation

5.6 Suggestion for Further Research

i. The study was limited to Nyeri County that has unique attractions that motivates guests to visit the county. There is also different star rated hotels that is able to provide accommodation, food and beverage services to these guests. These unique attractions may have influenced on the type of

technologies adopted and the behavior of the guests on how they interact with the social media platforms. This calls for the same study to be conducted in a different county with different technologies and behavior of guests to confirm the findings.

ii. The study generalized on the people-technology interactions. The future studies should be specific on interaction of various elements of people and technology; for example effects of customer-social media interaction on service innovation or effects of employee-hotel information system interaction.

iii. The current study used cross-sectional descriptive design that collected data from customers and employees at only a specific time of the year. Longitudinal design would be adopted by future researchers to get data from guests visiting hotels at different times of the year. This would provide adequate information for analysis.

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APPENDICES

Appendix I: Questionnaire for Customers

Dear Respondent,

I am **Akoko Geoffrey** a masters' student in Chuka University undertaking an academic research on *Effects of People-Technology Interactions application on Service innovation in star rated hotels in Nyeri County*. This study results was used by Hotel owners/ Managers in Kenya to adopt an interactive system of people and technology and is likely to enhance efficiency, customer satisfaction and higher sales revenues. The data collected will enable the researcher to develop a masters' thesis that forms a partial academic requirement for the conferment of Master's degree in Hotel Management. The information to be provided was treated with high confidentiality. Thank you.

SECTION A:

Demographic Characteristics (Please indicate with a tick where necessary)

A1. Please indicate your Gender; (GEND)

i. Male [ ]
ii. Female [ ]

A2. Please indicate your highest level of education; **(**EDCN)

i. Primary [ ] ii. Secondary [ ] iii. College [ ] iv. University [ ]

A3. Please indicate your age; (YERS.).

i.10-25 [ ] iii. 32-47 [ ] iv. Above 53
ii.26-31[ ] iv. 48-53 [ ]

A4. Please indicate your frequency of visiting this hotel; (FQCY)

i. One time [ ] ii. 2-3 times in 5 years [ ] iii. Every year [ ]

SECTION B: Effects of Customer-Social Media Interactions on Service Innovation in Star Rated Hotels in Nyeri County

B1: Please indicate your rates of interaction with social media platforms **(Tick as appropriate) Very High (5) High (4), Moderate (3), Low (2) Very Low (1)**

Customer-Social media interaction	**5**	**4**	**3**	**2**	**1**
I use Facebook to give the hotel my feedback on my experience with the hotel products.					
I use WhatsApp chat groups to interact with the hotel					
I use the hotel's active Twitter account for conversing on my expectations of the hotel products					

I use hotel's active website to get regular updates on new room facilities, menu modification.					
I use Email account to maintain a regular communication with the hotel.					
I use Instagram to get a visual impression of the products offered by the hotel					

B2. How has your communication on Social media enabled you to make suggestions for hotel service improvement? **Please tick appropriately. Very High (5) High (4), Moderate (3), Low (2) Very Low (1)**

Customer suggestions on social media	**5**	**4**	**3**	**2**	**1**
I often use social media to suggest the need to improve on accommodation facilities					
I often use social media to suggest the need to improve on food and beverage products					
I often use social media to suggest the need to improve on the personnel skills					
I often use social media suggest the need to improve in booking services					
I often use social media to suggest the need to improve on hotel interior and exterior designs					
I often use social media to suggest the need to improve recreation and entertainment services					

C. Please indicate the effectiveness of the social media used in influencing service innovation. **Please tick appropriately. Most Effective (5) Very Effective (4), Effective (3), Less Effective (2) Least Effective (1)**

Effectiveness of Social Media	**5**	**4**	**3**	**2**	**1**
Facebook					
WhatsApp					
Twitter					
Website					
Email					
Instagram					

Appendix II: Questionnaire for Employees (Operational staff, Section/Departmental Supervisors and Managers)

Dear Respondent,

I am **Akoko Geoffrey** a masters' student in Chuka University undertaking an academic research on *Effects of People-Technology Interactions application on Service innovation in star rated hotels in Nyeri County*. This study results were used by Hotel owners/ Managers in Kenya to adopt an interactive system of people and technology and is likely to enhance service efficiency, customer satisfaction and higher sales revenue. The data collected will enable the researcher to develop a Masters' thesis that forms a partial academic requirement for the conferment of Master's degree in Hotel Management. The information to be provided was treated with high confidentiality. Thank you.

SECTION A: Demographic Characteristics (Please indicate with a tick where necessary)

A1. Please indicate your gender; (GEND)

i. Male [ ] ii. Female [ ]

A2. Please indicate your age (YERS.).

i. 10-25 [ ] ii. 26-31 [ ] iii. 32-47 [ ] iv. 48-53 [ ] iv. Above 53

A3. Please indicate your highest level of education; **(**EDCN)

i. Primary [ ] ii. Secondary [ ] iii. Technical College [ ] iv. University [ ]

A4**.** Show how long you have worked in the hotel; (DRTN): (Tick where appropriate)

i. less than 1 year [ ] iii. 1-4 years [ ] iii.5 – 8 years [ ] iv. Above 8 years

A5. Your current position in the hotel;(PSTN)

i. Departmental head [ ] ii. Supervisor [ ] iii. Operational Staff [ ]

A6. Show the department of the hotel where you work;(DPTM)

i. Front Office [ ] iii. Food & Beverage [ ] v. Sales and Marketing [ ]

ii. Housekeeping [ ] iv. Information Technology [ ] vi. Stores and Acounts [ ]

(vii) Human Resource [ ] (viii) others [ ]

SECTION B: Effects of employee-hotel information system interactions on service innovation in star rated hotels in Nyeri County

B2: Please indicate the levels of employee application of Hotel Information System in your hotels. **(Please tick) Very high (5) High (4), moderate (3), Low (2) Very Low (1)**

Employee-Hotel Information System interaction	**5**	**4**	**3**	**2**	**1**
My organization uses Reservation Systems to undertake online booking and reservation of guest rooms.					
My organization uses Electronic Point of sale System in food and beverage outlets for enhancing efficient service.					
My organization provides Rooms Management System to control room status and avails the report to other departments of concern					
My organization provides mobile device technology for enhancing faster services.					
My organization incorporates Biometric technology for logging.					
My organization uses Virtual Reality to learn to avail trending updates on service delivery expectations.					

B3. Please indicate the extent to which employees Interaction with the Hotel Information System has facilitated job performance. **(Please tick). Very high (5) High (4), moderate (3), Low (2) Very Low (1)**

Job performance with Hotel Information System (HIS)	**5**	**4**	**3**	**2**	**1**
Coordination with other employees is easier when we share information with HIS					
My working style has positively changed with the use of Hotel Information system					
I have improved on the time taken to complete a task in my area of operation (speed)					
I have achieved the sales targets set by my department of operations					
My Independency levels at work has improved when am using the Hotel information system					

SECTION C. Service innovation realized through employee-Hotel Information System interaction

C1. Please indicate the extent to which service innovation would be realized through enhanced interactions between Employees and Hotel Information System. **(Please tick). Very high (5) High (4), moderate (3), Low (2) Very Low (1)**

Service Innovation realized	**5**	**4**	**3**	**2**	**1**
The hotel has developed new features of rooms, food and beverage services.					
The hotel has experienced advanced room facilities, satisfying food and beverage elements					
There is transformation of hotel interior and exterior designs as compared to the previous designs					
The hotel has created new personalized hotel services that has reduced complaints level.					
There is positive change in delivery time for hotel product such as room services, food and beverages					
There is improved accountability of finances and stock items through online tracking					
The hotel has realized additional booking/food and beverage services via online systems					
The hotel has developed democratic work style for excitement and motivation					

Appendix III: Nyeri County Star Rated Hotels (Fredrick and Authority, 2019)

Hotel	**No. of Rooms**	**No. of Beds**	**Star Rating**
White Rhino Hotel	102	128	4
Aberdares Country Club	47	94	4
Green Hills Hotel	100	260	3
Westwood Hotel	57	74	3
Outspan Hotel	43	93	3
Serena Mountain Lodge	42	84	3
Giraffe Ark Camp Lodge Nyeri	30	52	3
The Ark	60	120	2
Ibis Hotel Nyeri	40	44	2
Ibis 2000 Hotel Karatina	52	57	1
TOTAL	**573**	**1006**	**10**

Appendix V: Chuka University Ethics Review Letter

CHUKA UNIVERSITY

Knowledge is Wealth *(Sapientia divitia est)* Akili ni Mali

CHUKA UNIVERSITY INSTITUTIONAL ETHICS REVIEW COMMITTEE

Telephones: 020-2310512/18 **P. O. Box 109-60400, Chuka**

Direct Line: 0772894438 **Email: info@chuka.ac.ke,**

Website: www.chuka.ac.ke

REF: CUIERC/ NACOSTI/ 148 **06/ April/2021**

TO: **Geoffrey Akoko**

RE ; **Effects of People Technology Interactions Rate on Service Innovation Levels in Star Rated Hotels in Nyeri County.**

This is to inform you that *Chuka University IERC* has reviewed and approved your above research proposal. Your application approval number is *NACOSTI/NBC/AC-0812.* The approval period is 06/April/ 2021 -06/April/2022

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by *Chuka University IERC.*
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to *Chuka University IERC* within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to *Chuka University IERC* within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to *Chuka University IERC.*

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely

DR. B. M. KANGA
CHAIRMAN CHUKA UNIVERSITY

Appendix VI: NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 885729

Date of Issue: 15/April/2021

RESEARCH LICENSE

This is to Certify that Mr.. Geoffrey Oluoch Akoko of Chuka University, has been licensed to conduct research in Nyeri on the topic: Effects Of People-Technology Interactions Rate On Service Innovation Levels In Star Rated Hotels In Nyeri County. for the period ending : 15/April/2022.

License No: NACOSTI/P/21/10001

885729

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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