DURBAN UNIVERSITY OF TECHNOLOGY

PROMOTING A TECHNOLOGICALLY DRIVEN TOURISM INDUSTRY POST-COVID-19: A CASE STUDY OF HOTELS IN DURBAN, SOUTH AFRICA.

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PROMOTING A TECHNOLOGICALLY DRIVEN TOURISM INDUSTRY POST-COVID-19: A CASE STUDY OF HOTELS IN DURBAN, SOUTH AFRICA.

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APPROVED FOR EXAMINATION

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ABSTRACT

The outbreak of the coronavirus disease (COVID-19) in 2019 resulted in governments from around the world being proactive by responding with extreme measures that had significant impacts on economies from travel bans to some hotels closing down temporarily and others indefinitely. Quarantine and partial-to-full lockdowns were enforced to contain the spread of the virus. As a result of this, the tourism industry suffered the most. The South African tourism industry was not spared from such impacts. The aim of the study is to promote a technologically driven tourism industry post-COVID-19 in South Africa. Hotels are now adopting technological solutions to provide guests with contactless hotel services and reassure them of their health and safety. There is an increase in the adoption of robotics and AI, self-service kiosks, remote check-out and facial recognition check-in systems, all these technological innovations are being implemented to minimize the spread and risk of COVID-19 infections by eliminating physical human-to-human contact. The spatial setting of this research study was the City of Durban, KwaZulu-Natal (KZN). The study integrated two different sampling techniques underpinned by probability sampling method, namely: simple random sampling and nonprobability sampling method, namely: purposive sampling technique. The study's target population for hotel guests, was N=2 000 000 (forecasted visitors), thus a sample size of n=384 was determined to be appropriate. However, a sample size of 422 was achieved. The respondents were categorized into two different groups namely hotel guests (travelers) and 11 General Hotel Managers. A convergent parallel mixed method was adopted for this study. Data was collected through online survey questionnaires and structured interviews and was analyzed using SPSS (Statistical Package for Social Sciences) version 27.0 and NVivo software.

The primary results revealed that younger respondents had a positive attitude towards the use of service automation technologies (SATs) in hotels when compared to the older travelers' counterparts. There were concerns about privacy and security issues, the use of SATs by hotel guests and job losses as a result of the adoption of SATs by general hotel managers. The respondents had a high preference for human employees in hotels for interactivity purposes but also had a high preference for SATs for safety and health purposes where the risk of COVID-19 was involved. Hotels in the city of Durban faced SAT adoption barriers which included a lack of government support and inadequate IT skills and infrastructure. Hotels in the city of

Durban along with the city's tourism industry continue to lag behind in terms of technology adoption. A Conceptual Framework was developed, which was underpinned by the aforementioned findings, and they are expected to be useful tools in assisting General Hotel Managers in the city of Durban in successfully adopting SATs so that their benefits can be fully exploited and restore the trust of hotel guests and travelers and reassure them of their health and safety when consuming tourism and hotel services amid and post-COVID-19 pandemic.

KEY WORDS: Hotel, Guests, Hotel General Managers, Service Automation Technologies, COVID-19

DECLARATION

I hereby declare that this thesis is my own work. All citations, references and ideas used that belong to other authors have been acknowledged. This thesis is submitted to the department of Hospitality and Tourism, Faculty of Management Sciences for a Master of Management Sciences specializing in Hospitality and Tourism Management. None of the thesis or any other work that form part of it was previously submitted before in any form to Durban University of Technology or any other institutions whatsoever.

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DEDICATION

This thesis is dedicated to my lovely parents, Mr. Jackson William and Mrs. Ntombizodwa William.

I had a dream of obtaining a master's degree and planted its seed, then both of you watered it with love, patience, support and prayers. Today we are reaping the fruits of our toil and sweat. This thesis marks the culmination of a new chapter of our lives that is full of possibilities and living our lifelong dreams.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ANNEXURES

LIST OF LEGISLATION

Broad-Based Black Economic Empowerment Act 53 Of 2003

Labour relations Act 65 of 1995

Protection Of Personal Information Act (POPIA) No.4 Of 2013

The Disaster Management Act 57 Of 2002

Tourism Act No. 3 Of 2014

White Paper On The Development And Promotion Of Tourism In Kwazulu-Natal 2008

LIST OF ACRONYMS

4IR	Fourth Industrial Revolution
AI	Artificial Intelligence
BBBEE	Broad-Based Black Economic Empowerment
COVID-19	Coronavirus Disease 2019
EDTEA	Economic Development, Tourism and Environmental Affairs
GCM	Guest Cycle Model
GDP	Gross Domestic Product
ICT	Information and Communications Technology
KZN	KwaZulu-Natal
MICE	Meetings, Incentives, Conferences and Events
NDT	National Department of Tourism
NSCI	Non-Stop Check-In
POPIA	Protection of Personal Information Act
RAISA	Robots, Artificial Intelligence and Service Automation
SAT	South African Tourism
SATs	Service Automation Technologies
SPSS	Statistical Package for the Social Sciences
STATS SA	Statistics South Africa
TAM	Technology Acceptance Model
TKZN	Tourism KwaZulu-Natal
UNWTO	United Nations World Tourism Organisation
UV	Ultraviolet Radiation
VR	Virtual Reality
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

The coronavirus disease 2019, popularly known as COVID-19, is defined as an illness caused by a novel coronavirus, a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) formerly known as 2019-nCOV. The virus can be spread directly from an infected person's mouth and nose in small droplets that are produced into the air each time they cough, sneeze or breathe (World Health Organisation 2020b).
The COVID-19 pandemic impacted the travel and tourism industry significantly. The pandemic accelerated the immersion and application of various technological applications across the tourism and hospitality sectors (Dube 2021). Before the COVID-19 pandemic, the tourism industry proved to be one of the fastest-growing economic sectors and a major source of employment across the entire globe. The sector experienced a recorded growth of 3.5% in 2019, contributing a total of US$8.9 trillion to the global gross domestic product (GDP), accounted for 330 million jobs worldwide (Sibisi, Arun Das and Mohammed Ashaf 2020: 493). In South Africa, tourism contributed a total of R116.9 billion toward the South African economy during the 2018/19 period through the direct spending of both international and domestic travelers' markets. In addition, visitor exports reached a total of R126.7 billion which equates to 9,2% of total South African exports. Moreover, tourism was accountable for a total of 1.5 million jobs in South Africa representing approximately 9.2% of South Africa's total employment market (South African Tourism 2019).

Pre-pandemic, technological innovations within the tourism industry were seen and considered novelties or add-ons, however, due to the COVID-19 pandemic, there was a paradigm shift towards the intense adoption of various technologies, which became the tools for the survival of businesses operating in the hospitality and tourism industry (Jiang and Wen 2020:2565). Technology has become the most efficient tool for countries, especially developing ones, to utilize in bringing the tourists back to their destinations and restoring their trust. The National Department of Tourism developed a tourism sector recovery plan as a COVID-19 response guideline for the South African Tourism and Hospitality Industry. Tourism is a vital contributor to the South African economy; therefore, the plan acknowledges the urgent need for an intensely coordinated action to mitigate the impacts of the COVID-19 pandemic and set South Africa's tourism industry on a path to recovery, transformation, and long-term sustainability post-pandemic

(National Department of Tourism 2021). The introduction of touchless and contactless services, especially in hotels and other tourist destinations has proven to be effective in regaining the trust of tourists and governments alike in reopening the tourism sector to pre-pandemic levels (Zeng, Chen and Lew 2020: 726). These technological innovations assisted tourism business operators to mitigate the negative impacts of the pandemic and restore the trust of the travelers (Ivanov *et al.* 2020b: 30). As much as the recovery prospects for the South African tourism industry are high, both the hospitality and tourism industries of the country will never be the same again and the high demand for contactless travel experiences requires South Africa to invest more in technology as a measure to reduce risk and ensure traveler confidence (Dube 2021: 282).

As much as technology can bring about benefits to the tourism industry post-COVID-19, on the flip side of it, lies a possibility of job losses and the displacement of the industry's employees, reskilling and upskilling of employees and the large maintenance costs involved with technology adoption (Ivanov *et al.* 2021). In order for South Africa to fully exploit the benefits of various technologies as a result of the fourth industrial revolution, there is a great need for the upskilling and retraining of professionals and an aggressive regulatory policy framework is needed to address the issues, challenges and the negative impacts such job losses, redundancy, lack of specialized skills and low employment opportunities for semi-skilled individuals that come with the adoption of innovative technologies and fast-paced information and communications technology (ICT) individuals (Department of Science of Technology 2019: 40). Since the future of the tourism industry in South Africa is unknown post-pandemic, The aim of the study is to promote a technologically driven tourism industry post-COVID-19 in South Africa. is to promote a technologically driven tourism industry post-Covid-19 in South Africa to future proof it from alike pandemics that may occur in the future.

1.2 BACKGROUND OF THE STUDY

The Coronavirus (COVID-19) disease was first discovered in Wuhan, China in December 2019 (Chen and LI 2020:515). Guo *et al*. (2020:8) further explains that the virus soon rapidly spread from China to other countries and continents globally with approximately 750 000 registered cases of COVID-19 infections and 35 000 fatalities as of 30 March 2020 in Europe, USA, Iran and Asia-pacific being hit the hardest by the COVID-19 pandemic. As of 21 March 2020, South Africa had 240 confirmed COVID-19 cases, with 27 of them in KwaZulu-Natal. On 5 March 2020, the South African Health Ministry confirmed the spread of the virus to the country, with the first COVID-19 case being a male who had just returned from Italy (National Department of Health 2021). The World Health Organisation (WHO) declared COVID-19 a global pandemic as of 11 March 2020 (Chen and Li 2020:515). This resulted in

governments from around the world responding with extreme measures that had significant impacts on their economies from travel bans and the closure of hotels with some going out of business indefinitely. In addition, quarantine and partial or complete lockdowns took place to contain the spread of the disease. Similarly, on 15 March 2019-, the South African presidency declared a national state of disaster and announced measures such as immediate travel restrictions and the closure of schools from 18 March 2018. South Africa's national lockdown commenced on 27 March 2020 (National Department of Health 2021). As of September 2021, confirmed COVID-19 cases were just over 224 million globally, with confirmed deaths at 4.6 million (World Health Organisation 2021). As of 19 March 2022, South Africa had a total of 3 700 484 active cases with 3 585 603 recoveries. In addition, the country had recorded a total of 99 829 deaths related to the virus with 1 682 new cases reported. A total of 32 903 329 vaccines had been administered in South Africa (National Department of Health 2022).

The tourism sector was the most affected economic sector by the above-mentioned actions taken by various governments around the world (Ivanov et al., 2020: 27). Many companies whose business models were more flexible moved their operations virtually (online) with employees working from home. However, this was very different for service companies such as airlines, restaurants, hotels, event organisers, and the hospitality and tourism industry at large. These businesses were forced to stop operations due to the decreasing demands that resulted from the imposed lockdown regulations (Hanson 2020; Pandey 2020). The South African government introduced a 5-stage national lockdown approach. At stages 4 and 5, all airports, hotels, restaurants, and other recreational facilities around the country had ceased all operations with the exception of only emergency and repatriation services and frontline workers (Dube 2021: 282). Conversely, telecommunications and other technology-related companies saw an increase in demand as COVID-19 accelerated reliance on the use of digital technologies and platforms such as virtual conferences, online tours and virtual safaris gaining popularity amongst travelers. Durban Tourism launched a "Know your city" virtual Durban excursions campaign that gives travelers from around the country a virtual tour of the city empowered by virtual reality (VR) technology. Visitors and travelers can digitally explore and discover Durban's greatest and most popular landmarks and tourist activities through mainstream TV channels including Durban Tourism's social media platforms. The virtual Durban excursions were launched two months into the National lockdown due to travel restrictions and in response to the increased digital demands of travelers and consumers (Durban Tourism 2020).

As a result of reliance on the use of digital technologies due to the COVID-19 pandemic, the travel, tourism and hospitality sectors were forced to use robots and other service automation technologies(Jiang

and Wen 2020: 2566). According to Chen and Li (2020: 516), this is expected to continue post-COVID-19 since, amid the pandemic outbreak , travelers experienced changes in their preferences and developed a desire for contactless service supported by various technological innovations and digital platforms and the use of intelligent technology. The authors emphasise that these services are expected to continue and become the new normal after the pandemic. Hotels are now moving towards implementing technological solutions to provide contactless services while at the same time assuring customers of service safety (All-China Federation of Industry and Commerce 2020). The Hotel Sky Sandton, in Johannesburg, South Africa has become a pioneer as the first hotel establishment on the African Continent to have adopted automated attendants with the recent addition of its three robotic staff. The staff robots named Lexi, Micah and Ariel remain the hotel's answer to the desires of travelers and hotel guests for a socially distant hotel experience as a result of the COVID-19 pandemic. The robots can deliver room service to guestrooms, provide travel updates and information and can carry approximately 300 kilograms of guest luggage to their rooms. Guests have the option to choose between staff members or make use of self-service for interaction, which all is controlled by their mobile phones. In addition, as a protective measure by the hotel to ensure the safety of hotel staff and other guests, should a guest contract the COVID-19 virus, the robots (Micah, Arial and Lexi) instead of human employees can be deployed to serve the guest (Reinstein 2021).

Before the pandemic, technology use in hotels was seen as a novelty especially in 2015, when The Henn Na Hotel in Nagasaki, Japan, opened as the first hotel worldwide to be almost completely operated by robots and artificial intelligence Alexis 2017: 213). Hotel Sky Sandton and Hotel Sky Cape Town in South Africa opened their doors to the world and operated with three AI-powered robots. Both hotels have implemented various technological innovations which include seamless app-based reservations, check-in and room access including various smart technologies like these three robots (Roux 2020). Similarly, Durban is home to the flagship Hilton Garden Inn in South Africa which is a smart hotel. To enter the hotel and its rooms, everything is cardless and supported by smart technologies which either operate from guests' mobile phone app or their room keys. The Hilton mobile app was carefully designed to afford guests an opportunity to control appliances, such as lights, TVs and air conditioners remotely. The hotel also makes use of ultraviolet cleaning systems for sheets and other material items which ensures that sheets and guest robes are cleaned, sanitized and stainless (Property Wheel 2020).

The COVID-19 pandemic significantly altered the supply and demand balance of the hotel industry under "the new normal". Hotels are required to re-evaluate their current business models and marketing strategies to set out a new agenda that will enhance competitiveness by using technological innovation

as an avenue to achieve this (Hau, Xiao and Chon 2020: 1026). The COVID-19 pandemic accelerated the need for intelligent services in both the supply and demand sides of the hotel industry, changes in consumer behaviours and demands continue to be fundamental drivers of digital transformation. Hao, Xiao and Chon (2020: 1026) state that digital technologies and intelligent tools will eliminate human error and increase service efficiency incredibly, stabilize service quality and therefore enhance customer satisfaction levels and experiences. Furthermore, digital technology continues to make its way in all the spheres and operational activities of hotels and the industry as a whole, from guest services and communications to revenue management, distribution, customer relationship management and marketing (Roux 2020). Post-COVID-19, hotels will be more effective in attracting Generation- Y and Z customers and employees, on the notion that they continue to implement digital and smart technologies (Valle 2020). Infectous and easy to spread diseases such the COVID-19 virus have followed the trend of global travel regarding their rapid growth and spread as they do not remain in their country of origin (Roussou, Papanikolaou and Kornarou 2021: 309). The tourism industry is complex as the modes of transport used by travellers serves as a vector for the spread of viruses. It can thus be said that the tourism industry is both a catalyst for the spread of viruses and remains the victim of the spread.

1.3 PROBLEM STATEMENT

COVID-19 pandemic significantly slowed down economic activities globally, especially those of the tourism sector as it is the most affected economic sector with many countries gradually coming out from partial or total lockdowns. The lockdowns negatively impacted tourism in many countries including South Africa. Similarly, the tourism industry in KwaZulu-Natal, specifically in Durban, experienced negative impacts. These were visible through hotel occupancies decreasing from 70% in March 2019 to as low as 46% in March 2020. Moreover, visitor numbers decreased by 36% in March 2020 and direct tourism spending declined by R500 million (TKZN 2019: 122). Due to such negative impacts that were observed, there is a high level of uncertainty about how tourism will look post-COVID-19 at the end of national and international lockdowns; however, it is likely that various forms of technology used to manage the spread of the virus will continue to play an important role in our lives post-COVID-19. Therefore, hotels in Durban are facing an ever-increasing pressure to become more digitally equipped due to the COVID-19 pandemic.

The use and application of technological innovations will play an important role in achieving such goals as robotics are gaining attention for providing physically distant hospitality and tourism services. However, the hotel landscape in Durban is characterized by a lack of skills and resources for digital technology innovation within the hospitality, tourism, and hotel industry (TKZN 2019: 166). In addition,

there is evidence of lack of best practice of business management skills and innovation capacity, which limits the full potential of hotels in Durban to function efficiently and become innovative by being technologically driven (EDTEA 2020: 156). Similarly, there is a dearth of literature on the use of service automation technologies in the KZN tourism industry, especially in hotels across the entire province, particularly in the city of Durban. There is a need for service automation technologies in hotels operating in the city of Durban so that they are able to regain and sustain the trust of digitally driven travelers post the COVID-19 pandemic; however, there is uncertainty on the use of such disruptive technologies as they will displace human beings and result in high unemployment around the city of Durban. In addition, South Africa has low ICT levels, lack of ICT skills and remains stuck in the third industrial revolution while the fourth industrial revolution is already happening (Department of Science and Technology 2019: 98), with the latter being the same for Durban. There is a great need for tourism and technology policy planning and a framework for South Africa, especially in the context of Durban that will ensure that the application of disruptive technologies does not displace the current tourism human labour but co-exist with them to create much more pleasant tourism experiences for hotel guests. Moreover, there is a need for policy planning to address the deficit of ICT skills in Durban's tourism industry. The study is being conducted to address this gap.

1.4 AIM OF THE STUDY AND OBJECTIVES

1.4.1 AIM OF THE STUDY

The aim of the study is to promote a technologically driven tourism industry post-COVID-19 in South Africa.

1.4 2 OBJECTIVES OF THE STUDY

I. Examine COVID-19 as a driver of service automation technologies in hotels and the impact of such technologies in the tourism industry in Durban.
II. Assess the attitudes of hotel guests in Durban towards the use of service automation technologies in hotels.
III. Analyse the role of service automation technologies in achieving guest hygiene and cleanliness in hotels operating in Durban.
IV. Examine the barriers that affect the implementation of service automation technologies in hotels operating in the city of Durban.
V. To develop a conceptual framework for the successful implementation of service automation technologies for hotels and the tourism industry in Durban.

1.5 RESEARCH QUESTIONS

The above research objectives are translated into the following research questions:

I. How has COVID-19 accelerated service automation technologies and what impact will such technologies have on the tourism industry in KZN?
II. What are the attitudes of hotel guests in Durban towards the use of service automation technologies in hotels?
III. What is the role of service automation technologies in achieving guest hygiene and cleanliness in hotels in Durban?
IV. What are the barriers that affect the implementation of service automation technologies in hotels operating in Durban?

1.6 SIGNIFICANCE/RATIONALE OF THE STUDY

The world has experienced several pandemics which resulted in unprecedented negative impacts, however, none had similar repercussions for the entire global economy as that of the COVID-19 pandemic (Gössling *et al.* 2021: 14). According to United Nations World Tourism Organisation (UNWTO) (2020), the tourism and hospitality industries remain the most affected industries by the pandemic. Similarly, Rahimizhian and Irani (2020) highlight that the COVID-19 pandemic had in uncertainty imposed strict travel restrictions; therefore, drastic impacts were exerted on travel and tourist destinations. Gössling, Scott and Hall (2020: 02) highlights that the pandemic resulted in employees being out of jobs, major events being cancelled and tourist activities slowing down. COVID-19 has been noted as an accelerator of technological innovations in the hospitality and tourism sectors. Ivanov *et al.* (2020b: 16) reiterated that before COVID-19, technological novelties that were considered luxurious add-ons and extra services have suddenly become an obligation for tourism and hospitality firms in an era where travelers are extremely cautious when travelling.

The global tourism industry is attempting to regain and sustain the trust of travelers. The South African National Department of Tourism (NDT) launched a tourism sector recovery plan, in response to COVID-19 in August 2020. The purpose of the recovery plan was to act as a blueprint for implementing tourism-specific recovery measures with the aid of the R200 million Tourism Relief Fund (TRF) set aside by the NDT to reactivate the tourism sector and rebuild the confidence of travelers (National Department of Tourism 2020b: 10). Similarly, the eThekwini municipality and Durban Tourism also embarked on a journey to rejuvenate tourism within the city of Durban with a campaign aimed at promoting Durban as a clean city with health, safety and security precautions in place. In addition, Durban Tourism also created

new tourism packages relevant to a post-COVID-19 world (DurbanTourism 2020a: 14). COVID-19 has resulted in rules such as mask-wearing, the sanitization of hands and social distancing protocols. Similarly, Ivanov *et al.* (2020) state that touch-free and contactless technologies are being preferred as the relevant tools that will keep humans safe and isolated while businesses start operating normally. Jiang and Wen (2020: 2568) emphasise that the pandemic has unquestionably been an accelerator of the fusion of new modern technologies and application in the hotel sector as a whole. Lastly, from the above discussion, it can be concluded that the COVID-19 pandemic has forced tourism and hospitality organizations to resort to technological innovations for the sustainability of their businesses.

Rahimizhian and Irani (2020: 295) state that consumers are adopting technology at a rapid rate than ever before, and this calls for a need for hotels and other hospitality-related businesses to keep up to date with emerging travel technology trends that are proving to be more prevalent in the hotel sector. Travelers nowadays rely more on technology to plan their trips. Similarly, Sigala (2020) states that modern travelers are technologically advanced and inclined and are demanding contact-free services and alike experiences including mobile check-in apps, room keys, self-service kiosks and advanced in-room technologies for entertainment. Therefore, hotels around the globe are moving towards the introduction of such technological services and amenities. In the current atmosphere that is highly characterized by global health concerns, hotels are finding themselves trying to find a balance to inspire consumer confidence as they continue to demand technologies that will safeguard their well-being while travelling amid the COVID-19 pandemic. Baratti (2020: 1) also reiterates that under the new normal world where protocols such as mask-wearing, hand-sanitizing and social distancing are the norms, travel consumers are demanding scannable QR codes for contactless hotel check-ins, payments and booking purposes. Lastly, the author further explains that travel consumers want to access all aspects of the hospitality industry on their mobile phones and hotels are expected to introduce the right technological software to support such consumer demands. Such technological innovations are a result of the fourth industrial revolution.

Today, the global economy has moved towards the fourth industrial revolution (4IR), which is highly characterized by the outbreak and adoption of technologies that include the internet of things, artificial intelligence and robotics. In addition, there is a global trend of adapting to the 4IR which is influenced by innovative technologies with all industries including that of tourism and hospitality at the forefront of the 4IR applications (Osei, Ragavan and Mensah 2020). The tourism and hospitality industries are one of the industries that have embraced the outbreak of technological innovations that are associated with the 4IR, and IT alongside the internet has afforded both industries an opportunity for automating hospitality services. The 4IR technological systems and developments have made it easier for hospitality

and tourism service providers to easily supply consumers with relevant information, greater mobility and more personalized tourism experiences. Kuo, Chen and Tseng (2017) state that technological innovations presented by the 4IR improve customer service quality and service delivery in tourism and hospitality firms as technologies such as digital kiosks create value for travelers which makes the service delivery efficient, fun, curious and entertaining. Lastly, Ivanov, Webster and Berezina (2017) reiterate that hospitality and tourism organizations that embrace the outbreak of the 4IR often stand to benefit from a positive perceived industry image and word-of-mouth, which results in travelers being in favour of them. The 4IR is discussed in detail in Chapter 2. Technology, IT in particular, is considered one of the most powerful promotional tools that is available for hospitality and tourism organizations. Technological tools and innovations have afforded hotels and hoteliers to better approach their customers (Ezzaouia and Bulchand-Gidumal 2020). The adoption of technological innovations in hotels enables hotels to achieve the desired competitive advantages, and they are considered important for the daily functioning, support and operational and strategic business decisions. Technology provides hotels with much more practical and innovative ways of being connected with their existing and potential customers, maintaining a competitive advantage by differentiating their products and services.

1.7 RESEARCH METHODOLOGY

The study adopted a convergent parallel mixed-method approach to collect data. A mixed-method approach is a process for collecting, analysing, and applying both qualitative and quantitative methods within the same study to gain a more in-depth of the research problem (Ivankova et al. 2011: 244). The mixed-method approach for this study assisted with the triangulation of results between qualitative data, quantitative data, and secondary data. The population of this research study included hotel guests and general hotel managers from Durban. A target population is defined in accordance with the elements such as geographical boundaries and time frames set by the researcher. The sample was meant to be 384; however, the researcher received 422 responses from online survey questionnaires. This was due to the fact that they were distributed on Social Media Platforms such as Facebook and Instagram. In addition, Hotel General Managers also sent them via email to hotel guests on their database. In addition, 11 General Hotel Managers were interviewed.

A non-probability sampling technique will be applied in this study. In a non-probability sampling design, the elements in the population do not have any probabilities attached to their being chosen as sample objects. Purposive sampling was adopted by the study. Purposive sampling was aimed at hotel managers on the basis that they will be able to provide information on how they plan to go about implementing technology in their hotel operations and what are the implications thereof. A probability sampling design

was also used in conjunction with nonprobability sampling. Simple random sampling techniques were chosen to achieve a sample of 422 hotel guests.

The questionnaires were administered electronically/online by the researcher. Electronic/online questionnaires were used to collect data from the hotel guests after hotel managers furnished the researcher with email addresses only of their hotel guests. Moreover, structured interviews were conducted to collect qualitative data from hotel managers. Structured interviews are used when it is known at the outset what information is needed by the researcher, and the content of the structured interview is usually prepared in advance (Sekaran and Bougie 2016). Quantitative data collected from the sample for this study was analysed using the Statistical Package for Social Scientists (SPSS) version 20 using a descriptive statistics test, while qualitative data was analysed using NVivo software to generate and understand the themes obtained in comparison to the themes that the researcher wants to tap into this study. According to Miller *et al.* (2012: 12), ethics in research are the moral obligation, choice and accountability of a researcher that needs to upheld throughout the research process. A letter of information was sent to all the study participants, which addressed issues such as the purpose of the study, an outline of the procedures, risks and discomforts that the participants may experience, benefits, remuneration, and how the confidentiality of participants will be ensured.

1.8 LIMITATIONS AND DELIMITATIONS

1.8.1 LIMITATIONS

According to Simon and Goes (2013), limitations are defined as matters and occurrences that often arise within a research study and are totally beyond the researcher's control. Time and budgetary factors are the limitations of this research study as the researcher cannot include all the hotels that are operating within the city of Durban. The researcher only targeted 4- and 5-star graded hotels due to them providing more services and facilities.

1.8.2 DELIMITATIONS

Delimitations of the study can be defined as characteristics that arise from the limitations in the scope of the study (Simon and Goes 2013). The delimitations of this research study include that of the study being only limited within the borders of the city of Durban, which implies that the findings of the study can be generalised to only the city of Durban and not to the rest of the province of KwaZulu-Natal, due to all hotels in the Province were not in the study. This study adopts a mixed-method research design so that an in-depth understanding of variables such as the relationship between COVID-19 and technology adoption in hotels unlike if only one was used. Lastly, the researcher chose purposive sampling for

general hotel managers instead of other departmental managers in a hotel so that a holistic view is provided in terms of technology use in different hotel departments.

1.9 DEFINITION OF KEY TERMS

The definition of key terms eliminates the uncertainty and misinterpretation of key terms applied in this study. Defining key terms provide a clear direction for the study. The key terms used in this study include tourism, the fourth industrial revolution, hotel, tourist, ICT, technological innovation, and COVID-19. These key terms are defined as follows:

1.9.1 TOURISM

Tourism is defined by the United Nations World Tourism Organization (2007) as the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business, and other purposes not related to the exercise of an activity remunerated from within the place visited. In its broadest sense, the tourism industry is the total of all businesses that directly provide products and services to facilitate business, leisure, and pleasure activities to people away from their home environment. The UNWTO (2007) further outlines that the definition also reinforces the notion that tourism is concerned primarily with people who are:

I. Outside normal routines of work and social commitments.
II. On a visit that is temporary and short term.
III. Required to travel to the destination (usually making use of some mode of transport).
IV. Usually engaged in activities that are associated with leisure and tourism and sometimes business.

1.9.2 FOURTH INDUSTRIAL REVOLUTION (4IR)

The fourth industrial revolution (4IR) is described as an age and world where individuals are propelled to move from an offline reality to digital domains with the use and reliance of a network of connected technologies to enable and manage their lives (Xu, David and Kim 2018). Schwab (2017) further explains that the 4IR is a series of technological innovations that are set to disrupt society, businesses and the government due to the rate and outbreak of innovations. Such innovations include big data analytics and blockchain technology.

1.9.3 HOTEL

A hotel can be defined as a building, an organisation or an entity whose purpose is to provide services of accommodation and shelter, food and beverage and other service facilities that are intended for travelers either staying overnight at the hotel or those who are only using the facilities.

1.9.4 TOURIST

A tourist is a person who travels to a destination outside his/her usual living and working environment and stays overnight for at least 24 hours for the purposes of leisure or business.

1.9.5 INFORMATION COMMUNICATION TECHNOLOGIES (ICT)

Information and Communication Technologies (ICTs) is a broader term for information technology (IT), which refers to all communication technologies, including the internet, wireless networks, cell phones, computers, software, video conferences, social networking and all other media applications and services that enable users to access, retrieve, store, transmit and manipulate information in a digital form.

1.9.6 TECHNOLOGICAL INNOVATION

Technological innovation is a new or improved product or process whose technological innovations and features have significantly improved and are much different from before.

1.9.7 COVID-19

The WHO defines coronavirus disease (COVID-19) as an infectious disease caused by the SARS-CoV-2 virus. The virus is spread from the infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing or breath.

1.10 STRUCTURE OF DISSERTATION

Chapter One: Introduction and overview of the study

This chapter aimed to provide a detailed introduction and background to the study, research aims, objectives, problem statement and the significance of the study was presented.

Chapter Two: Literature Review

Chapter two will present a comprehensive review of existing literature on COVID-19 and its impacts and the types of service automation technologies that are being introduced in different hotels across the globe as means of fighting the COVID-19 pandemic. The rest of the review of the literature will be guided by the study's objectives. Secondary data sources for the review of literature that will be used will include journal articles, textbooks and reports.

Chapter Three: Research methodology

This chapter draws attention to the discussion of the research design and methodology that will be applied to this study. It will further discuss and provide justifications for the methods that will be used in conducting this research. The research method, population, sampling techniques, data collection instruments and data analysis techniques will be addressed with a directive provided by the study aim and objectives. This chapter will then conclude with ethical considerations that will underpin this study.

Chapter Four: Presentation and analysis of results

Chapter four will provide a full overview and spectrum of research findings which will be interpreted and discussed in relation to the aim, objectives and research questions of the study. The discussion of findings will also be integrated with relevant secondary data and literature review so that all the research questions are answered.

Chapter Five: Discussion of results

Presents a discussion of the study findings through drawing out major themes that emerged from the findings that were presented in the previous chapter. Literature will be used to ascertain and compare the study findings with the findings of other previous research studies and the work of other authors. The results presented and discussed are aimed at addressing the study research objectives.

Chapter Six: Conclusions and Recommendations

This chapter provides a comprehensive overview of the key findings and conclusions that will be drawn from the research. The chapter will further provide recommendations to improve the technological adoption in hotels. Lastly, foundations for future research will also be suggested.

CHAPTER TWO

LITERATURE REVIEW

AN OVERVIEW OF TECHNOLOGICAL INNOVATION IN HOTELS IN SOUTH AFRICA: A CASE STUDY OF HOTELS IN DURBAN

2.1 INTRODUCTION

This chapter provides an overview of past research studies conducted by various researchers around the globe on issues such as the introduction and use of service automation technologies in hotels and how the COVID-19 pandemic has transformed the service landscape in hotels, as technology continues to be rapidly adopted in the hospitality and tourism industries. The literature review of this study is guided by the study's research objectives that were presented in Chapter One. Tourism remains a major contributor to KZN's GDP, with the city of Durban remaining the most popular tourist city in the province, due to its beach and all-year-round warm weather (TKZN 2019: 88). According to Buhalis and Leung (2018: 4), some hotel establishments around the world employ outdated forms of technology while others are pioneers in the application of modern-day technologies for their everyday business and hotel operations. Ulubaş Hamurcu and Terzi (2020: 2) reiterate that the rapid development of technologies as a result of the 4IR continues to change and influence urban spaces in terms of the formation of urban space functions and uses.

Similarly, hotels that are operating in urban centers and spaces are not spared from the adoption and use of technologies and are expected to catch up with technological trends as this would not be the case with hotels that are nature and ecotourism driven. COVID-19 is noted as a driver and an accelerator of the use of service automation technologies in the hotel industry (Ivanov *et al.* 2020b: 10). Various technologies that are adopted by hotels are explained in detail in this chapter. This chapter then proceeds to provide a detailed overview of consumer perceptions on the use of service automation technologies in hotels. The literature also examines the use of technology to achieve hygiene and cleanliness in hotels. COVID-19 has reinforced the importance of cleanliness and hygiene, especially in sectors that involve a high volume of people travelling and consuming on-site experiences such as tourism (World Health Organisation 2020a). Jiang and Wen (2020: 5) highlight that due to the COVID-19 outbreak, travelers will likely prioritise hygiene and cleanliness and will choose tourism services and products that emphasize hygiene and cleanliness. Lastly, this chapter discusses the barriers that impede the hotels' adoption of service automation technologies and service robots.

2.2 A PRE-PANDEMIC OVERVIEW OF TOURISM IN SOUTH AFRICA

In South Africa, tourism remains one of the key economic sectors that drive the country's GDP. The tourism industry continues to be people and service orientated and it is multi-faceted as it is made up of businesses from different sectors and industries of the economy. In South Africa, the tourism industry is made up of the different sectors which include attractions, transportation, travel agents, accommodation and catering tourist information and guiding services and tour operators. This is shown in Figure 2.1 below

Figure 2. 1: The tourism industry and its interrelated sectors of the economy
Source: Sastry and Sushil (2018)

The tourism industry continues to be people and service orientated and it is multi-faceted as it is made up of businesses from different sectors and industries of the economy as shown in Figure 2.1. Tourism continues to be one of the biggest and significantly growing and still emerging sectors of the economy that underpins economic growth through the creation of employment and jobs and also acts as a vehicle that drives poverty reduction (Roopchund 2020). In South Africa, the tourism industry has proved to be of importance to the economy and had yielded positive impacts. The tourism sector is vitally important to the South African economy as it creates job opportunities. Tourism plays a vital sector role in job creation for South Africa, and it continues to outperform key industries such as utilities. From 2.1 it can be seen that one in every 23 workers are employed within the tourism sector. In addition, the sector employs more people compared to the mining sector.

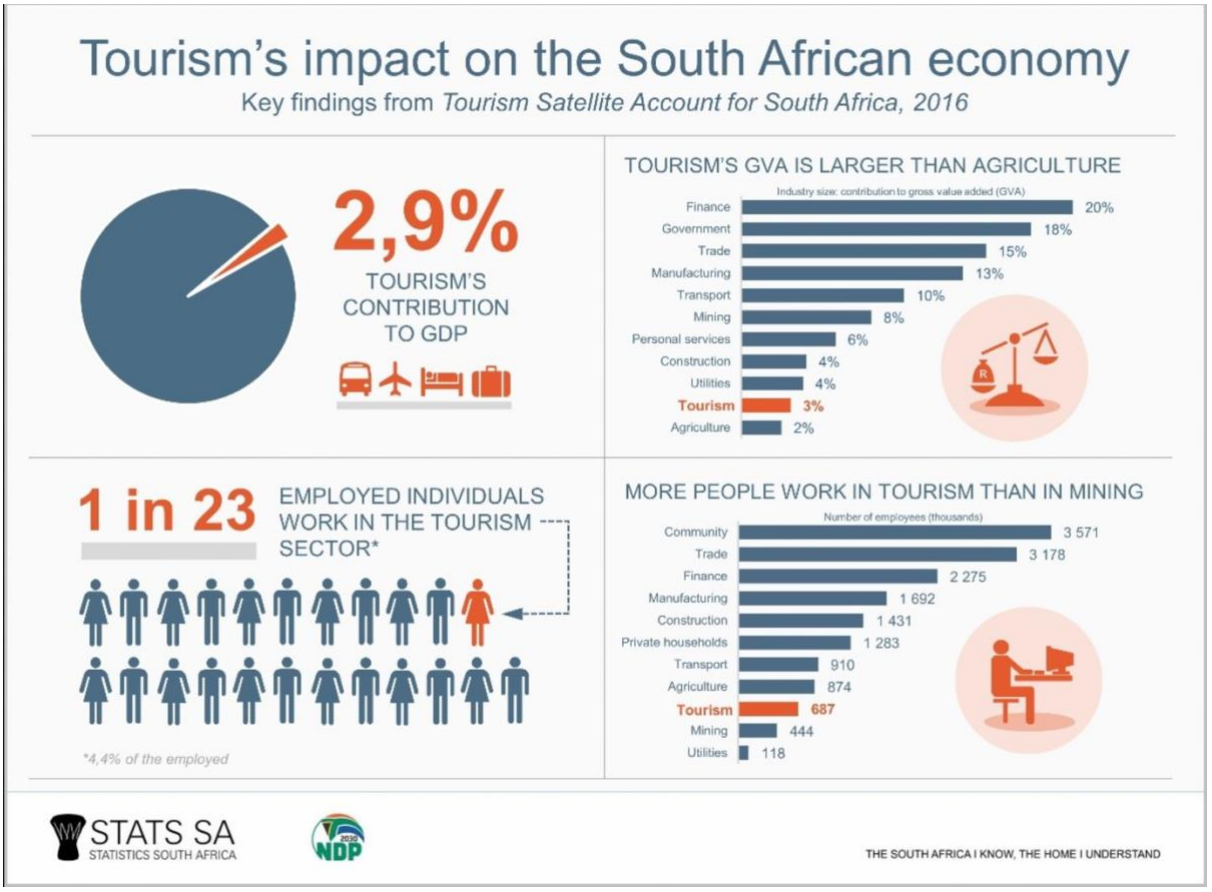

Figure 2. 2: The impact of tourism on the South African economy.
Source: Statistics South Africa (2018)

From Figure 2.2, it was noted that the contribution of tourism to the South African Gross Domestic Product (GDP) is approximately 2.9%. This proves the significance of the tourism industry to South Africa's economic growth. According to the UNWTO (2017), the tourism sector accounts for up to 10% of the global GDP, 10% of worldwide employment and 7% of the world's total exports, which are equivalent to USD 1.4 trillion. The tourism sector in South Africa is an employer of a total of 686 596 employees, which outnumbers the respective workforce of utilities which comprises 118 000 employees and that of mining which comprises 444 000 employees. In addition, during 2016, the total number of people employed both formally and informally consisted of 15,8 million workers. Of these, 4.4% or one in every 23 employees were directly employed by the tourism sector, which represents an increase of 3.8% that was recorded in the year 2005 (Statistics South Africa 2018). Between 2018 and 2019, South Africa experienced a total of 29.0 million trips to the country, this was an increase of 7.5% from the 27 million overnight trips between the years 2017/18. Of these overnight trips, 18.6 million (64%) were domestic tourism-related trips, which also grew by 12.2% more than the 16.6 million trips during 2016/17. Furthermore, there was a total of 10.4 million international trips during the same period, with a visible decline of 0.6% when compared to 10.5 million trips in 2017/18 (SAT 2018). During 2018, the

purpose of visits to South Africa was categorized as follows, Visiting Friends and Relatives (39.8%), holiday and leisure (20%), shopping-personal (13.8%), shopping-business (8.9%), meetings, incentives, conferences and events (MICE) (14.5%) and business travel (3.3%) (SAT 2019). On average, international tourists visited 1.20 provinces during the period of 2018/19, and it highlights a decline of 1.5% compared to the period of 2017/18. Table 2.1 highlights South Africa's foreign tourism overview as of the year 2018.

Table 2. 1: South African Foreign Tourism Overview (2018)

Number of Foreign Tourists	10.5 Million
Spend	R701 (R8 200 per trip)
Total Spend	R82.5 billion
Average length of stay	11.7 nights
Main overseas source markets	UK, USA, Germany, France, Netherlands
Spend: Foreign vs Domestic	83% vs 17%

Source: South African Tourism (2019)

Table 2.1 provides an overview of the foreign tourism influx in South Africa. It can be noted that South Africa's foreign market spend accounts for a total of 83% of the tourism income while the domestic market accounts for 17%. Based on the data presented in Table 2.4, South Africa welcomed 10.5 million foreign tourists from the main overseas source markets which include the United Kingdom (UK), the United States of America (USA), Germany, France and the Netherlands, with all of them spending an average of 12 days in South Africa. South Africa's top five overseas (long haul) tourist markets in 2018 include the United Kingdom, the United States of America, Germany, France, and the Netherlands. In terms of a domestic tourism perspective, South Africa's top five domestic markets as of 2018 included, Gauteng (7.2 million), Limpopo (2.3 million), KwaZulu-Natal (1.5 million), Eastern Cape (1.4 million), and lastly, Mpumalanga (2.2 million). All of these domestic tourism source markets play a significant role in the development and growth of the South African domestic tourism sector (SAT 2019). According to SAT (2018), tourism in South Africa, during the period of 2018/19 injected a total of R116.9 billion into the South African economy through means of direct spend of both international and domestic tourism source markets. In addition, the tourism injection into South Africa's economy represents a total increase of 12.7% over the R103.8 billion during the period of 2017/18. It is further highlighted that the foreign

direct spend by international tourists grew by a total of 6.6% over the R82 billion between the period of 2017/18 despite the 0.6% decrease in international arrivals.

The city of Durban has, for decades, remained well-known as the MICE (Meetings, Events, Conferences and Exhibitions) capital of South Africa and one of the leading conference destinations in Africa. The Durban KwaZulu-Natal Convention Bureau has significantly contributed to Durban's market positioning. The Convention Bureau operates as a business unit of Tourism KwaZulu-Natal and is mandated with the responsibility for the promotion of business tourism within the province, with Durban being the major hub for hosting such events (TKZN 2019: 9). Since this study is based on hotels operating in the city of Durban, the next section provides a brief overview of the hotel accommodation sector in South Africa.

2.3 THE HOTEL SECTOR IN SOUTH AFRICA

Since Figure 2.1 depicted the interrelated sectors of the tourism industry, this study is solely based on the accommodation sectors, with a particular focus on and using hotels in the city of Durban as a case study. According to (PricewaterhouseCoopers 2018), there has been relatively minimal growth in South Africa in terms of the number of available rooms over the last period of five years with just an accumulative increase of only 70 rooms between 2011 and 2016. Furthermore, they highlight that towards the preparation of the 2010 FIFA World Cup, a steady increase of available rooms was evident which, however, led to occupancy rates declining which diminished hotel investments following the 2010 FIFA World Cup. In the year 2017, there was an increase of 1.3% in the number of available hotel rooms, which was considered the most significant increase in South Africa since the year 2011. The increase in the number of available hotel rooms in South Africa was propelled by hotels being opened, which amongst others included, the Radisson Blu Hotel and Residences, Radisson Red Victoria and Alfred in the mother city, Cape Town along with the Sun International Meropa in Polokwane, each of these hotels are 4-star graded and the Stayeasy Cape Town City Bowl which was 3-star graded.

Durban's hotel market continues to attract more tourists than that of the City of Johannesburg, however, it attracts fewer than that of Cape Town. In addition to this, Durban enjoyed the benefits of a re-boost of tourism in 2016 (PricewaterhouseCoopers 2017). It further highlights that guest nights in Durban rose by 4% while room revenue rose by a total of 12%. In early 2017, Durban appeared to be performing well when compared to Johannesburg but not as well as Cape Town, with guest nights rising by a total of 3% and room revenue rising by a total of 7%. According to PricewaterhouseCoopers (2018), the hotel market in Durban did not present signs of improvement and growth as guest nights had declined by 6%, however,

there was a 4% increase in average daily rate which resulted in mitigating the negative growth impacts within the Durban hotel market, nonetheless, room revenue took a downward curve of 2%.

2.4 THE IMPACTS OF THE COVID-19 PANDEMIC ON TOURISM IN SOUTH AFRICA

South Africa's first official COVID-19 case was recorded on 5 March 2020. The country began to experience a steady increase in the number of infections and prompted the South African Government to enforce a National State of Disaster followed by a 21-day lockdown, which was subsequently extended by two weeks. Since then, South Africa has been under lockdown for over 350 days (Statistics South Africa 2020). The business impact survey of the COVID-19 pandemic on the South African tourism landscape, concluded that 46.4% of tourism-based businesses indicated that they were forced to temporarily close down and pause business activities. In addition, 23.8% of businesses indicated that it was difficult to access financial resources, while another 23.8% businesses indicated that they had to reduce working and trading hours and a further 19.6% of businesses had to lay off workers as a short-term intervention. The novel COVID-19 pandemic significantly disrupted the global travel and tourism operations, with South Africa not being spared from such devastating effects.

By late March, just after the lockdown regulations were enforced, hotel occupancy rates were down by a total of 50% year-on-year along with the rest of the sector and a further 5% was observed with most hotels serving as quarantine and isolation sites during the level 5 of the South African risk-adjusted approach. Furthermore, both small and large hotels had closed their establishments and properties, airlines had stopped operations, and popular tourist attractions remained shut (SAT 2020). The Tourism Sector Recovery Plan 2020 prepared by (SAT 2020) states that the COVID-19 pandemic and lockdown regulations resulted in some 50 000 businesses having no choice but to temporarily close down, with most of them in severe danger of closing indefinitely, resulting in nearly 60 000 jobs at risk. Furthermore, a total of 58% of tourism businesses that were surveyed indicated that they were unable to repay their loans and outstanding debts, while 54% of tourism firms indicated that they were struggling to cover their operating fixed costs at the end of March 2020. This was followed by actions which were highly characterized by downscaling and a prevalence of booking deferment and reduced wages remained the most preferred short-term mitigation strategy.

According to Statistics South Africa (2020), hotel owners felt the effects of long-term disintermediation by travel agents and intermediaries as a result of COVID-19, with customer deposits and their pre-payments due to establishments while in many instances, such payments being withheld as the liquidity effect rippling the tourism value chain. Table 2.8 further summarizes negative impacts of the COVID-19

pandemic and presents the collapse in demand for tourism services and products in South Africa along with the cancellation of bookings across the entire hotel sector between March 2020 and April 2020 during the few weeks of the enforced government lockdown regulations. The transportation sector (aviation, road, rail and waterborne operators) characterized by high costs experienced a forward-booking decline of up to a total of 49.4% between April and September 2020.

As the virus continued to spread globally in the early months of 2020, the negative realities of the COVID-19 pandemic were felt by the South African tourism industry. The hard travel restrictions that were enforced by the South African Government and the rest of the governments worldwide, interrupted tourism activities and this was visible in South Africa as international tourist arrivals in the country declined by a total of 4.2% from 2018/19 to reach 10.0 million in 2019/2020. The South African tourism industry lost a total of R54.2 billion between February and May 2020. Under the same scenario, before South Africa moved to alert level 3 of the lockdown risk-adjusted strategy, the forecasted revenue loss for the last quarter of 2020 was R149.7 billion with approximately 438 000 jobs likely lost (Statistics South Africa 2020). Pre-COVID-19, South Africa entered into 2020 with a significantly low consumer demand, but with high and increasing government borrowing, not forgetting one of the highest unemployment rates in the world and an unstable network infrastructure all of which continue to affect the growth of tourism within the country (SAT 2020). Table 2.2 further summarizes the travel and movement restrictions that were related to and affected tourism during the different South African different lockdown alert levels.

Table 2. 2: Travel Restrictions During Different Lockdown Levels

LOCKDOWN LEVEL	MOVEMENT RESTRICTIONS	TRAVEL-RELATED RESTRICTIONS
5	Drastic measures to contain the spread of the virus	• No air travel • No domestic/international travel • Tourism products unavailable • SA tourism sector prepares a strategy
4	Extreme precautions to limit community transmission and outbreaks, with limited activities resuming	• No air travel • No domestic/international travel • Tourism products unavailable

LOCKDOWN LEVEL	MOVEMENT RESTRICTIONS	TRAVEL-RELATED RESTRICTIONS
		• SA tourism industry prepares strategy implementation
3	Restrictions are placed on many activities, including work and social activities to address the high risk of transmission of the virus	• No air travel • No domestic travel • Tourism products are still unavailable • Plans are implemented and put into action
2	Physical distancing and restrictions on leisure and social activities to prevent a resurgence of the virus	• South Africans permitted to travel between provinces • Large gatherings are still not permitted with some tourism products, but limited, are available
1	Most normal activities resumed, with precautions and health guidelines followed at all times Population prepared for an increase in alert levels if necessary	• South Africans were permitted to move between provinces • Restricted International travel • Large gatherings are permitted with most tourism products available, bearing safety measures in mind

Source: SAT (2020)

From the above table, SAT observed that the travel restrictions as a result of the outbreak of the pandemic had significant impacts on the South African tourism industry and its further development and growth. South Africa was not spared from the impacts of the pandemic, as from the above discussion, trends that included a decline in international tourist arrivals and hotel booking cancellations were also observed, resulting in the loss of revenue. This section aimed at setting a background that underpins the literature of this study. The next section will unpack the theories that underpins this study.

2.4 THEORETICAL FRAMEWORK

According to Sekaran and Bougie (2009: 232), a theoretical framework provides a researcher with a conceptual foundation from which the study emerges and sets the stage for the presentation of the proposed research questions that are in line with the study aim and objectives that drives the investigation being reported. Against this definition, this study is conceptualized within the theories and context of the technology acceptance model (TAM), Maslow's hierarchy of needs and the technological innovation process. These theories are explained in detail below along with how they all fit into and are relevant to the current study.

2.4.1 TECHNOLOGY ACCEPTANCE MODEL (TAM)

The advent of growth and development of technologies, in particular, information and communication technologies (ICT) and how they are integrated into the private and professional lives of their users, remains an open question of acceptance or rejection. TAM was introduced by Fred Davies in 1989 and has become a useful tool in the investigation of the factors that affect users' acceptance of technology (Davis 1989). TAM is used to explore the causal relationship that exists between variables which are perceived ease of use and usefulness to attitudes and behavioral intentions to use various types of information communication technologies (Davis 1989). Over the years, TAM has evolved in research and the results yielded have shown that perceived usefulness remains a powerful denominator of behavioral intention to use a certain type of technology. TAM is present in Figure 2.3 below.

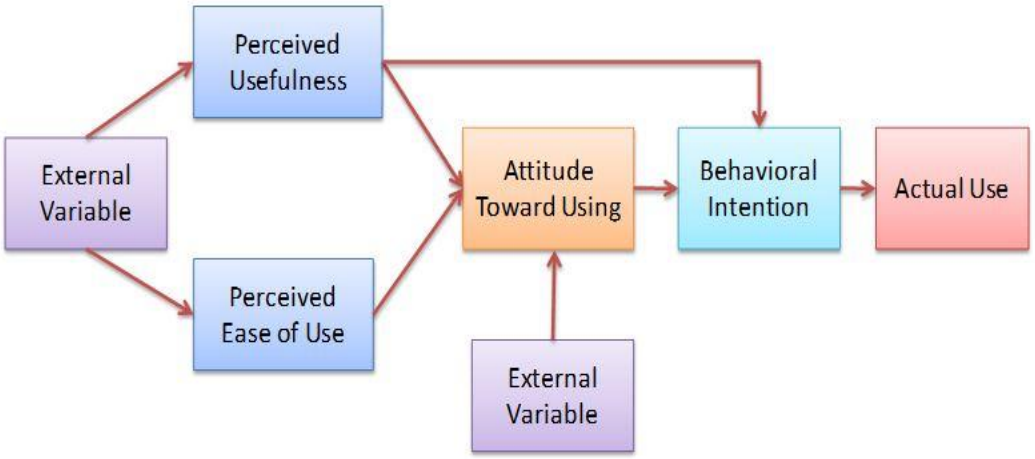

Figure 2. 3: Technology Acceptance Model (TAM)
Source: Davies (1989)

The TAM plays a crucial role in the current study as one of the objectives of the study is to Assess the attitudes of hotel guests in Durban on the use of service automation technologies in hotels, therefore the model provides a framework within which the attitudes on the hotel guests and their adoption intentions can be measured towards the introduction and use of technology in hotels in the city of Durban. In addition, through TAM the causal relationship between the variables ease of use and perceived usefulness will be studied and understood in relation to attitudes and behavioural intentions towards various types of service automation technologies in hotels within the context of Durban. Kucukusta (2017) strongly emphasizes the importance of hoteliers developing the most relevant hotel technology amenities that strongly resonate with its customers so that their value judgement of the guests towards the hotel is increased. Therefore, the application of TAM will enable this study to serve as a guideline for the successful implementation of service automation technologies for the hotels and hoteliers in the city of Durban.

2.4.2 MASLOW'S HIERARCHY OF NEEDS

According to Mackenzie and Goodnow (2020), tourists' travel motivation values are expected to change post-COVID-19 and also expected to reorganize their travel motivations due to the perceived risk factors associated with the COVID-19 pandemic. Wachyuni and Kusumaningrum (2020) further reiterate that the risk factors for travelling associated with the COVID-19 pandemic include fear, panic, stress, some disturbance and discomfort. Maslow's hierarchy of needs theory (1943) remains the widely accepted and applied model theory to gain a deeper understanding of the needs of human behaviour (Sibisi, Arun Das and Mohammed Ashaf 2020). Maslow categorized the human needs into five categories namely, i) physiological needs, ii) safety and security, iii) social needs, iv) self-esteem and iv) self-actualization. Maslow's hierarchy of needs is presented in Figure 2.4 below.

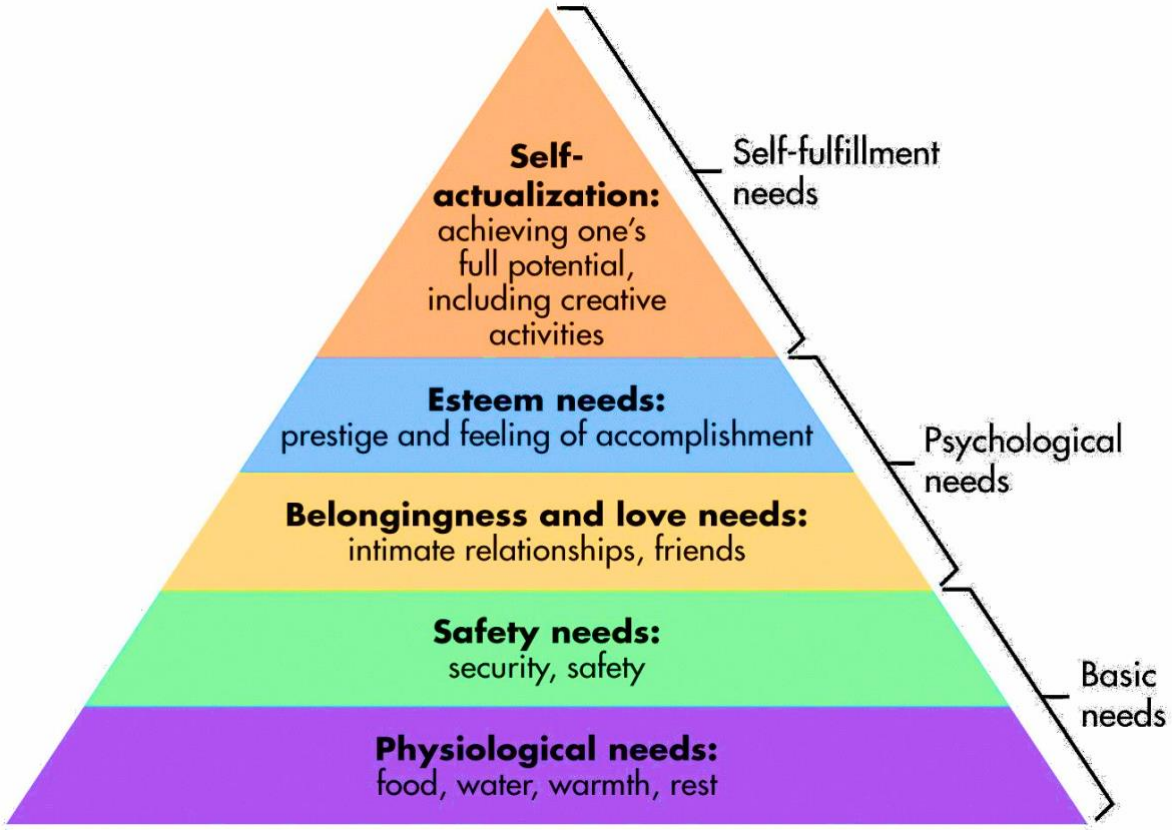

Figure 2. 4: Maslow's Hierarchy of Needs
Source: Maslow (1943).

Maslow (1943) explains physiological needs as basic human needs and they are at the beginning of the motivational theory of needs. They consist of food, water and shelter, which remain the individual's primary needs. From a tourism perspective, physiological needs can be elementary motivational factors that propel a tourist to visit a destination and it should give them access to water, food and shelter/accommodation such as hotels (Sibisi, Arun Das and Mohammed Ashaf 2020). Maslow (1943) defines the second category of human needs as an individual seeking security and safety from danger, illness, criminal activities and also catastrophic events such as the COVID-19 pandemic. Sibisi, Arun Das and Mohammed Ashaf (2020) state that tourists want to be assured of comfortability and safety during their travel, stay and participation in touristic experiences. In addition, the tourism industry can thrive more when it provides and guarantees safety and security to tourists visiting a destination. They further explain that this also includes tourists feeling safe from the spread and infection of COVID-19.

Maslow's (1943) third individual needs include the need for love, social belonging and forming social relationships within a society. Sibisi, Arun Das and Mohammed Ashaf (2020) emphasize that when an individual bonds with friends and family, the desire for travel and engaging in tourism is aroused because

of word-of-mouth. The fourth individual need of the theory, self-esteem, is defined according to Maslow (1943) as a strong desire an individual has for self-development and growth, freedom and attaining social reputation along with a level of pristineness. When individuals are at this level, they begin to travel and engage in tourism activities in a quest to gain a level of social reputation and prestige such as booking into high-end hotels. Maslow (1943) states that once all four bottom needs are satisfied, an individual inevitably realizes what they can become and their potential is understood, they use their full potential to solve challenging societal problems. At the last level of self-actualization, travelers seek tourism experiences that are related to polishing their travel desires and become involved in once-in-a-lifetime tourism experiences that they truly do not want to miss out on (Sibisi, Arun Das and Mohammed Ashaf 2020).

Maslow's second level of needs (safety and security) is going to be one of the primary travel motivations that tourists will take into consideration post-COVID-19. To reiterate this notion, Matiza (2020) states that the COVID-19 pandemic has resulted in three prevalent risk typologies namely, health, psychological and social risks that impact the likelihood of tourists travelling post the pandemic and even in future. One cannot ignore the fact that health risk in tourism is associated with potential hazards to tourists' health and well-being when they engage in travel and tourism experiences (Olya and Al-ansi 2018). Scholars such Huang, Dai and Xu (2020) agree that health risks and tourism are associated and highlight that within the present travel and tourism perspective that is dominated by the COVID-19 pandemic, the perceived health risk is one of the important factors that will influence tourists' decision-making processes post-COVID-19. Maslow's hierarchy, in particular, the second level of needs emphasizes that safety and security will underpin travel motivations post-COVID-19. Therefore, this theory is relevant to the current study since the aim of the study is to promote a technologically driven tourism industry post-COVID-19 in South Africa. This study uses the context of the Maslow's Theory of needs to provide an overview of how hotels and the tourism industry at large can use technology as a tool to build and regain the trust of travelers' post the pandemic, especially where health and safety are concerned in relation to the fear of contracting the virus.

2.4.3 THE INNOVATION PROCESS IN ORGANIZATIONS

Through innovation, organizations create and maintain their competitive advantage against their competitors. Innovation is an important process for all sectors of the economy, in particular, the hotel industry. Innovation provides hotels with a platform to differentiate themselves in terms of category and service quality, which may significantly result in higher levels of guest satisfaction (Vuković *et al.* 2018: 57). Four main factors need to be considered for tourism organizations to foster innovation, namely,

strategic advantages (socio-economic environment-tourists' markets and consumers), employee skills (relations, professional training and capabilities for new technologies), decision making (procedures and control systems in place) and organisational abilities (company resources, capital and research and development). The relationship between these four factors is depicted in Figure 2.5 below.

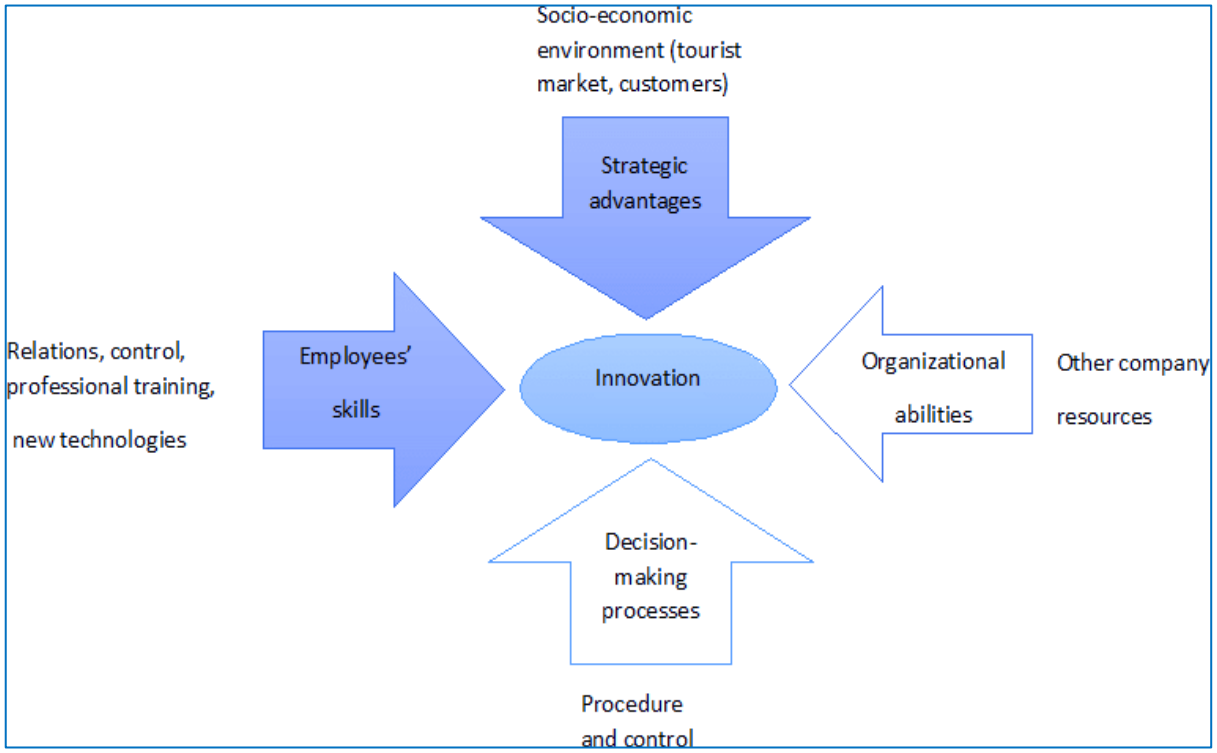

Figure 2. 5: The innovation process in an organisation
Source: (Vuković *et al.* 2018)

The aspect of dynamic capabilities (organisational capabilities) has been extensively studied over the past decades, with more attention being directed on mainly on the influence of strategic management within an organisation. Such studies have resulted in a better understanding of how innovation in organizations is designed. Bouzaida and Abdelli (2020: 13) reiterate that an organisation's dynamic capabilities, are analysed from the resource-based view (RBV) theory, as resources form part of an organisation's competitive advantage and play a crucial role in the implementation of innovation projects such as service automation applications in hotels. Tuomi *et al.* (2020: 7) emphasise that tourism organizations, more especially hotels, should match their already existing and available resources to the nature of service automation technologies they wish to introduce. Bouzaida and Abdelli (2020: 17) state that for the hotel sector to experience substantial growth, it needs the ability to exploit technological innovations. The authors reiterate this needs a highly competitive infrastructure and a pool of professional

skills (employee skills). Organisational capabilities such as financial resources are important in the implementation of service automation technologies (Bouzaida and Abdelli 2020: 17).

Management and leadership styles are two crucial organisational strategic advantages for implementing service automation technologies in hotels ((Vuković *et al.* 2018: 59) A study conducted by Vuković *et al.* (2018) concluded that the Serbian hotel managers exercise two types of leadership styles, mainly transformational and transactional leadership styles- with both having a positive influence on innovation in hotels in Serbia. However, transformational leadership proved to be the most popular leadership style. The study further concluded that the use of leadership styles by hotel managers has provided their employees with the relevant training and skills upgrade needed along with organisational support during the implementation of technological innovation projects, as employees were also afforded the opportunity to become more creative and actively participate in decision-making processes. This was useful during the transformation from tradition-based models to modern business models driven by technological adoption (decision-making processes that involve procedures and control activities between employees and management).

This model fits into the current study in such a way that it will serve as a blueprint for the hotels in the city of Durban in terms of how providing practical knowledge on the main factors will directly impact the innovations processes within their respective hotels. The hotel landscape in Durban is characterized by a lack of skills and resources for digital technology innovation within the hospitality, tourism, and hotel industry (TKZN 2019: 166). Therefore, the innovation process model highlights the need for employee training and upskilling in order for the hotels in the city of Durban to fully exploit the benefits that come with service automation technologies. There is evidence of a lack of best practice in business management skills and innovation capacity which limits the full potential of hotels in Durban to function efficiently and become innovative by being technologically driven (EDTEA 2020: 156). Therefore, the innovation process model emphasises the need for relevant management and leadership styles to be applied during the innovation process of adopting service automation technologies in hotels in Durban. In conclusion, the innovation process is suitable to help alleviate the two main challenges that the hotel sector in Durban is currently facing. The next section will unpack the legislative framework that governs the growth and development of tourism in South Africa. The innovation processes in hotels in Durban should be centred around the legislation presented in the next section.

2.5 LEGISLATIVE FRAMEWORK

This section provides an overview of the legislative framework that governs the development, management, growth and promotion of tourism in South Africa. This section will analyse the specific legislation that pertains to the tourism sector of South Africa. The study analyses (1) Tourism Act No. 3 of 2014, (2) White Paper on the Development and Promotion of Tourism in KwaZulu-Natal March 2008, (3) The Protection of Personal Information Act No.4 of 2013,(4) Broad-Based Black Economic Empowerment (BBBEE), (5) The Disaster Management Act 57 of 2002, and (6) The Labour Relations Act of 1995. The above legislation was chosen as it an impact on the growth and development of tourism in South Africa. The legislation is discussed in detail below:

2.5.1 TOURISM ACT NO. 3 OF 2014

The first South African Tourism Act was signed into law in 1993, and it was later amended in 2014. The amendment aimed to encourage tourism to and within South Africa, regulate and rationalize the tourism industry, standardize methods to maintain and improve tourist infrastructure and services, and coordinate the activities of people and enterprises involved in tourism. The amended Tourism Act also has the goals of promoting responsible tourism for the benefit of the Republic and the enjoyment of all its people and tourists, facilitating the promotion of high-quality tourism products and services, and promoting tourism growth and development in South Africa. The Act, in its preamble recognises the importance of tourism and its contributions to the growth in the socio-economic development of the nation since 1994. However, challenges of inadequate, uncoordinated, inconsistent, and fragmented tourism planning is noted as one of the major challenges affecting the sector. The Act emphasises that these challenges can only be addressed through the concerted efforts of all spheres of government working with the private sector to create a conducive environment for the sustainable growth of tourism in the country (Mogale and Odeku 2018: 9). Although the amended Act addresses issues of creating a national tourism sector strategy , information and monitoring system, grading system, tourism complaints officer, and national registrar of Tourist Guides, however the use of technology as a tool to aid the main objectives of the creation, expansion, management, and marketing of tourism in South Africa is not addressed in the South African Tourism Act. This reveals a gap in the tourism sector in South Africa, where the benefits and possibilities of technology are not addressed and regulated. The Covid-19 pandemic has highlighted the need to further amend the Tourism Act which is the major legislation regulating tourism in the country to specifically regulate the use of technology in the sector to prevent a situation where South Africa could become a dumping ground for the various technological advancements in the sector.

2.5.2 WHITE PAPER ON THE DEVELOPMENT AND PROMOTION OF TOURISM IN KWAZULU-NATAL MARCH 2008

The White Paper on the Development and Promotion of Tourism in KwaZulu-Natal was developed as a result of a wide consultative process which involved all identified stakeholders in the tourism sector in the province. The stakeholders range from the previously excluded communities, youth, women, children the environment and many others that were not included in the previous tourism legislation (EDTEA 2008). The White Paper considered all tourism-related national and provincial legislation, policies, and plans in order to provide a coordinated approach that places tourism in KwaZulu-Natal within a larger context. As a result, it is a Policy document, that lays out the strategic policy concerns that any competitive destination works for. It outlines the Province of KwaZulu Natal's tourism vision: to position the province as Africa's top eco-cultural tourism destination, both domestically and globally. Its mission is to originate, facilitate, coordinate, and implement "Experience-based" tourism marketing and "Demand-driven" tourism development programs in order to meet tourism growth goals and contribute to the Province's shared and sustainable economic growth and development. It advises that the province sell the destination in an "experiential - beyond limits" manner, while remaining competitive. It promotes the province to provide world-class service and showcase its cultural diversity while respecting the cultures of its residents and visitors and practicing responsible tourism. It recognizes that numerous partners are required to fulfil the tourist growth objectives and, as a result, establishes the roles and responsibilities of tourism partners, taking into account the provisions of Schedule 4 of the South African Constitution. It also establishes a governance framework for ensuring performance and compliance. The White paper has been well received as a well thought out policy document for the province, however, there is a need for the inclusion, recognition and regulation of the use of technology in the sector in order to ensure a sustainable growth in the sector post Covid-19 pandemic (TKZN 2019: 35)

2.5.3 Protection of Personal Information Act (POPIA) No.4 of 2013

The POPI Act is South Africa’s first comprehensive data protection statue that is applicable to all sectors. The POPIA gives effect to the right to privacy of all persons in the country and brings South Africa in line with many other developed nations where data protection are now the norm (Sutherland 2017: 94). The purpose of the act is to promote the protection of personal information processed by public and private bodies, to introduce certain conditions to establish the minimum requirements for the processing of personal information, to provide for the establishment of an Information Regulator in accordance with this act and the Promotion to Access to Information Act of 2000, to provide for the rights of individuals regarding unsolicited electronic communications, and to automate the process of processing personal

information. POPIA recognizes that everyone has the right to privacy under Section 14 of the Constitution of the Republic of South Africa. POPIA's mission is to provide. The goal of POPIA is to give effect to the constitutional right to privacy by safeguarding personal information during processing by a responsible party, subject to justifiable limitations, and to regulate the manner in which personal information may be processed by establishing conditions that are in line with internationally acceptable standards that prescribe the minimum threshold requirements for the processing of personal information. In this context, hotels and other tourism-related businesses must align and comply with POPIA's rules for the processing and handling of guests' personal information. To ensure that guests' privacy is not compromised, the POPIA act must be promoted within the travel and tourist business. The POPIA statute establishes principles for how hotels should secure their visitors' personal information and respect their right to privacy. Later in this chapter, we'll look at privacy and security concerns as a barrier to implementing service automation technology in hotels.

2.5.4 BROAD-BASED BLACK ECONOMIC EMPOWERMENT AMENDMENT ACT 46 OF 2013 (BBBEE ACT)

The BBBEE Act's purpose is to create a legal framework for the promotion of black economic empowerment by empowering the minister to issue codes of good practice, publish transformation charters, and address issues related to the apartheid regime's control over access to South Africa's productive resources and skills, and the country's economy still excludes the vast majority of its people from owning productive assets and possessing skills. As a result, the Act's main goals are to promote broad-based black economic empowerment by promoting economic transformation to enable meaningful participation of black people in the economy, achieving a significant change in the racial composition of ownership and management structures, as well as skilled occupations in existing or new businesses, and increasing the number of black people in the workforce, Increasing the number of black women who own and manage current and new businesses, as well as increasing access to capital for black economic empowerment. The Tourist BBBEE was designed by the National Department of Tourism in 2009 to express the commitment of all stakeholders in the tourism sector in South Africa to the sector's empowerment and transformation so that tourism advantages and opportunities are given to all black South Africans. The Tourism BBBEE Scorecard's primary goal is to ensure that the benefits of tourism are shared equitably among the people of South Africa, as well as to advocate for the empowerment of

youth, women, people with disabilities, and cooperatives through enterprise development, entrepreneurship, and people development.

Within the sector, women are concentrated in low-paying jobs alongside unskilled workers. In addition, women hold a disproportionate number of low-ranking posts and continue to earn less than their male counterparts with equivalent training and experience. This issue is still unresolved. Furthermore, ownership of tourism businesses has always been concentrated among Whites, with around 95% of all tourism businesses owned by Whites, while Blacks hold only 5% of all tourism businesses in South Africa (Sixaba and Rogerson 2019: 2). To reiterate, the difficulty in the South African tourism business is that it is dominated by white entrepreneurs, according to Rogerson and Rogerson (2019: 300). The South African government, on the other hand, is working to reverse this tendency, using the BBBEE Act as a model.

2.5.5 THE DISASTER MANAGEMENT ACT 57 OF 2002

The Disaster Management Act aims to establish an integrated and coordinated disaster management policy that promotes disaster prevention and mitigation, emergency preparedness, rapid and effective disaster response, and post-disaster recovery, as well as the establishment of national, provincial, and municipal disaster management centres and an expanded reporting system by state organs on information. Due to the COVID-19 outbreak, the National Government of South Africa proclaimed a National State of Disaster under the Disaster Management Act. As of 15 March, the following measures and restrictions were in effect. For the first wave of coronavirus infections in South Africa, the following measures and restrictions were implemented as of March 15, 2020: prohibition of gatherings of more than 100 people, immediate school closures, restrictions on the sale, dispensing, and transportation of liquor, and travel restrictions to and from South Africa. When COVID-19 was first proclaimed a National State of Disaster, South Africa was on Alert Level 5, indicating a high COVID-19 spread and low health system preparation. South Africa's National State of Disaster, which had been in place for 750 days, came to an end, allowing some activities in the country to resume. By late March, just a few weeks after the lockdown rules went into effect. Most hotels served as quarantine and isolation sites during level 5 of the South African Risk-Adjusted Approach, and occupancy rates were down by a total of 50% year-on-year, along with the rest of the sector, and a further 5% was seen with most hotels functioning as quarantine and isolation sites. In addition, small and large hotels had closed their facilities and properties, airlines had ceased operations, and popular tourist sites remained closed (SAT 2020). The declaration of a National State of Disaster adds to the study's purpose and significance, as the Act affected the tourism sector in KwaZulu-Natal significantly. In order for hotel management to continue its operations during

the operation of the Act, they had to resort to the use of technology in order to reduce human to human interactions. It can be argued that the Act is the most significant reasons why technology had become highly embraced within the tourism sector of South Africa.

2.5.6 LABOUR RELATIONS ACT 66 OF 1995

Like most legislation that came into effect with the new democratic government in South Africa, The Labour Relations Act sought to improve workplace democracy, social justice, economic development, and labour peace. The Employment Services Act and the Immigration Act of 2002 complement the Labour Relations Act in that they forbid employers from employing foreign nationals on South Africa's territory. The act stipulates that foreign nationals should have a valid and pertinent visa and can only work on South African territory under the following circumstances: (1) Despite extensive searching, the potential employer has not been able to locate a qualified citizen or permanent resident who possesses the necessary credentials, abilities, and experience that are comparable to those of the application, (2) The applicant possesses credentials, experience, and skills that are in line with the job offer, (3) The applicant's salary and benefits are comparable to the average pay and benefits received by citizens or legal residents holding equivalent jobs in the Republic of South Africa, and (4) Section 15 and Regulation 14 (4) of the Business Visa require the Department of Employment and Labour to certify that at least 60% of the employees of companies given business visas are South African citizens or lawful permanent residents.

The hotel and tourist industry in South Africa, according to Vettori (2018: 09), is a labour-intensive sector with working conditions characterized by long and irregular hours, low earnings, and a lack of job security. Furthermore, because the hospitality industry in South Africa is largely characterized by the employment of unskilled, primarily female non-standard workers with poor working conditions, gender- and race-based unfair discrimination within the industry is intensified and visible throughout the industry. In terms of the adoption and implementation of service automation technologies and the technical skills requirements to maintain such systems, and their unavailability within the South African tourism sector, hotels in South Africa and KwaZulu-Natal may find difficulties in sourcing the required skills to maintain and manage the systems due to the rigidity of the Labour Relations Act in allowing for foreign nationals being employed within South Africa. This is an issue that will need to be addresses if hotels in South Africa are to remain competitive in terms of the adoption of service automation technologies.

From the above Legislative Framework, the absence of technological integration for the development and expansion of tourism in South Africa is clear from the above regulatory framework that governs and influences tourism in South Africa. In terms of the use of technology targeted at propelling tourism growth in South Africa so that it is competitive and on par with top worldwide tourism destinations, there is a dearth of literature on the South African tourism landscape and hotel sector in KZN. The study will contribute to the body of literature on the use of service automation technology by the tourism industry in South Africa against this setting. The following section will look at how COVID-19 has been identified as an accelerator of the adoption of Service Automation Technologies.

2.6 COVID-19 AS A DRIVER OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS

Zeng, Chen and Lew (2020: 725) highlight that a crisis and a pandemic like COVID-19 can bring about technological innovations and developments. To reiterate, Yu (2020: 25) states that the COVID-19 has accelerated the use and application of technological innovations like advanced AI and robotics. Yu (2020: 27) further emphasizes that AI and robotics have grown to be more viable in the hospitality and tourism industry, even beyond COVID-19 and are expected to provide concierge, housekeeping and other service-related tasks that would have otherwise been provided by humans. Legislation in the post-COVID-19 world may oblige tourism and hospitality establishments to consider physical distancing by making use of biometric technologies to measure the health status of employees and guests with health and safety being part of legislation in most countries around the world following the pandemic (Ivanov *et al*. 2020).

According to Ivanov *et al.* (2020a), travelers and hotel guests will prefer to interact physically with technologies rather than with other human beings and frontline service employees as a measure to minimise health risks. Such traveller preferences will further accelerate the development and applications of technological innovations such as robots, virtual/augmented/mixed reality technologies, chatbots, voice-activated technologies and other service automation technologies. The application of new technologies such as Robots, Artificial Intelligence and Service Automation (RAISA) has led to unprecedented changes in the service landscape and ways in which hotels cater for their guests (Ivanov, Webster and Berezina 2017: 1504). The authors further state that RAISA applications afford hotels opportunities to improve and streamline their operations and ensure consistently high levels of service quality. Such technologies are based on automation, which in a broader sense, is the substitution of the physical human labour and they continue to be widely used in service industries like Hospitality and Tourism (Lukanova and Ilieva 2019: 158).

Lukanova and Ilieva (2019: 159) state that the formation process of the guest experience is a complex process in which it is significantly influenced by any form of direct and indirect interaction with the guests and the entire hotel organisation before, during and even post-stay. The guest cycle model (GCM) was first introduced by Michael Kasavanna in 1978. The GCM model has four broad stages which are interrelated to each other and they are the pre-arrival, arrival, stay, and departure stage. The GCM is depicted in Figure 2.6.

Figure 2. 6: Guest Cycle Model
Source: Lukanova and Ilieva (2019)

The four main stages in the Guest Cycle Model in Figure 2.6 are explained below:

I. **The first stage (Pre-Arrival):** involves two main operations that are carried out which include information seeking about a hotel and making a booking.

II. **The second stage (Arrival):** involves welcoming the guest to the hotel and the check-in and room allocation process.

III. **The third stage (Stay):** provides the main service and additional hotel services to the guests. These services should meet or even exceed guests' expectations based on the hotel's marketing collateral and materials.

IV. **The fourth stage (Departure):** the guest checks out of the hotel and settles an account if there is a need to do so.

The GCM is further developed with a fifth stage; Assessment: which involves the guest assessing all the aspects of the stay in comparison to their expectations RAISA technologies are evident in each of the stages of the GCM, which will be explained in detail below. These technologies include mobile technologies, virtual reality, chatbot technologies, digital kiosks, mobile check-in, facial recognition check-in services, smart room keys and non-stop check-in, In-room smart technologies and lastly, robotics and robotization technologies:

2.6.1 RASIA APPLICATIONS IN THE PRE-ARRIVAL STAGE

The potential customer (the hotel guest) initially gathers information about hotel accommodation options that interest him/her in a destination that they want to visit (Lukanova and Ilieva 2019). They further explain that the potential guest examines different hotel types, services, amenities, sanitization and hygiene standards, and most importantly prices. It can thus be said that it is imperative for a hotel organisation to be visible, as much as possible, to the potential hotel guest. Howell and Hadwick (2017) state that mobile technologies, chatbots and virtual reality (VR) are classic examples of modern technologies that are widely applied within the hospitality and tourism sectors as an approach to enhance customer interactions and experiences with the hotel product and other added services.

2.6.1.1 MOBILE TECHNOLOGIES

The outbreak of the COVID-19 pandemic has meant that travel consumers are rapidly adopting mobile technologies to facilitate the search for travel information, make hotel reservations, request service assistance and additional information and the convenience to make changes to their hotel reservations. Travel consumers adopt mobile technologies and applications to save time and be more efficient without physical contact with other human beings (Dorcic, Komsic and Markovic 2019: 88). There have been notable pioneers in the application of mobile technologies through the creation and applications of 521 various mobile applications in the hospitality and tourism sectors at large. These pioneers include some of the world's renowned hotels like Hilton Worldwide developed a Hilton Honors Application, while Starwood Hotels and Resorts developed a Starwood Preferred Guest App. Hotel guests can use this mobile application in the comfort of their own homes to view the layout of different hotel rooms. In addition, using the same mobile applications, they have the ability to inform the hotel in advance about their preferences such as the type of pillows and even order additional services such as food and beverages, all this will be available upon their arrival at the hotel (Lukanova and Ilieva 2019: 172). Since

this is the case with mobile applications in the hotel and hospitality sectors, (Ivanov and Webster 2017: 1) point out that the implementation and introduction of innovative modern technologies in hotels around the globe has had significant costs as an underlying factor. They further explain that in most case scenarios, it is large hotel chains and companies that often have the capacity to implement such innovative mobile technologies because of the huge capital investments involved. The internet statistics imply that South Africa is in the top five African countries, having a total of 32.6 million active internet users (Mkwizu 2019: 9). This presents prospects for further tourism growth and development in South Africa in terms of the integration of mobile technologies in the country's sector. With this said, the study will contribute to the body of literature pertaining to the use of mobile technologies by hotels and the tourism industry in South Africa.

2.6.1.2 Virtual Reality (VR)

Advances in technology have significantly impacted tourism and hospitality and one of the emerging innovations is virtual reality (Wei 2019). According to Diemer *et al.* (2015). VR can be defined as a computer-generated environment that represents a real world with a total immersion in the digital world and it is known for its advantage of providing perceptual simulations of real-world situations. VR reality experiences can be any of the three types: Non-immersive VR, Semi-Immersive VR or Fully-Immersive VR. These are common within the tourism industry. Figure 2.7 depicts the classification of VR experiences in tourism.

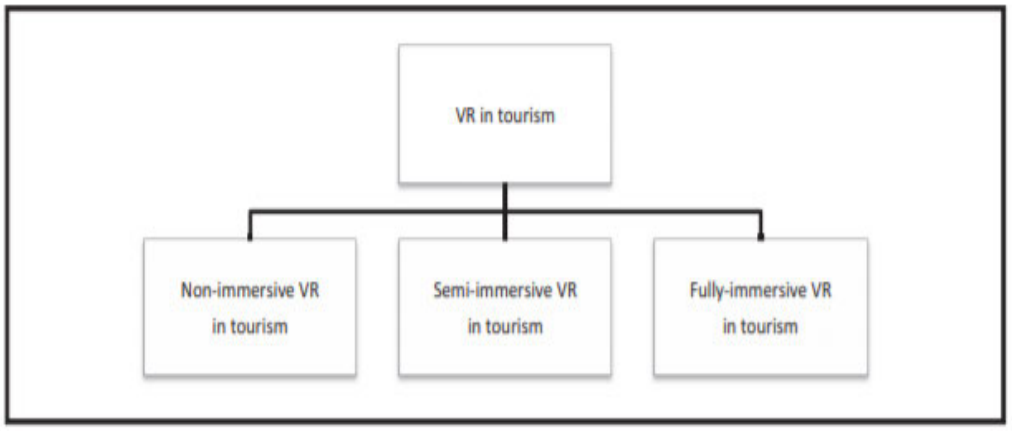

Figure 2. 7: Classification Framework for VR Applications in Tourism
Source: Beck, Rainoldi and Egger (2019)

As shown in Figure 2.7, Non-immersive VR displays 360-degree real-life captured situations and events on a computer screen that enables virtual tourism experiences for the purposes of marketing tourism

products and services. Semi-immersive VR projects synthetic 360-degree real-life situations into a large screen to enable and stimulate the visual senses of the user. It also involves the use of catalogues and brochures to influence the choice of tourists in their decision-making processes when planning a trip to a tourism destination. Lastly, Fully-immersive VR isolates the user completely from the real world by the provision of 360-degrees real-life captured situations using a VR headset to facilitate full visual immersion into the experience (Beck, Rainoldi and Egger 2019: 592). According to a study conducted by Eye For Travel 36% of Britons, 49% of Germans and a total of 74% of Americans strongly believe that VR technology will be crucial in facilitating tourist trips (Howell and Hadwick 2017).

Durban Tourism launched a "Know your city" virtual Durban excursions campaign that gives travelers from around the country a virtual tour of the city empowered by VR technology. Visitors and travelers can digitally explore and discover Durban's greatest and most popular landmarks and tourist activities through mainstream TV channels including Durban Tourism's social media platforms. The virtual Durban excursions were launched two months into the National lockdown due to travel restrictions and in response to the increased digital demands of travelers and consumers (Durban Tourism 2020). Similarly, The Bestwestern is the world's first big hotel chain, which takes the improvement and facilitation of planning tours to a whole new level using VR technology. The hotel chain launched its own YouTube channel known as BestwesternTV, where it offers potential hotel guests the luxury and ability to view each and every room in a selected hotel, including the hotel's lobby and all other amenities that the hotel has to offer, way in advance of their arrival at the hotel using VR technology software applications (Lukanova and Ilieva 2019: 175). The rapid adoption of VR by the tourism industry, especially since the outbreak of the COVID-19, makes it difficult to forecast exactly to what extent VR becomes a substitution for tourism in the future. It is important to note that VR could pose a threat to developing countries that are dependent on tourism earnings (Beck, Rainoldi and Egger 2019: 589). South Africa is a developing country and tourism plays a crucial role in the country's economy as shown in Figure 2.2, could this become an ethical dilemma for the South African Tourism industry to adopt VR. Therefore, this study will contribute to the body of literature regarding the adoption of VR by hotels and the tourism industry in South Africa as it highlights the benefits of VR and how it is applied by various hotels from across the world.

2.6.1.3 CHATBOT TECHNOLOGIES

According to Ukpabi, Aslam and Karjaluoto (2019), chatbots can be defined as technological software agents that simulate an organisation's humans, or specifically outlined characteristics in which the user can interact in a conversation (it can be oral, written or even mixed). Chatbots are a practical form of

artificial intelligence (AI) technology and continue to be widely adopted in the hospitality sector. Gamanyuk (2017) highlights that the benefits of implementing chatbots are they afford consumers the opportunity to perform various tasks without the need to download applications such as finding and exploring the hotel/restaurant's menu, prices and available tables and manage their dinner reservations on the move. Through advancements in technology, there is a substantial rise in the use of technology by various companies in South Africa as this is seen through the adoption of chatbots and automated communications in sectors like fast food. KFC, South Africa uses chatbot technologies as part of its e-commerce offerings. The fast-food outlet introduced a WhatsApp channel to facilitate its click-and-collect service. Through this platform, consumers are able to view menus, place orders and determine the KFC outlet closest to them (Gavaza 2022).

According to (Ukpabi, Aslam and Karjaluoto 2019) chatbot technologies have functions that mimic human intelligence and even look and feel like a human answer as the engine connects to an organisation's reliable database to provide hotel guests with information such as available hotel rooms, room rates and hotel facilities. This eliminates the need for direct human contact with hotel employees, especially amid the COVID-19 pandemic outbreak. FCM Travel Solutions, a company based in Cape Town, aims to revolutionize the travel industry as they strive to simplify the lives of travelers. Through the launch of chatbots, Sam the chatbot assists business travelers before, during and after travel with itinerary management, airline and hotel bookings, flight update management, access to local cities and country travel-related information, local weather patterns and restaurant suggestions, and facilitate ground transportation (News24 2018).

Similarly, Marriot Hotels also introduced a chatbot service to enhance guest experiences and to assist guests with booking a room, enriching the pre-arrival experience, by allowing the guests to choose their own preferred hotel rooms and other amenities such as spa treatments, airport transfers and even make dinner reservations within the hotel without any direct contact with human employees (Ukpabi *et al.* 2018). It then can be noted that the South African tourism industry is progressing towards the adoption of chatbot technologies to facilitate their travel services to consumers. Despite the advantages of chatbot technologies, Murphy, Hofacker and Gretzel (2017) outline that challenges associated with chatbot adoption in hotels involve technical issues, high costs, organisational culture and size of the hotel, and most importantly, job losses by human employees. This study contributes to the body of literature regarding the adoption of servicer automation technologies to futureproof the future of tourism in South Africa.

2.6.2 APPLICATIONS OF RAISA AT THE GUEST ARRIVAL STAGE

The second stage in the guest cycle model in Figure 2.6 involves welcoming the guest to the respective hotel and allocating a room. The global hospitality industry is facing the introduction of innovative technologies such as digital kiosks, mobile check-ins, facial recognition check-in technologies and smart room keys are increasingly being implemented in hotel operations to save guests time and enrich their hotel product and service experience These technologies are discussed and examined in detail below:

2.6.2.1 DIGITAL KIOSKS

The tourism and hospitality industry has experienced major changes in service delivery methods due to advancements in technology and information and communication technologies (ICTs), allowing for the fourth industrial revolution (4IR). In addition, the outbreak of the COVID-19 pandemic resulted in a paradigm shift in customer preferences as they have favoured interaction with self-service technologies over human employees (Gupta and Sharma 2021). According to Lukanova and Ilieva (2019: 163), digital kiosks are considered to be an approach to efficient hotel services and can contribute to the hotel's successful strategy of enhancing customer services. The introduction of digital kiosks in hotels allow hotel guests check-in and register by themselves thus at the same time eliminating long queues and waiting times in the hotel reception or lobby, and the guests can select their preferred language that is probably not spoken by frontline service staff members. A popular fast-food restaurant chain, McDonald's, South Africa has introduced digital self-service kiosks. Through these digital self-service kiosks, customers are afforded the pleasure of facilitating their own orders by placing and paying for them without the need to be attended to by human cashiers (Davis 2019). Similarly, various hotel software companies such as IBM and NCR continue to work together with various world-leading hotel chain companies such as Hilton Worldwide, Marriott and Sheraton alongside other major hotel chain companies that own hotel properties around the world where digital kiosks are being installed. Moreover, Hilton went further by installing their digital kiosks in the baggage claim section in various airports around the world. Also, Hilton Hawaiian Village Beach Resort and Spa guests are afforded the opportunity to check in at the airport long before they arrive at the hotel property (Self Service in Hotels and Motels 2018). The introduction of digital kiosks in hotels facilitates the check-in and registration processes, eliminating waiting tine and guests have the option to use their preferred language of communication. The study contributes to the body of literature on the adoption of digital check-in kiosks by hotels and the tourism industry at large in South Africa. The study is yet to ascertain the rate of adoption of digital kiosks by the hotels in the city of Durban.

2.6.2.2 MOBILE CHECK-IN

Mobile check-in technologies are another form of technological innovation that is being widely adopted in the hospitality industry. The introduction and implementation of mobiles and web check-in technologies, provides guests with endless possibilities that are filled with convenience and the ability to communicate with the hotel from any location in the world, without having to wait for their arrival at a hotel to begin interacting with frontline employees (Lukanova and Ilieva 2019: 172). Peermont, Africa's top hospitality group with hotels located across South Africa and Botswana launched a new hotel App. The hospitality group believes that amid the COVID-19 pandemic, the newly developed hotel App will afford their guests mobile capabilities and contactless services through contactless hotel mobile check-in and the use of mobile keys over traditional hotel key cards. The App is now available for guests to download and use, and they can easily skip the front desk queue and check in from their devices and use the mobile keys on their smartphones for the duration of their stay (Peermont 2021). Similarly, the President Hotel in Cape Town, South Africa, used the national lockdown to enhance health and safety protocols around its hotel property. The hotel launched a keyless entry and contactless check-in and -out systems. The hotel streamlines its check-in and out processes through the utilization of digital platforms to limit guest-to-employee interactions. In addition, the hotel has implemented a keyless entry system that allows guests to enter their rooms using their smartphone devices baring the hotel's Bluetooth enabled door locks (Independent Online 2020).

Some of the world's leading chain hotels soon followed suit and introduced their own mobile check-in technologies. Some of these include Hilton Worldwide which introduced the Hilton Honors mobile Application and Marriot International which introduced Marriott mobile application for Marriot Rewards Members. Clock software (2016) states that mobile check-in technology improves the guest arrival experience in a hotel and increases the levels of satisfaction as they carry out the check-in and check-out procedures the way they want and most importantly, at their own convenience time. It further concludes that mobile check-in technologies eliminate the need for over staffing the hotel and even in some cases, it gives human employees ample time to focus more on value-added, face-to-face services that are more valuable to guests than just handing out registration cards and room keys.

2.2.6.3 FACIAL RECOGNITION CHECK-IN SERVICES

Over the years, technology has enabled hoteliers to improve the delivery of services while strengthening customer relationships from an array of perspectives (Sota, Chaudhry and Srivastava 2020: 43). Some of the pioneering hotels worldwide have started to introduce intelligent facial recognition technology in a

quest to enhance their guest check-in services. Wang (2018) states that an intelligent check-in system reduces guest check-in time from approximately three minutes to one minute, thus eliminating direct contact with the hotel frontline employees and improving the check-in processes in a traditional hotel. The author further states that facial recognition software is a type of biometric technology that is gaining popular preference to facilitate customer service more efficiently by some of the world's pioneering, luxury hotels, more evident in China. Xu *et al.* (2020: 08) highlight that during the COVID-19 pandemic, hotels started using facial recognition systems to enhance their service quality while ensuring that health and safety protocols are being adhered to. They further state that, due to the COVID-19 pandemic, facial recognition software companies have developed a solution through this type of software for non-contact body temperature scanning and contactless check-in procedures and service in hotels while controlling the virus in real-time. Facial recognition technology continues to gain popularity and preference in the hotel sector as it has the ability to reduce the risk of cross-infection with COVID-19 and significantly improve traffic efficiency, which saves time and reduces congestion between hotel employees and the guests in the hotel lobby. However, given the fact that the guests' biometric information is collected, read and analyzed prior to arrival by a hotel's biometric systems, there exists a high risk that their private information may be disclosed or misused by the hotel (Xu *et al.* 2020: 12).

Furthermore, trust in a hotel's facial recognition system is a key factor that affects the user's adoption of such technologies in hotels (Pai *et al.* 2018: 885). The question of how hotel guests trust facial recognition systems when security and privacy are not perceived in the adoption of a facial recognition system remains unanswered to date and calls for research studies to address this gap. It remains important to explore the differences in the decision-making processes of new and experienced hotel guests' adoption of a facial recognition check-in system in a hotel. As this might be the case, Chijindu, Angela and Steven (2019: 24688) and Lin, Chi and Gursoy (2020: 536), in their studies concluded that facial recognition check-in systems in hotels and other related service industries will see an increase in its introduction and usage. Chi, Denton and Gursoy (2020: 530); Fan *et al.* (2020: 273) and de Kervenoael *et al.* (2020: 104042) conclude by highlighting the importance of gaining an empirical understanding of hotel guests' intention to adopt such check-in technologies. They further conclude that such understanding has turned into an urgent necessity within the hospitality and tourism industries. The study contributes to the body of literature pertaining to the adoption of facial recognition check-in services by the tourism industry in South Africa to futureproof the industry against alike pandemics post-COVID-19.

2.2.6.4 Smart Room Keys and Non-stop Check-in (NSCI)

Smartphone room keys and non-stop check-in (NSCI) is another form of innovative technology that is taking the hotel sector and hospitality industry by storm in terms of implementation and continues to enable hotel guests to go straight to their hotel room without stopping and engaging with the hotel's frontlines employees at the reception (Keymolen 2017). There are various types of NSCIs such as smartphone applications for room keys, traditional smart mobile phone pin codes, 2D barcodes and biometrics. These NSCI technologies are explained in detail in Table 2.3.

Table 2. 3: NSCI Technologies in hotels

Type of NSCI Technology	Description	Disadvantages
Smartphone Application for Room Keys	The guest registers in the application and checks in beforehand, then upon arrival they use the same application to activate a signal via Bluetooth or Radio Frequency Identification (RFID) to automatically unlock the hotel room door.	All members of the family need to be in possession of their own smartphones and the main registered guest must find a secure way to share the mobile key with the rest of the family. When the smartphone battery runs out it poses a great challenge to gain access to the hotel room.
Traditional Smart Mobile Phone	The hotel sends the hotel guest an SMS prior to arrival and once the guest arrives at the hotel, he/she transmits an acoustic signal in front of the hotel room's door then it opens.	This is an expensive solution as the hotel has to send out many SMSs even to guests in international destinations which proves to be very expensive
Pin Code	The hotel guest receives a pin code via SMS or an email from the hotel. Then the guest will type in the pin code in an electronic keypad installed on	The guest can easily lose the pin code and without it, there is no access to the hotel room.

Type of NSCI Technology	Description	Disadvantages
	the hotel room door and they gain access to the room.	
2D Barcode	The hotel guests get a 2D barcode prior to their arrival at the hotel. Then upon arrival, the guest will scan the barcode at the door to gain access to the hotel room.	2D barcode scanners are relatively expensive and are known for consuming too much energy which can drive up the hotel energy bill.
Biometrics	Access to the hotel room is often controlled by a guest's fingerprint scan or a retina (eye) scanning device mounted in the door	Scanning devices are very expensive to install and maintain.

Source: Modified from (Lukanova and Ilieva 2019)

Keyless entry systems are praised for their full automation of check-in and check-out processes which also enables the guest to automatically receive their hotel bill or invoice via email. Lukanova and Ilieva (2019: 179) state that another leading hotel chain company, Hilton Worldwide is a big role player in the implementation of keyless entry systems. The company developed the Programme named "Hilton Honors" whereby its loyalty members have the opportunity to benefit from the keyless entry technologies in Hilton properties across the world, and not only do they use the smart keyless entry for hotel rooms but to also gain access to other parts of the hotel such as gyms, spas, elevators and other amenities essential to the guest experience and stay in a hotel. In South Africa, the President Hotel in Cape Town has pioneered the use of keyless entry systems as explained in section 2.5.2.2

Digital technologies continue to alter the hotel service landscape, pioneering new standards for hotel services. The American Hotel and Lodging Association (2016) concluded in their survey that from the year 2016 and beyond, 65% of hoteliers in the United States would have introduced keyless entry and mobile check-in systems for their hotel guests. According to Filipova and Kadieva (2017: 19), the digitization of hotels, including their services and amenities, has also resulted in much-needed attention

given to the development of analytical and security systems so that guests trust such technologies that are introduced in hotels, some of which are used to emphasize marketing and promotion initiatives carried out by the hotel. Moreover, the modern traveler and tourist are well equipped with digital knowledge and are dependent on the internet as they spend more time on their mobile phones searching for information. The study is yet to ascertain the adoption of NSCI technologies by the hotels in Durban and contribute to the body of knowledge on the adoption and the benefits of NSCI in hotels in South Africa and the tourism industry at large.

2.6.3 APPLICATIONS OF RAISA DURING STAY/ROOM OCCUPATION

From the Guest Cycle Model presented in Figure 2.6, the third stage involves the guest staying in a hotel. Due to the hotel and hospitality industry being highly competitive, the adoption of service automation technologies by hotels has significantly increased, as they afford hotels the opportunity to reduce labour costs and increase efficiency while enhancing guest experiences during their stay (Kuo, Chen and Tseng 2017: 1307). These include in-room smart technologies and robotics and robotization. These technologies are discussed in detail below:

2.6.3.1 IN-ROOM SMART TECHNOLOGIES

Nowadays, more hotels are rapidly introducing smart hotel rooms as means of attracting more international travelers. A smart hotel room is a type of hotel room that relies significantly on the use of various smart technologies to facilitate guest requirements and needs during their hotel stay and the provision of personalized services (Tyagi and Patvekar 2019: 1314). According to Stylos *et al.* (2021: 02), hotel guests often expect convenience during their hotel stay and seek to enjoy the room amenities with little effort and less complex operations without having to rely on the hotel staff for support. It is behind this backdrop that more and more hotels around the globe have started to introduce in-room smart technologies. The flagship Hilton Garden Inn in Durban's Umhlanga, South Africa, opened its doors in October 2020 and is known for being a smart hotel. The Hilton Mobile App has been designed to afford guests the opportunity to be in full control of their hotel room as they can use the app to control and operate applications remotely such as lights, TV and aircon from the comfort of their smartphones (Property wheel 2020).

Some of the world's leading hotel chain companies such as The Peninsula Hotels introduced an in-room tablet technology. Using this tablet, guests can control room temperature, adjust room lighting, set a wake-up alarm, switch the TV on and off, close and open curtains and even book spa treatments and many other things (Wroten 2017). According to Lukanova and Ilieva (2019: 180), one of the emerging

in-room smart technologies that is being currently tested and introduced by hotel chain companies worldwide, is voice-control technology in which guests have the ability to order room service, housekeeping services and also adjust room controls without a touch of a button or having to make a call to the reception to request such services. Some of the hotels to introduce this pioneering technology is Marriott International which introduced Alexa for hospitality, developed by Amazon. Moreover, hotels such as the Marriott Hotels, Westin Hotels and Resorts, St. Regis Hotels and Resorts, Aloft Hotels and Autograph Collection Hotels have already introduced such innovative technology to their guests. A smart traveler is accustomed to using voice-operated devices such as Alexa in their homes, especially international travelers coming into South Africa. In South Africa, the market for such technology is small but relatively growing. This implies that the South African hotel industry is lagging in the race to adopt voice-activated technologies like Alexa as a quest to enhance customer experiences during their hotel stay (Tourism Tattler 2018). This represents a gap in the adoption of voice-activated technologies as part of in-room smart technologies by hotels in South Africa. Therefore, the study contributes to the body of literature surrounding the adoption of voice-activated technologies and alike in-room smart technologies for the hotel sector in South Africa.

Dalgic and Birdir (2020: 328) state that hotel companies like Marriott International, Aloft Hotels and Four Seasons Hotels have introduced new generation, smart hotel rooms. These rooms do not only focus on providing guests total control of their rooms, but through the combination of innovative software such as AI, the hotel management has the ability to learn more about their guests, especially their preferences so that they can offer them better personalized services, increase room revenue, and the maintain general hotel operations. Even though these technologies offer hotels such benefits, there have been critics that surround their introduction. Wroten (2017) maintains that the biggest challenge with such innovative technologies is that they are expensive and require constant updates. The scholar further concludes that such technological systems are very susceptible to attacks by hackers, which in turn drives increased security costs for the hotel.

2.6.3.2 ROBOTICS AND ROBOTIZATION TECHNOLOGIES

Service robots in hotels have developed modern and efficient ways of interacting with customers to provide a new dimension of service experience for guests using and staying in hotels (Kuo, Chen and Tseng 2017: 1307). According to Reis and Melao (2019: 412), service robots can be defined as “an artificial intelligence-driven system based on autonomous interfaces that work together to adapt, interact, communicate and deliver automated service to an organization’s customer”. Different robot technologies serve different purposes, especially in terms of their interactions with human beings. They can be

classified as Telerobot, Teleoperator or Social Robot. These robot classifications are explained in detail in Table 2.4 below.

Table 2. 4: Classification of Robot Interaction with Humans

Robot classification	Definition	Function	Types of Robots
Telerobot	Robots that can sense the environment and make limited automatic reactions through computer programmes to complete routine tasks	Routine tasks	Cleaning robots, delivery robots and disinfection robots
Teleoperator	Robots that deal with non-routine tasks in hazardous or inaccessible environments with continuous remote control from humans	Non-routine tasks	Drones, under-sea robotic vehicles and unscrewed aerial robot vehicles
Social Robot	Robots that have autonomous agents with social intelligence to interact with humans in an acceptable manner	Entertainment, teaching, comfort and assistance	Guiding robots, teaching robots, communication robots and autonomous vehicles

Source: (Zeng, Chen and Lew 2020).

Jiang and Wen (2020: 2565) state that the COVID-19 pandemic outbreak is expected to accelerate the use of AI-driven robotics technology within the hospitality and tourism industries, in order to provide completely contactless services. They further reiterate and highlight that it is predicted that robot receptionists, facial scan check-ins, voice guest control, robot deliveries, robot concierge and other related AI contactless services will begin to replace human-to-human contact services beyond the

COVID-19 pandemic. In conclusion, it was noted that technology will be an important factor in mitigating COVID-19 and alike pandemics in future. Huang and Rust (2021: 36) explain that COVID-19 is highly contagious through human-to-human transmission. This implies that various technologies implemented in hotels have switched from being considered a luxury to being the ultimate survival tool for the hotel sector amid the COVID-19 pandemic. The Hotel Sky Sandton, in Johannesburg, South Africa has become a pioneer as the first hotel establishment on the African Continent to have adopted automated attendants with the recent addition of its three robotic staff. The staff robots named Lexi, Micah and Ariel remain the hotel's answer to the desires of travelers and hotel guests for a socially distant hotel experience as a result of the COVID-19 pandemic. The robots can deliver room service to guestrooms, provide travel updates and information and carry approximately 300 kg of guest luggage to their rooms. Guests have the option to choose between staff members or make use of self-service for interaction, which all is controlled by their mobile phones. In addition, as a protective measure by the hotel to ensure the safety of hotel staff and other guests, should a guest contract the COVID-19 virus, the robots i.e. Micah, Arial and Lexi can be deployed to serve the guest instead of human employees (Reinstein 2021).

Service robots are gaining much attention in the hospitality and tourism industries, and are equipped with AI to provide information, carry out housekeeping activities, provide food and beverage services and ensure the comfortability and entertainment of guests in a much safer way, especially amid the COVID-19 pandemic outbreak , a situation that might prove to be difficult with human employees with the high risk of infection a common denominating factor that cannot be ignored (Zeng, Chen and Lew 2020: 33). According to Belanche *et al.* (2020b: 215), the Spanish Association of Hotel Managers predicts that a total of 96% of hotel frontline workers will be replaced by these types of robots by the year 2029, and further predicts that 42% of food and beverage delivery in hotels will be performed by such robots in the year 2023. One of the notable examples of the use of service robots in the hospitality industry frontline is the Henn-na Hotel in Japan. The Henn-na Hotel opened its doors to the world in 2015 and it is believed that it is the first fully automated robot-staffed and operational hotel, in which customers have no direct contact with a human employee throughout their hotel stay and service encounters within the hotel (Nakanishi *et al.* (2020: 04); Ivanov, Webster and Berezina (2017: 1507). This implies that the use of robotics has always been evident within the tourism industry, however, through the outbreak of the COVID-19 pandemic, the adoption of robots within the tourism industry gained popularity.

There is a need for South Africa to build and maintain structures and competencies to fully participate in an AI-driven future through the development of robotic technologies across sectors of the economy

including tourism. However, several challenges significantly hamper South Africa's ability to fully integrate new technologies such as AI and robotics into the economy. These include a weak quality of education (from primary level to university level), a weak innovation ecosystem at a national level and a poor enabling structure to support innovation, notwithstanding a deficit of skills (Accenture 2018). With the advent of the fourth industrial revolution and the need for innovation due to the outbreak of the COVID-19 pandemic, Rwanda has become the first African country to launch a center dedicated to AI. The purpose of the center is to design and pilot new technologies that will foster a culture of innovation to facilitate economic growth and resilient economic systems across all its economic sectors including tourism. The study contributes to the body of literature on the adoption of AI and robotics for the tourism industry in South Africa for a more resilient tourism industry ecosystem. This section aimed at describing and examining COVID-19 as a driver of service automation technologies in hotels by providing an understanding of the various technologies adopted by the tourism industry. The next section provides a detailed overview of the state of technology adoption within the South African Tourism sector.

2.6.4 THE STATE OF TECHNOLOGY ADOPTION BY THE SOUTH AFRICAN TOURISM SECTOR

Section 2.5.3 examines the various technologies adopted by hotels across the globe in response to the outbreak of the COVID-19 pandemic accelerating their adoption. It is then imperative to understand the current state of technology adoption within the tourism industry in South Africa. This section aims to provide a detailed overview of the rate of technology adoption by the South African tourism sector. Factors such as resources for tourism development, a skilled labor force, tourism technology education and training, infrastructure and South Africa being an active ICT role player are explicitly examined.

According to Mxunyelwa and Vallabh (2017: 6), tourism growth and development remain one of the main contributors and drivers of South Africa's GDP growth. Although this is the case, tourism in South Africa remains inadequately resourced and funded by the national government. To reiterate, (Mogale and Odeku 2019: 6) state that the South African government has poorly prioritized the provision of adequate resources directed at developing the tourism industry and only the least marginal resources have been directed towards the growth of the tourism sector in the country. As a developing country, South Africa has been unable to develop its ICT sector, regardless of the benefits ICT affords the development and growth of tourism (Sibisi, Arun Das and Mohammed Ashaf 2020: 491). Tichaawa, Mhlanga and Sicwebu (2017: 25) reiterate that despite South Africa having a sophisticated ICT market, South Africa is still being identified as lagging in ICT when compared to other African countries and poorly ranks on the global ICT index. Similarly, this explains why there is a poor diffusion of ICT in the South African tourism industry. The gap that exists between the integration of ICT and the tourism industry in South

Africa is the underpinning factor as to why there remains a dearth of literature on service automation technologies across the tourism industry in the country, especially the hotel sector. South Africa is incapable of being an active competitor and participant within the international tourism value chain due to low ICT tools in the tourism infrastructure, as a result, it cannot exploit the benefits that come with adopting ICTs for tourism as a technologically advanced traveller market is steadily growing. This type of traveler market will be rigorously active in the tourism system post-COVID-19.

Tourism growth in South Africa is characterized and slowed down by a lack of infrastructure. Tourism development cannot be propelled only by natural attractions as natural attractions needs to be supported by tourist facilities and ICT infrastructure, so that technology can be used as a tool to enhance the current tourism experiences in South Africa (Mxunyelwa and Vallabh 2017: 3). To ascertain this, (Kruger-Cloete 2021: 38) states in that most global tourism destinations, as is the case with South Africa, a competitive advantage no longer lies on the natural features of a destination, but extensively on man-made competitive edges that are underpinned by science, technology, information and innovation for the tourism industry. The author further emphasizes that for the South African tourism industry, the biggest challenge remains the lack of action by the government and other relevant tourism stakeholders to develop technology-related capacity for the tourism industry. According to Mogale and Odeku (2019: 8), there is inadequate tourism technology education and training in South Africa. The authors further explain that training and education in tourism- and hospitality-related services are only offered by a limited number of both public and private higher education institutions, and the current curriculum presents an absence of tourism and technology education and training. Therefore, this proves a gap in technology use in the South African tourism industry and there is a need for more studies to address this gap that exists. Areff (2017) concurs that there is a need for the South African government to provide free education and accessibility to tourism education and training which will result in graduates that are equipped with technological skills and knowledge to accelerate tourism growth in South Africa with technology being the ultimate tool for that. Lehloenya (2017: 92) reiterates that there remains an urgent call for South Africa to incorporate ICT infrastructure in tourism policy and planning so that the country's tourism industry can enjoy the benefits of technology for tourism development and growth.

According to Mogale and Odeku (2019: 12), tourism growth in South Africa is confronted by issues and challenges such as an unskilled labor force, a mismatch between tourism education and the actual industry needs and inadequate development and application of technologies that are mainly designed for the tourism industry in South Africa. These include the management of various modes of transport, hotel development and expansion technologies, travel distribution systems and the absence of technology in the management of tourism in South Africa (Kruger-Cloete 2021: 21). This calls for action to develop

and harness a technology curriculum within the South African tourism industry so that the benefits (which will be discussed in the next section) technology affords to the tourism industry can be exploited since tourism is a major contributor to South Africa's GDP. As this is the case with challenges confronting tourism development in South Africa, EDTEA (2020: 32) states tourism development and growth in KZN are similarly confronted and slowed down by the following main factors:

I. Adverse economic conditions which result in high levels of competition and challenges in maximizing efficiencies in different subsectors of the industry.
II. A lack of and limited access to funding and financing for technological innovation adversely affect the operation of tourism enterprises especially hotels in the entire province.
III. Lastly, the lack of best practice of business management skills and innovation that harnesses technology which limits the potential of tourism enterprises such as hotels to function efficiently and become competitive.

This section identified the gaps in technology adoption by the South African tourism industry. Therefore, the study contributes to the body of literature by providing action measures that need to be facilitated and actioned by the South African Government alongside tourism stakeholders, to fully integrate technology in all sectors of the economy, especially tourism. There remains a great need for policy development that addresses the gaps identified in the above discussion and regulates the innovation ecosystem and the rate of technology adoption within the South African tourism industry as far as job losses are concerned. The next section describes the benefits and the impacts technology adoption will have on the South African tourism industry.

2.6.5 TECHNOLOGY FOR THE SOUTH AFRICAN TOURISM INDUSTRY: IMPLICATIONS AND PROSPECTS.

Technological innovations as a result of advancements in ICT made possible by the 4IR have redesigned tourism in significant ways that cannot be ignored. The magnitude of these impacts and changes are not only visible based on their levels of disruptiveness and how they alter long-established economic models, but also with unprecedented effects due to the rapid speed at which tourism and hospitality technological innovations influence consumers and their cultures, preferences, and travel purchase choices (Gössling 2020: 841). According to Hu *et al.* (2020: 12), the COVID-19 pandemic has reinforced the importance of technology as it became tool in managing the pandemic. In addition, the tourism industry adopted technology as a mitigation strategy to minimize the impacts of the pandemic. Vaishya *et al.* (2020: 338) reiterate that technology use gained importance during the pandemic as innovative technologies, such as artificial intelligence (AI), were used for contact-tracing purposes across different tourism enterprises

around the globe. South Africa is still lagging in the use of AI in tourism management development and marketing, thus not being able to exploit benefits such as minimizing the spread of COVID-19 in tourism establishments across the country.

Scholars such as Ruel and Njoku (2020: 55) applaud AI for its ability to afford the tourism industry increased efficiency and total control of staff and employees, especially in hotels. While on the same note, with the use of AI, the South African tourism industry and hotels in Durban, KZN can be assured of staff and employee efficiency thus resulting in the provision of greater customer service and increased sales. Scholars such as Tussyadiah (2020: 883) argue that as much as technologies like AI, digital personal assistants, chatbots, automated porters, robot receptions and other technologies discussed in section 2.9 of this chapter are adopted in tourism, and have created new experiences in the consumption of tourism and hospitality services, they significantly continue to displace humans. Gössling (2020: 852) concurs that automated tourism services will increasingly depersonalize and dehumanize tourism experiences, depriving the industry of the most important element and function, that of social exchange and co-existence of travelers and employees. In a developing country like South Africa, where tourism is a significant role player in the economy and job creation opportunities, it is important to note that the use of service automation services is not to displace humans but to enhance the provision of service in hotels in Durban to eliminate service variability levels. The use of service automation technologies in hotels in KZN, Durban would result in enhanced service experiences that are personalized to each traveler and hotel guest, something that is very difficult to achieve and maintain with human employees.

The tourism sector has proved to be most proactive in the implementation of digital technologies, and it continues to pioneer digitalization. The tourism and hospitality industries continue to exploit digital technologies and such technologies are constantly expanding as they become more and more accessible to the industries (Natocheeva *et al.* 2020: 2). However, some countries have ignored technology in tourism policy planning, with South Africa being one of them, thus missing out on benefits such as sustainable development and growth of tourism in the country. The widespread development and advancements in ICT as a result of the 4IR, have had significant positive impacts on the development and growth of technological advancements. Advancements such as the Internet of Things (IoT) have afforded tourism enterprises the ability to analyze tourist trends and preferences such as frequently visited tourist attractions, time spent on the internet, spending patterns and so on. This enables tourism enterprises to gain an in-depth understanding of tourist preferences and anticipate their changes, and ensure that the most suitable tourism products and services are developed to match the needs of tourists (Watkins *et al.* 2018: 43).

Digital marketing initiatives have become important means of promoting tourism and hospitality-related services in the modern-day economy enabled by various forms of technological innovations and their benefits. According to Ziyadin *et al.* (2019: 1066), Kazakhstan Tourism Company uses digital technologies such as Virtual Reality (VR) for the promotion of tourism and has reaped benefits such as a stronger market share, increased sales, visible brand awareness and access to a wider global audience and target market. Digital promotions have since then been playing a crucial role in the development and growth of the Kazakhstan tourism industry. Similarly, in a country like South Africa which is surrounded by negative publicity due to the high crime rate, the country can use the same digital technologies with evidence from Kazakhstan. South Africa's tourism industry, with the use of digital technologies, can enjoy benefits such as an improved destination image and an increased demand for the services of tourism companies and hotels, thus improving the perceptions of South Africa as a tourist destination around the globe (Mogale and Odeku 2019: 10) The advent of digitalization technologies in tourism has opened up opportunities and trends that have altered how tourism enterprises communicate with their target market and travelers and how they can best satisfy their needs and wants. The city of Akmola, Kazakhstan launched a "Visit Akmola" campaign with the use of digitization technologies. The aim of the campaign is to promote tourism around the city and beyond. This is made possible through a single tourist portal and a digital marketing campaign was developed to promote e-tourism (digitization of tourist resources with important gay friendliness elements, 3D visualization of attractions around the city). The city is successfully promoting itself in both the domestic and foreign markets and has since enjoyed an influx of tourists within the city (Natocheeva *et al.* 2020: 4)

The lack of literature on the use of digital technologies in KZN and the city of Durban proves that both the province and the city are missing out on digital technology benefits for marketing tourism. KZN, with the use of digital technologies for marketing tourism could benefit from being a visible tourism destination in the foreign market, a surge of new tourism businesses and models, positive PR-related coverage and sustainable tourism growth. Countries around the globe have been successful in using ICTs to develop their industries. Evidence from Malaysia and Australia shows that both countries have been very successful in attracting large numbers of international tourists (Wagaw and Mulugeta 2018: 3). While on the same note, countries such as Ethiopia and Iran have not been successful in developing their tourism industries' and increasing tourist numbers mainly due to the lack of ICTs and internet development for tourism-related purposes. Ali (2017: 16) concluded that the low levels of ICT integration in the Ethiopian tourism industry have resulted in the poor promotion of tourist attractions in Ethiopia, thus resulting in limited tourism benefits such as foreign expenditure. These findings imply that South Africa, specifically KZN should develop a framework for the integration of ICTs in tourism within the

province so that benefits such as visibility of tourism attractions will result in attracting foreign markets, which will result in tourism growth and foreign expenditure. van Nuenen and Scarles (2021: 124) state that immersive technologies have gained increased attention from scholars in the last few years and never more so than during the current COVID-19 pandemic. The tourism industry is no exception, as there has been a call for mobilizing destinations to tap into the virtual realms, enabling tourists to experience virtual simulations as though they are physically present in a destination (Martins *et al.* 2017: 105). Experiences similar to the Everest VR, enable tourists to climb up the mountain through virtual simulations in the comfort of their own homes. Corrigan-Kavanagh, Scarles and Revill (2019: 344) highlight that such VR technologies are adopted in tourism to enrich on-site visitors.

Scholars such as Yung and Khoo-Lattimore (2019: 2076) concur that the benefits of VR technologies involve multi-layered media content to immerse visitors in destinations and attractions while resulting in marketing and promotional efforts being carried out as a destination interacts with prospective tourists prior to their travel and accurately understands their needs and wants and provide for them. , VR applications in the South African tourism industry, can result in the country's source markets such as Germany, the UK, Netherlands and Spain, to be understood better through personalized marketing activities and the creation of experiences to cater for them. Since the benefits of VR were discussed, there has been a debate on the use of VR technologies in tourism. Scholars such as Gursoy *et al.* (2019: 160) highlight that the use of VR technologies results in high levels of self-isolation and that it provides the means to substitute the actual travel itself.

ICTs and technology play an important role in the tourism industry and afford destinations like South Africa to reach and communicate tourism offerings in the country with a huge global audience. Technology in tourism has resulted in the growth of the industry. Evidence from a study by Tichaawa, Mhlanga and Sicwebu (2017: 25) conclude that the use of ICTs in tourism, hotels, bed and breakfast establishments and travel agents in East London, South Africa has increased profitability and competitiveness, and improved customer satisfaction levels. As much as this is the case in East London, South Africa Anwar *et al.* (2014: 26) concluded that tourism enterprises in the Western Cape, South Africa are reluctant to use ICTs mainly due to factors such as affordability, and slow internet connections, with the major challenge being the skills deficit in tourism enterprises and lack of ICT training. This proves a need for ICT skills training in South Africa along with ICT infrastructure in order for the South African tourism industry to exploit the benefits of technology in tourism. Gössling (2020: 855) highlights that technology and tourism planning have the potential to contribute to some of the Sustainable Development Goals (SDGs). Scholars such as Leal *et al.* (2020: 18) reiterate that ICTs and technologies

should be a foundation for all economies to ensure that sectors such as tourism are supported in terms of development, growth and marketing thus making a valuable contribution to the SDGs. Since Section 2.5 examined COVID-19 as a driver of service automation technologies in hotels and Section 2.5.5 examined the implications and prospects for adopting service automation technologies by the South African tourism industry, the next section assesses the attitudes of hotel guests towards the use of service automation technologies in hotels.

2.7 CONSUMER PERCEPTIONS ON THE USE OF ROBOTICS AND SERVICE AUTOMATION TECHNOLOGIES IN HOTELS

According to Li, Bonn and Ye (2019: 174), artificial intelligence (AI), robotics and service automation technologies are being rapidly introduced in hotel operations and management as means of creating highly personalized and unique experiences for customers. Hotel guests and customers hold different perspectives, needs, preferences and attitudes towards technologically driven services and products that they are exposed to before, during and even post their stay in a hotel, which in most cases is often influenced by their own technological skills and experiences (Tavitiyaman, Zhang and Tsang 2020: 3). Kucukusta (2017) strongly emphasizes the importance of hoteliers developing the most relevant hotel technology amenities that strongly resonate with its customers and their expectations of a hotel. This section uses the Technology Acceptance Model (TAM) presented in Section 2.3.1 as a blueprint to discuss and assess consumer perceptions towards the use of robotics and service automation technologies in hotels.

2.7.1 PERCEIVED USEFULNESS OF TECHNOLOGY

Davis (1989: 320) defines perceived usefulness as the degree to which a person believes that using a particular system, often a technology-driven system, would enhance their performance or experience. According to TAM, users' behavioral intentions to adopt a certain type of technology are influenced by their perception of the technology's usefulness. The perceived usefulness of service automation technologies is influenced by the levels of interactivity that they afford their users (Huang *et al.* 2017: 761). When the concept of interactivity is applied to service automation technologies that are implemented in hotels such as robot concierge and digital check-in kiosks, the level of interactivity often is defined as how efficiently these service automation technologies can take action to carry out guests' requests in real-time, through means of active communication with the guests (Huang *et al.* 2017: 758). Shin and Kang (2020: 102664) reiterate that the impact of service automation technology's level of interaction remains of paramount importance in a service-consumption co-creation landscape because of the influence on guests' perceived usefulness. Douglas (2019: 279) conducted a study on mobile business

travel applications usage by comparing adopting intentions between South African men and women travelers. The results advised business travel applications are perceived to be more important by female than male business travelers in all phases. Female travelers indicated that mobile business travel applications are very useful in terms of facilitating their travel such as changing flight details and checking in for a flight or into a hotel.

The hotel sector is highly characterized by an interaction between guests and the hotel's frontline service employees, all starting from the check-in process right through to the check-out process. However, service automation technologies have taken over this kind of interaction and through this, they determine the usefulness of a service automation technology system (Shin and Jeong 2020: 102667). The authors further emphasize that even with service automation technologies in place, guests still expect a high level of interaction from them. According to Huang *et al.* (2017: 760), when the service interaction with service automation technologies such as robots is low, guest perceptions of the overall hotel service also become low due to the standardized services that are only available to guests by such service automation technologies, hence they render it not useful. Hotel chains around the world have been noted to have introduced service robots powered by AI, such as Hilton with their humanoid robot named Connie, which also has the ability to carry out concierge-related services for guests. On the same note, Shin and Jeong (2020: 2617) highlight that a robot concierge such as Connie provides guests with both high and low levels of interactivity. Moreover, the robot concierge provides guests with personalized information such as making restaurant recommendations to simpler information such as weather updates. The authors conclude that hotel guests that interacted with the robot portrayed a positive attitude towards it as it was highly interactive and that they would engage with it over the human employees as it was very useful for them to adopt. From the above discussion, it is imperative that the type of SATs that hotel introduce, should be useful to the hotel guests by catering to their needs and preferences.

2.7.2 EASE OF USE OF TECHNOLOGY

According to TAM, ease of use of technology influences the behavioural intentions of the users towards a technology. According to Tavitiyaman, Zhang and Tsang (2020: 13), the attitudes of guests towards service automation technologies have enabled them to accept technologies due to their nature of being easy to use. Matemba and Li (2018: 02) conducted an empirical study in South Africa on consumers' willingness to adopt and use WeChat Wallet. The results advised that ease of use was the TAM factor that influenced the adoption of the WeChat Mobile Wallet amongst South Africans. The results further presented that most South Africans prefer to use their physical cards or cash for facilitating travel-related

purchases due to finding the WeChat Mobile Wallet difficult to use. Similarly, a survey by Ivanov, Webster and Seyyedi (2018: 309) explored the use and application of robots in Russia's hotel sector. The Russian hotel sector introduced robots in the following areas of the hotel; the reception (they assist with guest luggage, housekeeping (for cleaning and general maintenance of cleanliness in a hotel) and food and beverage department (for room services and serving in the restaurant). The survey results suggested that male guests, individual guests and city residents perceive such technology to be very easy to use due to their ability to operate them with just the touch of a button during their hotel stay and have a positive attitude towards the use of robotic technology in hotels.

According to Brochado, Rita and Margarido (2016: 349), technology is two-dimensional for hotel use and applications, namely, technology for hotel operations and managerial levels. Kansakar, Munir and Shabani (2019: 63) further reiterate that technology for operational activities such as electronic loyalty programmes, point-of-sale kiosks and e-payment services has proved to be easy to use for guests due to their convenience as they can use them while they are on the move. Furthermore, Bilgihan *et al.* (2016: 121) highlight that hotel technologies such as self-service kiosks, high-definition television systems, voice-activated commands and digital keys, amongst others, continue to gain attention and favour from hoteliers and hotels due to their easy to use nature and ability to afford hotel guests with increased security levels, enhanced product and service experience without any interference and dependence with the human employees. Tavitiyaman, Zhang and Tsang (2020: 15) emphasize that hotels are facing a challenge with appropriate robotic and service automation technologies that match their guests' preferences for a high degree of experience and satisfaction. In conclusion, robotics and service automation technologies enable hotels to provide consistent services and more personalized guest services for improved hotel performance, not ignoring the fact that such technologies need to prove to be easy to use so that hotel guests can easily adopt them.

2.7.3 BEHAVIORAL INTENTIONS TOWARDS TECHNOLOGY

According to the TAM, the behavioral intention of users is underpinned by their levels of education. Warshaw and Davis (1985: 215) define behavioral intention as an individual's decision on whether or not to act upon a specific future behavior in accordance with a certain trend. According to the Peer Research Center (2017), the level of education of hotel guests is closely related to their level of technology adoption, behavioral intention and usage in hotels. Tavitiyaman, Zhang and Tsang (2020: 09), state that highly educated travelers are often most familiar with advanced technological applications and devices. They further explain that education levels interrelate with the adoption of technology. To reiterate this notion, a study by Bilgihan *et al.* (2016: 127), revealed that travelers with higher education

levels have a better understanding of AI the concepts, robotics and service automation technologies in the hospitality sector thus influencing the behavioral intention of the hotel guests.

Tavitiyaman, Zhang and Tsang (2020: 111) further emphasize that hotel managers are faced with a challenging responsibility of guests' behavioral intention towards hotel service quality in a volatile industry facing the rigorous technological outbreak and applications. Nhepera and Onojaefe (2019: 77) conducted a study on the examination of the importance of hotel innovation on guest loyalty in Cape Town, South Africa. The study results showed that the majority of the respondents indicated that business centers with technological facilities are important to their loyalty towards a hotel and are most likely to adopt the technological facilities and return to stay in a hotel. Similarly, a survey on behavioral intention towards technology use in hotels revealed that hotel self-service kiosks had a positive effect on the behavioral intention of hotel guests (Verma, Bhattacharyya and Kumar 2018: 797). Factors such as reliability, convenience and assurance significantly influence the behavioral intention of both experienced and inexperienced hotel guests and travelers. Findings of a study by Bilgihan *et al.* (2016: 123) concluded and presented that the influence of hotel technologies on the behavioral intention of experienced hotel guests is stronger and more positive than those of inexperienced tourists. Various types of service automation technologies are paramount for customer selection processes of a hotel and their visit intention. In addition, the hotels should offer technological amenities and facilities to create a desire for travelers to visit and use such technologies (Kucukusta 2017). Grad (2020) emphasizes the need for hotels to invest in product and service designs that are highly characterized by the use of technology post-COVID-19 to influence positive guests' behavioral intention. In conclusion, the extensive adoption of technology in the hotel sector makes a call to action to have travelers educated on the use and benefits of various technologies adopted by hotels. There remains a research gap with regards to educating travelers on technology use as part of their tourism experience (Tavitiyaman, Zhang and Tsang 2020: 121).

2.7.4 ATTITUDES TOWARDS USING TECHNOLOGY (PREFERENCE BETWEEN HUMANS AND TECHNOLOGY)

Galoni, Carpenter and Rao (2020: 381) highlight that, in particular, the salient risk aspect of COVID-19 has impacted customers' attitudes about hotels as a product and the degree of service automation they have introduced. Recent research studies conducted amid the COVID-19 pandemic presented a trend toward the growing demand for robots and service automation technologies in hotels and this will still be a trend post-COVID-19 pandemic (Seyitoğlu and Ivanov 2020: 3). The highly contagious nature of COVID-19 has had travelers and hotel guests filled with high levels of anxiety and uncertainty and initially influenced travelers to stay in robot-staffed and service-automated hotels. Moreover, given the notion that robots pose a low risk factor for the spread of COVID-19 compared to human service

employees' counterparts, travelers are likely to portray positive attitudes towards robot-staffed and service automated hotels to manage the risk of COVID-19 (Kim *et al.* 2020: 102979). Nhepera and Onojaefe (2019: 78) examined of the importance of hotel innovation on guest loyalty in Cape Town. The results advised that guests consider human service delivery innovation to be more important than any type of technological innovation within a hotel. In addition, guests consider staff competencies, friendliness, being called by their names, and strong product knowledge to be very important. Furthermore, management participation during service delivery contributed to customer loyalty and preference for human employees over technological innovations.

Studies conducted by Choi *et al.* (2020: 619) and Ivanov *et al.* (2020a: 13) concluded that there is an increased preference for robot-staffed and service-automated hotels compared to the preference for their human employee counterparts since the start of the COVID-19 pandemic. Kim *et al.* (2021b: 102792) further reiterate that the current COVID-19 pandemic has highly accelerated the acceptance of service automation technologies and robotics amongst travelers due to the benefits of maintaining social distance and the low perceived risk of the spread of COVID-19. Zeng, Chen and Lew (2020: 730) concluded that the COVID-19 pandemic has influenced travelers' perceived health risk, and this remains a moderating factor for the choice of robot and service automated hotels to enjoy enhanced sanitization standards when compared to their human employee counterparts. In conclusion, it is highly noted that the travel community at large has a high preference for robot and service automated hotels as far as the perceived health risk of the spread of COVID-19 is involved, with it being very high with service employees. Health and safety remain the primary factors that influence the choice of hotel guests to develop positive attitudes toward service automation technologies.

2.7.5 ACTUAL USE OF TECHNOLOGIES (PURCHASE INTENTIONS)

According to the TAM, the final stage is the actual use (adoption) of service automation technologies by the users. According to Pinillos *et al.* (2016: 52), service automation technologies are gaining popularity and favour because of their ability to improve guests' stay experience in a hotel. Zhong *et al.* (2020: 788) in their research concluded that travelers with high acceptance for the use of robots in hotels are willing to pay a higher price to a degree for service personalization afforded by the use of robots in hotels. Moreover, the Generation Y and Z segments have high intentions to purchase a hotel product and service that is highly characterized and driven by technology by paying a higher price for technology services and amenities.

The level of acceptance of technology affects the traveler's intention and willingness to pay higher premiums, resulting in the ultimate use of technology. To reiterate this notion, Ivanov and Webster

(2019a: 10) concluded that travelers and hotel guests are more in favor of highly personalized services and often look forward to new experiences brought by robots and service automation technologies actually used in a hotel. In addition, they highlighted that travelers are willing to pay more for experiences brought by robot services in hotels and use them during their stay instead of being dependent on human employees of a hotel.

According to Zhong *et al.* (2020: 779), certain robots have the ability to imitate the cognition and behavior of humans which helps in providing a degree of emotional connection during their service activities for hotel guests. They further explain that such design elements influence and motivate guests to pay an exclusive premium for their hotel stay with all their needs, personalized by robots and other service automation technologies. Chan and Tung (2019: 461); Tussyadiah and Park (2018: 312) state that robot and service automation technologies and their applications in the tourism and hospitality sectors have gained academic and research attention, however, limited studies have investigated the purchase and price intentions of travelers in relation to robot and service automation orientated hotels.
The study contributes to the body of literature pertaining to consumer purchasing attitudes towards the use of service automation technologies in hotels in South Africa within the TAM framework. The next section focuses on the use of technology as a tool to enhance hygiene and cleanliness in hotels.

2.8 THE ROLE OF SERVICE AUTOMATION TECHNOLOGIES IN ACHIEVING GUEST HYGIENE AND CLEANLINESS IN HOTELS

This section aims to analyse the role and use of service automation technologies in hotels to achieve enhanced hygiene and cleanliness standards. Firstly, it is crucial to understand the importance of hygiene and cleanliness in hotels. Then, a detailed discussion on the use of technology innovation as a risk reduction strategy for hygiene and cleanliness in hotels follows.

2.8.1 COVID-19 EMPHASIZES THE IMPORTANCE OF HYGIENE AND CLEANLINESS IN HOTELS

Delea *et al.* (2020) define hygiene as protecting one's own safety from any form of harm to life and well-being. They further explain that hygiene can also be regarded as a preparation for and securing conditions that will positively benefit health. Enhanced hygiene practices can significantly reduce the risk of infection of diseases such as the novel COVID-19 that the entire globe is currently fighting against (Delea *et al.* 2020). Hotel guests recognize hotel hygiene based on an array of factors, so that they have the ability to perceive the importance of overall hygiene and cleanliness aspects of staff members, such as uniforms, personal grooming, and the neatness of hair and nails, and also spaces used by the hotel staff

to carry out their service duties to hotel guests, such as desks, computers and chairs (Yu, Seo and Hyun 2021).

They further explain that such hygiene and cleanliness conditions of a hotel have a significant impact on consumer behavior towards the hotel as a product and a service offering. Most importantly, they have an impact on their decision-making process when booking a hotel. Moreover, they conclude that hygiene and cleanliness management are of paramount importance, especially for the overall hygiene of the hotel and that of staff members in a global public health pandemic like COVID-19. Moon, Yoon and Han (2017) emphasize that a hotel should capitalize on investing in hygiene and cleanliness, which have the potential to provide them with a competitive edge, especially in times of the current global health pandemic such as COVID-19. Since this section provided an overview of the importance of hygiene and cleanliness, the next section will describe the various technologies that are used in hotels across the globe and by some in South Africa to deliver and maintain the highest standards of hygiene and cleanliness to their guests.

2.8.2 Technology Innovation as a Hygiene and Cleanliness Risk Reduction Strategy in Hotels

According to Mitchell (1999: 164), a risk can be defined as a process in which consumers seek to reduce the perceived risk and high levels of uncertainty involved in purchasing a product or a service. When the level of the perceived risk exceeds the levels that consumers moderately find acceptable, they often adopt a risk-reduction strategy to make a better decision (Pappas 2016). Zeithaml, Bitner and Gremler (2018) define technology innovation as a series of innovations that significantly related to technological developments, with the main objective being that of improving an existing product or service in order to create new user experiences. Shin and Kang (2020) further explain that nowadays, hotel operations are being revolutionized by the adoption of hotel operational technologies as a quest for reducing perceived hygiene risks, especially those associated with COVID-19.

Without ignoring the fact that social distancing in the new normal world is the new norm to contain the spread of COVID-19, new technological innovations such as disinfecting robots, electrostatic sprays and digital kiosks, amongst others, can significantly reduce the perceived health and hygiene risks and the infection of the COVID-19 virus by eliminating physical interaction among the guests and the rest of the hotel (Shin and Kang 2020: 102664). With this said, the section below examines technological innovations aimed at promoting and maintaining hygiene and cleanliness in hotels namely, ultraviolet (UV) radiation disinfection, electrostatic spraying technology and cleaning robot systems.

2.8.2.1 ULTRAVIOLET (UV) RADIATION DISINFECTION

The White Paper on Healthy Hotels highlights that hotel guests have higher expectations of how clean their hotel rooms should be upon arrival. It further highlights that this is due to the fact that studies have shown that bacteria levels found in hotels are much higher than those found in homes, restaurants and also in airports and airplanes (Lo (2019). The current outbreak of the COVID-19 pandemic has exerted more pressure and attention on how hotels and their facilities are going about creating the safest and cleanest hotel experiences for travelers, hotel guests and their employees. UV radiation disinfection technology has been taken to the next level through advancements in technology which has made it much more powerful, efficient, affordable, and most importantly, it has become smaller and easier to utilize in hotels. In addition, UV radiation technology has the ability to rapidly disinfect a room of any size in seconds by making use of the proprietary miniaturized Xenon light engine system compared to a human being or housekeeping team (PURO UV Lighting 2020).

Hilton Garden Inn Umhlanga, in Durban, South Africa introduced and uses UV technology cleaning systems for sheets and all other materials to afford their hotel guests the highest standards of hygiene and cleanliness. The UV technology cleaning system ensures that sheets and gowns are practically brand new as it sanitizes and removes all stains (Property wheel 2020). Similarly, to mitigate the spread of COVID-19 and ensure that guests enjoy the highest standards of hygiene and cleanliness, the President Hotel in Cape Town, South Africa has partnered with Diversey, a global leader in hygiene and infection prevention solutions, to equip the hotel with high-quality hospital-grade cleaning products such as Surface Defence Standard Treatment (SDST). The hotel also uses enhanced technologies such as electrostatic spraying technology and HEPA-grade air purifiers. Moreover, to afford guests safety, hygiene and cleanliness during their stay, the President Hotel introduced contactless payment options. A variety of contactless payment methods are available which include Masterpass, Tap and Pay credit card machines, Snapscan and iVeri Secure Payment Gateway (Independent Online 2020).

A study published in Food and Environmental Virology, planted a sample virus in a hotel room and, after careful observations, it was concluded that the hotel cleaning staff spread the same sample virus to three nearby hotel rooms (Sassi *et al.* 2018: 509). Hotels such as Best Western Hotels and Resorts have introduced a stay well Programme that is driven by the implementation of cleaning technologies in a quest to improve their disinfection practices. UV radiation light technology is amongst these technologies and it has been declared a key protocol practice in the cleaning of the hotels to achieve higher guest satisfaction levels for sanitization, cleanliness and hygiene (PURO UV Lighting 2020). The Texas Biomedical Research Institute tested Xenex's light strike robot that produces UV radiation light

technology, against a series of viruses such as the SARS-COV2, a virus that causes COVID-19. It then found that the UV light technology placed at a one-meter distance, eliminated the virus by 99.9999% (Xenex Germ-Zapping Solutions 2020b). In addition to the Beverly Hilton Hotel, the Intercontinental Hotel Group is also using UV light radiation technology in some of their hotels including the Crowne Plaza in New York. The group explained that it uses four UV light lamps for its cleaning processes and the fight against the COVID-19 (Folmer and Bhatt 2020). In conclusion, since travelers place great attention and emphasis on hygiene and cleanliness amid the COVID-19 pandemic outbreak, UV light technology has become one of the key technologies that are driving health and safety protocols in hotels through enhanced disinfection standards.

2.8.2.2 ELECTROSTATIC SPRAYING TECHNOLOGY

Electrostatic Spray disinfection technology has been an uncreative practice across the hotel sector; just after Marriott International Hotel Group announced their initiation of this disinfection technology across their hotel properties worldwide amid the COVID-19 pandemic and hotel operations resumed (Above The Line Solutions 2020a). Kimball Hospitality (2020) highlights that electrostatic spraying technology uses the most advanced classification of disinfectants that are highly recommended by the Centre for Disease Control and Prevention (CDC) and the World Health Organization (WHO) to treat known pathogens. It is important that hotels should have heightened cleaning protocols in place accompanied by the most advanced cleaning technologies for high traffic areas such as the lobby and front desk, business centers, fitness centers, and swimming pools including all the other high-touch surfaces throughout the hotel to combat the spread of the COVID-19 virus (Business Traveller 2020).

First Group Hotels and Resorts, South Africa is on a mission to provide their guests with a cleaner, safer, and germ-free holiday amid the COVID-19 pandemic. Access to the group's properties is strictly controlled through the introduction of various hygiene and cleanliness measures such as no-contact thermometers, the use of electrostatic disinfectant tunnels alongside the use of UV light technology for guest rooms and hotel public areas (First Group 2020). Marriott International also pioneered the future of cleaning protocols and standards in the hotel sector to meet the new health, hygiene and safety regulations as a result of the COVID-19 pandemic-related industry challenges. In addition, Marriot International embarked on a journey to introduce and implement enhanced cleaning technologies such as electrostatic sprays with hospital-grade disinfectant to sanitize surfaces throughout their hotel properties. The sprays can rapidly clean and disinfect high touch areas in a hotel to ensure enhanced sanitization and disinfection standards (Cadnum *et al.* 2020: 952). Above The Line Solutions (2020a) explain that the Internet of Things (IoT) and sensor-enabled electrostatic sprays are also on the rise and are increasingly

becoming important as they will enable hoteliers and hotel managers to ensure high standards of cleanliness and to display such efforts in a most tangible way to hotel guests and patrons. To reiterate this, Architectural Digest (2020) maintains that the travel community will move more toward a more automated service environment to mitigate the spread of COVID-19. In addition, COVID-19 has accelerated cleaning technologies and touchless technologies in hotels for guest services and cleaning protocols. In conclusion, it is imperative for hotels to introduce cleaning technologies as guests are constantly on the lookout for tangible cues that promote hygiene and cleanliness in a hotel so that they are assured of their safety in a hotel.

2.8.2.3 CLEANING ROBOT SYSTEMS

Shin and Kang (2020: 102664) state that the expected cleanliness of a hotel has an impact on perceived health risks. Hotel guests may often perceive lower levels of health-related risks, especially when they are aware that advanced cleaning technologies are implemented in a hotel. They further highlight that the COVID-19 pandemic has forced and resulted in the hospitality industry adopt new working practices to provide guests with the ultimate health and safety. Hotels have the tedious task of proving they are safe to both their existing and prospective guests through means of introducing robotic cleaning technologies in their daily operations, especially in an era whereby safety, hygiene and cleanliness are concerned.

Cleaning robot systems and germ-zapping robots have merged to be critical in reducing the actual perceived health risk of staying in a hotel amid the COVID-19 pandemic. In Texas, one hotel invested in its guests' health and safety by introducing a high-tech solution for ensuring the highest level of cleanliness, especially amid the COVID-19 pandemic outbreak, namely a virus-killing robot. The Westin Houston Medical Centre now boasts the prestigious title of the one and only hotel in the USA, Texas, to use light strike germ-zapping robots to combat COVID-19 related germs and pathogens, across the entire hotel property. In addition, the robots make use of UV light technology to zap the germs and pathogens which cannot be seen with the naked human eye away, and they also disinfect products such as bath amenities and high touch surfaces within the hotel's guest rooms (Rosen 2020). In addition to this robotics trend within the hospitality industry, two hotels in Copenhagen, Denmark, have introduced self-cleaning rooms. Each hotel property is treated with an invisible, odorless cleaning solution which is known as the ACT clean-coat with the ability to actively eliminate micro-pathogens such as E coli, viruses and allergens that might be present in a hotel room (Rosen 2020). In conclusion, it is important for hotels to invest in advanced technological cleaning measures in order to reduce their guests' perceived health risks while at the same time acknowledging the important role such technologies play in attracting

hotel guests even post the COVID-19 pandemic. Although this might be the case, certain disadvantages are attached to the above-discussed cleaning technologies in hotels, and they are summarized in Table 2.5.

Table 2. 5: Disadvantages of Disinfecting Technologies

Type of disinfecting technology	Hotel/hotel group	Disadvantages
I. Ultraviolet (UV) Radiation Technology	• Hilton hotel in Beverly, Texas • Intercontinental Hotels • Crowne Plaza, New York City	• Due to the specialized kind of UV light used to kill germs known as UV-C, it can be extremely harmful if it is directly exposed to human beings at high intensities. • Uses intensive energy which can drive up the hotel's operating costs
II. Electrostatic III. Spraying Technology	• Marriott International • Accor Hotels	• The disinfecting technology uses strong chemicals that may damage the contents of the rooms, especially those frequently exposed to the technology • A hotel room needs to be vacant for at least 24 hours before being occupied again- this could lead to a loss of revenue for a hotel.
IV. Cleaning Robot Systems	• Hotel O'ttilia and Hotel Herman K (both in Denmark) • Best Westin Houston Medical Centre Hotel	• High implementation costs • Loss of human labour and employment • Increased hotel operational costs

Source: Rosen (2020); Xenex Germ-Zapping Solutions (2020b) and (PURO UV Lighting 2020).

From the discussion above, it is highlighted that the outbreak of the COVID-19 pandemic propelled hotels from around the globe, and some from South Africa, to respond with investments in various technological cleaning systems and measures for enhanced hygiene and sanitization standards in and around their hotel properties. The above section presented the various innovative technological measures

being adopted by hotels around the world in a quest to ensure guests of safety. The study contributes to the body of literature on the use of technology as a risk reduction strategy for COVID-19 and for enhancing hygiene and cleanliness in hotels in South Africa. The next section will examine the barriers that impede the adoption of service automation technologies.

2.9 BARRIERS THAT IMPEDE THE ADOPTION OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS

The growth and prevalent development of the fourth industrial revolution has resulted in various state-of-the-art technologies being introduced across the hotel sector (Nam *et al.* 2020: 12). According to Kansakar, Munir and Shabani (2019: 63), the widespread adoption and implementation of new technological innovations within the industries, especially during the COVID-19 pandemic outbreak , has extensively reshaped the way in which services are provided and consumed by the travel consumers. Although this might the case, hotels are still facing barriers that impede their ability to adopt service automation technologies. This section discusses internal barriers such as employee resistance, financial costs and justifications and interoperability; and external barriers such as privacy and security issues regarding data sharing and guests' reluctance to use technological systems. These barriers are explained in detail below:

2.9.1 INTERNAL BARRIERS

2.9.1.1 EMPLOYEE RESISTANCE

Research studies that have drawn much attention to employees' and managers' perspectives of interacting and working in co-existence with service automation technologies and robots are rapidly emerging within the hospitality and tourism sectors (Ivanov, Seyitoğlu and Markova (2020: 515) Yu (2020: 24). Weber (2018: 607) laments that the popularity of such studies is mainly related to factors such as autonomy, empathy, trust, loyalty and, most importantly, the ignored social impacts and economic requirements of robotic and service automation technologies applications, as such issues remain unanswered. According to Vatan and Dogan (2021: 100775), it remains a paramount aspect for hoteliers and hotel managers to measure and determine employees' perceptions and attitudes towards the introduction of robots and service automation technologies in hotels because their success is solely dependent on acceptance by employees.

A previous research study conducted by Belanche *et al.* (2020b: 217) highlighted a trend of negative perceptions by hotel employees towards the introduction of robots and service automation technologies

because they strongly believed that their jobs were being displaced by such innovative technologies. A study conducted by Tung and Au (2018: 2683) concluded that hotel employees are afraid of technologies being introduced in hotels because they fear that they will replace their jobs. Ivanov and Webster (2019b: 240) state that the perceived acceptance among hotel employees and intention to work alongside service robots, is when they are introduced to provide customer-related information, do housekeeping activities, handle bookings and process payments, which are considered the most relevant duties and tasks for robot employment. Scholars such as Lu *et al.* (2020: 362) hold a different perspective and highlight that working with service automation technologies in hotels such as robots can be frustrating, and a degree of discomfort may be present and confusing at times. They further explain that employees often resist change because of factors such as the implementation of service automation technologies and robots in hotels.

Brougham and Haar (2018: 243) also concluded that when there are high levels of smart technology, artificial intelligence and robotics and its awareness is at the highest level amongst employees, it results in low levels of employees being committed to an organization and also portrays low levels of career satisfaction. Lastly, Ivanov and Webster (2019b: 243) concluded that employees working with service robots and service automation technologies consider them a threat to their jobs and employment and, most importantly, they feel that their skills and work experiences are underutilized. The study is yet to ascertain if employee resistance is a barrier to the adoption of service automation technologies by hotels in South Africa and contributes to the body of literature.

2.9.1.2 INTEROPERABILITY

Maheshwari and Janssen (2014: 85) define interoperability as the ability of different technological systems and business processes to easily collaborate, support and enable data exchange and processing for information and knowledge purposes. According to Rezaei, Chiew and Lee (2014: 202), there are four levels of interoperability. Firstly, there is the interoperability of data, processes, rules, objects, software systems and the cultures of the different users involved in using a certain type of technology. Secondly, this level is about knowledge, services provided by an organization and cohesion within a social network through identifiable electronic interoperability of a technological system. Thirdly, cloud interoperability is about data that is stored in a cloud system for a more secure personal data management and storage, and it involves boundaryless data access as and when it is necessary. Lastly, the last and highest level of interoperability within a technological ecosystem is to enable all technologies involved to seamlessly communicate to give the user an enhanced experience. Interoperability issues significantly impact guest experiences as service automation technologies can create hassles and inconveniences that

eventually take away seamless user experiences that the guests desire. Furthermore, they explain that different service automation technologies in different hotel properties result in unwanted longer learning periods that guests do not require during their hotel stay as such technological systems can warrant challenges in their interface and data processing from guests' personal devices. Similarly, Liu and Hung (2019) reiterate this by stating that hotels usually implement service automation technologies in an attempt to afford their guests convenience. However, such technologies demand customers' understanding and ability to make use of and interact with them. In addition, they highlight that guests experience difficulties when learning how to use and operate such technologies and it wastes their time, decreases service efficiency and ultimately results in guests having a negative experience during their hotel stay.

Buhalis and Leung (2018: 45) explain that guests remain at the center of service personalization and the use of service automation technologies in hotels and often prefer a simple technological interface that will enable them to easily use these technologies. While on this note, Liu and Hung (2019: 229) conducted a survey and concluded that hotel guests found it difficult to use and operate intelligent curtains and lighting as it took some time to find the correct switch and how to learn to operate them. They further concluded that the guests were not satisfied with their hotel experience and stay. In conclusion, it is imperative for hotels to consider the dynamics of their target market before deciding on various service automation technologies, as they run the risk of having a wider audience of dissatisfied guests.

2.9.1.3 FINANCIAL AND COSTS RELATED CHALLENGES

According to Osei, Ragavan and Mensah (2020: 482), financial costs and justifications are major challenges that significantly confront both the hospitality and tourism firms. They further explain that such financial cost challenges impede tourism and hospitality firms, especially hotels, in their adoption of the fourth industrial revolution driven technologies such as robotics and facial recognition check-in systems. To reiterate this, Ivanov, Webster and Berezina (2017: 1508) explain that the acquisition, installation and maintenance of innovative service automation technologies, especially artificial intelligence-driven robots, tend to be very expensive and result in huge financial cost burdens that eventually impact the profitability of a hotel. Similarly, Ivanov, Webster and Berezina (2017: 1509) again identified and categorized the financial cost challenges and burdens that are associated with the adoption of service automation technologies and robots in hotels. The authors advise that these include, acquisition costs, installation costs, maintenance costs, software update related costs, huge costs for adapting the hotel infrastructure to facilitate the mobility of service robots within the hotel, and most importantly, the

costs involved in hiring specialists with IT expertise and not forgetting the costs for staff training so that they learn to operate, service and work side-by-side with such service automation technologies and robots. The lockdown and travel restrictions imposed by the South African Government resulted in international arrivals to the country declining by 86%. This had devastating impacts on hotels in South Africa, as they experienced cancellations of hotel bookings of up to 78% and operating on occupancy rates as low as 22% (Dube 2021: 272). This implies that the hotels in South Africa lost revenue, and the adoption of service automation technologies requires huge capital outlays as suggested by the literature. Could this imply that the adoption of service automation by hotels in South Africa is impossible due to lost revenue? Similarly, According to South African Tourism (2020), the South African tourism industry lost a total of R54.2 billion between February and May 2020 due to the lockdown induced by the outbreak of the COVID-19 pandemic. This implies that tourism businesses in South Africa are under financial pressure due to revenue lost as a result of the national lockdown. The study will ascertain financial barriers faced by hotels in Durban and contribute to the body of literature pertaining to barriers to adoption of service automation technologies. Nam *et al.* (2020: 8) emphasize that hotels are often faced with old and outdated IT-related existing software and infrastructure. They further explain that these factors result in most hotels outsourcing IT expertise from reliable vendors which comes with an expensive price tag attached to such expert IT services, in order to prepare for service automation technologies. As a result of this, hotels then prefer not to introduce service automation technologies.

According to Ho, Tojib and Tsarenko (2020: 102501) and Tuomi, Tussyadiah and Stienmetz (2020) a hotel's market position is one of the most important primary determinants that affects the adoption of service automation technologies and robots, as the market position of a hotel determines its financial strength to adopt such technologies. Similarly, the question of whose responsibility it is to decide on sevice automation technology and fund its implementation is paramount in terms of financial costsA justification of such a question is propelled by the general belief that hotel brands should be the ones to find an appropriate technology type and thus recommend its application and the related financial costs, which in most cases many of the hotels cannot afford (Nam *et al.* 2020: 11). In conclusion, it is important for hotels to develop strong financial means and attract additional investments where necessary to financially support the implementation of service automation technologies and robots. It has been proved through the above discussion, that the capital and financial strength of any hotel holds the key to adopting digital and service automation technologies.

2.9.1.4 LACK OF SKILLS AND LEADERSHIP

According to Olowoyo, Ramaila and Mavuru (2020: 1083), a critical skills shortage hamper maximum growth in the South African the tourism industry. The authors further emphasize that the South African tourism industry is characterized by a lack of training and an inadequate supply of skilled workers. A study conducted by (Wessels, du Plessis and Slabbert 2017: 11) concluded that the key competencies and characteristics of managers within the South African tourism industry are in need of training in order for them to effectively respond to the needs of the industry and provide the much-needed leadership to facilitate innovation. Wakelin-Theron, Ukpere and Spowart (2019: 57) conducted a study on the perceptions of students on hospitality programmes in two South African public universities. The study concluded that in addition to hospitality and tourism curriculum gaps, factors such as students' background, geographical locations, lack of financial support to advance practical work experience, lack of or limited exposure to the latest technologies and the world of work limit their abilities to acquire crucial skills needed for the hospitality and tourism sectors.

Research on tourism innovation in the Western Cape, one of the premier tourists' destinations in South Africa, revealed that tourism firms within the province have an innovation culture which is closely associated with management competencies such as leadership, strategic orientation and professionalism. Moreover, innovation in the Western Cape is a result of top tourism managers possessing a high degree professionalism, knowledge and skills in financial management and technical skills. However, the latter is not the same in KwaZulu-Natal (KZN) province. The hotel landscape in Durban is characterized by a lack of skills and resources for digital technology innovation within the hospitality and tourism industry (TKZN 2019: 166). In addition, there is evidence of a lack of best practice in business management skills and innovation capacity which limits the full potential of hotels in Durban to function efficiently and become innovative by being technologically driven (EDTEA 2020: 156). There remains a policy need and action to support skills development and leadership for employees and managers in the tourism and hospitality industry in KZN and South Africa at large.

Tourism in South Africa is characterized by human capital that is not highly skilled and not creative enough to drive innovation such as technology adoption within tourism firms. In addition, there is a lack of capacity building in tourism firms, especially at managerial levels, particularly, in countries like Kenya and South Africa (Pikkemaat, Peters and Chan 2018: 55). The majority of employees in hospitality and tourism firms have low levels of formal education and skills training (Booyens, Motala and Ngandu 2020: 89). Luxtravelex (2020) laments that South Africa's tourism industry is dominated by small

businesses and skills shortages. Workers with formal qualifications and training within the tourism industry are significantly lower than unskilled workers. Approximately 54% of workers in the South African tourism industry are unskilled and lack basic numeracy and literacy skills. From the above discussion, it can be noted that the prevalent challenge remains the lack of skills within the South African tourism industry and the lack of proper business practices and leadership. This calls for remedial action by industry stakeholders and the government to facilitate the adoption of service automation technologies by hotels in South Africa. The next section examines external barriers that impede the adoption of service automation technologies in hotels in South Africa.

2.9.2 EXTERNAL BARRIERS

2.9.2.1 RELUCTANCY OF GUESTS IN USING TECHNOLOGICAL SYSTEMS

The types of barriers that impede the introduction and implementation of service automation technologies stem from the demand-side of the tourism and hospitality sector, which is the travel consumers and hotel guests, as such technologies are designed and implemented with them in mind (Ivanov, Webster and Berezina (2017: 1512). According to Ivanov, Webster and Seyyedi (2018: 311), travel consumers have the ability to sabotage the introduction of new service automation technologies in hotels by their persistence and high preference and tolerance for human-delivered services by hotel guests because of their inability and lack of experience that often results in some sort of intimidation, and even fear of using and interacting with such technologies. They further state that these are the main reasons that propel guests and travelers to reject the use of such technological services.

The results of a study conducted by Ezeuduji and Dlomo (2020: 128) on push and pull factors for domestic leisure travel in the Mtubatuba Local Municipality in South Africa revealed that 83% of the respondents engage in domestic tourism in South Africa due to them seeking social interactions with other travelers and human beings. In addition, the respondents also revealed that they are engaging in domestic tourism because South Africa is home to different vibrant cultures and cultural heritage that facilitates cultural knowledge during travel due to social interactions. Similarly, Makhaola and Proches (2017: 6) conducted a study on the significance of domestic tourism in Durban, South Africa. The results revealed that the majority of travelers visit Durban as a destination of choice because they are afforded an opportunity to learn about the authentic Zulu culture. Moreover, Durban offers a mixture of Zulu and Indian ethnic groups and creates an opportunity for them to experience both cultures through the city's rich history. This implies that the domestic tourism market in South Africa is people-orientated, and the travelers seek social interactions during their travels. This is likely the result of the reluctance to use

service automation technologies in hotels in Durban as they do not provide guests with the social interactions they are seeking and yearning for. South Africa is known for rich vibrant cultures and the spirit of ubuntu is a common factor in all the different cultures.

Liu and Hung (2019: 230) explain that the reluctance of guests and travelers is because of the tangible and visible cues such as human expressions and emotions that are involved in a service production-consumption process that is driven by human employees than with service automation technologies. They further explain that service automation technologies cannot portray facial expressions and express emotions, and even if they are programmed to do so, they are often not authentic like those expressed by the hotel's human employees. The domestic tourism market in South Africa is appealing and presents the potential for growth. However, it is characterized by middle-income earners, most of whom were previously disadvantaged under the apartheid regime and the majority of them have low education levels or no education at all (Adinolfi, Harilal and Giddy 2021: 307). This could be a possible barrier as the domestic market would be frustrated using service automation technologies as they will be expected to learn them and might even not understand what is expected of them while relying on service employees is much easier as they can easily express what they need. This section is summarized in Table 2.6 and follows the SPENT (socio-demographics, political, economic, natural and technological factors) analysis to further summarize all the factors that impede many of the hotels' efforts to implement service automation technologies and robotics.

2.9.2.2 Privacy and Security Concerns of Consumers regarding data sharing

One of the most unique features of service automation technologies is their ability to offer guests personalized services and experiences all made possible by the access, gathering and exploitation of their data, which further makes provision for forecasting the future needs of consumers and improving services (Femenia-Serra, Neuhofer and Ivars-Baidal 2019: 115). With this being the case about data, Ransbotham and Kiron (2018: 1) state that privacy is one of the major barriers to service automation technology adoption in the hotel sector. According to González-Reverté *et al.* (2018: 413), privacy and security concerns amongst hotel guests are usually alarming because some hotels use the most advanced smart devices to untangle basic information such as age, sex and nationality for a better insight into consumers' needs, wants and product preferences to more specific and personal data such as real-time position, income levels and expenditure trends for higher degrees of guest service personalization. Kansakar, Munir and Shabani (2019: 63) state that guests facing systems such as self-service digital kiosks, in-room tablets and smartphone applications are the most susceptible systems in hotels that are prone and vulnerable to security attacks and require the most robust security systems and measures in place to

protect the data of users. In addition, they explain that such security measures come at a huge cost; most hotels cannot afford to implement service automation technologies. An empirical study in South Africa conducted by Matemba and Li (2018: 64) on consumer's willingness to adopt and use WeChat wallet, concluded that there was an insignificant relationship between trust and privacy which indicated that consumers with high trust in the WeChat mobile application tend to have lower perceived privacy and security concerns.

Femenia-Serra, Neuhofer and Ivars-Baidal (2019: 116) highlight that there are alarming concerns about privacy and personal security within the sector and across the entire tourism and hospitality industries, which have been cited as the main issue and barrier that affects the adoption of various service automation technologies in the current tourism ecosystem that remains vulnerable and characterized by the outbreak of technological innovations. While on the same note, Saravanan and Ramakrishnan (2016) emphasize that research on privacy and security related to the use of technology in the tourism field is still lagging , but is increasingly gaining attention as the tourism industry continues to move towards the use of technology. Smith, Milberg and Burke (1996) developed a conceptual theory which is used as an instrument to measure consumer concerns regarding the privacy and treatment of information by organizations including hotels in five broad categories mainly: I) extensive collection of identifiable data, II) Internal unauthorized use of secondary data, III) External unauthorized use of secondary data, IV) Improper access by unauthorized personnel and, V) Errors in data management. In conclusion, it is important for hotels to develop a data management policy that will assure their guests' that their personal data will be treated with the utmost sensitivity, until then, this barrier will continue to impede many of the hotels' attempts to implement service automation technologies.

2.9.2.3 LACK OF GOVERNMENT SUPPORT AND FUNDING

According to Kontsiwe and Visser (2019: 1342) tourism development in South Africa is characterized by uncoordinated marketing and development efforts by the government and tourism industry stakeholders. Notable challenges that comprise political instabilities and insufficient funds by the government for tourism development in South Africa continue to hinder the growth of the industry (Chili and Ngxongo (2017: 8). To reiterate, Mogale and Odeku (2019: 6) advise that the South African government has not prioritized facilitating the provision of adequate resources to enhance tourism development, with the only visible action being the allocation of marginal resources towards the development of the tourism industry. The White Paper on tourism development in South Africa emphasizes that tourism development remains a missed opportunity for optimal socio-economic transformation and growth. Inadequate tourism education, training and awareness in South Africa

continues to hamper tourism development and growth. Training and education in tourism and hospitality services are limited to a few universities including other higher education institutions (both public and private). Furthermore, most South Africans who have no access to tourism and hospitality education remain unskilled and lack knowledge. Provinces such as Mpumalanga and Limpopo have very limited resources for tourism education and training, and this continues to hamper development in South Africa, the South African government has not done much to address such challenges (Mogale and Odeku 2019: 8). This study will contribute to the body of literature regarding barriers that impede hotels in South Africa from adopting service automation technologies.

Table 2. 6: SPENT Analysis Factors that Impede Hotels from Introducing Service Automation Technologies

SPENT FACTORS	CHALLENGES FACING HOTELS
Socio-Demographics	• Changes in consumer attitudes towards new types of technologies and the internet • Changes in consumers' hotel services and product preferences • Low educational levels result in consumers not being able to operate and use service automation technologies • Different cultural backgrounds lead to some consumers accepting and some rejecting service automation technologies • Conflict in the co-existence of different social groups on how they interact with one another and with service automation technologies • Low-income levels mean less disposable income; therefore, consumers cannot consume tourism and hospitality services driven by technology
Political/Legal	• Privacy and security issues • Personal data use, distribution and management • Ethical matters and policies • Security hacking and attacking of technological systems in hotels
Economic	• Changes in economic growth, especially from tourism source markets countries

SPENT FACTORS	CHALLENGES FACING HOTELS
	• Interest and inflation rates; hotels paying off high loan interest and having not being able to afford technologies • Currency fluctuations can eliminate a hotel's cost advantage • High implementation and maintenance costs of service automation technologies • High unemployment means a weaker economy and lower profits for hotels to invest in technological innovations
Natural	• Natural disasters can occur anytime, most hotels prefer to have contingency funds rather than invest in technologies • Service automation technologies consume huge amounts of energy which exerts pressure on the natural environment and natural resources
Technological	• Ongoing development of technologies and the internet has resulted in the service process being constantly reorganized which costs time and more money • Rapid technological developments require a constant upgrade of software which is costly for hotels • Technological improvements confuse and frustrate hotel guests as they have to spend time trying to learn the new technology

Source: Author's own construct.

This section sought to examine all the factors that impede the adoption of service automation technologies by hotels. It can be concluded that the adoption of service automation technologies poses a challenge to hotels, particularly because of their large capital outlays and strong financial positions, which are unrealistic for most hotels due to the negative impacts of COVID-19 on their revenue streams. most hotels due to the negative impacts of COVID-19 on their revenue streams. A lack of skills is also a common constraint to the adoption of service automation technologies in hotels, especially in the South African tourism industry, which is characterized by a majority of unskilled workers. Therefore, the public and private sectors must act immediately to address the challenges discussed above, to ensure that the benefits of technology are fully harnessed by the tourism industry in South Africa. In addition to the

challenges and barriers discussed above pertaining to the adoption of service automation technologies sin hotels, the next section will also unpack the challenges associated with the legislation that hotel managers need to be aware of.

2.10 CHALLENGES ASSOCIATED WITH THE LEGISLATION

Section 2.4 of this Chapter provided a brief overview of the South African legislation that impacts on the tourism industry and will have an impact on the adoption of service automation technologies. Therefore, this section highlights major challenges that are associated with the legislation. Corruption, according to Shai, Molefinyana and Quinot (2019: 27) has a significant impact on how BBBEE processes and regulations are implemented in South Africa. The authors also emphasize that an increasing number of ineffective organizations are receiving contracts and tenders despite the fact that they do not meet the BBBEE requirements. Similar to this, Abrahams (2019: 825) underlines that there are two primary obstacles to the BBBEE transformation and tourism in South Africa: the requirement to be globally competitive and the urgent need to include more black people in the industry. he government must demonstrate this commitment if it wants to reform South Africa's tourist sector, which is still mostly controlled by white-owned businesses. The crucial question is whether or not the government would provide black-owned tourism businesses the support and direction they need to adopt service automation technologies. The nature and size of the tourist and hospitality sectors present a number of practical issues associated with the implementation of applicable Labor Legislation in South Africa (Vettori 2018: 02). The adoption of service automation technologies requires IT skills, which are not available in South Africa as previously discussed in this Chapter. This challenges continues to face hotel managers in South Africa.

The Labour Relations Act 66 of 1995 prohibits the employment of foreign nationals in South Africa and the country’s tourism industry might be forced to rely on foreign skills for the adoption of service automation technologies. This rises a critical question on how does the South African Tourism industry adopt service automation technologies if there are no sufficient skills?. The POPI Act No. 4 of 2013 also poses challenges to the tourism enterprises which requires attention and planning for. Technology will play a crucial role in the implementation and monitoring processes of the POPI Act by tourism organizations. This implies that substantial investments in technology and related infrastructure to build stronger network systems that will not be susceptible to external hacks and cyber-attacks, thus compromising the personal information of guests and travelers. In addition, tourism organizations such as hotels also needs capital for ongoing monitoring and system upgrades of technological systems to ensure compliance with the POPI Act (MPREM INC 2019). This section highlighted major challenges

that are posed by the legislation which may also be barriers to towards the adoption of service automation technologies by hotel sin South Africa.

2.11 CONCLUSION

The negative impacts of the COVID-19 pandemic on the South African tourism industry were highlighted in this chapter. As much as the global COVID-19 pandemic had devastating impacts ion tourism, it has also hastened the adoption of technology at an alarming rate, and hotels are following suit by implementing service automation solutions to transform their services. The pandemic emphasised the need for regular social distancing protocols, the wearing of face cloth masks and sanitising of hands. As a result of this hotels around the globe started adopting service automation technologies such as mobile technologies, virtual reality, chatbot technologies, digital kiosks. Facial recognition check-in services, in room smart technologies and robotics and robotic technologies. It is against this backdrop that the COVID-19 pandemic has been noted as a driver of service automation technologies in hotels. The need for safety, security and protection from harm and illnesses or viruses such as the COVID-19 as advised by Maslow's Hierarchy of needs, literature advises that consumer perceptions and attitudes are positive towards the use a of service automation technologies in hotels due to the fear of contracting the COVID-19 virus. The TAM was also discussed in detail to assess the attitudes and perceptions of consumers towards the use of service automation technologies in hotels in terms of ease of use of technologies, perceived usefulness of technologies, privacy and security concerns associated with the use of technologies, attitudes towards using technology and actual use of technologies.

The adoption of service automation technologies has presented hotel managers with challenges. Internal challenges such as employee resistance, interoperability, financial and cost related challenges and lack of skills were identified and discussed in details. The innovation process in an organisation pointed out the need for employee skills and an innovative organisational culture to adoption service automation technologies. Lack of these two factors poses as a barrier. In addition, external challenges such as reluctancy of guests in using technological systems, privacy and security concerns of consumes regarding data sharing and lack of government support and funding. In addition, Legislation related challenges are also prevalent such as the labour Relations Act which prohibits the employment of foreign nationals and requires attention and planning from the tourism industry stakeholders. This is due to the fact that the much needed skills for the adoption of service automation technologies are not available in South Africa. The next chapter will unpack the research methodology that the study adopts in an attempt to achieve the proposed research objectives and answer the research questions.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

The previous chapter discussed the literature on the overview of pre-pandemic tourism in South Africa, the impacts of COVID-19 on tourism in South Africa, COVID-19 as an accelerator of technology adoption in hotels and the types of technologies adopted by hotels. Lastly, the theoretical and legislative framework that underpins this study was also discussed. The current chapter examines the research methodology approach to this study. The chapter begins to outline the research method and then proceeds to discuss the research design and approach the study adopts. In addition, the chapter discusses the study population, target population and sample size, sampling methods and techniques, followed by data collection methods and tools. Emphasis is placed on data analysis techniques, methods and tools used in the evaluation of the study results. The chapter concludes with a discussion on validity and reliability, pilot study and ethical considerations that govern the study in terms of data collection and handling. This study is a descriptive research study because the aim is to promote a technologically driven tourism industry post-COVID-19 in South Africa to future proof it from alike pandemics that may occur in the future. The study describes the types of technologies that transform the tourism industry and the travelers' experiences.

3.2 RESEARCH METHOD

The research study adopted a mixed-method approach. Ivankova, Creswell and Plano Clark (2007: 257) define a mixed-method approach as a research procedure that collects and analyzes data by using both quantitative and qualitative data within a single study, to completely understand the research problem at hand. Babbie (2016: 202) and Burton (2000: 339) reiterate that a mixed-method research enables the researcher to obtain in-depth knowledge on trends that are closely related to the research problem, aim and objectives and to thoroughly examine the different perspectives involved with the research problem. In addition, it afforded the researcher an opportunity to gain a deeper understanding between the variables involved in the research study. The authors further explain that the process of combining different research methods, qualitative and quantitative methods, is known as triangulation.

3.2.1 TRIANGULATION

Triangulation is a technique which is often associated with mixed methods. The use of triangulation is applauded for its ability to afford the researcher the confidence of using different methods that lead to

the same outcome or results. Moreover, triangulation requires that the research problem is addressed from several dimensions, which include, the method, data, researcher and theory triangulation (Sekaran and Bougie 2016). The study adopts the following dimensions of triangulation:

I. ***Method Triangulation:*** Using multiple methods for data collection and analysis. In this study, quantitative data was collected using close-ended questions through an online survey questionnaire while qualitative data was gathered from open-ended questions using structured interviews. The statistical technique adopted for analyzing quantitative data is Statistical Package for Social Sciences (SPSS) while NVivo software is adopted for analyzing qualitative data.

II. ***Data Triangulation:*** Collecting data from different sources. For this study, primary data was collected from hotel guests and general hotel managers while secondary data was collected from the review of literature, research reports and journal articles.

III. ***Theory Triangulation:*** Multiple sources and perspectives are used to interpret data. For this study, findings from previous research studies were used to interpret data and draw conclusions.

The study results were then integrated to enhance the research findings and draw conclusions relevant to the study objectives.

3.3 RESEARCH DESIGN AND APPROACH

According to Khan (2011: 69); Malhotra and Peterson (2006: 187) and Creswell and Clark (2017: 58) a research design can be defined as a research framework and blueprint that is used to conduct a research study or project. The authors further explain that a research design specifies the necessary procedure that a researcher needs to follow to obtain all the data that is paramount for solving the identified research problem and to address the research questions that emanate from the study's aim and objectives. Maxwell (2012: 2) states that a good research design is one in which all the research components work seamlessly together and promotes efficient and successful functioning. This study adopted a convergent parallel mixed-method design.

A convergent parallel mixed-method design entails that the researcher concurrently conducts the quantitative and qualitative elements of the study in the same phase of the research process, prioritizes both the methods equally to each other, analyzes the two research components separately and independently, and then interprets the results together (Creswell and Clark 2017). According to Edmonds and Kennedy (2016: 77), convergent design is the most well-known and widely applied in most studies. In addition, it is used when the researcher wants to triangulate the two methods by directly comparing and contrasting statistical results derived from quantitative methods with qualitative results for the

purposes of validating and correlating their results. The convergent mixed-method design was applied since the purpose was to promote a technologically driven tourism industry post-COVID-19 in South Africa to future proof it from alike pandemics that may occur, since COVID-19 has been noted as a drive force behind service automation technologies in hotels. The most common advantage of a convergent parallel mixed-method design is that it provides the researcher with the most comprehensive analysis of the research problem identified (Creswell and Clark 2017).

3.4 STUDY POPULATION

As defined by Marwat, Zia-ul-Islam and Khattak (2016: 288), a study population is an aggregate or the totality of objects or individuals that belong to a certain group possessing the same characteristics and/or specifications. Identifying a population is essential to the research study and objectives as it affords the researcher the opportunity to carefully investigate and solve any identified social phenomenon that is of interest and is considered to pose threats and challenges to the population. The authors further state that this is done by identifying an appropriate sample of the identified population to find solutions and provide bases for recommendations that would be applicable to the rest of the population (Babbie 2016). For this study, there were two sets of populations, namely, hotel guests and general hotel managers. With specific reference to the year 2020, the City of Durban recorded the lowest number of visitors, both domestic overnight and foreign overnight with a total of 4 290 646 (four million two hundred ninety thousand six hundred forty-six). In addition, on average, the city of Durban attracts 2 million visitors (Mehta 2021). According to Lemour (2021), Durban's hotel market is characterized by 3-star graded hotels that account for a total of 2 666 rooms and 4-star graded hotels account for a total of 2 475 rooms, while 5-star graded hotels account for 656 rooms. The City of Durban has a total of 6 231 hotel rooms offered by 53 hotels.

3.4.1 TARGET POPULATION AND SAMPLE SIZE

A target population can be defined as a set of dynamics constituted of essential and belonging relationships that are evident in their immediate environment. Stevens *et al.* (2006) and Bryman (2016) reiterate that these individuals or groups of individuals possess specific characteristics that are of great interest to the researcher and most importantly, from which valid research implications and conclusions can be drawn to answer the proposed research questions. According to Privitera (2018) and Babbie (2016) identifying a target population is essential to the research study and objectives as it affords the researcher the opportunity to carefully investigate and solve any identified social phenomenon that is of interest and is considered to pose threats and challenges to the population. The authors further state that this is done by identifying an appropriate sample and sample size of the identified population with the aim of finding

solutions and providing bases for recommendations that would be applicable to rest of the population. The target population for the study is both business and leisure travelers staying in hotels in the city of Durban. In addition, the study's target population also includes general hotel managers of 4- and 5-star graded hotels operating in the city of Durban. The sample size estimate was calculated using the following formula:

$$M = z\ (p\sqrt{1} - \frac{p}{n})$$

Where M=margin of error given as 0.05
Z area under the normal curve given as 1.96
P= probability that 50% of the population will be selected
n= sample size estimate

From the formula above= the sample size estimate is calculated as
n= 1.96 x1.96x0.5x0.5/0.05x0.05
= 0.9604/0.0025
=384.2
Using the Cochran sample size formula to calculate the true sample size for the study

n= no/1+ (no-1/N)

Where n= true sample size
No estimated sample size given as 384.2
N=Estimation of Durban annual average visitors given at 2000000
n= 384.2/1+ (384.2-1/2000000)
= 384

It is concluded from the above formula that the sample size for the hotel guests is 384. The Cochran formula afforded the researcher the ability to calculate and determine an ideal sample size with a high probability of generalizing the study results with a desired level of precision and confidence levels (as shown in the formula above). In addition, the Cochran formula was used to determine the sample size for this research study because it emerged as the appropriate formula in situations with unknown large populations, as is the case with this research study. Due to time and resource constraints, the researcher targeted only a total of 11 General Hotel Managers of hotel properties in the city of Durban that are 4- and 5-star graded.

3.5 SAMPLING METHODS AND TECHNIQUES

According to Sekaran and Bougie (2009: 344) and Kanika (2015), there are two main types of sampling design, which are probability and nonprobability sampling. Probability sampling is known for being more robust as each sampling has a known probability of being chosen by the researcher and has a non-zero chance of being selected in the final sample (Omair 2014: 142). Sekaran and Bougie (2016) reiterate that

with probability sampling, the population have a known zero chance of being chosen as subjects in the sample, and it can either be restricted or unrestricted in nature. On the other hand, nonprobability sampling is defined as a procedure that does not afford any basis for the estimation of the probability that each item in the population has been included in the sample (Kumar 2018: 07). Sekaran and Bougie (2009: 345) further explain that in nonprobability sampling design, all the elements found in the population do not have any probabilities attached to their being chosen as sample objects. They further highlight that this implies that the findings from the study of the sample cannot be confidently generalized to the entire population.

3.5.1 PURPOSIVE SAMPLING

The study adopted a purposive nonprobability sampling for the qualitative data aspect. Nieuwenhuis (2007: 87) defines purposive sampling as a process in which participants are selected because of certain defining characteristics that make them the providers of the exact data needed for the study. Sekaran and Bougie (2016: 277) reiterate that purposive sampling is chosen by researchers when the research data that is needed is confined to a specific type of people who can only provide the desired information, with reasons being that they are the only ones who have it, or they fit into the criteria formulated by the researcher. The researcher employed a purposive sampling technique for the general hotel managers. The general hotel managers provided adequate and relevant information that contributed to achieving the study objectives. The general hotel managers were purposively selected for the study because of their direct involvement with the tourism industry and due to the leadership roles, they take on as far as innovation within their respective hotels is concerned. In addition, hotel managers are directly involved with the product design and improvement of the hotels they run.

3.5.2 SIMPLE RANDOM SAMPLING

A simple random sampling design was used to collect quantitative data for this research study. Simple random design is best for a research study when the generalizability of the findings to the rest of the population is the objective of the study. In addition, it is the least biased (Sekaran and Bougie 2016: 321). Welman and Kruger (2001: 155) reiterate that simple random sampling is the best as it is representative of the rest of the population. Simple random sampling was chosen as it enabled the researcher to generalize the research findings to the rest of the hotel guests and traveler population to and in the City of Durban, on the perceptions they hold about service automation technologies in hotels in the city, as well as to provide a broader understanding of the population and their hotel service preferences.

3.6 DATA COLLECTION

Welman and Kruger (2001: 48) state that when a research problem needs to be solved, researchers and scholars collect data from different sources of enquiry in an attempt to solve the research problem at hand. To reiterate this, Burton (2000: 339) highlights that researchers and scholars need to examine different theoretical debates that are related to the research problem and on the same note, decide on data collection methods to obtain the required information that will solve the research problem. Both primary and secondary sources of data were consulted for this research study. Sekaran and Bougie (2016: 288) state that the researcher collects and acquires primary data firsthand, while for secondary data, the researcher consults existing information sources.

3.6.1 SECONDARY DATA

A research project entails a process in which a researcher collects existing literature and information to understand different theories that are in debate with each other and related to the research problem that the researcher wants to solve. Secondary data was collected by consulting different journal articles, relevant textbooks, websites, annual reports and existing literature to identify gaps and a dearth of literature in the already existing body of literature in relation to this study. Both Qualitative and Quantitative data was collected over a period of four months (August -November 2021).

3.6.2 PRIMARY DATA

The primary data source for this research study was obtained through an online survey questionnaire and structured interview questions. The processes that were followed are discussed in detail below.

3.6.2.1 ONLINE SURVEY QUESTIONNAIRES

Pietersen and Maree (2007: 186) define a survey questionnaire as an assessment of the current status, opinions, beliefs and attitudes about a particular trend from an identified group of individuals. De Vaus and de Vaus (2013: 5) further explain that survey questionnaires are used to obtain rich quantitative data such as biographical particulars, typical behavior, opinions, beliefs and attitudes of a population. Sekaran and Bougie (2016: 144) state that survey questionnaires are generally designed to collect a large number of quantitative data and they can be distributed and administered personally by the researcher, distributed electronically/online or mailed to the respondents. According to (Babbie 2016: 210), survey questionnaires are known for their popularity as instruments for quantitative analysis and applauded for their excellent ability to measure attitudes and orientations of the population.

For this research, quantitative primary data was collected through the use of online/electronic survey questionnaires. According to Sekaran and Bougie (2016), one of the biggest advantages of online survey questionnaires is that they make the most of the ability of the internet to provide access to groups and individuals who are deemed very difficult, if not impossible, to reach through other channels. In addition, online survey questionnaires afforded the researcher the opportunity to automatically process answers which further saves the researcher costs, time and energy. Since this research study is being conducted amid the global COVID-19 pandemic outbreak, the use of online/survey questionnaires appeared to be the most relevant, given that the COVID-19 pandemic has emphasized social distancing, and most importantly, some people are not comfortable with being in direct contact with other human beings. The use of online/survey questionnaires guaranteed the safety of both the researcher and the respondents by reducing the perceived health risk of the spread and infection of the virus. The researcher followed the steps below to administer the online survey questionnaires.

Step 1: The questionnaire was created as an online "web form" that can be filled in.
Step 2: The respondents (hotel guests) were invited to participate in the online survey via social media platforms. Due to the POPI Act, the researcher could not access participant's email addresses without their permission. The link for the questionnaire along with the letter of information and consent (Annexure 3) were posted on social media platforms to outline all the details of the study. Some hotels agreed to send out a bulk email with the questionnaire link to guests on their database to complete the online survey questionnaire. Some hotel managers explained that the online questionnaire link was sent to over 1000 hotel guests in their respective database.
Step 3*:* The hotel guests filled in the questionnaire online and submitted the completed questionnaire once they were done.
Step 4*:* As the respondents were completing the online questionnaire, the researcher was able to automatically process the respondents' answers.

The questionnaire (Annexure 4) was developed in relation to literature review including the TAM Model and reviewing previous studies on technology adoption. The questionnaire used a five-point Likert scale to illustrate the level of agreement and disagreement of the respondents. and started with an introduction and provided an overview of the research study. It also provided the respondents with instructions for completing the questionnaire. The online questionnaire included close-ended questions. De Vaus and de Vaus (2013: 364) define close-ended questions as forced questions. Babbie (2020) states that close-ended questions are the most popular in a survey questionnaire as the responses are uniform and can easily be processed by the researcher. Close-ended questions were not included by the researcher so that the

respondents did not have to think long and hard about their answers. Likert scales were used in the survey questionnaires to assess hotel guests' attitudes regarding the use of service automation technologies and robots in hotels. Welman and Kruger (2001: 157) state that Likert scales are useful to assess the attitudes and perceptions of the respondents. Likert scales are designed to examine how strongly subjects agree or disagree with statements raised by the researcher on a five-point scale (Sekaran and Bougie 2016: 434)

3.6.2.2 STRUCTURED INTERVIEWS

A widely used method of data collection in business research is to interview the respondents to obtain information that is needed to solve the research problem. An interview can be defined as a guided, purposeful conversation between two or more people (Sekaran and Bougie 2016). May (2011) states that interviews are applauded for yielding rich insights into people's biographies, experiences, opinions, values, aspirations, attitudes and feelings about a particular issue that is of interest to the researcher and the interviewee. Burton (2000) further reiterates that interviews are popularly used as they provide the researcher with huge amounts of qualitative data that is rich. For the purpose of this research, structured interviews were conducted with the general hotel managers. Sekaran and Bougie (2016) define structured interviews as those that are conducted when the researcher knows from the outset what type of information is needed, as the content and questions of structured interviews are prepared in advance. The authors further explain that structured interview questions usually consist of the following aspects. The researcher also carried them out.

I. **An introduction:** The interviewer (the principal researcher) introduced himself, the main purpose of the interview, assured the interviewees confidentiality and most importantly, sought permission to record the interview.
II. **A set of topics (questions) in a logical sequence.** This included the researcher starting with "warm-up" questions that are easy to answer and pose no threats. This involved the researcher asking basic questions like hotel facilities, amenities, services offered, number of hotel rooms, and the type of target markets catered for by the hotel, to asking the hotel manager about their number of years in a managerial position and their qualifications.

The researcher first sent the targeted hotel managers a letter of information and a consent letter (Annexure 2) from the hotels have been identified from the list of Hotels in KwaZulu-Natal that by provided by South African Tourism. To outline the study and, most importantly, to explain the benefits and risks involved in their participation in this study. The hotel managers were chosen on the fact that they are

General Hotel Managers, and they will be able to provide a holistic overview of the hotel operations. Upon receiving the Gatekeeper's letter from the hotel managers (Annexure 6) to the researcher sent the Gatekeeper letters to the Institutional Research Ethics Committee (IREC) in order to be furnished with an Ethics Clearance Letter (Annexure 7) and proceeded to set the date and time for data collection in hotels. Structured interviews were chosen because the researcher already knew what type of information was needed and intended to use the questions prepared in advance to guide the general hotel managers' interviews. The researcher used an interview guide (Annexure 5) to conduct structured interviews with general hotel managers. According to Welman and Kruger (2001: 188), an interview guide is defined as a list of topics and aspects with a theme that guides the interviewer on what and which questions to ask. The interview guide was used to elicit information on how COVID-19 has accelerated technology use related to service automation technologies and robots, including identifying the barriers to the adoption of service automation and robots in hotels. The researcher was also able to use probes to clarify questions and answers provided by the general hotel managers. Lastly, in order for the interviewer to establish credibility, rapport and motivate the general hotel managers to respond to the interview questions, the researcher projected a level of professionalism, enthusiasm, and confidence and most importantly, knowledge about the research problem and articulateness in detail to make the interviews a success.

3.7 DATA ANALYSIS

Malhotra and Malhotra (2012) state that the processing and analysis of data is an essential part of the research process as it affords the researcher an opportunity to cover all the technical matters related to the research study itself. Monette, Sullivan and DeJong (2013: 364) reiterate that the analysis of quantitative data involves the use of statistics, which is a detailed procedure that involves assembling, classifying, tabulating and summarizing numerical data to obtain meaningful information doe the data collected. The data collected using survey questionnaires was edited, coded and carefully processed using the Statistical Package for Social Scientists (SPSS). The quantitative data of this research study was analyzed through the use of descriptive statistics. Qualitative data was analyzed using the NVivo software.

3.7.1 DESCRIPTIVE STATISTICS

Black (2002: 69) and Pietersen and Maree (2007: 411) explain that descriptive statistics help the researcher to organize and summarize data in a most meaningful way, which in turn helps solve the research problems and ensures that the research aim is achieved. A descriptive statistics analysis is a type of analysis that describes the nature of an object or a phenomenon under study. Descriptive statistics analysis was used for two major purposes in this research study, first, to summarize the quantitative data

set; and second, to numerically describe the sample and how variables are related to each other. The sole purpose of descriptive statistics is to afford the researcher the ability to present and describe quantitative data findings using frequencies, mean, mode and standard deviations amongst others in a tabular and graphic form. The following descriptive statistics was applied in this study.

3.7.1.1 BIVARIATE AND UNIVARIATE ANALYSIS

Bivariate and univariate analyses were carried out by the researcher, to analyze the key variables and highlight the relationships that exist between the study variables (Sekaran and Bougie 2016). Babbie, Wagner III and Zaino (2018: 142) explain that univariate analysis is mainly concerned with describing the survey sample of the research study, while on the other hand, bivariate analysis is associated with exploring issues. Burton (2000: 449) and May (2011: 202) reiterate that bivariate analysis entails exploring the relationship that exists and makes it evident between variables, and within the same scope. It highlights the extent to which one variable is influenced and influences another variable. In order to validate the data collected once analyzed, the relationship between COVID-19 and service automation technologies was tested.

3.7.1.2 FREQUENCIES

Frequency analysis was adopted by the study. Ho (2013) explain that frequency analysis is used to determine the main associated number of times each respondent has referred to a particular response. The author further explains that frequency analysis provides a clear view of the number of cases that fall into various response categories that the researcher has set out in the research questionnaires, and most importantly, it assets the researcher in depicting the overall results of the study (Churchill, Brown and Suter 2014: 309). Quantitative data was presented in the form of tables, cross-tabulations and a variety of graphs after determining the total number of cases in each of the various response categories set in the research questionnaire. McGivern (2006) highlights the advantage of presenting data using graphs is that the main characteristics of the distribution are immediately evident and observed by the researcher. In addition, graphs make the data results more interesting to the audience and easier to understand as they quickly convey detailed and complex data in an easy understand manner.

3.7.1.3 MEAN

The mean remains one of the most popular methods that are used to measure the location and calculate the central tendency in a set of research results, and it is determined as the arithmetic average of all the data values. Wagner, Kawulich and Garner (2012: 229) state that the mean is often calculated by adding together all the scores obtained from the research data and then the sum is divided by the total number

of scores. After the mean was calculated by the researcher, the findings were presented using a percentage formula as they allow for the accurate measurement of all the raw scores from the research results.

3.7.1.4 MEDIAN

The median is often the middle of the central point of distribution. Maree and Publishing (2016: 229) states that the median is used to split the distribution into two halves and in order to find the median, the data has to be ordered from the smallest to the biggest value. The median is then calculated by adding the values of the two middle scores and the total divided by two (Wagner, Kawulich and Garner 2012: 178).

3.7.1.5 MODE

The mode is the score that occurs most often in a data set. The mode allows the researcher to describe the nominal or categorical data. Wagner, Kawulich and Garner (2012: 179) highlight that the mode in research refers to the total frequency in which a response occurs.

3.7.1.6 THEMATIC ANALYSIS

The qualitative data aspect of this research study will be elicited through the use of structured interviews which will include interview transcripts/schedules. Sekaran and Bougie (2016) state that the crucial first step in qualitative data analysis is data reduction which involves the process of selecting, coding and categorizing the raw qualitative data. According to Miles and Huberman (1994: 14) three main steps are involved in qualitative data analysis:

I) Data reduction, which is the first step in qualitative data refers to the process of selecting, coding and categorizing the data.

II) Secondly, data display, refers to different ways in which qualitative data results can be displayed so that it is easily understood. This is mainly through a selection and use of direct quotes, a matrix, graphs and even charts to clearly illustrate patterns that are evident in the data.

III) Lastly, data display helps the researcher to draw conclusions based on patterns that are evident in the reduced data set.

Braun and Clarke (2006: 80) advise that thematic analysis is a method used to identify, analyze, organize, describe and report themes that are present within a set of data. The use of the thematic analysis approach provides the researcher with theoretical freedom through the provision of a highly flexible approach which can be modified to suit the needs of different studies as it provides a rich and detailed yet complex account of research data (King 2004: 261). The researcher applied a thematic analysis research process

to generate themes from the data collected and carefully contrasted the similarities and differences in the perspectives of different general hotel managers.

3.7.1.7 FACTOR ANALYSIS

Moonsamy and Singh (2014: 271) define factor analysis as a statistical technique whose primary goal is to reduce the research data. Factor analysis is mainly used in survey research as it is applied as means to ascertain if the measures used, measure what they are intended to measure and if they measure the same thing. The authors further explain that once the variables were established these variables can be combined to develop a new variable that can contain a score for each respondent within a factor. For this study, the matrix table is underpinned by a summarized table that depicts the results of Kaiser-Meyer-Olkin (KMO) and Bartlett's Test. According to Moonsamy and Singh (2014: 271), KMO test is useful for assessing the appropriateness of applying factor analysis to a data set while Bartlett's Test is applied to test the hypothesis (in this instance, no hypothesis was developed). Moreover, the authors emphasize that the prerequisite for a KMO Test, the measure of sampling adequacy should always be greater than 0.50 while Bartlett's Test of Sphericity should be less than 0.50. In the instance of this study, the KMO value exceeds the recommended value of 0.50 and the Bartlett's Test of Sphericity was statistically significant which suggested that the variables were unrelated and further statistical analysis is possible.

3.8 RELIABILITY AND VALIDITY

According to Gratton and Jones (2014: 101), the two main critical elements in which the quality of the research is assessed are reliability and validity – and these two elements are applauded for their ability to assess how truthful a piece of research actually is. Reliability can be defined as a quality of a measuring instrument that would result in it reporting the same value in successive observations of a given case, given the fact that the phenomenon under measure does not change (Efron and Ravid 2019: 56). Monette, Sullivan and DeJong (2013: 364) describe reliability as the probability that an instrument performs its intended function without any degree of failure under predetermined conditions for a specified period of time. On the other hand, Phakiti (2015) defines validity as the degree to which a measure captures what it claims to measure. According to Goodwin and Goodwin (2016) validity remains an important element of research as it affords the researcher an opportunity to determine the level of the actual measure, if it actually measures what it is intended to measure and not something totally different. Efron and Ravid (2019: 89) reiterate that validity highly depends on the quality and appropriateness of the measures used by the researcher to collect data. It can then be concluded that an instrument is declared valid when it accurately measures the concepts that it is intended to measure (Babbie 2016: 76).

To ensure both the validity and reliability of the data collection instruments, the researcher conducted a construct validity test. Sekaran and Bougie (2016) explain that construct validity testifies how well the results obtained from the use of the measures fit into the theories around which the test is designed. In other words, construct reliability is all about "does the instrument tap the concept as theorized". The construct validity test remained s suitable test because the survey questionnaires and the interview schedule were guided by the theories that were raised in the body of the literature as discussed in detail in Chapter 2, in terms of consumer perceptions and attitudes towards the adoption of service automation technologies in hotels, COVID-19 as an accelerator of service automation in hotels, the barriers faced by hotels for adopting service automation technologies and how hotels can make use of various types of technologies to maintain hygiene and cleanliness of guests.

3.9 PILOT TESTING

In addition to the construct validity test, the researcher conducted a pilot study. Connelly (2008) defines a pilot study as a small sample, a quantitative study which is conducted as a prelude to a larger scale study. The pilot study was conducted on 55 respondents. The changes on the pre-test questionnaire were recorded and used to advance the questionnaire. Most questions in the pre-test questionnaire were negatively worded, there they were re-worded positively. The researcher conducted the pilot study to achieve the following aspects related to the measuring questionnaire that will be used in the actual research sample. Van Teijlingen and Hundley (2001) applauds a pilot study for the following advantages:

I. Develop and test the adequacy of research instruments.
II. Affords the researcher an opportunity to assess the feasibility of the full and actual study/survey.
III. Helps the researcher to develop or modify an existing research protocol.
IV. Carefully assess whether the research protocol set by the researcher is realistic and feasible.
V. Eliminates or modifies ambiguous research questions used in an instrument.
VI. Most importantly, it gives the researcher an opportunity to assess whether each question asked in the instrument gives an adequate and expected range of responses.

After the pilot study was conducted, the researcher was in a better position to adjust the difficult aspects that may arise in the questionnaires and then rectify them. Amongst other aspects of the questionnaire, the researcher aimed to adequately tap into consumer perceptions and attitudes toward the introduction of service automation technologies in hotels. Lastly, the researcher aimed to precisely tap into the barriers

that hotel managers are facing with the adoption of service automation technologies in hotels using the interview schedule that was prepared beforehand.

3.10 ETHICAL CONSIDERATIONS

According to Miller *et al.* (2012: 14), ethics in research are considered as the moral obligation, choice and accountability that a researcher needs to uphold throughout the research process. Drew, Hardman and Hosp (2007) reiterate that ethical considerations are also concerned with the respect and protection of the research participants by the researcher throughout the entire research process. In essence, these aspects maintain that a researcher has set principles that s/he adheres to in a quest to ensure that an appropriate approach for conducting research is undertaken. With reference to this research study, the study participants and respondents (hotel guests and general hotel managers) were informed about the nature and all the processes involved in the study, and in return obtained their consent. A letter of information and consent, both accompanied by the research questionnaire and interview schedule were given to the participants. These letters explicitly detailed all the possible risks and benefits of taking part in the proposed research study. To ensure this, both the letters of information and consent complied with the ethical standards set out by the DUT Faculty of Management Sciences Research Ethics Committee including, the Institutional Research Ethics Committee. Such compliance ensured that the participants were fully aware of the nature of the study and that the researcher protected their well-being as far as it is concerned during the research process (Kruger, Ndebele and Horn 2014). In addition, the researcher adhered to the following the aspects in terms of the study's ethical considerations:

I. Information given by both the hotel managers and hotel guests will remain confidential and the staff members will also remain anonymous.
II. Personal information was not requested, and in the event that personal information did need to be obtained, it was handled with care
III. No hotel guest nor any hotel manager was forced to respond to the questionnaires and interviews without their consent or willingness.
IV. There was no misrepresentation or distortion in reporting the data collected during the study and the study findings will be made available to hotels that participated in the study upon request.

To also ensure that the names of the hotels that participated in the study are not exposed due to ethical and confidentiality reasons, they are being reffered to as Hotels A, B, C, D, E, F, G, H, I, K, and L.

3.11 CONCLUSION

The purpose of this chapter was to outline the research method and techniques which assisted the researcher in obtaining all the necessary information to help address the research problem. The primary investigation of this study was conducted using both qualitative and quantitative methods commonly known as mixed methods to adequately describe the impact of COVID-19 and how it has accelerated the adoption of service automation technologies in hotels and better understand the perceptions of hotel guests towards such technologies. The online survey questionnaires included closed-ended questions to prevent the hotel guests from thinking too long and hard to respond to the questions. The online survey questionnaires to collect quantitative data were chosen because this research study was conducted in the midst of the COVID-19 pandemic outbreak. For the qualitative data aspect of this study, structured interview questions were conducted with general hotel managers to obtain their viewpoints on technology adoption in hotels and the barriers thereof. The next chapter will present, interpret and discuss the results from primary data that was collected.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION OF STUDY FINDINGS

4.1 INTRODUCTION

The foregoing chapter indicated that a mixed-method using a convergent parallel mixed-method research design was adopted. Purposive sampling was used for general hotel managers and simple random sampling was used for hotel guests. Quantitative data was elicited from 422 hotel guests and qualitative data was elicited from 11 General Hotel Managers who manage 4- and 5-star graded hotels, due to the fact they usually have more facilities and cater for both business and leisure travellers. They provided the much needed insights for this study. This chapter presents and analyses primary research data that was collected using two different types of data collection methods namely, online survey questionnaires (Annexure D) for hotel managers and structured interviews for general hotel managers using an interview guide (Annexure E). Quantitative data was analysed using SPPS version 27.0 while qualitative data was analysed using NVIVO software. This chapter firstly assesses the reliability and validity of constructs using the Kaiser-Meyer-Olkin (KMO) as a measure of sampling adequacy and Bartlett's test of sphericity to ensure that the data collection tools measured what they were intended for concerning the study objectives. The chapter then proceeds to present demographics both for general hotel managers and hotel guests, hotel profiles and attributes that influence consumers' choices choice of hotel. The qualitative data analysis and interpretation follow a thematic analysis technique. The themes were derived from the study objectives which were then translated into research questions as presented in Chapter 1. The four main themes are as follows:

I. **Theme 1:** COVID-19 as a driver of service automation technologies in hotels.
II. **Theme 2:** The attitudes of hotel guests towards service automation technologies in hotels.
III. **Theme 3**: The role of service automation technologies in achieving guest hygiene and cleanliness.
IV. **Theme 4:** The barriers that affect the implementation of service automation technologies in hotels operating in the city of Durban.

4.2 ASSESSING THE RELIABILITY AND VALIDITY OF CONSTRUCTS

This section presents the outcome of the validity and reliability carried out on the research constructs. Factor analysis was computed to test if each item measures the same constructs. Factor analysis is an analytical procedure whose core objective is data reduction. The Principal Component Matrix (PCM)

making use of Varimax rotation was used to identify the underlying constructs and patterns of the relationships among the items and factors constituting the questionnaire.

For a factor analysis to be computed, several conditions must be fulfilled. The condition is that the Kaiser-Meyer-Olkin measure of sampling adequacy should be more than 0.50; and Bartlett's test of sphericity less than 0.05. The matrix table is summarized in Table 4.1 which reflects the results of the Kaiser-Meyer-Olkin measure of sampling adequacy, as well as Bartlett's test of sphericity. The Kaiser-Meyer value exceeds the recommended value of 0.5 (Field 2007: 640) and Bartlett's test of sphericity was statistically significant, which suggested that variables were unrelated and further statistical analysis was possible. The reliability and validity of each of the constructs are detailed in Annexure 1.

Table 4. 1: Matric extraction table

Constructs	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity
Covid-19 as a driver of technological innovation	.910	.000
Attitude towards the use of service automation technologies in hotels	.861	.000
Perception of pricing and purchase intentions towards the use of technology in hotel	0.604	.000
Importance of technological systems to enhance hygiene and cleanliness in hotels	0.859	.000

4.3 SOCIO-DEMOGRAPHIC PROFILES OF RESPONDENTS AND PARTICIPANTS

The respondents' socio-demographic characteristics are presented in this section. The respondents' demographic characteristics are described in detail according to gender, age group and highest levels of education of the respondents.

4.3.1 GENDER

The study results show that the majority of respondents were females more than the male counterparts. As presented in Figure Table 4.2, 55,9% of the respondents were females while males only accounted for 44.1% of the respondents from the sample size of 422. According to Zhang and Hitchcock (2017:07)

women travelers continue to outnumber men in terms of both leisure and business travel and account for more than half of the entire travel market. George (2019:195) reiterates that women are becoming more and more present within the travel industry, especially since that women are taking up more managerial positions. It thus can be concluded that the findings of the study are in support of this trend.

Table 4. 2: Respondents' Gender

		Frequency	Percent
Gender	Male	186	44.1
	Female	236	55.9
	Total	**422**	**100.0**

The profile of the hotel managers is given in Table 4.3. The majority of the managers were females which accounted for a total of 72.7% while male general hotel managers accounted for a total of 27.3%. This data on respondents; demographics was collected demographic characteristics can influence the type of hotel they choose to stay in and their perceptions towards the use of technology in hotels (Baratti 2020: 5). It is against this backdrop that hoteliers and General Hotel Managers should familiarise themselves with the demographic characteristics of their clients, in order to invest in the relevant type of technology to improve customer satisfaction

Table 4. 3: Profiles of the Hotel Managers

Hotel Manager	Age Group	Gender	No of years as a manager	Highest level of Qualification
HM1	51-60	Female	6-10	Diploma
HM2	31-35	Female	1-5	Diploma
HM3	41-50	Female	11-15	Diploma
HM4	41-50	Male	11-15	Undergraduate Degree
HM5	41-50	Male	11-15	Undergraduate Degree
HM6	41-50	Male	6-10	Diploma

HM7	41-50	Female	6-10	Higher Certificate
HM8	41-50	Female	11-15	Diploma
HM9	36-40	Female	16-20	Postgraduate Degree
HM10	51-60	Male	More than 20 years	Diploma
HM11	36-40	Female	1-5	Diploma
Note: HM- Hotel Manager				

The common trend that can be noted from both quantitative and qualitative data is that the sample constituted more females than the male counterparts. According to Zhang and Hitchcock (2017: 07) women travelers continue to outnumber men in terms of both leisure and business travel and account for more than half of the entire travel market. George (2019: 195) reiterates that women are becoming more and more present within the travel and tourism industry, especially since more women are taking up managerial positions. It thus can be concluded that the findings of the study are in support of this trend.

4.3.2 AGE

The quantitative data in Figure 4. 1 indicates that, 39.6% of the respondents were within 21-30 years of age, 32.7% and 5% were within 31-40 and 51-60 years respectively. Overall, the analysis suggests that the majority, 83.9% are in their youthful age (18 to 40 years age). In contrast, most general hotel managers are within the age group of 41-50 years which accounted for a total of 54.5% of the total sample.

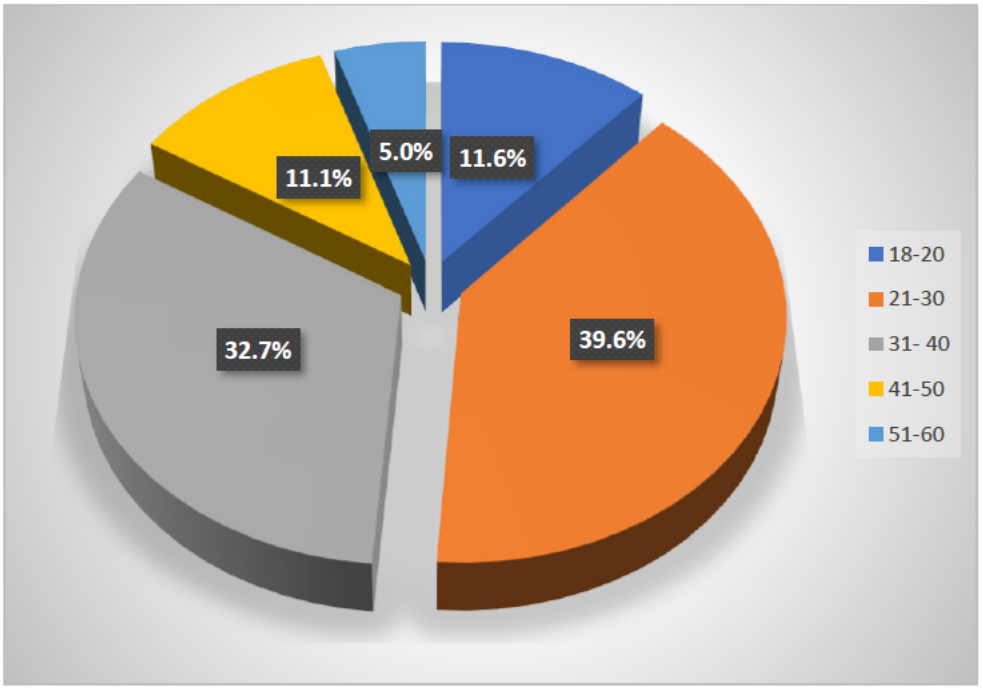

Figure 4. 1: Age distribution of the respondents

Hudson, Orviska and Hunady (2017: 199) claim that Millennials and Generation Z are a growing and attractive traveler market because they are younger, technologically savvy and more receptive to technological innovations within the travel and tourism industry. This trend is supported by the study results as it was noted that most of the respondents are in their youthful years. It is also noted that a total of 54.5% of general hotel managers are within the age group of 41-50 which could mean that they boast years of experience as hotel managers.

4.3.3 Education levels

The highest level of education attained by the respondents is given in Table 4. 4. The majority of respondents 41.7% had Bachelor's Degrees, both Higher Certificate and Diploma holders accounted for 18.7% each, 15.6% had only completed high school while 5.2% claimed to hold other levels of education. From the general hotel managers, it was noted72.7% hold Diplomas as a level of qualification

Table 4. 4: Education Levels of Respondents

		Frequency	Percentage
Education levels	Completed High School	66	15.6
	Higher Certificate	79	18.7
	Diploma	79	18.7

	Bachelor's Degree	176	41.7
	Other	22	5.2
	Total	**422**	**100.0**

A study conducted by Tavitiyaman, Zhang and Tsang (2020: 12) concluded that experienced hotel users (repeat guests) with a Bachelor's Degree presented a more positive attitude and perception towards technology use and acceptance in a hotel. While on the other hand, hotel guests who possess an Associate Degree or less believe that humans provide accurate guest-related information than technology, therefore they had a negative perception of technology use in hotels. It is evident that a correlation exists between education levels and the use of technology and the acceptance of it by guests in hotels.

4.4 HOTEL PROFILES AND ATTRIBUTES FOR CHOOSING A HOTEL

The data presented in Table 4.5 indicate the rating of the importance of the highlighted attributes to the respondents when choosing a hotel brand, especially beyond Covid-19. The mean value measured for the 1st, 2nd, 3rd, 4th, 5th and 9th attributes were greater than 2.5, which is closest to very important. This suggests that the respondents rated these attributes as 'very important' when choosing hotel brands during and beyond Covid-19. Overall, the attribute that is most important to the respondents is the 1st statement which refers to hygiene and cleanliness, resulting in M=2.78, followed by the 2nd statement health and safety (M=2.74). The Chi-Square value indicates that there was a statistically significant difference in the rating of the respondents in all the attributes ($p<0.001$).

Table 4. 5: Attributes for choosing a hotel

	Rating (n=422)				Mean	Std	P value
	No	Not Important	Important	Very Important			
Hygiene and Cleanliness	1	3.1%	16.1%	80.8%	2.78	0.485	0.000
Health and safety	2	3.3%	19.2%	77.5%	2.74	0.508	0.000
Hotel facilities	3	3.8%	38.6%	57.6%	2.54	0.570	0.000
Service quality	4	3.8%	21.8%	74.4%	2.71	0.533	0.000
Sanitization standards	5	3.1%	22%	74.9%	2.72	0.515	0.000

Limited human contact	6	6.9%	37.2%	55.9%	2.49	0.623	0.000
Hotel brand	7	15.9%	47.2%	37.0%	2.21	0.696	0.000
Service automation	8	10.9%	43.6%	45.5%	2.35	0.667	0.000
Adequate social distancing practices amongst guests and staff	9	5.7%	28%	66.4%	2.61	0.594	0.000

From the table above, it was noted that a majority of the respondents (80.0%) indicated that hygiene and cleanliness was very important. A study by Del Chiappa, Pung and Atzeni (2021: 17) concluded that amongst Italian consumers, 60.5% of the consumers stated that hygiene and cleanliness are the most important attributes for choosing a hotel amid the COVID-19 pandemic. The findings are in line with those of the study. The COVID-19 pandemic emphasized the importance of health, safety and hygiene. Health and safety accounted for 77.5%. Similarly, a study by Mirzaei, Sadin and Pedram (2021: 7) explored changes in travel patterns and tourists' behavior in Iran during the COVID-19 pandemic. The study results suggested that 71% of the travelers highlighted that health concerns determine which hotel to choose when travelling. It can be concluded that the attributes of hygiene and cleanliness, and health and safety are the most important attributes for choosing a hotel amid the pandemic.

Table 4. 6 details the profile of the hotels that were part of the study. Most of the hotels that participated in the study were 4- star graded (90.9%) and offer leisure and business services to guests. Many of the hotels (36.4%) are either independently owned or part of a chain. The hotel boasts different guest rooms with the highest number of rooms given as 256 and the lowest at 25.

Table 4. 6: Hotel Profiles

Hotel	Star Grading	Traveller Market	Facilities offered by the hotel	Type of ownership	No. of Guestrooms
H1	4	Leisure and business	Restaurant, Conference rooms, Business Centre and Gym	Family-owned	124
H2	4	Leisure and business	Restaurant, swimming pool, conference rooms and gym	Chain Hotel	205

H3	5	Leisure and business	Restaurant, Spa, Shops, swimming pool, conference rooms, theatre, Business Centre, Gym and casino	Chain Hotel	165
H4	4	Leisure and business	Restaurant, Conference rooms, Theatre and Business Centre	Independently owned	95
H5	4	Leisure and business	Restaurant, Spa, Swimming pool, Conference rooms, Business Centre and Gym	Family-owned	136
H6	4	Leisure and business	Restaurant, Swimming pool, Conference rooms, sauna, business Centre and squash courts	Independently owned	262

The above section presented demographics and hotel profiles of the study hotels guests and hotel managers that participated in this study and which primary data was solicitated from. Primary data collected from 422 Hotel Guests' and 11 General Hotel Managers was separated into research themes using a Thematic Analysis approach. Therefore, the next section presents and analyses data in four main themes.

4.5 THEME 1: COVID-19 AS A DRIVER OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS.

This theme was derived from Objective 1 of the study and seeks to answer the research question which was proposed (How has COVID-19 accelerated service automation technologies and what impact will such technologies have on the tourism industry in KZN ?). In an attempt to answer this research question, the following subthemes were developed based on the different sections of the questionnaire: Technological innovation as a necessity in hotels in Durban, Innovative technologies introduced in hotels in Durban and impacts of service automation technologies in hotels and the tourism industry in Durban. The COVID-19 pandemic has been considered as a driver of technological innovation, especially in hotels. It was against this statement that the respondents were asked to indicate the level of their agreement with the statements highlighted in Table 4. 7. Positive statements (strongly agree and agree) were interpreted as agreement while negative statements (disagree and strongly disagree) were interpreted as disagreement. The mean value was used to show the level of agreement and disagreement. Values less than 2.5 is considered as agreement while a value greater than 3.5 disagreements. The neutral value has a range from 2.5 to 3.4. The results are summarized below in Table 4. 7.

Table 4. 7: COVID-19 accelerates technological innovations in the hotel industry

	Q	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std	P value
A promotion of cashless and contactless payments	1	53.1%	31.8%	11.4%	2.8%	0.9%	1.67	0.857	0.000
A promotion of the use of health and travelling Apps	2	48.3%	37.4%	11.8%	1.4%	0.9%	1.69	0.807	0.000
An increased use of drones for contactless delivery in hotels and the tourism industry	3	26.8%	38.9%	24.9%	7.1%	2.4%	2.19	0.989	0.000
The adoption and use of robotics	4	19.7%	27.7%	35.8%	11.6%	5.2%	2.55	1.090	0.000
A reliance on 3D thermal scanners to obtain the health status of guests	5	39.1%	37%	15.2%	5.9%	2.8%	1.96	1.018	0.000
A collaboration between human employees and artificial intelligence	6	32.7%	37.9%	20.6%	6.2%	2.6%	2.08	1.005	0.000
A development of mobile Apps for contactless guest room controls and personalization features	7	34.6%	44.8%	15.9%	2.8%	1.9%	1.93	0.886	0.000
The emergence of e-menus in hotel restaurants	8	38.9%	40.5%	14.9%	3.8%	1.9%	1.89	0.922	0.000
An introduction of autonomous delivery carts to deliver guests luggage to their rooms without any physical contact	9	30.8%	38.4%	20.4%	7.3%	3.1%	2.14	1.033	0.000

The above information presented in Table 4. 6 is further summarized and presented in a graphical form in Figure 4.2. This section explores Covid-19 as a driver of technological innovation in the hotel industry. The section sought to answer the research objective one which is to examine COVID-19 as a driver of

service automation technologies in hotels and the impact of such technologies in the tourism industry in Durban.

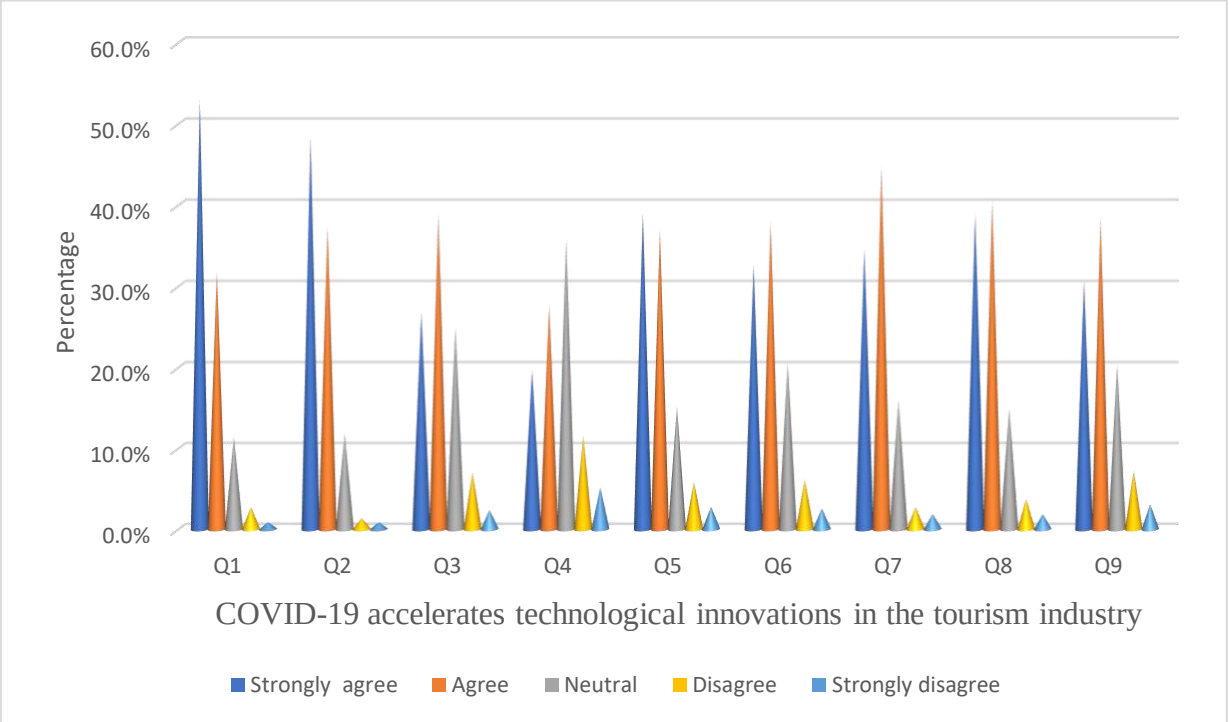

Figure 4. 2: COVID-19 accelerates technological innovations in the tourism industry

The data in Table 4. 7 and Figure 4. 2 indicate that a significant number (84.9%) of the respondents were in agreement (strongly agree= 53.1%; agree= 31.8%) that a promotion of cashless and contactless payments is a driver of technological innovation due to Covid-19, resulting in as ($M=1.67\pm0.857$; $p<0.001$). Similarly, a good number 85.7% were in agreement that the development of health and travelling Apps is a technological innovation brought about due to Covid-19, with the result given as ($M=1.69\pm0.807$; $p<0.001$). Equally, 65.7% of the respondents also see (strongly agree=26.8%; agree=38.9%) an increase in the use of drones for contactless delivery in hotels and the tourism industry as a technological innovation introduced due to Covid-19, with the result given as ($M=2.19\pm0.989$; $p<0.001$). Colombo *et al.* (2016: 650) argue that a crisis often accelerates technological innovation and adoption. Similarly, Ivanov *et al.* (2020b) reiterate that the COVID-19 pandemic has proven to have been a significant driver of disruptive technologies and related innovations across the global tourism and hospitality industries. The innovation in the use of health and travel Apps is evident in China. As a response to manage and contain the spread of the virus, the Chinese government launched the use of travel and health Apps. These Apps contain codes and digital health certificates which travelers use to declare their health status upon arrival at airports and check-in in hotels. The Apps help the Chinese authorities to track and report individuals who might pose a risk to others (Liu and Yang 2021: 2917). In summary, there was a high level of agreement that Covid-19 had introduced innovative technology

including cashless and contactless payments (1st statement), and the use of health and travelling Apps (2nd statement). The respondents, however, appeared to be unsure whether the adoption of robotics was due to Covid-19 (4th statement). The results of the study correlate with the available literature that COVID-19 has accelerated technological innovation in hotels and the tourism industry at large.

Having presented and analysed quantitative data on theme 1, qualitative data was collected through structured interviews from 11 General Managers in Durban and analysed using Nvivo Software into the same theme to corroborate the findings. The General Hotel Managers were coded as HM1 to HM11. The following question was used to initiate a discussion with the hotel managers "Covid-19 has been noted as a driver of service automation technologies in hotels. How true do you think this statement is?" From the interviews, all the participants agreed with the statement that Covid-19 has been the driver of service automation technologies. The responses by some of the Hotel Managers were as follows:

> *That is true because guests are seeking tourism products that prioritizes their health and safety and their direct contact with staff could result in covid infections and technology has proved to be the best tool to prevent such from happening (HM11).*
>
> *That is true because the pandemic has forced the hotel to be innovative to continue attracting guests (HM12).*

Nevertheless, some hotel managers indicated that as much as the pandemic has accelerated the adoption of service automation technologies, the adoption of service automation by the hotels in South Africa will be dependent on two key factors which include the availability of skills and capital.

> *Covid has accelerated the adoption of technology in hotels. However, one must remember that this is Africa and skills for such technologies are not easily available - (HM5).*

The availability of capital is also a moderating factor in the adoption of service automation technologies:

> *It is true but it all depends on the hotel ownership and the availability of capital to invest in technology - (HM7).*

In support of the above, Hotel Manager 8 clarified that automation technology works well for international brands and chain hotels. The manager attributes this to the brand's financial prowess

> *That is very true, but however, automation works very well for international brands and chain hotels. As they have the financial capacity to invest in such technologies - (HM8)*

From the above presentation and analysis of results on Theme 1, it is noted that COVID-19 has indeed

accelerated the adoption of technologies in hotels. In order to ascertain the extent of adoption and the types of technologies by the hotels in Durban, The following subthemes emerged from data collected through structured interviews with the 11 hotel managers in Durban. The subthemes are presented and analysed in detail below:

4.5.1 SUBTHEME 1: TECHNOLOGICAL INNOVATION AS A NECESSITY IN HOTELS

This subtheme summarizes the views of the hotel managers on technological innovations in hotels. The participating managers were asked if they think technological innovation is a concern for their respective hotels. It was uncovered that a few of the participants view technological innovation as a concern that needs to be implemented in the hotel industry. Many, however, noted that technological innovation is not a priority. Furthermore, some of the participants voiced the opinion that technological innovation is unnecessary expenditure for the hotel while others argued that it is only feasible in developed countries. Participant HM13, for example, voiced that technological innovation could help attract more international travellers.

> *It is definitely a necessity for us so that we can attract more international travellers and become competitive, however, it will all depend on the hotel's ability to afford such technologies (M13).*
>
> *It is a necessity so that our hotel product continues to remain competitive and that meets international hotel and tourism standards - (HM9).*

The above statement may be connected to the fact that travellers are extremely cautious when travelling due to Covid-19 (Ivanov *et al.* (2020b: 16). Nonetheless, it can be drawn from the statement that using technological innovation in the hotel will largely depend on affordability. Besides this, the competitiveness of the hotel was noted as the reason why technology innovation is a concern: While technological innovation has become an obligation for the tourism and hospitality industry in the age of Covid-19 (Ivanov *et al.* (2020b: 16), six of the hotel managers interviewed, however, did not consider technological innovation in the hotel a priority. According to the manager (M2), the hotel industry in South Africa is still lagging in terms of technology use. Manager M2 further noted that the main goal of the hotel is to survive the pandemic.

> *COVID-19 only made things worse as technology is still not a priority for our hotel sector. At this point and time, it remains not a concern because our main concern is to survive and keep our doors open and be afloat - (HM2).*
>
> *Technology innovation is not a concern for our hotel due to the capital it requires, and they might be more expensive than human employees in terms of their maintenance. Human employees remain a crucial part of the hospitality and tourism industry and we cannot trade it for*

automation technologies - (HM5).

At this point and time, hotels in Durban, including my hotel are fighting for survival and maintaining their market share and only international chain hotel brands can afford service automation technologies. Technological innovation is not a necessity for our hotel right now as it remains an unnecessary expenditure (HM1).

From the above narrative, one could easily deduce that financial worries from the impact of Covid-19 are the hotel's main concern as well as an impediment to technological innovation. This view can be supported by Hotel Manager 5 who accentuated that technological innovation is not a concern for the hotel due to the capital requirement. Hotel Manager 1 was of the view that technological innovation hotels in South Africa remain an unnecessary expenditure. HM1 based this view on the fact that the hotel industry, particularly in Durban where the study was carried out is still fighting to survive and maintain the local market share. Hence, the cost of using technological innovation might have provoked the sentiment that only international chain brands could afford service automation technologies. Part of the concern uncovered on why service automation may not be feasible in the South African hotel landscape is the financial implication of such technologies. Hence, it was uncovered that only developed countries could afford to use such technologies. This position can be corroborated by Ivanov *et al.* (2020b: 16) who said that technological novelties were considered luxurious add-ons and extra services.

4.5.2 SUBTHEME 2: TECHNOLOGICAL INNOVATIONS INTRODUCED DUE TO COVID-19 PANDEMIC

From a South African hotel and tourism industry perspective, it became important to know if any service automation technologies were introduced to combat the Covid-19 pandemic. The following question was asked, "Are there any service automation technologies introduced in your hotel as a result of the COVID-19 pandemic?" From the interviews, it was uncovered that some of the hotels in this study have introduced some form of service automation. Among these include automated booking systems, automatic hand sanitizers, easy application and Omni online channel. Nevertheless, four of the hotels had not introduced service automation services at their hotels. The excerpt from the interview is summarized below.

Hotel Manager 9 indicated that an automated booking system was introduced as a form of technological innovation. Automatic hand sanitizing stations appeared to be the most common type of service automation technology that was introduced by the hotels in Durban that participated in this study. HM 3 and 7 explained that there was no desire to introduce any further types of service automation technologies since it is the only type of technology the hotel can afford:

Yes, only automatic hand sanitizers in public areas. This is the currency, the only type of automation the hotel can afford since the pandemic affected our income baseline (HM3).

We only introduced automated hand sanitizers. We have no desire to introduce any form of service automation technologies (HM7).

From the above statement, particularly attributed to HM3 and HM7, one could draw out two main factors. First, the above managers have no intention of introducing new service automation technologies other than automatic hand sanitizers. Secondly, the decision not to introduce new technologies was based on financial considerations. This may likely be associated with the economic challenges many local hotels are facing due to low patronage caused by the health crisis. Omni online system is another service automation. Manager 2 revealed the usefulness of this technology which includes ease of checking-in processes.

We also introduced the Omni online system which is used by our housekeeping and maintenance teams to report on the status of guest rooms to avoid longer check-in processes and guests waiting longer to occupy rooms (HM2).

Some hotel managers indicated that they did not introduce any form of service automation technology. It was uncovered that financial concerns and struggles were the main cause for the hotel not using any service automation. This is reflected in the following statements:

No, there are no service automation technologies that were introduced in our hotel. We were too concentrated on surviving the pandemic and keeping our doors open, technology was just not important - (HM5).

Not at all. Our main priority is to keep our doors open and sustain our employees' livelihoods - (HM10).

We did not introduce any automation technologies. Our hotel strongly believes in the human touch element and the sympathy of humans towards other humans. All of this is absent in automation technologies - (HM6).

Another unique reason uncovered for not introducing service automation was based on human preference over the machine. Hotel Manager 6 indicated that the hotel strongly believes in the human touch element The above statement is largely debatable given the current health crisis. Kim et al. (2021), for example, revealed that while customers prefer humans over service automation before Covid-19, their preference has, however, altered given the current health crisis. Therefore, this presents an opportunity for further research to establish customers' preferences in the health crisis. It can be concluded that there are mixed reactions towards technology innovation as a concern in hotels as some hotels only introduced a minimal degree of it while others did not to introduce any form of service automation technologies.

4.5.3 SUBTHEME 3: TECHNOLOGICAL INNOVATION PLANS FOR THE FUTURE INTRODUCTION OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS

According to Ivanov *et al.* (2020a) travelers and hotel guests will prefer to interact physically with technologies rather than other with human beings and frontline service employees as a measure to minimise health risks. It then became prudent to ask if hotel managers of the hotels in Durban who participated in this study have a technological innovation plan in place. Most of the hotel managers indicated that there is no technological innovation plan in place, for reasons that include, a lack of demand by the hotel guests and the preference for a human touch over technological systems. Three hotel managers indicated that they prefer the human touch which will not result in a technology plan or the implementation of service automation technologies. One hotel manager indicated that human employees are an integral part of the running of the hotel:

> *There is no technology plan in place that is being developed. The human employees will forever remain an integral part of the running of this hotel, and it is in line with our philosophy. There is no need to develop a technological plan - (HM1).*

What was also uncovered through the interviews is that hotel managers of chain hotels are not in a position to make major decisions. One hotel manager stated that management permission is needed to develop such a plan. The manager stated the following:

> *No technology plan has been developed and since we operate under a chain hotel group, we wait for a directive from the head office and only then we would implement we as per the grand plan developed by our head office and its research team - (HM2).*

> *No plan is being developed because we currently have no demand for the use of technology (HM3).*

> *No technology plan is in place. We can only develop one where there is a demand for technology from our clientele. Currently, developing one now is an unnecessary admin exercise as it consumes more time (M10).*

Another factor that contributed to hotels not developing technological innovation plans for their respective hotels is the lack of demand for technological products in hotels in Durban as reported by some of the hotel managers

Contrary to the above, three hotel managers stated that they do have technological innovation plans in place that will see parts of their hotels being automated. Service automation technologies that are being planned for future implementation by the respective hotel managers includes digital door locks, service robot and UV light technology systems. The hotel managers reported the following:

4.5.3.1 DIGITAL DOOR LOCKS

We are in a process of introducing new door locks that will allow guests to use their mobile phones to access their rooms - (HM9).

We are looking into changing our current door locks and installing digital ones that will allow guests to gain access into a hotel room by just using their smart mobile phones. This will be in different phases, and we will launch the project to our guests (HM6).

4.5.3.2 SERVICE ROBOT

Definitely, because consumer preferences have changed and require high standards of health and safety and protection from contracting the COVID-199 Virus. Therefore, we are planning to introduce a service robot that will welcome our guests and easily facilitate their check-in processes for their stay in our hotel - (HM5).

4.5.3.3 UV LIGHTING SYSTEMS

The hotel is planning to introduce UV lighting systems for enhanced hygiene and cleanliness purposes and a social media campaign will be carried out to attract the attention of travellers - (HM5).

A hotel's adoption of various technological innovations is influenced by adoption decisions, practical implementation measures and customer feedback (Liu and Yang 2021: 2910). In addition, the authors further reiterate that factors such as technology types, organisational culture, environmental context and different consumer preferences all exert some sort of influence on how hotels adopt and implement service automation technologies. Therefore, it can be concluded that the respective hotels did market research on the most suitable types of service automation technologies for their target markets.

4.5.4 SUBTHEME 4: THE IMPACTS OF SERVICE AUTOMATION TECHNOLOGIES ON THE TOURISM INDUSTRY IN DURBAN

According to Kim et al. (2021), the innovations caused by automation technologies are modifying consumers' consideration sets and experiences. From a South African hotel perspective, the hotel managers interviewed were asked the following question "What impacts do you believe service automation technologies will have on your hotel and the tourism industry in Durban?" From their responses, it was uncovered that service automation will have positive or negative impacts on the hospitality and tourism industry of Durban. The most common cited positive impact by the hotel managers was that the adoption of service automation technologies will result in a competitive advantage. Hotel guests were also asked what impacts will result from the adoption of service automation

technologies in hotels by indicating true or false on the statements. Their responses are summarized in Table 4. 8

Table 4. 8: The Impacts of Service Automation Technologies on hotels

	No	False	True
An innovative technological hotel product is associated with a high price value	1	12.8%	87.2%
The use of Service automation technologies will result in efficient hotel services	2	17.3%	82.7%
The use of service automation technologies will result in a lack of interaction with trained human employees	3	21.3%	78.7%
Service automation technologies will provide poor service quality compared to human employees	4	44.8%	55.2%
Service automation technologies will require me to have specialized skills and knowledge which might be difficult to operate them	5	18.7%	81.3%
The use of service automation technologies is associated with job losses	6	19.2%	80.8%
Maintenance and network challenges that are associated with service automation technologies will impede satisfaction	7	18.2%	81.8%
Technology is rapidly advancing therefore this will result in me being exposed to too many technologies that might confuse me	8	20.6%	79.4%

Many of the hotel managers indicated that the adoption of service automation technologies will result in a competitive advantage. One hotel manager reported that human errors will be limited:

> *The hotel would be very competitive and there will be limited human errors which will result in efficient hotel operations. Most importantly, it will reduce our operational costs. The tourism industry in Durban will reach international standards and the city would be one of the world's must see and visit cities - (HM13).*

In support of the above, one of the hotel managers also indicated that the adoption of service automation technologies will result in reduced operational costs:

> *The positive impact is that our hotel will be competitive and appeal to international travellers especially those who are more technologically inclined and savvy. This would also improve our service quality as a hotel product while at the same time reducing our operational costs - (HM9).*

In conjunction with the statement by Hotel Manager 13 above, a total of 82.7% responded 'true' to the statement "The use of Service Automation technologies will result in efficient hotel services" however, a total of 81.8% of the respondents believe that network-related challenges will impede satisfaction. Huang and Rust (2018: 155) highlight that the adoption of service automation technologies affords hospitality and tourism organizations the luxury to direct more efforts towards operational efficiency through rigorously consistent and standardized service offerings. In addition, the authors further advise that the adoption of service automation technologies allows hotel executives and human employees to exert attention in more complex service tasks in service delivery encounters where they can apply creativity, problem-saving and empathy skills.

As much as some hotel managers noted the positive impacts that will result from the adoption of service automation technologies, some hotel managers have pointed out negative impacts related to job losses and loss of human touch. The majority of the hotel managers cited job losses within the tourism industry in Durban as the key negative impact. One hotel manager cited that livelihood will no longer be sustained:

> *From an industry perspective, there will be job losses as humans will be displaced by robots and the tourism industry would no longer sustain livelihoods like it is now (HM10).*

Presenting the same views as the above statement, one manager stated that the tourism industry in Durban will be in the hands of the machines and robots:

> *We will experience job losses as the majority of the employees in the tourism industry are unskilled and tourism graduates are already struggling to fight [for] jobs, so how much more when technology takes over. Our tourism industry will be handed to machines (HM2).*

Similarly, from the data presented in Table 4. 8, 80.8% of the respondents are of the view that the use of service automation technologies is associated with the loss of jobs. Huang and Rust (2021) and Boyd and Holton (2018) emphasized the main concern with the use of service automation technologies and robots in service industries such as tourism and hospitality and their nature of being human employee intensive, is the displacement of human employees which will result job losses and unemployment. It is then evident that the adoption of service automation technologies creates concerns over job losses. Some of the hotel managers pointed out the loss of humans as another negative impact that will result from the adoption of service automation technologies. The hotel managers reported the following:

> *The introduction of technology in the Durban tourism industry will result in the loss of warmth*

of the KZN people as they play a crucial role in welcoming our travellers to our province. Tourism will never be the same due to human employees being replaced by robots (HM6).

The impacts would be negative because robots cannot provide our guests with a feeling of being welcome and empathy during the service delivery process and our brand is that of a traditional hotel and the human factor remains of importance to us (HM8).

The above view agrees with Kim et al. (2021) that hotels are represented as a symbol of hospitality, which manifests as human values or human touch. To reiterate the importance of human touch in tourism experiences, Chan and Tung (2019: 463) conducted a study to compare the service delivery by human employees and that provided by service robots using a hotel brand experience as a moderating factor. They concluded that whatever the hotel brand, human staff were favoured over service robots mainly for the reason that humans contributed towards guests acclimatizing and developing of a sense of emotional attachment to the hotel brand and being provided with an enriching yet integrative experience. This means that hotel managers are faced with a strategic dilemma as far as the human touch is concerned against the use of service automation technologies. From the above discussion of the main theme and the subthemes, it was noted that COVID-19 is accelerating the rate of the adoption of service automation technologies. Hotels in the city of Durban are still lagging in terms of technology adoption. The next theme will present and analyse the results regarding consumer perceptions towards the use of service automation technologies in hotels.

4.6 THEME 2: THE ATTITUDES OF HOTEL GUESTS TOWARDS SERVICE AUTOMATION TECHNOLOGIES IN HOTELS

This theme was derived from Objective 2 and sough to answer the research question " What are the attitudes of hotel guests in Durban towards the use of service automation technologies?". In order to answer this research question, the following subthemes were developed: Perceived usefulness of technologies, perceived ease of use of technologies, privacy and security perceptions associated with technology in hotels, attitudes towards using technology(preference between humans technology) and actual use of technologies (purchase intensions). According to Kim et al. (2021), the innovations caused by automation technologies are modifying consumers' consideration sets of experience. Owing to this, this theme explores the measurement of guests' attitudes and perceptions of the hotel. It then became prudent to pose the question to managers, "How important it is to measure consumer attitudes and perceptions towards the hotel service they receive?" From the interviews, it was uncovered that the managers see measuring guests' attitudes and perceptions as important to the hotel. Among the reasons uncovered on the importance of measuring guest's attitudes and perceptions. The majority of the hotel managers indicated that measuring the guests' attitudes and perceptions helps them to identify areas that

need improvement in and around the hotel. One hotel manager alluded that guests' preferences change over time:

> *It is very important because it helps us to identify areas for improvement in the management and running of the hotel. Yes, because guests' preferences change over time, and should they require technology introduced in and around the hotel that is exactly what we will give to them. However, since we are under a chain hotel group, there will be a need for further market research since services are standardized under brand standards and star grading - (HM3).*

Some of the hotel managers indicated that measuring hotel guests and their perceptions assists hotels to become innovative and adapt to economic market conditions that affect their guests and the overall hotel operations. One hotel manager emphasized without measuring guests' perceptions and attitudes it would be impossible to innovate:

> *It is very important because since the hotel once closed due to the pandemic, that made us realize the importance of innovation so that we can change our marketing strategies to best adapt to the current market and economic conditions characterized by the COVID-19 pandemic. This would not be possible without such information as it presents the trends that our clientele follows. If our guests want automation, only some parts of the hotel can be automated but the human factor with being an over-arching element - (HM6).*

Ukpabi and Karjaluoto (2017:3) noted that deeper knowledge about the acceptance of these technologies is key for marketers, travel agencies, and hotels, as it determines their adoption and usage by individuals. Hotels in the city of Durban are using in-house guest survey forms and email addresses to measure the attitudes and perceptions regarding their service experience in their respective properties. To answer research objective two, which is to assess the attitudes of hotel guests in Durban towards the use of service automation technologies in hotels, hotel guests' attitudes were measured using the TAM framework presented in Chapter 2. However, Privacy and security perceptions were included in light of the POPI Act. The results are presented under key five subthemes:

4.6.1 SUBTHEME 1: PERCEIVED USEFULNESS OF TECHNOLOGIES

The perceived usefulness of service automation technologies is influenced by the levels of interactivity that they afford to the users (Huang *et al.* 2017: 761). Therefore, the level of interactivity with service automation technologies was used to measure guests' attitudes towards the perceived usefulness of technology. The mean value was used to show the level of agreement and disagreement. Values less than 2.5 is considered as agreement while a value greater than 3.5 as disagreements. The neutral value has a range from 2.5 to 3.4. Summarized data is presented in Table 4. 9 below:

Table 4. 9: Perceived Usefulness of Technologies

	No	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std	P value
Robots are more interactive than human employees	1	11.1%	15.6%	33.4%	22%	17.8%	3.20	1.224	0.000
Hotel service automation technologies offer low levels of interactivity	2	23.2%	39.3%	25.8%	7.3%	4.3%	2.30	1.039	0.000
Hotel service automation technologies offer high levels of interactivity	3	12.8%	26.3%	32.5%	17.8%	10.7%	2.87	1.169	0.000
Hotel service automation technologies only offer programmed answers	4	46.7%	31.3%	17.1%	3.8%	1.2%	1.82	0.929	0.000
I cannot interact with hotel service automation technologies like I would with human employees	5	44.8%	32%	16.6%	4.7%	1.9%	1.87	0.979	0.000
The quality of interaction of service automation technologies is poor compared to human employees	6	30.8%	33.2%	25.8%	7.6%	2.6%	2.18	1.037	0.000
Hotel service automation technologies do not offer active communication	7	34.8%	37.7%	19.4%	5.9%	2.1%	2.03	0.986	0.000

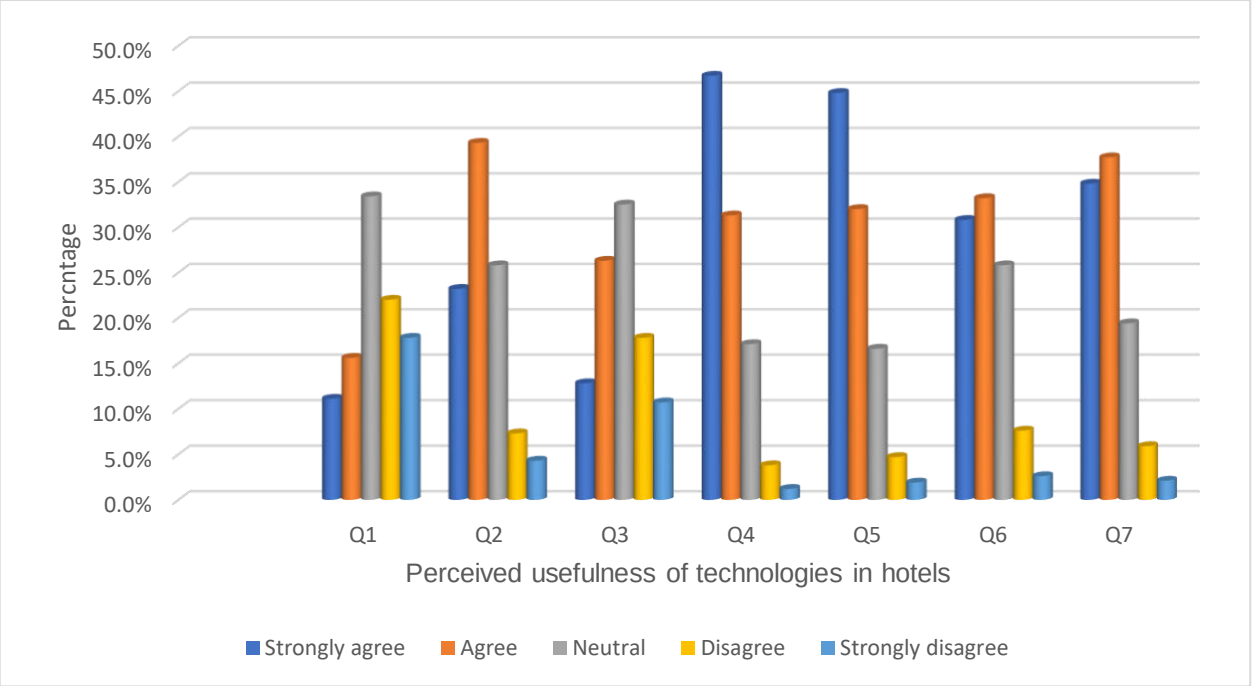

Figure 4. 3: Perceived Usefulness of Technologies in Hotels

The data in Table 4. 9 and Figure 4. 3 indicate that a significant number of the respondents neither agreed nor disagreed that robots are more interactive than human employees, resulting in as ($M=3.20\pm1.224$; $p<0.001$). This suggests that respondents were unsure (neutral) about whether robots interact better than human employees and vice versa. Nevertheless, a significant number of the respondents (62.5%) were in agreement (strongly agree=23.2%; agree=39.3%) that hotel service automation technologies offer low levels of interactivity, resulting in as ($M=2.30\pm1.039$; $p<0.001$). It can, therefore, be said that respondents value human services in terms of interactivity with automation. Despite this, a significant number of the respondents (32.5%) neither agreed nor disagreed (neutral) that hotel service automation technologies offer high levels of interactivity, with the results given as (2.87 ± 1.169; $p<0.001$). A study conducted by Choi *et al.* (2020: 625) concluded that human employees are preferred by hotel guests as they believe that they provided a much better service over robots in terms of interaction and helping them settle into the hotel environment. Contradictory findings are presented by Van Doorn *et al.* (2017: 50) in their study on hotel guests' experiences with service robots. The results suggested that hotel guests enjoyed new and memorable experiences during their interaction with service robots. It can be concluded that satisfactory levels of interactivity are solely based on individual hotel guest preferences and past experiences. Hotel managers were asked, "Based on your hotel guests' profiles, what do you think their perceptions and attitudes will be towards the introduction of service automation technologies in your hotel?" Five of the managers believed that their guests, specifically the returning guests such as leisure guests, will not accept the use of service automation. One hotel manager alluded the following statement:

> *Our guests are people and family orientated and they prefer a hotel experience driven by the spirit of ubuntu and human collaboration to make their hotel stay very pleasant. They utterly enjoy the warm smile and welcome gestures from our staff members which robots can provide. They will not be pleased with automation technologies in our hotel - (HM6).*

The finding was corroborated by Kim *et al.* (2021) who said the need to interact with hotel staff signifies guests' desire to experience quality and personalized service and revealed that such interactions include human staff calling hotel guests by their names. Overall, the analysis suggests that respondents prefer human interactive services over automation which could be attributed to the fact that hotel service automation technologies only offer programmed answers (4th statement). Hence, respondents noted that they could not interact with hotel service automation technologies like they would with human employees (5th statement).

4.6.2 SUBTHEME 2: PERCEIVED EASE OF TECHNOLOGIES

This subtheme explores the perceived attitudes of the respondents toward the ease of use of technology in hotels in terms of ease of use. Shin and Jeong (2020: 2620) highlight that the perceived ease of use and usefulness of service automation technologies in a hotel plays a crucial role in influencing hotel guests to adopt various service e automation technologies during their hotel stay. Positive statements (strongly agree and agree) were interpreted as agreement while negative statements (disagree and strongly disagree) were categorized as disagreement. The mean value was used to show the level of agreement and disagreement. Values less than 2.5 is considered as agreement while a value greater than 3.5 disagreements. The neutral value has a range from 2.5 to 3.4. Data is presented in Table 4. 10.

Table 4. 10: Perceived attitude towards the Ease of Use of Technology in a hotel

		Perceived attitude towards ease of use of technology (n=422)							
	No	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**Mean**	**Std**	**P value**
Technology is perceived with ease of use	1	30.6%	45%	19%	4.3%	1.2%	2.00	0.880	0.000
It is easy to learn to use hotel technology	2	22%	46.4%	24.4%	5.5%	1.7%	2.18	0.895	0.000
Much conscious efforts are not needed when using any hotel self-service technology	3	17.1%	42.7%	28.4%	10.2%	1.7%	2.37	0.938	0.000
I do not find using hotel self-service technology difficult	4	24.2%	46.2%	20.6%	6.9%	2.1%	2.17	0.943	0.000
Using hotel automation technology will enable me to save check-in and check-out time	5	36%	42.4%	17.8%	2.8%	0.9%	1.90	0.854	0.000
Using hotel automation technology makes my check-in and Check-out easier	6	35.1%	43.1%	18.2%	2.8%	0.7%	1.91	0.839	0.000
Overall, hotel automation technology limits unnecessary processes	7	33.9%	42.4%	18.5%	4.3%	0.9%	1.96	0.883	0.000

Data presented in Table 4. 10 is further summarized and presented in a graphical form in Figure 4. 4 below:

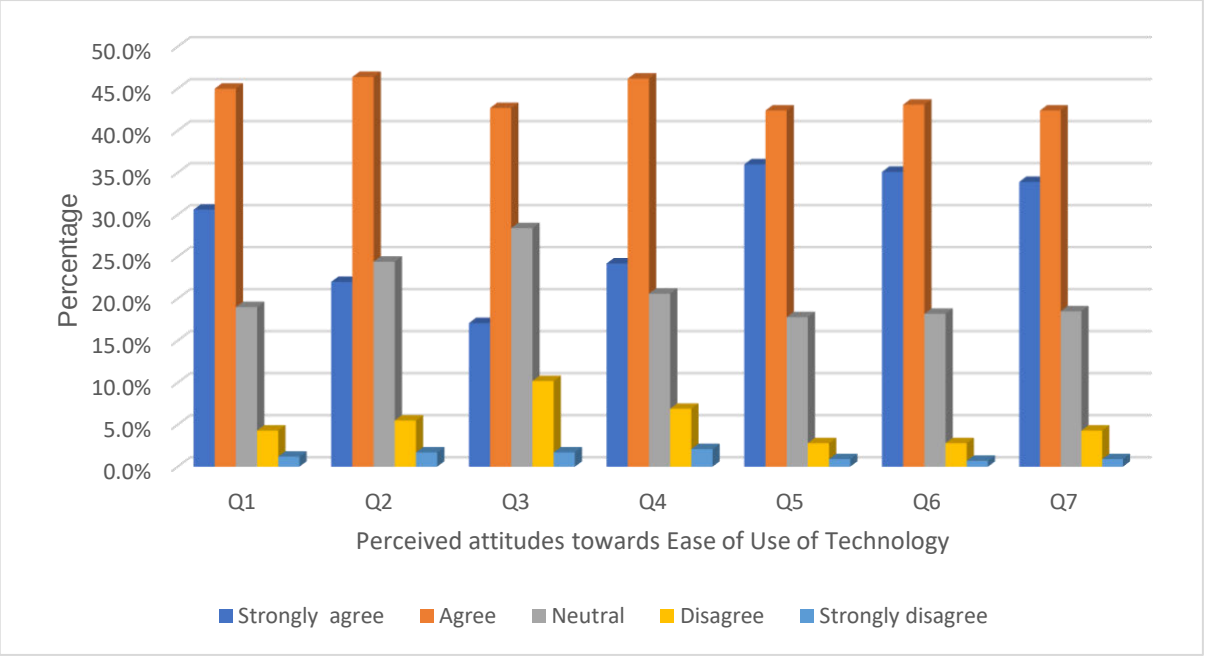

Figure 4. 4: Perceived Attitudes Towards Ease of Use of Technology

The level of agreement on the perceived attitudes towards the use of technology in hotels. There was significant agreement (75.6%) that technology is perceived with ease of use, with the results yielding as ($M=2.00\pm0.880$; $p<0.001$). In terms of the statement "It is easy to learn to use hotel technology, a significant number of the respondents were in agreement (68.4%), with the results given as ($M=2.18\pm0.895$; $p<0.001$). Equally, the data indicated that there was significant agreement (59.8%) that conscious efforts were needed when using any hotel self-service technology, with yielded results ($M=2.37\pm0.938$; $p<0.001$). There was also significant agreement (76.3%) among the respondents that overall, hotel automation technology limits unnecessary processes, with the results given as ($M=1.96 \pm0.883$; $p<0.001$). In today's modern society, the tourism industry is characterized by business travel whereby time is an issue for business travelers who are often sensitive to the speed of service delivery during the check-in and check-out process (Hong and Slevitch 2018: 1). This is validated by findings from a study conducted by tom Dieck and Jung (2018: 160), as they concluded that hotel guests' often accept and develop a positive attitude towards the adoption of service automation technologies on the basis that they offer them functionality, are highly efficient, are easy to use, operate and control and in turn, saves them check-in and out time.

Similarly, two of the hotel managers (2 and 9) noted that corporate guests would appreciate automation technologies. The justification for this is that service automation will offer corporate guests convenience and private services. One hotel manager reported the following:

Corporate guests would appreciate automation technologies because they are often busy and, in

a rush, and have no time therefore automation will offer them convenience and save them more time to go on about their business of the day - (HM2).

However, one of the hotel managers presented a different view. The hotel managers believe that the introduction of service automation technologies will frustrate hotel guests:

Our guests are mainly [from] the domestic market, introducing automation technologies would scare them away because they are not accustomed to self-service technologies and this could result in frustration - (HM13).

In contrast, Chen *et al.* (2015: 840) argue that the perceived ease of use and usefulness of service automation technologies does not have a significant impact on consumer satisfaction, behavioural intentions and attitudes. Therefore, various studies have reported inconsistent findings regarding the ease of use and usefulness of service automation technologies. Overall, it is sufficient to conclude that respondents had a positive attitude towards the use of technology in hotels. It was found that the 5th statement which refers to using hotel automation technology will enable me to save check-in and check-out time had the most support for the use of technology in hotels.

4.6.3 SUBTHEME 3: PRIVACY AND SECURITY PERCEPTIONS ASSOCIATED WITH TECHNOLOGY IN HOTELS

While the use of technology in the hotel industry is a welcome development, there have been legitimate concerns about the privacy and security of guests. This subtheme assesses the perception of the respondents on the privacy and security concerns of technology deployment in the hotel industry. Positive statements (strongly agree and agree) were interpreted as agreement while negative statements (disagree and strongly disagree) were interpreted as disagreement. The mean value was used to show the level of agreement and disagreement. Values less than 2.5 is considered as agreement while a value greater than 3.5 disagreements. The neutral value has a range from 2.5 to 3.4. Data is summarized and presented in Table 4. 11 below.

Table 4. 11: Perceptions of privacy and security concerns in the use of technology

		Privacy and technological issues of technology (n=422)							
	No	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std	P value
Using hotel automation technology infringes on my privacy	1	25.6%	36.5%	30.6%	6.4%	0.9%	2.21	0.929	0.000
I do not feel safe when using hotel automation technology	2	22.7%	27.3%	32.7%	14.2%	3.1%	2.48	1.085	0.000
Hotel automation technology can store my personal data safely	3	24.2%	37%	30.1%	6.2%	2.6%	2.26	0.979	0.000
Hotel service automation technologies can easily be hacked, and my personal information can be wrongly used	4	31.3%	38.9%	23.7%	4.7%	1.4%	2.06	0.930	0.000
Hotel service automation technologies require too much of my personal information	5	28.4%	41.2%	25.4%	2.8%	2.1%	2.09	0.915	0.000

The data presented in the above Table 4. 11 is further summarized and presented in a graphical format in Figure 4. 5 below:

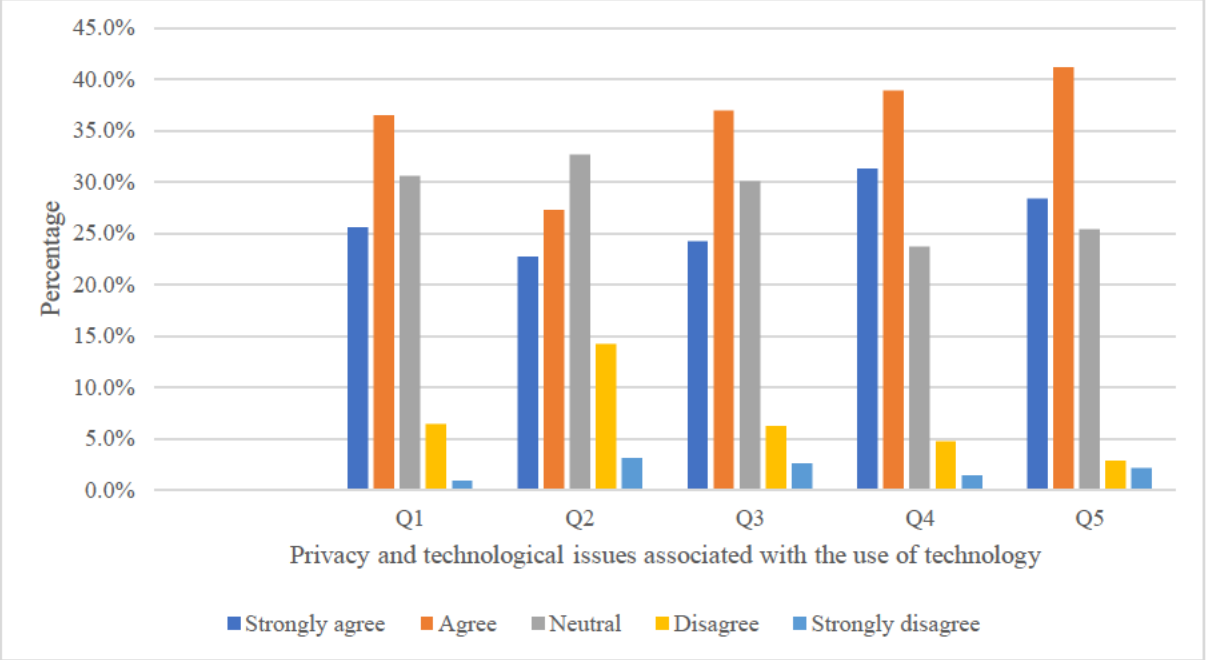

Figure 4. 5: Privacy and Technological Issues Associated with the Use of Technology

The data presented in Table 4. 11 and Figure 4. 5 indicate that there was significant agreement (62.1%) among the respondents that using hotel automation technology infringes on privacy, resulting in as ($M=2.21\pm0.929$; $p<0.001$). Similarly, there was significant agreement (50%) that respondents did not feel safe when using automation technology, resulting in as ($M=2.48\pm1.085$; $p<0.001$). An empirical study on Chinese tourists' perceived risk and intention to use biometric technology by Pai *et al.* (2018) revealed that Chinese travellers have a preference toward the use of fingerprint technology and trust it more than any other types of biometric technology since it does not require much of their personal information. Nevertheless, there was also a significant agreement (61.2%) among the respondents that hotel automation technology can store their personal data safely ($M=2.26\pm0.979$; $p<0.001$). Despite this, respondents were concerned (70.2%) that hotel service automation technologies can easily be hacked and personal information can be wrongly used, with the results given as ($M=2.06\pm0.930$' $p<0.001$).

According to Yallop and Seraphin (2020: 259), the use of technology within the hospitality and tourism industry such as big data and blockchain technologies is characterized by data breaches, mishandling and misinterpretation of travellers' personal data. Armerding (2018) further reiterates that the prevalence of global cyberattacks and significant data breaches across various industries, including the hospitality and tourism industries is the main contributing factor behind travellernot being at ease with sharing their

personal data and information. Moreover, there was significant agreement (69.6%) that hotel service automation technologies require too much personal information, resulting in as (M=2.09±0.915; p<0.001). Overall, the analysis suggests that respondents are concerned about the privacy of their personal information (1st statement). This may likely be linked to the fact that there is a concern that service automation can easily be hacked and personal information wrongly used (4th statement). Hence, the concern of service automation requiring too much personal information was noted (5th statement).

4.6.4 Subtheme 4: Attitudes towards using technology (preference between humans and technology)

While the use of technology has been amplified in the hotel industry, nonetheless, hotel guests may prefer dealing with human employees while some may prefer service automation technologies. This subtheme explores attitudes toward using technology versus humans (employees) by the respondents. Positive statements (strongly agree and agree) were interpreted as agreement while negative statements (disagree and strongly disagree) were interpreted as disagreement. The mean value was used to show the level of agreement and disagreement. Values less than 2.5 is considered as agreement while a value greater than 3.5 disagreements. The neutral value has a range from 2.5 to 3.4. Data is summarized and presented in Table 4. 12 below:

Table 4. 12: Attitudes towards using technology (Preference between humans and technology)

		Preferences between human employees versus service automation technologies (n=422)							
	No	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std	P value
I prefer interacting with human employees at a hotel	1	49.8%	28.2%	18.5%	3.6%	0%	1.76	0.876	0.000
Human employees provide a degree of attention that no technology can provide	2	54.3%	28.2%	14.5%	3.1%	0%	1.66	0.836	0.000
Human employees can provide quality service that no technology can provide	3	44.8%	30.3%	20.1%	4.5%	0.2%	1.85	0.911	0.000
Robots will be faster than human employees	4	31.6%	35.8%	29.9%	10.4%	2.4%	2.36	1.008	0.000
Service automation technologies can malfunction	5	32.9%	36.3%	2.7%	6.6%	1.4%	2.07	0.973	0.000

		Preferences between human employees versus service automation technologies (n=422)							
	No	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std	P value
during service delivery and employees do not									
Hotel automation technology can satisfactorily cater for my needs like human employees	6	17.1%	29.1%	37%	14%	2.8%	2.56	1.020	0.000
Hotel service automation technologies limit unnecessary human employee contact	7	22.7%	44.3%	25.6%	4.7%	2.6%	2.20	0.932	0.000
Robots will be able to understand my level of satisfaction faster than human employees	8	13.3%	20.1%	34.8%	22.5%	9.2%	2.94	1.152	0.000
Service Automation technologies do not have a high risk of infection from COVID-19	9	28.7%	38.2%	21.6%	8.1%	3.6%	2.20	1.053	0.000
Service automation technologies are able to provide information in different languages than human employees	10	30.8%	36%	24.6%	5.7%	2.8%	2.14	1.011	0.000

The above data presented in Table 4. 12 is further summarized and presented in a graphical form in Figure 4.6 below:

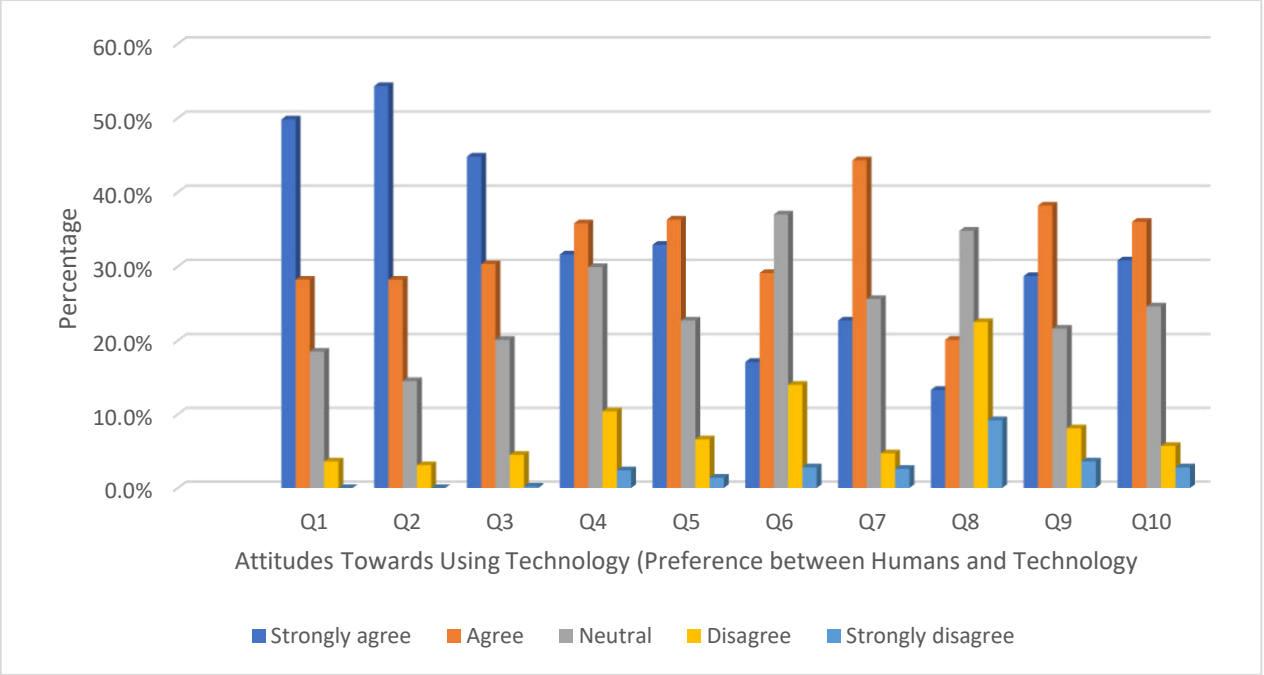

Figure 4. 6: Attitudes Towards Using Technology (Preference between Humans and Technology)

The level of agreement on the statements measuring the preference between human employees versus service automation technologies. In terms of preference for human employees, there was significant agreement (78%) among the respondents that they prefer "interacting with human employees at a hotel", there was significant agreement, with the results yielding as ($M=1.76\pm0.876$; $p<0.001$). Equally, there was significant agreement (82.5%) among the respondents that human employees provide a degree of attention that no technology can provide, resulting in as ($M=1.66\pm0.836$). In terms of the statement, "human employee can provide quality service that no technology can provide", the data indicated that there was significant agreement (75.1%), with the results given as ($M=1.85\pm0.911$). This finding contradicts those of recent studies like that of Ivanov, Webster and Seyyedi (2018: 25) that reported and concluded that there is a growing preference for service robots and other service automation technologies over human employees as they offer them efficient and consistent service. Hotels managers have different views regarding their respective hotel guests' preferences between humans and service automation technologies. Most of the hotel managers were of the view that different hotel guests have different backgrounds and preferences. One hotel manager reported the following:

> *Our guests have different backgrounds and preferences. But seemingly, most travellers have become technologically savvy and they are the ones that would the adoption of service automation technologies compared to the older clientele counterparts who would find these technologies difficult and frustrating and would prefer the human touch element. The most important thing is for us to best cater for these two different clienteles, not all parts of the hotel can be automated - (HM7).*

A few of the other managers indicated that their respective hotel guests, especially leisure guests, would

not appreciate the introduction of service automation technologies. One hotel manager indicated that their guests appreciate being called out by their names:

> *Our leisure guests (especially repeat guests) would not appreciate the introduction of automation technologies because they enjoy the personalized service that we offer them. Robots do not remember guests' names like human employees would and that's what makes them feel welcomed, valued and most importantly, they feel like they are at home away from home - (HM2).*

In support of the above view, Hotel Manager 2 emphasized the need for the spirit of ubuntu during service encounters:

> *Our guests are people and family orientated and they prefer a hotel experience driven by the spirit of ubuntu and human collaboration to make their hotel stay very pleasant. They utterly enjoy the warm smile and welcome gestures from our staff members which robots can provide. They will not be pleased with automation technologies in our hotel - (HM6).*

Additionally, there was significant agreement (66.9%) among the respondents that service automation technologies do not have a high risk of infection from COVID-19, with the results given as ($M=2.20\pm1.053$; $p<0.001$). This is critical and suggests that respondents may prefer service automation technologies to human employees due to the risk of Covid-19 in the latter. A study by Romero and Lado (2021: 4067) found out that Generation Z prefers the use of service robots over interacting with human employees as they believe that the COVID-19 contagion risk is very low with service robots when compared to human employees. The perceived risk of COVID-19 cannot be ignored and continues to play an important role in the consumer decision-making process when purchasing tourism products. As a result, the hospitality and tourism industries have seen an explosion of disruptive technologies such as service robots. It is believed that such technologies have the potential to alleviate consumer concerns as far as COVID-19 is concerned (Qiu *et al.* 2020: 50). Overall, it is sufficient to say that respondents prefer human employees over service automation for service delivery experiences. However, service automation technologies are preferred over human employees based on the risks of COVID-19, the pace of service, and the ability to provide information in different languages.

4.6.5 SUBTHEME 5: ACTUAL USE OF TECHNOLOGIES (PURCHASE INTENTIONS)

Extant literature price is a strong determinant of purchase intentions. This subtheme assesses the respondents on their level of agreement with the statement measuring pricing and purchase intentions in the use of technology in the hotel industry. Positive statements (strongly agree and agree) were interpreted as agreement while negative statements (disagree and strongly disagree) were interpreted as disagreement. The mean value was used to show the level of agreement and disagreement. Values less

than 2.5 is considered as agreement while a value greater than 3.5 disagreements. The neutral value has a range from 2.5 to 3.4. Data is presented and summarized in Table 4. 13 below:

Table 4. 13: Actual Use of Technologies (Purchase Intentions)

	No	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean	Std	P value
I would pay a higher premium for a service automated hotel	1	17.1%	21.6%	34.1%	20.4%	6.9%	2.78	1.158	0.000
Service automation technologies are just a method for guests to pay higher prices	2	23%	30.8%	33.2%	10.9%	2.1%	2.38	1.022	0.000
I have no intentions of paying higher premiums for service automation technologies in hotels.	3	37.2%	33.2%	22.3%	5.9%	1.4%	2.01	0.981	0.000
Price does not matter as long as I receive excellent hotel service	4	20.6%	23.5%	31.8%	15.9%	8.3%	2.68	1.204	0.000
Hotels should charge lower prices if they use service automation technologies because of reduced operational costs	5	38.6%	32.2%	21.3%	5.9%	1.9%	2.00	1.005	0.000
I always compare prices for different hotels before I book and service automation technologies are not important	6	43.4%	32.7%	19.2%	4.3%	0.5%	1.86	0.906	0.000

The above data is further summarized and presented in a graphical form in Figure 4. 7 below:

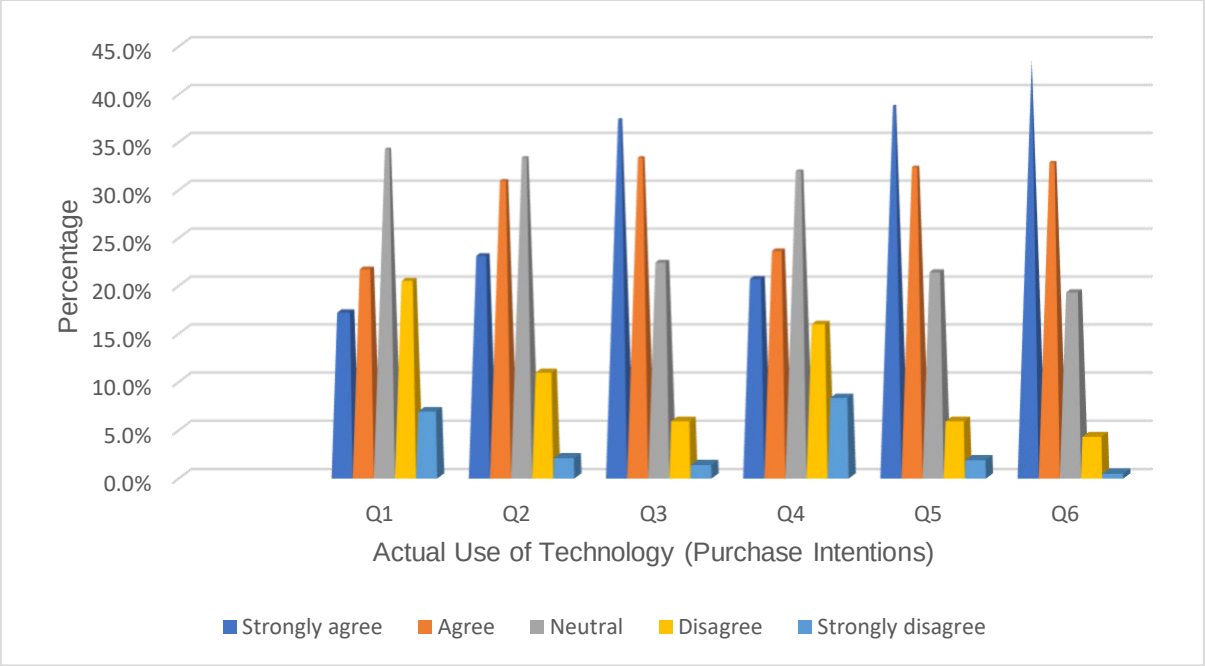

Figure 4. 7: Actual Use of Technology (Purchase Intentions)

The mean value measured for the statement, I would pay a higher premium for a service automated hotel was closest to neutral, which suggests that a significant number (34.1%) of the respondents neither agreed nor disagreed with the statements; the results given as (M=2.78±1.158; p<0.001). This may be attributed to the concern that service automation technologies are just a method for guests to pay higher prices as more than half (53.8%) of the respondents believed so (strongly agree=23%; agree=30.8%, with the mean value given as (M=2.38±1.022). Moreover, there was significant agreement (strongly agree=37.2%; agree=33.2%) that respondents (70.4%) have no intentions of paying higher premiums for service automation technologies in hotels, with the results given as (2.01±0.981; p<0.001). This finding contradicts those by Erdem, Atadil and Nasoz (2019: 290) and Cunningham *et al.* (2019: 422) as the authors contend that travellers are willing to pay more for in-room technologies and food delivered by drones over those delivered by humans. Similarly, Kim *et al.* (2021a: 704) conducted a study on 145 US travellers and the findings suggested that the travellers had a high preference for higher price options in hotels which was influenced by the threat of COVID-19. A significant number of the respondents (70.8%) were in agreement (strongly agree=38.6%; agree=32.2%) that hotels should charge lower prices if they use service automation technologies because of reduced operational costs, with the results given as (M=2.00±1.005; p<0.001). These findings are in line with those by Ivanov, Seyitoğlu and Markova (2020: 517) that advise that most hotels adopt the use of robots as an innovative measure to achieve lower operational costs with consumers yearning that they also benefit from such cost reduction measures through discounted prices. Overall, the analysis indicates that respondents are price sensitive and do not

consider service automation as a criterion when making a hotel booking (6th statement). Hence, they will not pay the premium price due to service automation (3rd statement). Since they believe that prices should be lower due to reduced operational costs (5th statement).

4.7 SOCIO-DEMOGRAPHIC CHARACTERISTICS AND PERCEIVED ATTITUDES TOWARDS THE USE OF TECHNOLOGY

The mean and standard deviation of respondents' socio-demographic characteristics (gender, age group, education) and the perceived attitude towards the use of technology in hotels are given in Table 4.14. The data indicated that there is no significant difference among the respondents in terms of gender and perceived attitude towards the use of technology in hotels (P>0.05).

Table 4. 14: ANOVA Test of socio-demographics and the perceived attitude towards the use of technology

		N (422)	Mean	Std. Deviation	P value
Gender	Male	186	2.0591	.73410	0.758*
	Female	236	2.0793	.60626	
Age group	18-20	49	2.1195	.57020	0.000***
	21-30	167	2.0274	.55725	
	31- 40	138	2.1263	.61392	
	41-50	47	1.7052	.85735	
	51-60	21	2.7483	.91463	
Education	Completed high school	66	2.1494	.52530	0.021**
	Higher certificate/diploma	79	2.0000	.58724	
	Undergraduate Degree	79	2.2550	.79232	
	Postgraduate Degree	176	2.0065	.68517	
	Other	15	1.8286	.40116	
P* >5% P** <5% P*** <1%					

Regarding the age group and respondents' perceived attitudes towards the use of technology, the data obtained indicate that there was a statistically significant difference (p<0.001). The analysis indicated

that the respondents within 41-50 years had the lowest mean value (M=1.71±0.9) while the highest value was found for the respondents within 51-60 years of age (M=2.75±0.9). This suggests that older respondents (51-60 years) perceived attitudes toward the use of technology in hotels were less favourable when compared to other age groups. Similarly, Vitezić and Perić (2021: 932) state that Generation Z members are born into a digital world, are exposed to various types of technologies and often have a positive attitude towards adopting technology when compared to their older generation counterparts.

For the respondent's highest level of education, the data indicated that there was a statistically significant difference with respect to their perceived attitudes towards the use of technology (P=0.021). The analysis of the mean value indicates that respondents with a high level of education (M=1.83±0.4) had a more favourable attitude towards the use of technology in hotels when compared to other groups. Tavitiyaman, Zhang and Tsang (2020) state that highly educated travelers are often most familiar with advanced technological applications and devices. They further explain that education levels interrelate with the adoption of technology. To reiterate this notion, findings by Bilgihan *et al.* (2016), revealed that travelers with higher education levels better understand the concepts of AI, robotics and service automation technologies in the hospitality sector thus influencing the behavioral intention of the hotel guests. Overall, the results suggest that the respondents in their youth have a more positive attitude towards service automation technologies when compared to older respondents. More so, respondents with higher levels of education have a favorable attitude towards service automation technologies when compared with those with low levels of education. The next theme will present and analyze data on the role of service automation technologies in achieving guest hygiene and cleanliness.

4.8 THEME 3: THE ROLE OF SERVICE AUTOMATION TECHNOLOGIES IN ACHIEVING GUEST HYGIENE AND CLEANLINESS

This theme was derived from research objective three, which is to analyse the role of service automation technologies in achieving guest hygiene and cleanliness in hotels operating in Durban. This theme sought to answer the research question " what is the role of service automation technologies in achieving guest hygiene and cleanliness in hotels in Durban. To adequately answer this research question, the following subthemes were developed: Innovative measures introduced for enhancing hygiene and cleanliness in hotels in Durban and the effectiveness of adopted hygiene and cleanliness measures in hotels. According to Pizam and Tasci (2019: 27), hygiene and cleanliness in hotels is one of the key determinants of hotel-centric customer behavior which involves customer satisfaction levels, perceived quality of the hotel product and service and intentions for a repeat visit. It became prudent to know how important the interviewed managers considered hygiene and cleanliness in the hotel. It was uncovered that managers

rated this from important to extremely important. Three hotel managers stated that it was very important, eleven hotel managers indicated that it was extremely important. Hotel Manager 9 alluded that the COVID-19 pandemic strengthened their hotel's cleaning protocols:

> *It is extremely important even way before the pandemic. The pandemic just made us strengthen our hygiene cleanliness protocols - (HM9).*

In support of the above statement by Hotel Manager 9, quantitative data presented in Table 4. 4 of this section presented that a total of 80.8% of the respondents indicated that hygiene and cleanliness are a very important attributes when choosing a hotel. In addition, a total of 77.5% of the respondents also rated the health and safety hotel attributes as extremely important. The research findings are in line with Maslow's hierarchy of needs theory. The second category of human needs which (Maslow 1943) defines as an individual seeking security and safety from danger, illness, criminal activities and catastrophic events such as the COVID-19 pandemic. This is against such a backdrop that the managers were asked to indicate which innovative cleaning protocols did their respective hotels introduce to enhance hygiene and cleanliness.

4.8.1 SUBTHEME 1: INNOVATIVE MEASURES FOR ENHANCING HYGIENE AND CLEANLINESS IN HOTELS

Hotel managers were asked to indicate the innovative measures in place to ensure the highest standards of hygiene and cleanliness. It was uncovered that numerous hygiene and cleanliness techniques such as screen barriers, deep cleaning, fogging, use of masks and washing of linens, were carried out to ensure the highest standards of hygiene and cleanliness. Hotel Manager 1 reported that they have adopted the use of WHO approved cleaning detergents:

> *We have screen barriers, deep cleaning of the hotel building daily, especially in high touch areas, automatic hand sanitizers all around the hotel, staff members are provided with their personal hand sanitizers, staff do not re-use their PPE, each room is fogged and sanitized each day, public areas are sanitized each day at 11.00, During conference breaks- the conference room gets sanitized again, guests are screened upon arrival and we use WHO recognized and recommended detergents and disinfectants to ensure high standards of health and safety (HM1).*

Hotel Manager 2 indicated that the hotel had introduced the use of electrostatic spraying technology:

> *Electrostatic sprays, the use of screen barriers, cleanliness champion that conducts staff training on hygiene, physical distancing stickers around the hotel, sanitizers in guestrooms, lifts and high touch areas around the hotel, guests are provided with disinfecting wipes, deep cleaning and disinfecting of all our furniture in high touch places frequently - (HM2).*

From the interviews with the hotel managers, it was noted that the most common measures of hygiene and cleanliness protocols amongst the hotel properties included sanitizing stations around the property, the use of screen barriers, physical distancing stickers and protocols, and regular sanitizing of highly touched surfaces and areas of the hotel. According to Rahimizhian and Irani (2020: 293), regulations

such as wearing of masks, hand-sanitizing protocols and social distancing practices are part of the new norm along with touchless contactless technologies which involve hotels and restaurants replacing traditional menus with digital ones, contactless payments and transactions and mobile room keys amongst others are the new normal for the tourism and hospitality industries. The findings of the study are in support of hygiene and cleaning, and health and safety protocols. It should be noted that there is an absence of the introduction of technology for ensuring advanced standards of hygiene and cleanliness, with the exception of Hotel Manager 2, who mentioned the introduction of electrostatic spraying technology.

4.8.2 SUBTHEME 2: EFFECTIVENESS OF ADOPTED HYGIENE AND CLEANLINESS MEASURES IN HOTELS

Hotel guests were required to indicate their level of agreement regarding the effectiveness of hygiene and cleanliness measures delivered by human beings and technological systems in hotels. Positive statements (strongly agree and agree) were interpreted as agreement while negative statements (disagree and strongly disagree) were interpreted as disagreement. The mean value was used to show the level of agreement and disagreement. Values less than 2.5 are considered as agreement while a value greater than 3.5 disagreements. The neutral value has a range from 2.5 to 3.4. Data is summarized and presented in Table 4. 15 below:

Table 4. 15: The effectiveness of technology versus human-delivered cleaning measures

	No	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std	P value
I believe that hygiene and cleanliness information offered by technological systems is clear, sincere, and reliable	1	38.6%	29.4%	23.5%	6.9%	1.7%	2.04	1.023	0.000
I think that hotel technological systems will carry out sanitizing activities more effectively than human employees	2	27.3%	30.8%	26.8%	10.7%	4.5%	2.34	1.121	0.000
I think that technological systems have a better understanding of the importance of hygiene and cleanliness than human employees	3	22.5%	22%	29.4%	16.8%	9.2%	2.68	1.250	0.000
I think that hotel technology systems can better maintain high standards of hygiene than human employees	4	20.9%	28.2%	29.6%	13.7%	7.6%	2.59	1.180	0.000
I think the use of cleaning robots will carry out effective sanitization practices in hotel rooms than housekeeping teams	5	21.3%	25.1%	32%	13.7%	7.8%	2.62	1.188	0.000

The data presented in Table 4.15 is further summarized and presented in a graphical form in Figure 4.8 below:

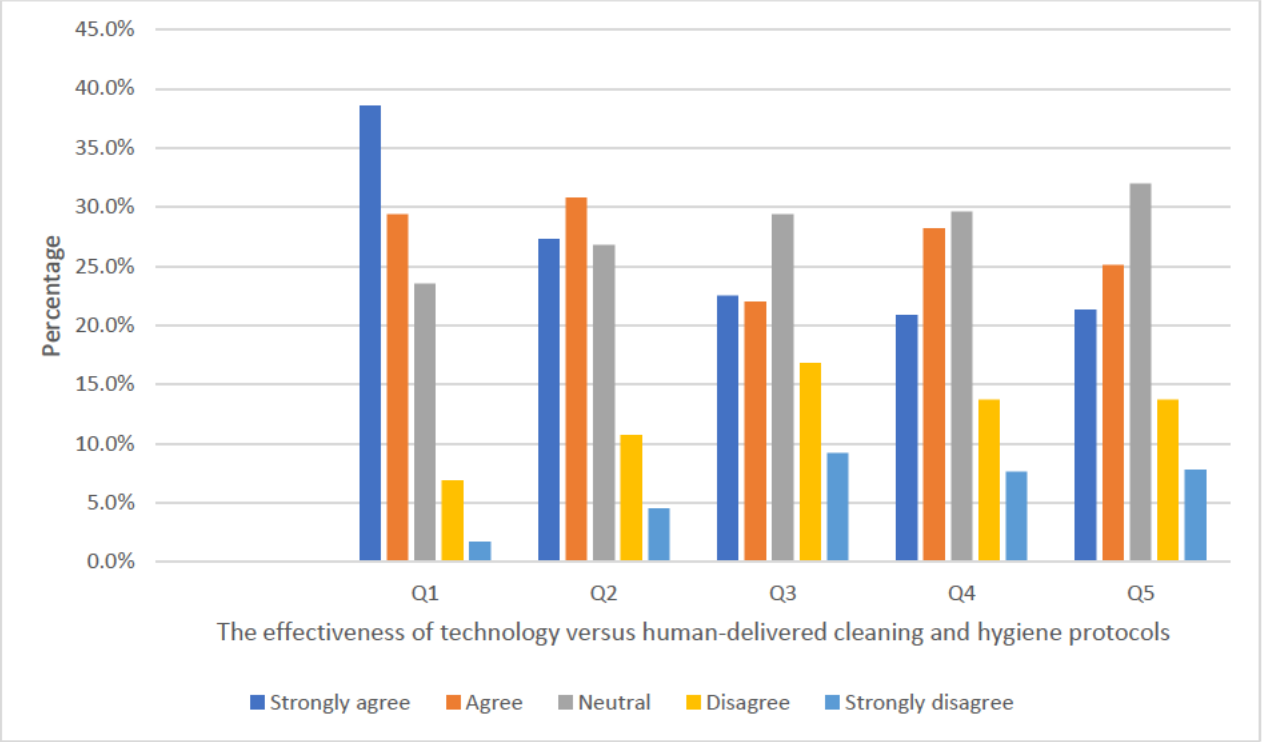

Figure 4. 8: The Effectiveness of Technology versus Human-delivered cleaning and hygiene measures

The data in Table 4. 15 summarizes the level of agreement on the importance of technological systems to enhance hygiene and cleanliness in the hotel. In terms of the statement, I believe that hygiene and cleanliness information offered by technological systems is clear, sincere, and reliable, there was significant agreement (strongly agree=38.6%; agree=29.4%) among the respondents (68%), with the result given as ($M=2.04\pm1.023$; $p<0.001$). Respondents (58.1%) were also agreement (strongly agree=27.3%; agree=30.8%) that hotel technological systems will carry out sanitizing activities more effectively than human employees, with the mean value given as ($M=2.34\pm1.121$; $p<0.001$). This is in line with findings of a study by Shin and Kang (2020), which included 63 female participants and 65% of them pointed out that they believed that cleaning robots ensure higher standards of cleaning and hygiene than human housekeeping teams. Similarly, Jiang and Wen (2020: 2567) state that modern cleaning robots are equipped with advanced technologies that detect dust in hotel areas that housekeeping teams team cannot detect with their naked eyes. Hotel managers had their own views too.

It was critical to know the effectiveness of the hotels' current hygiene and cleanliness practices. The following question was used to initiate a response "How effective are your hotel's current hygiene and cleanliness practices? Do you think they are more effective than the use of use and vice-versa?". From the interviews, most of the hotel managers indicated that the current (human-serviced) are more effective

when compared to robots. The reasons uncovered as to why human-serviced cleaning is better than robotic staff differed from hotel manager to hotel manager. Five of the hotel managers (1, 6, 7, 2 and 12) believed that humans understand the importance of cleaning. As such, human-serviced cleaning will do a better job than robots since they clean with passion. Hotel Manager 12 alluded that technology will do a great cleaning job compared to housekeeping teams:

> *They are effective because our housekeeping has daily briefings on the importance of maintaining high hygiene standards and they are very committed to their job and ensuring that our guests sleep in diligently clean rooms. The use of technology can only enhance our protocols but would not do a great job like our housekeeping teams (HM12)*

In line with the above statement by Hotel Manager 12, Hotel Manager 7 laments that cleaning robots are programmed to carry out repetitive tasks:

> *They are more effective as human beings [in] understanding the importance of hygiene and cleanliness and what it means for our guests more than a cleaning robot that is programmed to carry out repetitive duties (HM7).*

Qualitative results refute the views of hotel managers. Hotel guests appeared to be more in favour of technology cleaning systems over human housekeeping teams. From the data presented in Table 4. 11, it was noted that a total of 58.1% of the respondents were also agreement (strongly agree=27.3%; agree=30.8%) that hotel technological systems will carry out sanitizing activities more effectively than human employees, with the mean value given as ($M=2.34\pm1.121$; $p<0.001$). Nonetheless, the mean value measured suggests that a significant number of the respondents (29.4%) neither agreed nor disagreed (neutral) that technological systems have a better understanding of the importance of hygiene and cleanliness than human employees, with the mean value given as ($M=2.68\pm1.250$; $p<0.001$). Park *et al.* (2019: 2941) emphasise that hotel surfaces are frequently cleaned by housekeeping teams are usually the main sources of transmission of diseases and germs in and around a hotel facility. Similarly, A study published in Food and Environmental Virology planted a sample virus in a hotel room and after careful observations, it was concluded that the hotel cleaning staff spread the same sample virus to nearby three hotel rooms (Sassi *et al.* 2018)

Four of the hotel managers (3, 2, 8 and 10) believed that human-delivered cleaning and hygiene protocols are far superior to the use of robots. According to some of the arguments put forward, robots cannot access difficult areas like the human-serviced staff. In contrast, similar neutral positions were measured as respondents (29.6%) neither agreed nor disagreed that hotel technology systems can better maintain high standards of hygiene than human employees, with the mean value given as ($M=2.59\pm1.180$; $p<0.001$). Respondents were also neutral (32%) in their thoughts that the use of cleaning robots will carry out more effective sanitization practices in hotel rooms than housekeeping teams, with the mean value

given as (M=2.62±1.188; p<0.001).

However, Jiang and Wen (2020: 2567) states that modern cleaning robots that are equipped with advanced technologies detect dust in hotel areas that housekeeping teams cannot detect with their naked eyes. Despite the number of managers who preferred and believed human-serviced staff is much more effective than automation technologies, two of the managers (13 and 9) were of the view that service automation is preferable to human-serviced staff. The hotel manager reported that human beings become complacent over time:

> *They are, however, human beings [who] become complacent over time and some, they clean thoroughly and some days they do not. The use of technology will be much more effective as cleaning robots will reach areas of the hotel those human employees cannot reach and clean thoroughly - (HM13).*

Similarly, Hotel Manager 9 laments the above statement by stating that human housekeeping teams get easily exhausted from the enhanced cleaning protocols:

> *They are effective, but our housekeeping teams do get exhausted from the enhanced cleaning protocols due to the pandemic. In my opinion, a service cleaning robot would be much more effective than humans especially in high touch areas because sometimes human management is difficult as they constantly require supervision, which can be very tiring - (HM9).*

From the above analysis, it was noted that respondents believed in the clarity and reliability of the hygiene and cleanliness information offered by the technological systems (1st statement) as well as the technological system will be more effective in sanitization than humans (2nd statement), they were, however, neutral in the thought that technological systems have a better understanding of the importance of hygiene and cleanliness than human employees (3rd statement). In contrast, hotel managers believed that human housekeeping teams deliver high standards of hygiene and cleanliness compared to technological cleaning systems such as robots. The next theme will explore the barriers that impede the ability of hotels in the city of Durban to adopt service automation technologies.

4.9 BARRIERS THAT AFFECT THE IMPLEMENTATION OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS OPERATING IN THE CITY OF DURBAN.

This theme was derived from research objective 4 and sought to identify and examine the barriers that affect the implementation of service automation technologies in hotels operating in the city of Durban. A leading research question was " what are the barriers that affect the implementation of service automation technologies in hotels operating in the city of Durban?". The challenges identified were presented in subthemes as follows: financial challenges, guest resistance, employee resistance, lack of government support and lack of infrastructure and IT knowledge. These subthemes are presented and analysed in detail below.

4.9.1 SUBTHEME 1: FINANCIAL CHALLENGES

From the literature review, several barriers that impede on the adoption of service automation technologies in hotels were uncovered, and these included privacy and security concerns, employee resistance, financial cost challenges, guests' reluctance to use technologies, and interoperability concern. Given the aforementioned barriers, the hotel manager was asked, "What barriers is your hotel facing about introducing service automation technologies?" From the interviews, many of the managers revealed that their hotels faced several barriers mainly financial costs, lack of infrastructure and IT knowledge, and lack of government support for the industry. A previous study by Ivanov, Webster and Berezina (2017: 1510) identified financial cost challenges as the key concern associated with the adoption of service automation technologies and robots in hotels. A more recent study by Osei, Ragavan and Mensah (2020: 489) revealed financial costs to be a major challenge that significantly confronts both the hospitality and tourism firms. Consistent with the aforementioned studies, six (6) of the managers revealed that financial costs are the biggest barrier to the use of service automation technologies. Hotel Manager 6 indicated that the outbreak of the pandemic affected the hotel's revenue:

> *Lack of budget and financial capacity. Covid 19 has impacted our revenue baseline, therefore we do not have sufficient financial resources to invest in technology - (HM10).*

In line with the statement by Hotel Manager 10, who explained that the pandemic affected the revenue, two more hotel managers also related the impact of the pandemic to their respective hotel's financial strengths: The manager reported the following:

> *Lack of financial resources is the main barrier because due to the pandemic the hotel is cash strapped - (M12).*

The above finding can be corroborated by Ivanov, Webster and Berezina (2017: 1507) who stated that the acquisition, installation and maintenance of innovative service automation technologies, especially artificial intelligence-driven robots, tend to be very expensive and result in huge financial cost burdens that eventually impact on the profitability of a hotel. It was noted that the hotels in the city of Durban are facing financial challenges due to the pandemic.

4.9.2 SUBTHEME 2: GUEST RESISTANCE

Guest resistance was identified as the second impediment to the adoption of service automation technologies by hotels in the city of Durban. The manager (HM3) accentuated that their leisure guests will be frustrated by the use of service automation and will ultimately resist their use:

> *The domestic leisure travel segment is what is currently keeping the hotel afloat, and they are not accustomed to IT and related technologies for historical reasons so it would frustrate them - (HM3).*

The above finding is in line with the literature. Ivanov, Webster and Seyyedi (2018:309) note that guests' resistance to service automation constitutes a barrier. To reiterate, Chan, Okumus and Chan (2020: 7) lament that customer experience, perceptions and expectations act as a barrier for a hotel to adopt technologies. It can thus be highlighted that guests' preferences need to be considered before adopting technology.

4.9.3 SUBTHEME 3: EMPLOYEE RESISTANCE

Employee resistance to service automation technologies has been reported as a barrier in the literature. Two of the managers (5 and 7) interviewed were resistant to the use of service automation. Besides the cost of its use, Manager 7, for example, stressed that using such technology will lead to loss of employment.

> *South Africa is constantly facing load shedding challenges and having technology will halt operations even more and most importantly, loss of employment is the biggest challenge since our staff rely on our hotel for employment to support their families, we cannot have them displaced and replaced by robots - (HM7).*

> *We are also downsized therefore robots cannot be put on a rotational work schedule since they are programmed, they will be of no help to us - (HM5).*

The above finding suggests that managers are protective of their jobs and those of their staff. This can be corroborated by Belanche *et al.* (2020b) who said a trend of negative perceptions by hotel employees towards the introduction of robots and service automation technologies is because they strongly believed that their jobs were being displaced by such innovative technologies

4.9.4 SUBTHEME 4: LACK OF GOVERNMENT SUPPORT

Another barrier faced by some of the hotels in Durban in terms of adopting service automation technologies uncovered in this study is the lack of government support. Two of the managers (6 and 12) stated the following:

> *Lack of government support remains a challenge. We are barely trying to survive and pay staff salaries (HM6).*

> *Lack of government support and grants is the barrier - (HM12).*

Chan, Okumus and Chan (2018: 838) point out the lack of government support as a barrier to technology adoption. The authors reiterate that as far as the government support is absent, the adoption of service automation technologies by hotels may involve lengthy and complicated administration processes such as municipal permits for the approval of changes in spaces within and around the hotel and for the

addition of new technological facilities, which may influence a hotel's decision to adopt service automation technologies. The findings of the study are in line with the literature that supported government's lack of support for tourism.

4.9.5 SUBTHEME 5: LACK OF INFRASTRUCTURE AND IT KNOWLEDGE

Nam *et al.* (2020: 11) emphasize that hotels are faced with often old and outdated IT-related existing software and infrastructure. Consistent with this, from the interviews it emerged that the lack of adequate infrastructure poses a barrier to service automation:

> *Secondly, lack of adequate infrastructure as the hotel was not developed - (HM6).*

> *Lack of infrastructure as the hotel building was not designed with automation technologies in mind - (HM13).*

Furthermore, it was uncovered that a lack of IT skills is also a barrier to service automation in the hotel.

> *Lack of skills to operate and maintain service automation technologies prohibits its adoption (HM5).*

> *Lack of skilled personnel to maintain the automated systems (HM13).*

> *Lastly, lack of exposure to technology and its benefits also makes us reluctant to adopt service automation technologies (HM3).*

The 4IR is complex and requires a highly skilled workforce for adoption. However, South Africa is still struggling to produce such skills. This is reiterated by Statistics South Africa (2018) that about 30% of workers in South Africa are unskilled, while about 46% are semi-skilled and skilled workers only constitute of 24%. A significant number of unskilled and semi-skilled workers come from historically disadvantaged families (Statistics South Africa 2018). It can be noted that South Africa's tourism industry is characterized by unskilled workers. While the majority of the managers interviewed pointed out barriers that limit the use of service automation technologies in South African hotels, two of the managers, however, believed there are barriers on their part but not adopting service automation technologies is a matter of choice:

> *We are facing no barriers. It is a matter of our choice not to adopt service automation technologies (HM1).*

> *We did not introduce them because we chose not to (HM8).*

This theme aimed at achieving objective 3, which was to examine the barriers that affect the implementation of service automation technologies in hotels operating in the city of Durban. From the

above discussion and interviews with various hotel managers who participated in the study, it can be concluded that the most common barrier impeding the hotels in the city of Durban to adopt service automation technologies can be largely associated with a lack of financial resources.

4.10 CONCLUSION

This chapter followed a thematic approach in the presentation of the primary study results. Since a mixed method was adopted for this research project; this chapter started by presenting quantitative results followed by qualitative results. Interesting arguments from the hotel managers have come up in terms of the adoption of service automation technologies in hotels in Durban and the need to maintain the livelihoods of the frontline service employees, without having them displaced by robotics among other service automation technologies. The next chapter, Chapter 5 will discuss in detail the study results which are presented in the context of the city of Durban in a quest to respond to the study objectives and answer the research questions raised in Chapter 1. A thematic approach will still be followed in the discussion of the study results.

CHAPTER FIVE

DISCUSSION OF RESULTS AND FINDINGS

5.1 INTRODUCTION

The previous chapter presented and analysed data in both qualitative and quantitative forms which was collected through an online survey questionnaire and a series of structured interviews. For this study, eleven hotels (ten were 4-star graded and one was 5-star graded) and 422 respondents participated in the study. Data was presented in the previous chapter in a form of descriptive statistics using graphs and cross-tabulations. Therefore, this chapter will follow a thematic approach for the discussion of results in relation to the study objectives and research questions. The research questions that were proposed are:

I. How COVID-19 accelerated service automation technologies and what impacts will such technologies have on the tourism industry in Durban?
II. What are the attitudes of hotel guests in Durban towards the use of service automation technologies in hotels?
III. What is the role of service automation technologies in achieving guest hygiene and cleanliness in hotels in Durban?
IV. What are the barriers that affect the implementation of service automation technologies in hotels operating in Durban?

In addition to the above research questions, the discussion of study results will take place under four main themes along with subthemes for each theme in an attempt to achieve the research objectives and answer the research questions. The four main themes are as follows:

I. **Theme 1:** COVID-19 as a driver of service automation technologies in hotels and the impacts of such technologies on the tourism industry in Durban.
II. **Theme 2:** The attitudes of hotel guests in Durban towards the use of service automation technologies in hotels**.**
III. **Theme 3:** The role of service automation technologies in achieving guest hygiene and cleanliness in hotels operating in Durban.
IV. **Theme 4:** The barriers that affect the implementation of service automation technologies in hotels operating in the city of Durban.
V.

5.2 THEME 1: COVID-19 AS A DRIVER OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS AND THE IMPACTS OF SUCH TECHNOLOGIES ON THE TOURISM INDUSTRY IN DURBAN.

This theme sought to unpack in detail the extent of influence of the COVID-19 pandemic outbreak on the adoption of service automation technologies in hotels, with particular reference to the 11 hotels operating in the city of Durban. The general hotel managers were asked if they believed that COVID-19 drove the adoption service automation technologies in hotels. Literature proved that a crisis such as COVID-19 can bring forth technological innovations and developments. From the structured interviews conducted, hotel managers reported mixed emotions and views regarding COVID-19 as a driver of service automation in hotels in Durban. Hotel Manager 2 believed that the pandemic promoted innovation:

> *"It is true that the pandemic has forced hotels to be innovative in order to continue attracting guests" - (HM2).*

In contrast, the majority of the respondents showed a high level of agreement that the COVID-19 pandemic had accelerated technological innovation in hotels. The respondents, however, appeared to be unsure if the adoption of the robots was of the result of the COVID-19 pandemic which also included cashless and contactless payments (1st statement) and the use of health and travelling apps (2nd statement). Zeng, Chen and Lew (2020: 725) state that due to the COVID-19 pandemic, various forms of technology have emerged which accelerated innovation in hotels. The authors further emphasize that the various technologies that are currently in use to manage the pandemic, will significantly continue to play an important role post-pandemic within the tourism and hospitality sectors. Similarly, scholars such as Zeng, Chen and Lew (2020: 726) reiterate that it is anticipated that individuals (hotel guests) and organizations (hotels) needs and adoption of contactless services driven by technology are on the rise due to the pandemic and will continue to increase in the aftermath. However, the rapid advancements in technology have sparked debate amongst scholars over the trend from high-touch (human-driven) to high-tech (technology-driven) services within the tourism and hospitality industries (Liu and Hung 2021: 9). Hotel managers operating in the city of Durban presented further mixed emotions and opinions regarding COVID-19 as a driver of automation in their hotels and the tourism sector in general in Durban. They have stated that despite the fact that the hotel industry is embracing technology, South Africa along with the hotels in Durban is still lagging in its adoption. The lack of skills were cited as one of the reasons that

contributed to the hotels in the city of Durban lagging in the adoption of service automation technologies. Manager 5 cited that skills are not easily available and stated the following:

> *"COVID-19 contributed [to] technological innovation in hotels. However, one must remember that this is Africa, and we are in South Africa, therefore skills for such technologies are easily available" - (HM5).*

In addition to the lack of skills in South Africa, the lack of capital and type of hotel ownership also emerged as a moderator in COVID-19 being noted as a driver of service automation technologies in hotels. Hotel Manager 7 cited that the adoption of service automation technologies depends on capital and hotel ownership. The Hotel Manager 7 stated the following:

> *"COVID-19 pandemic indeed is driving service automation in hotels, but its adoption all depends on the type of hotel ownership and the availability of capital to invest in technology" –(HM7).*

In support of the above views presented by the hotel managers 5 and 7, Hotel Manager 8 further clarified that service automation technologies work well for international and chain hotels. He further attributed this to the financial strength and prowess of chain hotels:

> *"COVID-19 has significantly driven service automation in hotels. However, automation works well for international brands and chain hotels, as they have the financial capacity to invest in such technologies" –(HM8).*

Similarly, based on the profiles of the hotels included in this study and operating in the city of Durban, it was noted that 28% of the hotels are family-owned, while 36% of the hotels are independently owned and lastly, 36% of the hotels belong to a chain hotel brand. According to Ivanov and Webster (2017), as much as service automation technologies provide hotels with various benefits they also come with a hefty price tag and other related costs that cannot be ignored. The authors further reiterate that service automation technology adoption includes costs such as acquisition costs (purchasing a type of technology/paying for its development so that it fits with the hotel values), installation costs (labour for installing the type of technology), and maintenance costs (general upkeep of technology including electricity consumption) are just amongst the costs that are involved with the adoption of service automation technologies. Given the fact that 28% of the hotels from Durban included in this study are family-owned, it can be said that they are less likely to have the financial prowess to adopt automation technologies based on the financial implications that the hotels will incur. Similarly, Kallmuenzer (2018: 4) highlights that often family-run and owned hospitality firms cannot innovate due to the lack of financial resources as their aim remains to achieve business performance that highly satisfies all the family members involved and the regional society's needs in which they operate at the same time. Hotel

Manager 3 presented a different view and is not in agreement with the statement that COVID-19 had accelerated automation in hotels. The manager stated the following:

> *"No, I do not think this is true. The use of service automation technologies all depends on the hotel's clientele and what they want (35-55years) still prefer the personal human touch and only certain areas in the hotel can be automated, therefore technological innovation is not a concern for our hotel" - (HM3).*

In support of the above statement, Manager 9 believes that the tourism industry was heading towards technology despite the outbreak of the pandemic. The manager stated the following:

> *"I believe that we were heading there regardless of the COVID-19 pandemic, it just accelerated the adoption of service automation technologies. It was just a matter of time, so it is partly true that COVID-19 accelerated technology adoption in hotels It is a concern so that our hotel product continues to remain competitive and that meet international hotel and tourism standards" – (HM9).*

Similarly, quantitative results presented that a total of 35.8% of the respondents (hotel guests from Durban) appeared to be unsure whether the adoption of robotics was due to the COVID-19 pandemic. Wirtz *et al.* (2018: 908) argue that as much as previous research has extensively directed efforts towards the adoption of technology in hotels and services, the authors suggest that the current body of academic literature regarding the use of robots in service encounters and hotel experiences is still in its infancy stage and requires more attention and research efforts.

In light of the above discussion, it can be concluded that different hotel managers present different arguments regarding COVID-19 being given the spotlight by academic literature as a driver of technological innovation and automation hotels. It is important to note that the 11 hotels that are included as part of this study possess different operational dynamics and characteristics from hotel size, facilities and services that they offer. It is then not surprising when the 11 hotel managers present different views on COVID-19 as an accelerator of automation in hotels. Overall, the majority of the managers believe that COVID-19 is indeed an accelerator of automation in hotels. Figure 5.1 depicts the subthemes that emerge from the theme discussed above.

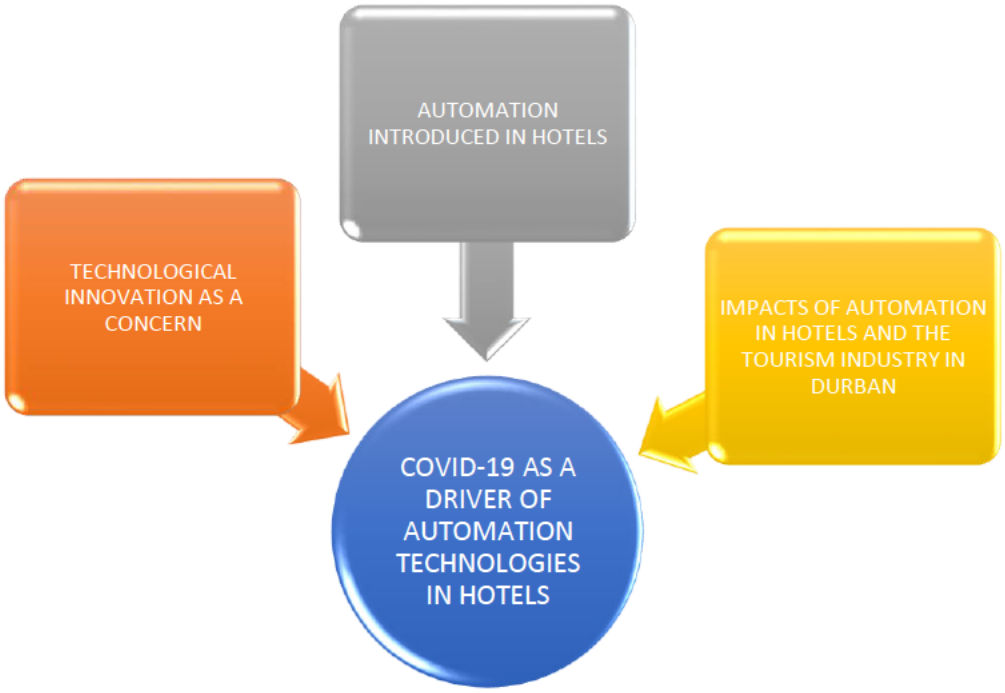

Figure 5. 1: Visualization of subthemes emerging from theme 1
Source: Researcher's own impression.

5.2.1 Subtheme 1.1: Technological Innovation as a necessity in hotels in Durban

The outbreak of the COVID-19 pandemic, without any reasonable doubt, proved the vulnerability of both the tourism and hospitality industries (Morrone *et al.* 2021: 3). However, the authors advise that despite the negative impacts of the pandemic on hotels, on the flip side of things, there is an opportunity for hotel infrastructure digitization. With this said, the managers were asked if technological innovation is a concern for their respective hotels. The hotel managers presented different views, with the managers maintaining that technological innovation is an unnecessary expenditure, while others argued that it is only possible in developed countries and not in hotels currently operating in the city of Durban. Hotel manager 13 expressed the view that technological innovation is a concern for their hotel as it could help attract more international travelers to their city of Durban, especially their hotel. The manager stated the following:

> *"Technological innovation is definitely a concern for us so that we can attract more international travelers and become competitive, however, it will all depend on the hotel's ability to afford such technologies." (HM13).*

Similarly, Morrone *et al.* (2021: 3) state that a as possible solution to overcome the COVID-19 tourism crisis, hotels need to consider digitization and take it more seriously as hotels will be in a position to

attract more international travelers who are already exposed to advanced technologies in their home countries. Durban is the largest city and tourism hub of KZN, and its international source markets include UK, Spain, Germany, the USA and the Netherlands (TKZN 2019: 132). Tourists from these countries are accustomed to technology and world-class tourism services, therefore, they will still have the same expectations when visiting Durban. From the above narrative by Hotel Manager 13, one could easily deduce that financial worries from the impact of Covid-19 are the hotels' main concern as well as an impediment to technological innovation. this view is supported by Hotel Manager 5, who accentuates that technological innovation is not a concern for the hotel due to the capital requirements:

> *Technology innovation is not a concern for our hotel due to the capital it requires, and they might be [more] expensive than human employees in terms of their maintenance. Human employees remain a crucial part of the hospitality and tourism industry and we cannot trade it for automation technologies." - (HM5).*

While technological innovation has become an obligation for the tourism and hospitality industry in the age of Covid-19 (Ivanov *et al.* (2020b: 16), six of the hotel managers interviewed, however, did not consider technological innovation in the hotel a priority. According to Manager 2, the hotel industry in the South is still lagging in terms of technology use. Manager 2 further noted that the main goal of the hotel is to survive the pandemic.

> *"It is very, however, being a hotel property which that operates in South Africa technology is still considered a luxury and the hotel sector in South Africa is still lagging in terms of technology use, therefore COVID-19 only made things worse as technology is still not a priority for our hotel sector. At this point and time, it remains not a concern because our main concern is to survive and keep our doors open and be afloat." - (M2).*

Hotel Manager 1's view on technological innovation in hotels in South Africa is that it is an unnecessary expenditure. He emphasized that the hotel industry, particularly in Durban, is still fighting to survive and maintain the local market share. Hence, the cost of using technological innovation might have provoked the sentiment that only international chain brands could afford service automation technologies.

> *"At this point and time, hotels in Durban, including my hotel are fighting for survival and maintaining their market share and only international chain hotel brands can afford service automation technologies. Technological innovation is not a concern for our hotel right now as it remains an unnecessary expenditure."-*
> *(M1).*

Apart from the financial concern, it was uncovered that a lack of IT skills could be a barrier to its implementation in South Africa. This is according to the sentiment of hotel manager 6.

> *"Other parts of like Europe but just not South Africa because we are a 3rd. world country that is stuck in the 3rd. industrial revolution due to lack of IT skills." - (HM6).*

Similarly, the literature suggests that the 4IR is a very complex revolution that requires a highly skilled labour workforce for adoption and implementation. Notwithstanding, Statistics South Africa (2018) advises that South Africa is struggling to produce such skills. The government department further advises that approximately 30% of the workforce in South Africa is unskilled, while semi-skilled workers account for about 45%, lastly, skilled workers only constitute 24% of the total labour force. With such a situation highlighted, the city of Durban is also facing skills challenges regarding technology adoption for the tourism sector. This is reiterated by TKZN (2019:66), which states the tourism sector in Durban is highly characterized by a lack of proper education and professional development opportunities in the digital technology innovation for the sector. This presents a gap in ICT and innovation skills for the tourism sector in Durban. It thus can be said that technological adoption by the tourism sector in Durban is still lagging . Nevertheless, Hotel Manager 3 was of the view that technological innovation in the hotel will largely depend on the hotel's clientele. In the manager own argument, some clients still prefer a personal human touch and stated the following:

> *"No, I do not think this is true. The use of service automation technologies all depends on the hotel's clientele and what they want (35-55years) still prefer the personal human touch and only certain areas in the hotel can be automated, therefore technological innovation is not a concern for our hotel." - (M3).*

Similarly, (Liu and Hung 2021: 1) state that since tourism and hospitality is a people-orientated service industry, hotels worldwide are in a challenging decision-making predicament when it comes to introducing self-service technologies. While on this note, Durban Tourism Authority's slogan for the city is "the warmest place to be". Now, this does not only refer to the warm all-year-round weather of the city but also encompasses and represents the warmth of the locals which is characterized by the vibrant Indian and Zulu cultures which play an important role in welcoming the city's domestic and international visitors. Therefore, this represents a challenge for hoteliers and hotel managers in the city of Durban regarding the introduction of service automation technologies and the maintenance of human-driven (human employees) tourism experiences in their hotels. The hotel managers strongly maintain that technological innovation is not a concern for their hotels for reasons that include lack of skills and technology being an unnecessary expenditure. It can be concluded that they are in favour of human-driven tourism and hotel experiences over technology-driven experiences. The next subtheme will present all the forms of service automation technologies introduced by the hotels in Durban.

5.2.2 SUBTHEME 1.2: AUTOMATION TECHNOLOGIES INTRODUCED IN HOTELS IN DURBAN

As discovered earlier through the body of literature in Chapter 2, the outbreak of the COVID-19 pandemic drove the adoption of service automation technologies in hotels. Therefore, this subtheme

sought to report on any service automation technologies that were implemented by the 11 hotels operating in the city of Durban. The findings are reported in Table 5.1.

Table 5. 1: Service Automation Technologies introduced in hotels

Type of technology introduced by the hotel	Purpose of technology	Hotel Manager
1. Automated Booking System	This booking system allows guests to choose their own preferred hotel rooms and check-in prior to arrival	M9
2. Automatic Hand Sanitizers	Hand sanitizers are equipped with sensor technology for automatic hand sanitizing by guests just reaching out their hand towards the sanitizing station.	M1, M2, M3, M7 and M12
3. Easy Application System	Property management system for the management of the hotel operations for safer COVID-19 regulations by just a touch of a button.	M9
4. Omni Online System	Specialized system used by housekeeping and maintenance teams to report on the status of guest rooms to avoid longer check-in processes and waiting times before they occupy their rooms.	M2
5. No technology was introduced	Hotel managers stated that no form of technology was introduced by their hotel properties. It was uncovered this was due to financial concerns and struggles.	M5, M10 and M13

Source: Researcher's own impression.

This subtheme along with the above table uncovers a gap of lack of technology adoption by hotels in the city of Durban but presents a minimal technology adoption as presented in Table 5.1. The primary research finding that was elicited from the 11 hotel properties in Durban presents a lack of innovative

technologies such as robots, self-service kiosks, mobile check-in systems, facial recognition systems and mobile room keys among others. The detailed literature review in Chapter 2 of this study, suggested that these technologies have gained popularity and attention within the global tourism and hospitality industry, with international leading hotel chains such as Hilton Worldwide and Marriott International paving the way for the adoption of such service automation technologies. However, as much as the 11 hotel properties in Durban have to some extent introduced minimal service automation technologies, the city is home to a smart hotel, the flagship Hilton Garden Inn is considered to be a completely smart hotel that was constructed in the heart of mixed-use Umhlanga Arch in Durban. For access to hotel rooms, everything is keyless and cardless and is driven by smart technologies which are easily operated from guests' mobile phone app or their room keys. The hotel also developed the Hilton Mobile App which was carefully designed with guests' needs in mind to afford them an opportunity to control appliances remotely along with lights, TV and air conditioning temperature. Furthermore, the hotel uses ultraviolet cleaning systems for sheets including other materials, which provides guests with the utmost standards of clean, sanitized and stainless bed sheets (Property Wheel 2020). The General Hotel Manager for the Hilton Garden Inn turned the researcher down for an interview. However, it is important to note that the hotel belongs to an international hotel chain group. Chain hotels often have the financial capacity to implement such innovative technologies, which prove to be expensive.

Three hotel properties in Durban indicated that they have not introduced any form of service automation technologies, it was uncovered that it was mainly due to financial struggles. The hotel managers stated the following: Hotel Manager 5 reported that they are concentrating on keeping hotel doors open:

> *"No, there are no service automation technologies that were introduced in our hotel. We were too concentrated on surviving the pandemic and keeping our doors open, technology was just not important." - (HM5).*

Yadegaridehkordi *et al.* (2018: 364) advise that a firm's technology adoption process is significantly influenced by the firm's internal characteristics which include hotel size, chain affiliation, and most importantly, financial strength, capacity, resources and readiness. This also involves environmental factors (location of the hotel), pressure exerted by competitors and technological characteristics (the complexity of the technology and the expected benefits that the technology will yield to the hotel. Similar, to this statement, due to the outbreak of the pandemic and the series of lockdowns enforced by the South African national government, hotels in the city of Durban reported a decline in revenue with occupancy rates dropping to as low as 20% from 80%. This suggests that hotels in the city of Durban were not making enough profit, which means that the hotels only focused on keeping their doors open. Hotel

Manager 3 believes that the pandemic only emphasized hygiene and cleanliness, not technology. The manager expressed the following:

> *"The pandemic only emphasized the importance of hygiene and cleanliness through the introduction of social distancing protocols and sanitization. Besides these aspects, the hotel continues to run exactly like how it did even before the pandemic. The new trends are just adhering to COVID-19 protocols. We only introduced automatic hand sanitizers." - (HM3).*

It was noted that some of the hotels that participated in the study have introduced some degree of service automation technologies to their hotel operations with the common form of innovation being automatic hand sanitizers. It can be concluded that most hotels that participated in the study disclosed that they are trying to survive in the aftermath of the pandemic rather than focusing on the introduction of service automation technologies as they have lost revenue during the lockdown. The next subtheme will present the impacts of the adoption of service automation technologies on the tourism industry in Durban.

5.2.3 SUBTHEME 1.3: IMPACTS OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS AND THE TOURISM INDUSTRY IN DURBAN

According to Bowen and Morosan (2018: 4), technology has two main roles that it should fulfil supportive automation (support) and substitutive automation (substitute). Moreover, there are new technology-specific roles of service automation technologies which include automation for novelty (differentiation), automation for better products/services (improvement), and automation for better jobs (skills). It was against this backdrop that the 11 hotel managers were asked "What impacts do you believe service automation technologies will have on your hotel and the tourism industry in Durban?" All the hotel managers presented different viewpoints on the impacts that will result from the adoption of service automation technologies. Hotel Managers 13 and 7 believe that the adoption of service automation technologies by the hotels in Durban will result in limited-service errors. The manager stated the following:

> *"The hotel would be very competitive and there will be limited human errors which will result in efficient hotel operations. Most importantly, it will reduce our operational costs. The tourism industry in Durban will reach international standards and the city would be one of the world's must-see and visit cities" - (M13).*

Manager 7 believes that the adoption of SATs (Service Automation Technologies) by the hotels in Durban will provide much quicker service. Manager 7 stated the following:

> *"The use of service automation technologies would result in much quicker and improved hotel service, efficiency and no human error although there be technical failures" - (HM7).*

In line with the above statement by Managers 13 and 7, Huang and Rust (2018: 155) highlight that the adoption of SATs affords hospitality and tourism organizations the luxury to direct more efforts towards

operational efficiency through rigorously consistent and standardized service offerings. In addition, the authors further advise that the adoption of SAT enables hotel executives and human employees to exert attention in more complex service tasks in service delivery encounters where they can apply creativity, problem-saving and empathy skills. Similarly, Manager 5 believes that SATs will result in improved service operations. Manager 5 stated the following:

> *"I believe that technologies will provide our hotel with an opportunity to utilize human employees in other areas like guest relations and ensure that they focus on crucial roles that will make the hotel run smoothly."* - *(M5).*

Liu and Mattila (2019: 270) state that the adoption of SATs improves a hotel's business' image through differentiation while at the same time it enhances customer perceptions about the firm. The authors further reiterate that the adoption of SATs in hospitality organizations such as hotels results in improved marketing strategies, one that emphasizes the firm's newness and innovativeness, therefore attracting international clientele and more tech-savvy travelers such as millennials. Notwithstanding, Managers 1, 3 and 9 emphasize competitive advantage and achieving and maintaining the highest standards of international tourism. Hotel Manager 9 stated:

> *"The positive impact is that our hotel will be competitive and appeal to international travellers especially those who are more technologically inclined and savvy. This would also improve our service quality as a hotel product while at the same time reducing our operational costs"* - *(HM9).*

Tussyadiah (2020: 1) reiterates that SATs such as service robots have the ability to support human employees by tirelessly providing service to customers and in multiple languages. However, the authors also advise that service robots do not perform well under uncertainty, as soon as a customer deviates from the programmed service encounter, the service encounter is likely to fail. Similarly, the quantitative results present that hotel guests in Durban strongly agree (30.8%) and agree (36%) that service automation technologies are able to provide information in different languages than human employees. Furthermore, the hotel guests in Durban strongly agree (32.9%) and agree (36.3%) that service automation technologies can malfunction during service delivery and employees do not malfunction. These findings are in line with literature that service automation technologies are prone to malfunctions, as much as they provide guests with convenience and quick service.

From the above statement by Hotel Manager 9, it can be concluded that three of these hotel managers for the hotel properties in Durban are more concerned about attracting and retaining international travelers as this will result in the tourism industry in Durban being on par with other international tourism standards thus becoming competitive. The adoption of SATs by hotels in Durban will give them the opportunity to stand out from the rest of their competitors. The rapid development of ICTs has resulted in a fast-paced

adoption of service automation technologies by hospitality firms, which continue to present hoteliers and hotel managers with an ethical dilemma: can higher profits be forecasted by replacing employees with robots? or adopting robots to improve employee work efficiency and the overall product/service? With the ultimate increase in SATs within the hospitality and tourism field, there is a growing debate centered around the displacement and substitution of human employees and job losses. Frey and Osborne (2017: 254) state the hospitality and tourism industry is a people-intensive industry with an extremely high employee turnover. Tuomi, Tussyadiah and Stienmetz (2021: 241) reiterate that an increasing number of jobs within the industry is being robotized and computerized and the needed scale of reskilling and upskilling human employees remains unprecedented. Similarly, quantitative data presented that 80.8% of the hotel guests in the city of Durban believe that the use and adoption of service automation technologies is highly associated with job losses. Also from qualitative data, six of the general hotel managers shared the same sentiments on the loss of jobs as a result of the adoption of service automation technologies. One of the managers reported the following:

> *"From an industry perspective, there will be job losses as humans will be displaced by robots and the tourism industry would no longer sustain livelihoods like it is now" - (M10).*

According to Statistics South Africa (2021), the results presented by the Quarterly Labor Force Survey (QLFS) for the 2021 third quarter advise that the number of employed people in South Africa declined by approximately 660 000 in the third quarter of 2021 to 14.3 million. The government Ministry further advises that this resulted in the official unemployment rate in South Africa being 34.9% in the third quarter of 2021. Given such a high unemployment rate in South Africa, the six general hotel managers are justified in believing that the adoption of SATs will result in job losses in Durban, in a country already faced with an unemployment crisis. The tourism industry has proved to be of importance to the South African economy and had yielded positive impacts. The tourism sector is vital to the South African economy as it creates job opportunities and continues to outperform key industries such as utilitiesLiterature in Chapter 2 has advised that one in every 23 workers are employed within the tourism sector. In addition, the sector employs more people compared to the mining sector. The impacts of the tourism sector on the South African economy prove why most of the general hotel manager interviewed are concerned about job losses that will occur through automation of services in hotels in Durban. It was noted from the above discussion that the adoption of technology offers mixed impacts; this calls for policy implementation to ensure a responsible manner of adoption of technology by hotels and the tourism industry in Durban at large. The next theme will discuss consumer perceptions towards the use of service automation technologies in hotels in Durban

5.3 THEME 2: THE ATTITUDES OF HOTEL GUESTS IN DURBAN TOWARDS THE USE OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS

It became prudent to know from the managers interviewed the attitudes and perceptions of hotel guests towards service automation. The following question was used to elicit a response from the managers "How are hotel guests' attitudes and perceptions measured in this hotel and how often are they measured?" It emerged that guests' attitude to service automation varies from guest to guest. This theme sought to understand guest attitudes and perceptions towards SATs in the city of Durban. It is expected that different guests with different needs react differently to the adoption of SATs by hotels in Durban. All the hotel managers reiterated that they understand their guests and that different guests have different needs and preferences. Hotel Manager 3 reported the following:

> *"We understand our guest profiles, However, guests' attitudes will vary from guest to guest based on their individual preferences and needs" - (HM3).*

In line with the above statement by hotel manager 3, Xu, Li and Lu (2019: 89) highlights that the travelling purpose of travelers and tourists significantly influences their needs and how they react to a hotel's service quality. This implies that the hotels in the city of Durban are well aware of the needs and preferences of their guests, and they attend to them. It remains imperative for hotels to gain a deeper understanding and knowledge of the factors that influence both business and leisure travelers' attitudes and perceptions towards overall hotel service. This affords hotels to implement service improvement strategies to cater for the specific needs of different target markets. This also is the case with the hotels in the city of Durban, as the general hotel managers stated the importance of conducting regular guest surveys. Hotel Manager 5 stated that they are able to offer guests the best quality service:

> *"Guests' attitudes and perceptions have helped us to take note of how best we can improve our hotel operations so that we offer them the best quality service that is in line with their needs and preferences" - (HM5).*

Ren *et al.* (2016: 13) directed attention towards critically analysing and understanding all the factors that positively influence hotel guests' perceptions and experiences during their hotel stay and visit. Such factors are categorized into the following categories: tangible and sensorial experiences, staff performance, hotel aesthetic perceptions and lastly, hotel location. It can be said that technology adoption by a hotel is not included in the above categories, which represents a research gap on the influence of technology on customer attitudes and perceptions towards a hotel. Similarly, quantitative results presented that 74.4% of the hotel guests in Durban stated that the service quality attribute is very important when choosing a hotel, while the service automation attribute accounted for 45.5% as a very important attribute when choosing a hotel. The following question was used to elicit a response from the

managers “Based on your hotel guests’ profiles, what do you think their perceptions and attitudes will be towards service automation technologies in your hotel?” It was uncovered that while some managers noted that guests have a positive attitude, others shared different views by noting the negative attitude of guests towards service automation. Most of the interviewed hotel managers were of the opinion that leisure guests will not appreciate SATs while business travellers will appreciate it due to it being time efficient: One hotel manager reported the following:

> *“Corporate guests will definitely appreciate it because they are always on the go for their meetings and do not want to be bothered and they often seek convenience. On the other hand, leisure clients would not be happy because they prefer a personalized service which is accompanied by interaction from a simple “how was your” to “how was your travel”. Now, this requires the co-existence of human employees working alongside various service automation technologies” - (HM9).*

The managers argued that service automation may not be able to offer personalized service that their returning or leisure guests prefer. The finding can be corroborated by Xu, Li and Lu (2019: 101) who advise that since the hospitality and tourism industries remain service-intensive industries, travellers’ evaluation of a hotel experience, service and satisfaction is dependent on interactions with hotel employees since they are service agents and captains. Kim *et al.* (2021b) revealed that such interactions include human staff calling hotel guests by their names. This is also reflected in the statement made by Manager 2 who stresses that a robot, unlike human employees, cannot remember guests’ names.

> *“Our leisure guests (especially repeat guests) would not appreciate the introduction of automation technologies because they enjoy the personalized service that we offer them. Robots do not remember guests’ names like human employees would and that’s what makes them feel welcomed, valued and most importantly, they feel like they are at home away from home” - (HM2).*

These findings concur with those of Zeithaml (2018) who concluded that the service quality of hotel employees is an important factor for leisure travelers’ travelling experience. The authors further advise that personal interactions between hotel staff and leisure travelers critically enhance leisure travelers’ happiness. Similarly, the quantitative results revealed that the respondents (hotel guests from the city of Durban), 44.8% (strongly agree) and 32% (agree) that they cannot interact with service automation technologies like they would with human employees. Moreover, 30.8% (strongly agree) and 33.2% (agree) that the quality of interaction with service automation technologies is poor compared to that of human employees. According to manager 5, while some guests would prefer service automation, others would rather prefer interacting with frontline staff members.

> *“We are known for the best quality service that is driven by our service employees, therefore our guests prefer interacting with the frontline staff members, although some would prefer some services of the hotel automated. This now requires a balance between automation and physical interaction so that all our clientele is catered for” - (M5).*

It can be noted that the hotel managers from the city of Durban understand their guests in terms of their different preferences and it is imperative for hotels to gain an understanding of customer perceptions of changing attributes and how customers go on about classifying such attributes. Hotels in Durban cater for both leisure and business travellers and it is noticed that the managers aim to satisfy both markets. Most past studies have directed attention on exploring a few hotel technological attributes but none of them explored specific technological attributes and the extent to which these attributes are being perceived by hotel guests (Chiang, Chen and Hsu 2019: 797). This represents a research gap worth exploring to ascertain how technological hotel attributes impact and influence their perceptions of the overall hotel service quality. The adoption of service automation technology by hotels in the city of Durban will require extensive research by the respective hotels to ensure that a balance is being stricken between different traveller markets with different needs and them being satisfactorily catered for. Figure 5.2 depicts subthemes that have emerged from Theme 2 which will also be discussed in detail.

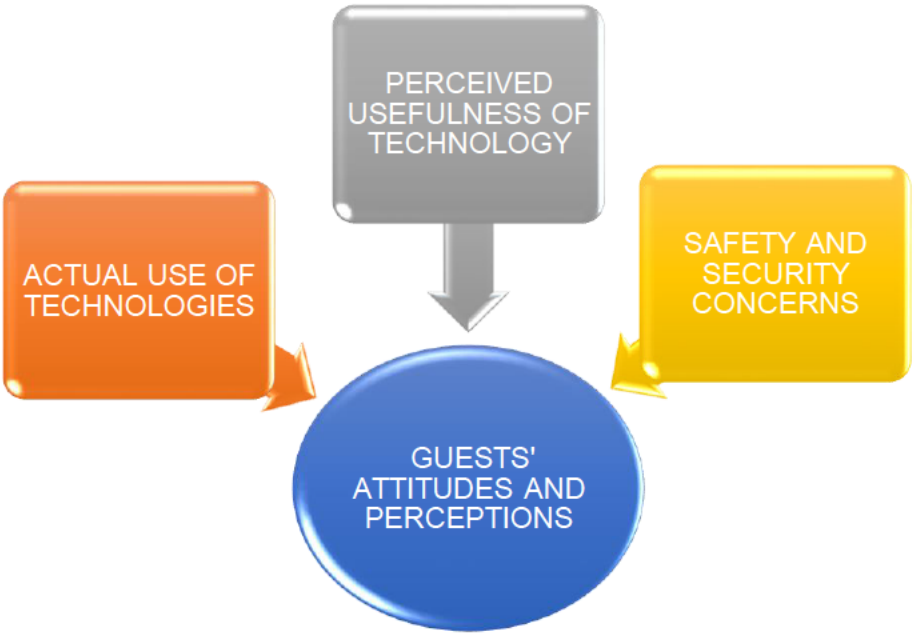

Figure 5. 2: Visualization of Theme 2
Source: Author's own impression

5.3.1 Subtheme 2.1: Perceived usefulness of technology

As part of Theme 2 and an attempt to answer Research Objective 2, it was imperative for the researcher to gain an understanding of the perceived attitudes of hotel guests towards the use of service automation technologies in hotels in relation to the perceived usefulness of technology when compared to humans. Table 5.2 indicates the regression coefficient ($r=0.370$; $p<0.001$), which suggests a relationship between

interactivity and humans. The beta coefficients for human service preference (β =0.365) were positive and significant (p<0.001). This means that there is agreement that human services increase interactivity. In contrast, the beta coefficients (β=0.056) measured for service automation preference (machine) although positive was, however, not significant (P>0.05). The R^2 values measured suggest that there was a strong explanatory power (14.3%).

Dzia-Uddin, Hashim and Isa (2018: 26) advise that with the rate of adoption and dependence on technology by the tourism industry, hotels are seeking the best methods to collaborate technology and human touch as a quest to enhance guest satisfaction levels. Similarly, hotel Manager 12 echoed the same sentiments regarding striking a balance between technology and human interactions. The manager stated the following:

> *"Different guests require to have different services. We must balance automation with human service so that different guest groups are catered for. Corporate guests seek convenience and automation technologies will offer them exactly that while leisure clients prefer being given attention and attended by staff members, some guests even have favourite staff members" - (M12).*

Ujang *et al.* (2016: 119) state that despite the rapid development of technologies for the tourism industry, with some of them highly sophisticated and advanced, they can never replace the element of human touch within the industry. Quantitative results support this view of the authors. The results presented that of the respondents, 49.8% (strongly agree) and 28.2 % (agree) that they prefer interacting with human employees in a hotel. Furthermore, 54,.3% (strongly agree) and 28.2%(agree) that human employees provide a degree of attention that no technology can provide. The results imply that the hotel guests are in favor of human employees over SATs as they find humans more useful in terms of the levels of interactivity they received compared to SATs. This may be due to SATs such as service robots providing guests with programmed answers.

This is corroborated by Shin and Jeong (2020: 2617) who highlight that when service robots or any other type of service automation technology, are less interactive, guests' perceptions about the quality of service being offered by the hotel will also be low as a result of programmed and repetitive answers robots usually give to guests, then the interaction is deemed very low with insufficient guest information. Guests ultimately conclude that SATs are not useful as they had anticipated. The findings report that the hotel guests in Durban do not find SAT to be useful due to their low levels of interactivity when compared to human counterparts. Most studies on self-service technologies and service automation technologies have been conducted and contextualized to industries other than that of tourism. There remains a gap with regard to the influence of such technologies on guest satisfaction (Dzia-Uddin, Hashim and Isa 2018: 26). This is a research gap worth exploring, especially within the context of the city of Durban.

5.3.2 SUBTHEME 2.2: SAFETY AND SECURITY CONCERNS REGARDING THE USE OF SERVICE AUTOMATION TECHNOLOGIES

The purpose of this subtheme was to uncover the concerns regarding privacy and security on the use and adoption of service automation technologies by hotel guests in the city of Durban. The purpose was to understand the perceived attitudes of hotel guests towards the use of service automation technologies in hotels due to safety and security concerns when compared to humans. Quantitative results presented that the respondents, (hotel guests in the city of Durban), 25.76% (strongly agree) and 36.5% (agree) that using hotel service automation technology infringes on their privacy. In addition, 31.3% (strongly agree) and 38.9% (agree) that hotel service automation technologies can easily be hacked, and their personal information can be wrongly used. Similarly, Domansji (2020: 19) advises that privacy and security risk is found to be the most important attribute regarding self-service technology adoption and use, as users are more concerned about issues such as fraud and identity theft which is associated with the adoption of self-service technologies. This implies that the hotel guests from the city of Durban are aware of the risks associated with the adoption of service automation technologies as far as security and privacy issues are concerned. According to Zeng (2016: 25), service automation technologies are underpinned by seven factors that pose a risk to its adoption by travelers within the travel and tourism industry and hinder post-service perceptions and attitudes. They are identified as functional, time, financial, privacy, security, psychological and social risks. For purposes of this research and due to time constraints, the researcher only focused on the aspects of privacy and security issues.

The results presented that 28.4% (strongly agree) and 36.5% (agree) that hotel service automation technologies require much of their personal information. According to González-Reverté *et al.* (2018), privacy and security concerns amongst hotel guests are usually alarming because some hotel experiences with a degree of personalization would entangle basic information such as age, sex and nationality for a better insight into consumer needs and wants and product preferences to more specific and personal data such as real-time position, income levels and expenditure trends, using the most advanced smart devices within a hotel for higher degrees of guest service personalization. In line with the authors' view, it can be concluded that hotels in the city of Durban and their management are facing the difficult task of convincing their hotel guests to adopt self-service technologies due to privacy and security concerns around their adoption.

The results suggest that hotel guests in the city of Durban have more trust in human employees than service automation technologies due to privacy and security risks which influence their purchase intentions. This can be associated with the fact that most business organizations emphasize the need for

confidentiality when dealing with clients' personal information, with some going to the extent of ensuring that their employees sign non-disclosure agreements to ensure that clients' confidential information is protected by all means possible. Zeng (2016: 19) states that past studies and research on the adoption of service automation technologies within the travel and tourism sector have only directed attention and focused only on the positive benefits and characteristics that result from the adoption of service automation technologies by both travelers and hotels. This sparks an interest in exploring such a research gap to gain an insight into the risks associated with the adoption of service automation technologies and their impact on service quality in hotels.

5.3.3 SUBTHEME 2.3: ACTUAL USE OF TECHNOLOGIES (PURCHASING INTENTIONS)

This subtheme sought to unpack and gain insight into consumer perceptions towards the actual purchase of hotel services driven by SATs. Hotel guests in the city of Durban expressed mixed feelings and emotions about pricing and purchasing intentions regarding the use of service automation technologies in hotels within the city. Quantitative results presented that of the respondents, 38.6% (strongly agree) and 32.2% maintain a position that hotels should charge lower prices if they use service automation technologies because of reduced operational costs. In contrast, Asgari and Jin (2019: 418) state that consumers are willing to pay more for a type of automation that saves them time and money and offers them convenience while at the same time improving their quality of life. However, the results advise that the hotel guests are not willing to pay higher premiums for the use of SATs in hotels in Durban as they believe that they reduce operational costs.

This may be attributed to the fact that the absence of human employees, means low operational costs through the absence of salaries and wages. This could also be attributed to the fact that with automation in hotels, personal attention that guests usually enjoy from human employees is now no longer an element in their service consumption process thus influencing their purchase intentions. Moreover, this could also be attributed to the fact that with automation in hotels, personal attention that guests usually enjoy from human employees is now no longer an element in their service consumption process thus influencing their purchase intentions as they are exposed to repetitive answers from SATs. Hotel Manager 10 is of the opinion that service automation technologies in hotels offer guests repetitive answers. The manager stated the following:

> *"Service automation has always been there way before the pandemic, and we chose not to introduce it so that we continue offering our guests a personalized service instead of repetitive answers and information from a programmed service robot" - (HM10).*

Findings by Ivanov and Webster (2021: 3936) conclude that travelers did not find much value in paying more for robot-driven services and are willing to pay an average of 20% less for automated services within the hospitality and tourism industry when compared to human-driven services. In line with this finding and conclusion, hotel guests from the city of Durban, strongly agree (23%) and agree (30.8%) that service automation technologies are just a method for guests to pay premium prices. Moreover, 37.2% (strongly agree) and 32.2% (agree) and maintain a position that they have no intentions of paying higher premiums for service automation technologies in hotels. It can then be concluded that hotel guests from the city of Durban are not willing to pay higher premiums due to automated services but rather to human-driven services, hence the regression test results indicated that the perceived usefulness of technology (interactivity) is a moderator for purchase intentions. This means that the guests from Durban believe that service automation technologies will offer them lower interaction levels compared to their human counterparts, thus they want to pay lower premiums. Yoganathan *et al.* (2021: 104309) reiterates further that only one paper has directed attention to assessing consumer willingness to pay for robot-delivered services within the context of travel and tourism. This creates a noteworthy research gap that is to be partially filled by this research project by determining the willingness to pay and purchasing intentions for automated hotel services by hotel guests in the city of Durban.

From the above and in relation to objective two, the findings conclude that the hotel guests found the adoption of SATs to be not useful in terms of their low level of interactivity when compared to the human employee counterparts. In addition, the guests raised concerns regarding the safety and security of their personal information given the fact that SATs can easily be hacked and they require more of their personal information. In this regard, human beings were favored as they believe that they are trained to handle personal consumer information. Moreover, the consumers are not willing to pay a higher premium as they believe that hotels that adopt SATs benefit from low operational costs and SATs offer them standardized services compared to human employees.

5.4 THEME 3: THE ROLE OF SERVICE AUTOMATION TECHNOLOGIES IN ACHIEVING GUEST HYGIENE AND CLEANLINESS IN HOTELS OPERATING IN DURBAN.

This theme aims to unpack the innovative hygiene and cleanliness measures that were introduced by the hotels in the city of Durban and their effectiveness. It also aims to ascertain the extent of innovative technologies introduced in hotels in the city for improved cleanliness and hygiene standards. There remains a need to explore how hoteliers and hotels can best collaborate with AI-driven robotics in a quest to transform their service offerings to ensure enhanced measures of cleanliness and hygiene goals (Gaur

et al. (2021: 4081). In this regard, Gössling, Scott and Hall (2020: 14) advises that as a result of the COVID-19 pandemic outbreak , the hospitality and tourism industry is expected to redesign their service offerings in a manner that prioritizes guest and employees' health and safety needs as a means of motivating customers' willingness to stay in hotels. The outbreak of the COVID-19 pandemic has forced hotels and hoteliers around the globe, along with those in the city of Durban to be innovative about risk reduction strategies. Innovative digital technologies are now on the rise since the hospitality and tourism industries began fighting for their survival and they offer new ways of interactions between hotels and their guests as well as new methods of hotel cleaning to ensure the highest standards of cleanliness and hygiene are achieved.

Hotels around the globe, as advised by the literature review in Chapter Two, have introduced innovative technologies such as service cleaning robots, electrostatic spraying and UV light technologies to ensure that they provide their guests with the highest standards of hygiene so that they feel safe during their hotel stay amid the ongoing COVID-19 pandemic. Therefore, this theme aims to gain an insight into what innovative technologies and measures have been introduced by the hotels in the city of Durban amid the COVID-19 pandemic. Figure 5. 3 depicts the subthemes that will be discussed in detail as part of theme 3 as an attempt to answer research objective three which was to analyse the role of service automation technologies in achieving guest hygiene and cleanliness in hotels operating in Durban.

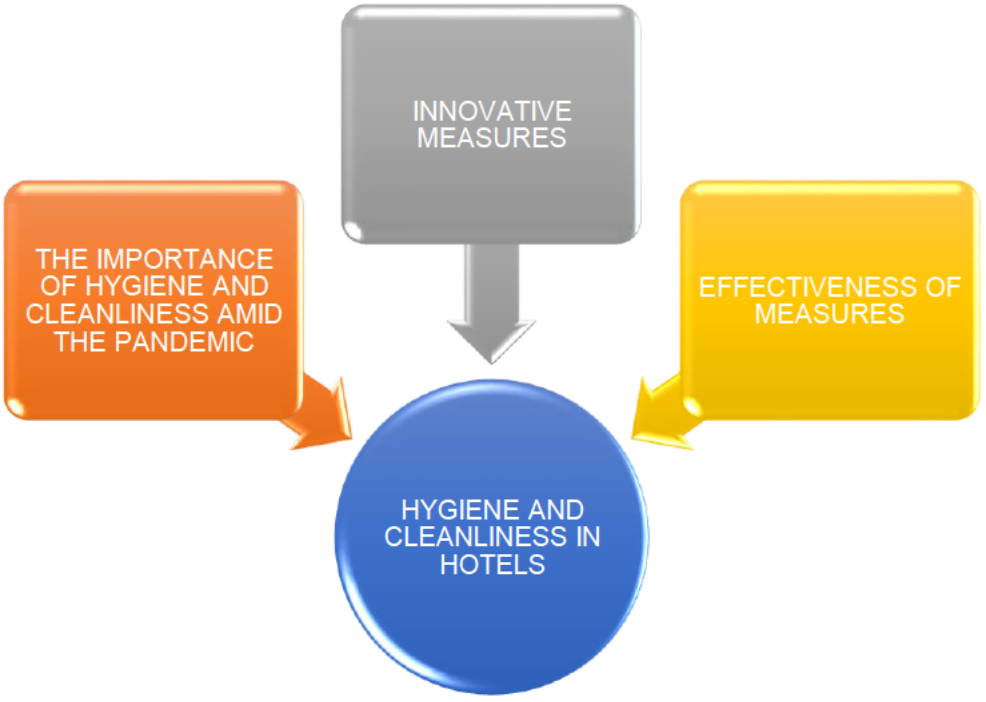

Figure 5. 3: Visualization of theme 3
Source: Author's own impression.

5.4.1 SUBTHEME 3.1: THE IMPORTANCE OF HYGIENE IN HOTELS IN DURBAN AMID THE COVID-19 PANDEMIC

The hotel managers of the 11 hotel properties in the city of Durban were asked "How important is hygiene in their hotel, especially in the midst of the COVID-19 pandemic?" Given the global public health concern created by Covid-19, it became prudent to know how important the managers interviewed considered hygiene and cleanliness in the hotel. It was uncovered that managers rated this from important to extremely important. Hotel Manager 5 reiterated that hygiene is the hotel's priority:

> *It is very important and remains the hotel's main priority - (HM5).*

One of the most significant factors that are being sought after by hotel guests and travellers for their accommodation needs amid the COVID-19 pandemic is hotel cleaning and sanitization standards (Nayak *et al.* 2021: 1). Similarly, seven of the hotel managers (3, 1, 6, 7, 8, 9, and 10) stated that hygiene and cleanliness are extremely important in the hotel. Hotel Manager 9 emphasized that the COVID-19 pandemic compelled the hotel strengthen its hygiene and cleanliness protocols:

> *"It is extremely important even way before the pandemic. The pandemic just made us strengthen our hygiene and cleanliness protocols" - (M9).*

Hotel Manager 9's statement echoes of the rest of the hotel managers understanding of the importance of hotel hygiene and cleanliness, particularly, amid the COVID-19 breakout. Yu, Lee and Hyun (2021: 7) emphasize that it is imperative for hotels to fully commit to hygiene and safety protocols including the most effective hygiene standards during and after the COVID-19 pandemic. Similarly, quantitative results presented that 80.8% of the respondents stated that hygiene and cleanliness are very important attributes when choosing a hotel, with the second very important attribute being health and safety accounting for a total of 77.5%. Lastly, 74.9% of hotel guests in the city of Durban considered sanitization standards to be very important when choosing a hotel. Moreover, Manger 2 used the word non-negotiable to describe the importance of hygiene and cleanliness in the hotel.

> *"It is not negotiable" - (M2)*

The statement by Manager 2, implies that hygiene and cleanliness are given the most attention, effort and resources to ensure that the highest standards and levels of hygiene and cleanliness are achieved within the hotel. According to (Nayak *et al.* 2021: 12), hotels need to understand that advanced hygiene and cleanliness measures can curb the spread of COVID-19 infections and should utilize these strategies to market their hotel rooms both during and after the pandemic. The authors further highlight that, travelers are willing to pay higher premiums for stringent cleaning and disinfection measures in hotels. This subtheme provided an overview of the importance of hygiene and cleanliness in hotels in the city of Durban. Different hotel managers presented different views, however, all their views emphasized that

they consider hygiene and cleanliness in their respective hotels to be of utmost importance. It is important for the hotel managers to maintain such high hygiene standards in their hotels to curb the spread of the COVID-19, and most importantly, restore the trust of the travelers. Subtheme 3.1 will examine the innovative measures in place to enhance cleanliness and hygiene in the 11 hotel properties in Durban that were included in this study.

5.4.2 SUBTHEME 3.1: INNOVATIVE MEASURES IN PLACE FOR HYGIENE AND CLEANLINESS IN HOTELS IN DURBAN

The hotel managers were asked what innovative measures are in place to ensure high standards of hygiene and cleanliness. The measures from the 11 hotel properties included in the study in Durban are summarized below in Table 5. 5

Table 5. 2: Hygiene and Cleanliness measures introduced in hotels in Durban

Hotel Manager	Hygiene and Cleanliness measures introduced in hotels in Durban
Hotel Manager 1	*We have screen barriers, deep cleaning of the hotel building daily, especially in high touch areas, automatic hand sanitizers all around the hotel, staff members are provided with their personal hand sanitizers, staff do not re-use their PPE, each room is fogged and sanitized each day, public areas are sanitized each day at 11.00, During conference breaks- the conference room gets sanitized again, guests are screened upon arrival and we use WHO recognized and recommended detergents and disinfectants to ensure high standards of health and safety.*
Hotel Manager 2	*Electrostatic sprays, the use of screen barriers, cleanliness champion that conducts staff training on hygiene, physical distancing stickers around the hotel, sanitizers in guestrooms, lifts and high touch areas around the hotel, guests are provided with disinfecting wipes, deep cleaning and disinfecting of all our furniture in high touch places frequently*
Hotel Manager 3	*Sanitizers all around the hotel, guests and staff are not allowed in the property with a mask, we are now using stronger than before cleaning detergents, rooms are spot checked and sealed by housekeeping supervisors, the use of separate laundry bags for laundry collected in different rooms and a cleaning champion that ensures that cleaning is done diligently*
Hotel Manager 4	*Guest linen is washed and kept in sealed plastic bags until a guest check-in, sanitizers are provided all around the hotel, guestrooms also have sanitizers for guest use, social distancing protocols are observed through the use of social distancing stickers, [and] we longer offer buffet services, but guests are required to order from the menu*
Hotel Manager 5	*We regularly Fogg guest rooms, there are sanitizing stations all around our hotel building, we encourage guests and staff to always wear their masks at all times, during conferences guests are given individual sanitizers, linen is now washed under high temperatures than before, we have introduced the use of stronger detergents, once a guest room is cleaned it is cleaned until a guest occupies it.*
Hotel Manager 6	*Sanitizers are placed all around our hotel building, guests are screened upon arrival, we have a dedicated hygiene officer with the sole responsibility to frequently sanitize and clean high touch areas in and around our hotel, guest rooms are frequently fogged, [and] if there is a positive covid case the linen is immediately burned, staff members fill in a health check questionnaire for each shift, the staff is provided with PPE and pocket sanitizers.*
Hotel Manager 7	*We have a guest awareness program about hygiene and COVID-19, rooms are regularly fogged, guests are given an option to have their room not cleaned during their stay, rooms are unoccupied for 24 hours after they have been fogged and*

	sanitized, [and] we no longer offer buffet services to eliminate human touch and introduced an Ala Carte menu.
Hotel Manager 8	*We have service screens, our rooms are regularly fogged and sealed until a guest check-in, high touch areas are fogged every second day, sanitizers are placed all around the hotel and staff members are screened daily.*
Hotel Manager 9	*We have sanitizers around the hotel, social distancing markings, we longer offer buffet services, staff is regularly provided with PPEs, regular fogging of guest rooms and sanitization of frequently touched surfaces.*
Hotel Manager 10	*Guest linen is washed and kept in sealed plastic bags until a guest checks in, sanitizers are provided all around the hotel, guestrooms also have sanitizers for guest use, social distancing protocols are observed through the use of social distancing stickers, we longer offer buffet services, but guests are required to order from the menu, staff and guests are screened upon arrival- (M10).*
Hotel Manager 11	*Hand sanitizers all around the hotel, guests are screened upon arrival, the staff is provided with PPE, guest rooms are fogged regularly, high touch areas are sanitized 3 times a day, the of desk screens, laundry from each room is kept and washed separately, cutlery is sanitized and sealed for guests- (M11).*

Source: Author's own impression.

The above table depicts the hygiene and cleanliness practices and protocols that are in place in the 11 hotel properties in the city for enhanced hygiene measures. The most common hygiene and cleanliness measures appear to include, sanitizing stations placed around the hotel, the use of social distancing stickers, fogging of guest rooms, temperature checks for both guests and employees, the use of screen barriers and the discontinuation of buffet stations. Hotel Manager 2 reported that the hotel introduced the use of electrostatic spraying technology. COVID-19 is considered to be highly infectious, hence abiding by social distancing protocols became vital to limit the spread of the virus (Chan *et al.* (2020: 515). Similarly, the respondents indicated that social distancing between guests and hotel staff is an important attribute for them when choosing a hotel and it accounted for 66.4%. Huang and Rust (2021) state that due to the virus being highly infectious, this provided an opportunity for hoteliers and hotels to rapidly adopt AI and robotics for their daily hotel operations amid the pandemic. Moreover, hospitality firms such as hotels have gradually started the introduction of service robots for safer provisions of frontline services and to ensure that both guests and employees adhere to the necessary social distancing protocols (Belanche *et al.* 2020a: 270). More so, Table 5. 5 presents the absence of AI and service robots for safer

hotel operations in hotel in the city of Durban. Similarly, Manager M1 stressed that their guests are aware of their hygiene standards and thus see no need for technology and stated the following:

> *"We are already a hygiene driven hotel, and our return guests are all aware of it. We do not need technology to attract and retain hotel guests whose hygiene is an important factor for them. We are a certified isolation site for COVID-19 mainly due to our cleaning fundamentals and hygiene standards. This is enough evidence to attract such guests, the use of technology will make no difference" - (M1).*

Manager 7 shared a similar sentiment as above by stating the following:

> *"Our marketing initiatives promote hygiene and cleanliness on our website and online booking sites, which already attracts travellers therefore, technology will make not much difference" - (M7).*

The views expressed by Managers 1 and 7 imply that they believe that technology will not enhance their current hygiene and cleanliness protocols that their respective hotel properties have already introduced to curb the spread of the COVID-19 virus while ensuring the safety and health of both staff and guests. A few international leading hotel brands such as Marriott, Hyatt and Hilton are paving the way through the adoption of various technologies that are aimed at ensuring the health and safety of both the guests and hotel employees through minimized interactions and human touch. These international hotel brands changed the norms of hotel cleaning and hygiene practices through the introduction of state-of-the-art cleaning technologies such as robot cleaning systems, mobile check-in facilities and self-service kiosks for their hotel guests. In addition, they went the extra mile by introducing advanced cleaning and disinfection practices through the introduction of hygiene and cleanliness procedures such as electrostatic spraying systems and ultraviolet-light radiation technologies (Sharma *et al.* 2021). Similarly, Park (2020) concurs that the introduction of digital technologies such as contactless fingerprint scanners, face recognition technologies and contactless data entry, amongst others, can potentially reduce the risk of infection of COVID-19 while controlling the spread in and around hotel properties. This presents a gap in terms of the adoption of digital and advanced technologies to fight the COVID-19 pandemic in hotels operating in the city of Durban, especially where hygiene and cleanliness are concerned. Gaur *et al.* (2021: 4084) emphasize that a hotel's strong reputation and brand are characterized by the cleanliness of rooms and restrooms and the adoption of technology by hotels to achieve the most enhanced hygiene and cleanliness standards. From the above discussion, a gap is noted in terms of the use of technological systems for enhancing hygiene and cleanliness in hotels operating in the city of Durban. Therefore, there remains a need for hoteliers and Durban-based hotels to move beyond regular hygiene and cleanliness practices by adopting technologically advanced cleaning and hygiene practices that best resonate with their guests' and travelers' expectations of standards of hygiene and cleanliness in hotels around the city,

and ultimately reduce their fear of being infected with the virus. The next subtheme will unpack the effectiveness of the above-discussed hygiene and cleanliness measures introduced by the hotels in Durban.

5.4.3 SUBTHEME 3.2: THE EFFECTIVENESS OF THE HYGIENE AND CLEANING MEASURES INTRODUCED BY THE HOTELS IN THE CITY OF DURBAN

It was critical to know the effectiveness of the hotels' current hygiene and cleanliness practices. The following questions were used to initiate a response "How effective are your hotel's current hygiene and cleanliness practices? Do you think they are more effective than the use of technologies and vice-versa?" From the interviews, most of the hotel managers indicated that the current (human-serviced) protocols are more effective than the use of technologies such as service cleaning robots. Five of the hotel managers (1, 6, 7, 2 and 12) believed that humans understand the importance of cleaning. As such, human-serviced cleaning will do a better job than robots since they clean with passion. Besides, it was noted that the guests are happy with the level of cleaning offered by housekeeping teams (humans). Hotel manager 1 stated that the hotel has always been known as a highly clean and hygienic facility:

> *"They are very effective because we have always been known as a highly clean and hygienic facility way before the COVID-19 pandemic. Automation technologies will not provide our guests with such high levels of hygiene and cleanliness that are maintained by our housekeeping team" - (HM1).*

In support of the above statement by Hotel Manager 1, Hotel Manager 12 asserts that human-housekeeping teams are committed to their jobs, therefore, they ensure diligently clean guestrooms:

> *"They are effective because our housekeeping has daily briefings on the importance of maintaining high hygiene standards and they are very committed to their job and ensuring that our guests sleep in diligently clean rooms. The use of technology can only enhance our protocols and would not do a great job like our housekeeping teams" - (M12).*

The above views and statements by hotel managers 1 and 12 advise that the majority of the managers strongly believe in their human-driven hygiene and cleanliness practices as they have highlighted that humans have empathy and as result, they clean better than robots. However, the quantitative results present that the respondents have contradictory views. There was significant agreement (strongly agree=27,3%; agree=30,8%) that hotel technological systems will carry out sanitizing activities more effectively than human employees. This trend in the findings implies that hotel guests strongly believe in SATs for advanced hygiene standards while managers believe in housekeeping teams for delivering high standards of hygiene and cleanliness. Shin and Kang (2020: 102664) explored hotel guests' perceptions of health risks, perceptions and attitudes towards different innovative technologies that are used by different hotels to ensure that social distancing protocols are observed to increase hygiene and

cleanliness practices post-pandemic. Moreover, the study found that the presence and adoption of advanced cleaning technologies reduce the perceived and actual health risks and perceptions. In the same vein, this may be contributed to the general consensus that hotel technology cleaning systems are more effective than human employees. The presence of technology in hotels in Durban will reduce the perceived risk of hygiene and cleanliness in hotels and this could also be the case with the introduction of cleaning technologies in hotels in the city of Durban. As much as this might be the case, the full potential of cleaning service robots is yet to be uncovered. Gaur *et al.* (2021: 4090) concur that there is a need to evaluate the adoption of service robots in hotels to ascertain if they are being adopted as marketing ploys by hospitality organizations or if they are going to be used to their maximum potential. This can be attributed to the views of the hotel managers as they believe that human housekeeping teams provide high standards of hygiene and cleanliness as compared to service cleaning robots. From such trends, a noteworthy research gap is identified to investigate the possible collaboration between service cleaning robots and housekeeping teams for enhanced hygiene and cleanliness measures in hotels in Durban.

Giousmpasoglou, Marinakou and Zopiatis (2021: 1297) reiterate that several studies have directed attention towards investigating hotel managers' perceptions of technology adoption for cleaning and concluded that the hotel managers considered technology as one of the main tools for enhancing guest experiences through improved and higher standards of hygiene and cleanliness during crisis times like that of COVID-19. In this regard, Manager 5 noted that human services are more preferable than automation due to the unreliability of the latter.

> *"Service automation technologies such as cleaning robots can easily malfunction at any given time, which makes them an unnecessary investment which proves that our current protocols and housekeeping teams are much more effective than automation" - (M5).*

The study findings suggest a contrast between the views of hotel managers in Durban and what the literature suggests. In line with the above statement by Manager 5, quantitative results presented contradictory findings. There was significant agreement (strongly agree=38.6%; 29.4%) that hygiene and cleanliness information offered by technological systems is clear, sincere, and reliable. This trend implies that travelers, including the hotel guests in Durban, have placed more trust in service automation technologies than human employees as far as hotel hygiene and cleanliness are concerned. Hotel managers from Durban should be aware of guests' preferences and use the adoption of service cleaning robots to restore the trust of the travelers. A few studies on service robots have concluded that service robots can act as a technological protection shield between hotel guests and the hotel employees, thus reducing the probability of the spread of the COVID-19 virus (Seyitoğlu and Ivanov 2020: 2).

The hotel managers still maintain their views that human housekeeping teams provide effective hygiene and cleanliness measures compared to service cleaning robots. Four of the hotel managers (3, 2, 8 and 10) believed that human-driven practices are far superior to the use of robots. According to some of the arguments put forward, robots cannot access difficult areas like the human staff. One of the hotel managers reported the following:

> *"They are much more effective than the use of technology, for instance, a robot would not be able to move up and down the stairs and has no ability to clean areas such as rails and high windows like a human would do. Humans understand the importance of hygiene, especially amid this pandemic" - (HM3).*

In conjunction with the above strong sentiments shared by hotel managers 3,2,8 and 8 from the city of Durban, Shin and Kang (2020) make reference to the Best Western Hotel Chain Group. The authors state that technology innovation remains a basis for facilitating advanced cleaning methods in hotels. The Best Western Hotel Chain Group began to equip their housekeeping teams with cleaning equipment that has UV-driven technologies to achieve higher standards of hotel cleanliness. This proves that the use of technology can provide hotels with the most enhanced hygiene standards that are being sought after by hotel guests and the travelling community, with the case also being the same for the hotels in the city of Durban. Kim *et al.* (2021b) advise that a study was conducted to investigate guest preferences between technology-driven services and human services amid the COVID-19 pandemic. The study results indicated that travelers with future travel plans were more favourable towards robot-staffed hotels compared to humans, mainly on reasons underpinned by health and safety and hygiene and cleanliness. Similarly, the quantitative result indicated that there was significant agreement (strongly agree=21.5%; agree=25.1%) that technological systems have a better understanding of the importance of hygiene and cleanliness than human employees. It then remains imperative that the hotels in the city of Durban review their current cleaning measures and introduce some degree of cleaning technologies to ensure that the hotel guests are at ease and trust the sanitization standards of the hotel guestrooms. Hotel guests and travelers, through their perceptions and attitudes towards a hotel as a product and service, dictate to the hotel management what their needs are. The hotels in Durban should pay much more attention to hygiene and cleanliness requirements and the requests of their guests'.

Despite the number of managers who preferred and believed human staff is much more effective than automation technologies, two of the managers (13 and 9) were of the view that service automation is much more effective compared to human staff. According to the logic put forward, humans become complacent which thus compromises the quality of the cleaning services rendered.

"They are, however, human beings become complacent over time and some days they clean thoroughly and some days they do not. The use of technology will be much more effective as cleaning robots will reach areas of the hotel those human employees cannot reach and clean thoroughly" - (M13).

"They are effective, but our housekeeping teams do get exhausted from the enhanced cleaning protocols due to the pandemic. In my opinion, a service cleaning robot would be much more effective than humans especially in high touch areas because sometimes human management is difficult as they constantly require supervision, which can be very tiring" - (M9).

Taking note of the views presented by Managers 13 and 9, it is important for hotels to create and maintain synergy between housekeeping teams and service automation technologies for cleaning purposes. The integration of robotic technologies and other technologies into daily operations is crucial for hotels to achieve the highest standards of health and safety, competitiveness, and most importantly restore the trust of travelers, but the human touch is still needed for more personalized guest services. Similarly, (Ivanov and Webster 2019a) emphasize that is important for hospitality entities to find the right balance between digital and human-driven interactions. In this regard, Davari *et al.* (2022) point out that with the advent of the pandemic, maintaining a balance between digital technologies and humans proved to be a difficult task given its contagious characteristics.

With this said, hotels in the city of Durban should identify areas that can be easily cleaned by service robots and initiate the adoption process, so that housekeeping teams can exert their cleaning efforts in tasks that robots may not be able to reach like the moving of furniture, as they do not have the capacity to do so. This will foster teamwork and collaboration between human employees (housekeeping teams) and digital technologies (i.e., cleaning robots) and achieve high standards of hygiene in and around the hotel, thus ultimately responding to the housekeeping, hygiene and cleaning preferences of the hotel guests. The most advanced hygiene and cleanliness protocols to fight the COVID-19 spread and infections in and around the hotels in the city of Durban are through integration and synergy of organisational cleaning norms achieved through human employees and the use of cleaning technologies. The next theme will examine the barriers that affect the implementation of service automation technologies in hotels operating in the city of Durban.

5.5 THEME 4: EXAMINE THE BARRIERS THAT AFFECT THE IMPLEMENTATION OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS OPERATING IN THE CITY OF DURBAN.

This theme aims to explore the barriers that impede the adoption of service automation technologies by the hotels in the city of Durban. The hotel managers were asked, "What barriers is your hotel facing about introducing service automation technologies?" From the interview, many of the managers revealed that

their hotels faced several barriers, mainly financial cost difficulties and the lack of infrastructure, IT knowledge, and government support for the industry. Similarly, from the literature review, several barriers to service automation were uncovered and these include privacy and security concerns (Ransbotham and Kiron 2018), employee resistance (Belanche et al. 2020), the financial cost (Ivanov, Webster and Berezina 2017), guests reluctant to use the technology (Ivanov, Webster and Seyyedi 2018), and interoperability concerns (Kansakar, Munir and Shabani 2019). Figure 5.4 provides an overview of the barriers currently facing the hotels in the city of Durban and their impacts on their competitiveness will be discussed in detail below.

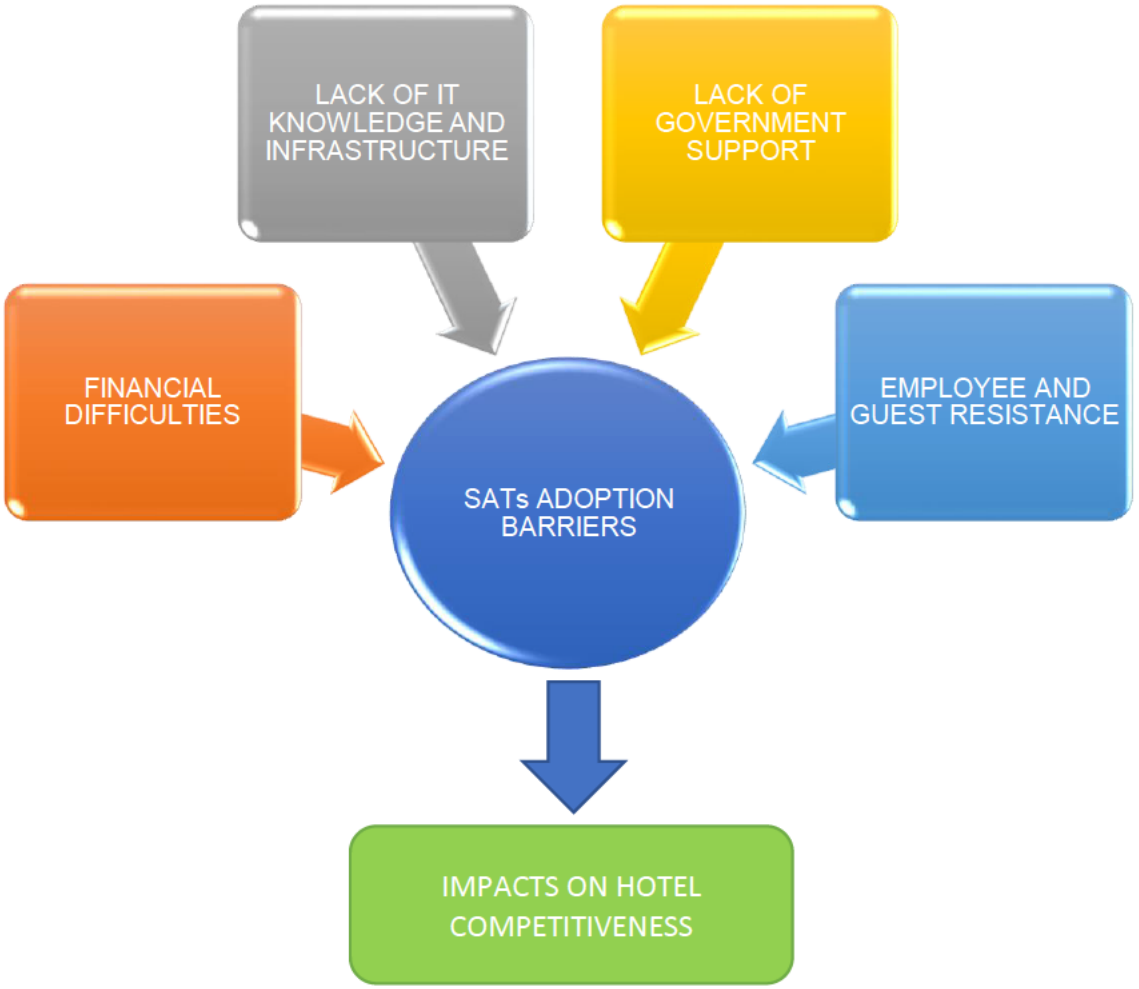

Figure 5. 4: Visualization of Theme 4
Source: Author's own impression

5.5.1 Subtheme 5.1: Service Automation Adoption Barriers

5.5.1.1 Financial Difficulties

Six of the eleven hotel managers revealed that financial costs are the biggest barrier to the use of service automation technologies. The managers indicated the following. Hotel Manager 9 revealed that resources available to introduce service automation technologies are inadequate.:

> *"Revenue is a challenge. We do not have sufficient budgets and financial resources to introduce service automation technologies" - (HM9).*

It is evident that the majority of the hotels in Durban are facing financial challenges pertaining to the adoption of service automation technologies, which can be attributed to the outbreak of the pandemic. The aforementioned findings are in line with a previous study by Ivanov, Webster and Berezina (2017) who identified financial cost challenges as the key concern associated with the adoption of service

automation technologies and robots in hotels. In addition, a more recent study by Osei, Ragavan and Mensah (2020) revealed financial costs to be a major challenge that significantly confronts both the hospitality and tourism firms in terms of the adoption of SATs. Thus, hotels across the globe not just in the city of Durban are facing financial challenges in the adoption of service automation technologies.The financial difficulties referred to by the hotels in the city of Durban can be attributed to low occupancy rates, loss of income during the pandemic due to booking cancellations including that of conferences and events, and high operational costs. Hotel Manager 3 indicated the following:

> *"Financial costs and capital resources are the biggest barriers, since the hotel is experiencing low cash flow due to the pandemic" - (HM3).*

Sharing similar sentiments with the above statement by Manager 3, is Manager 12 who indicated that the hotel is cash strapped.

> *"Lack of financial resources is the main barrier because due to the pandemic the hotel is cash strapped" - (HM12).*

It then can be concluded that the hotels in the city of Durban are facing financial difficulties and challenges as a result of the COVID-19 which resulted in lockdowns and stricter travel regulations that led to a decline in international tourist arrivals. In line with this, the literature proves that the adoption of service automation technologies is costly and requires an organization to possess strong financial resources and capabilities. The above findings can also be corroborated by Ivanov, Webster and Berezina (2017) who said that the acquisition, installation and maintenance of innovative service automation technologies, especially artificial intelligence-driven robots, tend to be very expensive and result in huge financial cost burdens that eventually impact the profitability of a hotel. It can be concluded that the hotels in the city of Durban require a strong financial position so that they may begin to adopt SATs. The adoption of SATs by hotels in Durban may not materialize in the near future due to the tourism industry still recovering from the outbreak of the pandemic.

5.5.1.2 LACK OF IT KNOWLEDGE AND INFRASTRUCTURE

Nam *et al.* (2020) emphasize that hotels are faced with often old and outdated IT-related existing software and infrastructure. Consistent with this, it emerged the that lack of adequate infrastructure poses a barrier to the adoption of SATs. Managers 6 and 13 echoed the opinions regarding the factors that act as barriers to the adoption of service automation technologies in their respective hotels.

> *"There is lack of adequate infrastructure as the hotel was not developed to accommodate various types of hospitality and tourism technologies" - (HM6)*

In agreement with the above statement, Hotel Manager 13 laments automation was not planned for when the hotel was built:

"Lack of infrastructure as the hotel building was not designed with automation technologies in mind" - (HM13).

Conclusions from the study by Mckinsey Global Institute, highlight South Africa's capital investment in infrastructure between 1992 and 2012 exceeded that of most developed countries. South Africa according to the study spent an average of 4.9% of its GDP exceeding that of Canada (3.0%), Australia (4.7%) and Russia (4.1%) respectively (Mckinsey 2015). Despite such significant spending on infrastructure, the quality of information and communication infrastructure in South Africa remains poor (Manda and Ben Dhaou 2019: 248). South Africa does not have adequate IT infrastructure to support the adoption of SATs by hotels in Durban and by the tourism industry at large. This remains a challenge to the progression of tourism towards embracing technology. In addition to the lack of IT infrastructure, the Department of Science of Technology (2015) states that South Africa's failure to increase Science, Engineering and Technology (SET) outputs can be linked to poor performance in Mathematics and Physical Science education. The 4IR is complex and requires a highly skilled workforce for adaptation, However, South Africa is still struggling to produce such skills. This is reiterated by Statistics South Africa (2018) that about 30% of workers in South Africa are totally unskilled, while semi-skilled workers account for 46% and skilled workers only constitute 24%. A significant number of unskilled and semi-skilled workers come from families that were historically disadvantaged (Statistics South Africa 2018). These findings justify the concerns that were raised by hotel managers 6 and 13 regarding the lack of skills to operate and maintain the SATs:

"Lack of skills to operate and maintain service automation technologies prohibits its adoption" - (HM6).

"Lack of skilled personnel to maintain the automated systems" - (M13).

It can be noted that the hotels in South Africa are facing skills challenges such as the adoption of SATs requires IT skills maintenance and operations. Given the fact that skilled workers only account for 4% of South Africa's workforce, the adoption of SATs by hotels in South Africa proves to be something that might not happen anytime soon. There is a need for skills development, especially IT-related, for a more ready workforce to adopt SATs. This raises the need for and importance of skills training for hotel employees in the city of Durban. A literature survey conducted by Wang and Wang (2021) which focused on the investigation of the adoption of robotic technologies during the COVID-19 pandemic resulted in a Technology Readiness Level (TRL) index for the adoption of robotic technologies by hospitality organizations during the peak of the COVID-19 pandemic. Moreover, the study demonstrated that significance of organisational readiness (both financially and technologically) for the successful adoption of robotic technologies. It was already uncovered from the structured interview questions with the 11

hotel managers that their respective hotels lack organisational readiness for the adoption of service automation technologies, especially financially as the managers have indicated they do not have sufficient budgets to adopt service automation technologies.

5.5.1.3 GUEST AND EMPLOYEE RESISTANCE

Employee resistance was also noted as one of the barriers to the adoption of service automation technologies by the hotel managers. Similarly, employee resistance has been reported as a barrier in the literature. Hotel manager 7 advised that they were resistant to the adoption of service automation technologies. Besides the cost of adoption of SATs, Manager 7, stressed that using such technology will lead to loss of employment:

> *"South Africa is constantly facing load shedding challenges and having technology will halt operations even more and most importantly, loss of employment is the biggest challenge since our staff rely on our hotel for employment to support their families, we cannot have them displaced and replaced by robots" - (*HM7*).*

The above finding suggests that managers are protective of their jobs and those of their staff. This can be corroborated by Belanche *et al.* (2020b) reported, hotel employees tend to perceive robots and automation technologies negatively because they strongly believed that their jobs are being displaced by such innovative technologies. Given that the pandemic has resulted in more job losses, the 11 managers of the hotel properties in the city of Durban have strongly advocated for their hotel employees and raised concerns about job losses as a result of the adoption of service automation technologies. More so, 80.8% of the respondents believed that the use of service automation technologies is associated with job losses which has waned their interest in using them This implies that the managers prefer the use of human labour as they manage to provide empathy and emotions during the service delivery process to some guests who seek it.

Technology resistance can also stem from the supply side of the industry (customers/travelers). The authors explain that some travelers and hotel guests may prefer the high-touch and high interactivity of human-facilitated hotel services over a high-tech driven service. Ivanov, Webster and Seyyedi (2018) note that guests' resistance to service automation constitutes a barrier. In agreeing with them, Hotel Manager 3 accentuates that their leisure guests will be frustrated by the use of service automation:

> *"The domestic leisure travel segment is what is currently keeping the hotel afloat, and they are not accustomed to IT and related technologies for historical reasons so it would frustrate them" - (*HM3*).*

Furthermore, 78.7% of the respondents from the city of Durban believe that the use of service automation technologies results in a lack of interaction with trained human employees. However, only 55.2% indicated it is true that service automation technologies provide poor service quality compared to human employees In addition, 79.4% of the respondents believed that technology is rapidly advancing; therefore, this will result in them being exposed to too many technologies that might confuse them. Chan, Okumus and Chan (2020: 7) explain that customer experience, perceptions and expectations act as a barriers for hotels in adopting technologies. Despite the demand for digital and mobile technologies by travelers within the tourism and hospitality industry, hotel managers are still prone to difficulties for the right proportional balance between good quality service and technology levels within a hotel (Yu, Li and Jai 2017: 1344). The 11 hotel managers from Durban who were interviewed should be aware that some of their hotel guests may never compromise on service quality, performance and convenience when using hotel technologies. It thus can be concluded that it is imperative for hotels in the city of Durban to provide a balance between SATs and human employees so that different hotel guests are catered for adequately. In addition, there remains a need for a blueprint that will ensure that the adoption of SATs is done responsibly through the minimization of job losses and valuable human skills.

5.5.1.4 LACK OF GOVERNMENT SUPPORT

According to Mogale and Odeku (2019: 6), the South African government has poorly prioritized the provision of adequate resources directed at developing the tourism industry and only the least marginal resources have been directed toward the growth of the tourism sector in the country. As a developing country, another barrier to service automation usage uncovered in this study is the lack of government support. Two hotel managers (6 and 12) stated the following:

> *"Lack of government support remains a challenge. We are barely trying to survive and pay staff salaries" - (HM6).*

Concurring with the above statement was Manager 12:

> *"Lack of government support and grants is the barrier" - (HM12)*

Chan, Okumus and Chan (2018) point out the lack of government support as a barrier to technology adoption. The authors reiterate that, as long as government support is absent, the adoption of service automation technologies by hotels may involve lengthy and complicated administrative processes, such as municipal permits for the approval of changes in spaces within and around the hotel, for the addition of new technological facilities, which may influence a hotel's decision to adopt service automation technologies. To reiterate, Ezzaouia and Bulchand-Gidumal (2020: 4) emphasize that government

support plays a very crucial role in both the adoption and implementation of IT and other technologies in the tourism and hospitality industry. The results clearly highlight that there is a lack of government support for the hotels in the city of Durban. Government support comes in various forms which include policymaking and regulations and financial (grants) support which may make the adoption of service automation technologies by the hotels, to be easier and smoother. Without the support from the government, the development of tourism does not materialise and its full potential is never fully realized. South Africa's tourism industry attributes its lagging in adopting new technologies to the lack of government support. This highlights a gap regarding the local government taking the initiative to harness technological innovations in hotels and the tourism sector in general in Durban, thus presenting a new call for rigorous policy developments that will address technological innovation in the South African Tourism Industry. The next subtheme will examine the extent of the impact of the above-discussed barriers on a hotel's competitive advantage.

5.5.2 SUBTHEME 5.2: THE IMPACTS OF BARRIERS ON THE COMPETITIVE ADVANTAGE IN HOTELS IN DURBAN

It is impossible to ignore the rate at which advances in IT have drastically transformed the hotel sector and the tourism industry at large. The tourism industry has embraced technology as the most powerful tool that affords hospitality entities the ability to swiftly conduct business through improved and advanced communication methods with employees and clients, enhance employee and business performance and efficiency, and most importantly, create and maintain a competitive advantage (Ezzaouia and Bulchand-Gidumal 2020: 2). Given the association between technological innovation and hotel competitive advantage, the managers from Durban were asked "How have the barriers to introducing SATs affected the hotel's ability to develop a competitive advantage?" It was uncovered that while some of the managers believe that barriers impede the adoption of SATs, other managers disagree that the adoption of SATs negatively impact their hotel's competitive advantage. Four of the hotel managers indicated that due to a lack of financial strength, the hotels cannot introduce service automation technologies and compete with international hotel standards. One of the managers reported the following:

> *"Yes, lack of finance to adopt service automation technologies has affected* our *competitive advantage to meet standards of international leading hotel properties" - (HM2).*

In agreement with the above statement, Hotel Manager 4 reiterates that developing a competitive advantage requires capital:

> *"The barriers do affect our competitive advantage. Developing a competitive advantage such as the adoption of robots requires capital which we currently do not have due to the pandemic" -*

(HM4).

Various studies have depicted that travelers and hotel guests continue to feel dissatisfied engaging in the traditional human-to-human and face-to-face interactions in service encounters. Consumer preferences have been significantly increasing towards service encounters and interactions that are technology-driven, thus in the near future, hospitality and tourism organizations that continue to emphasize their position for traditional human interactions, are likely to find it difficult to compete with other hospitality organizations who are rapidly adopting service automation technologies (Gupta and Sharma 2021: 237). Similarly, 7 out of the 11 hotel managers interviewed, maintain that their hotels are traditional hotels that are centred around human touch and traditional human-to-human interactions. This implies that the hotels in the city of Durban that have not adopted and have no intentions of adopting service automation technologies are running the risk of not being competitive and active role players in the global competitive tourism and hospitality industry, especially post-COVID-19, where there are high levels of uncertainty about how the industry will be and travelers with changing preferences who are seeking technology-driven service encounters in hotels. Hotels in the city of Durban are lagging in exploiting the opportunities that are brought about by the advancements in IT and the adoption of service automation technologies.

The diffusion of advanced and smart technologies within the hospitality and tourism industry remains low (Ivanov and Webster 2019a). This view by the authors is true, especially in the context of the city of Durban. Through this study, it was discovered that the hotels that were part of this study highlighted the absence of service automation technologies and other smart technologies, although three hotels indicated their future plans to introduce a service robot and install digital door locks. Currently, the city of Durban is home to one smart hotel, the Hilton Garden Inn hotel. Dogan and Vatan (2019: 384) highlight that the reasons why tourism and hospitality businesses embrace the adoption of service automation technologies are to capitalize on opportunities, such as:

(i) improved efficiency- service automation technologies have the ability to work longer than humans,

(ii) saving on labour costs-through the substitution of employees and relieving them from repetitive daily tasks, and

(iii) improving service quality and guest experiences through the introduction of new interactive technologies that call for new ways to engage in service encounters in hotels.

As much as this may be the case for competitive advantages, in contrast, five of the managers believed that the barriers uncovered in the implementation of service automation technologies did not affect the

hotel's competitive advantage. Manager 1 stated that their hotel's competitive advantage was not affected at all.

"Our competitive advantage is not affected at all" - (M1).

In support of the above statement, three other hotel managers echoed the same viewpoints. The hotel managers pointed out that they benefit from such factors as

(i) having a strong loyal customer base,

(ii) the ability to offer guests a personalized service is a strong competitive advantage and lastly,

(iii) competitive advantage attributed to hotel rooms being 1.7 times bigger than average hotel rooms, and

(iv) direct access to Durban's popular Gateway Mall.

In line with these hotel managers' viewpoints, Tussyadiah (2020: 102883) states that hotels that are located in the proximity of public transport systems, restaurants, shopping centers and malls, and the city center, are the preferred and ideal hotels for hotel guests, especially for those who are seeking convenience As much as this may be the case, the hotel managers should bear in mind that due to the outbreak of the COVID-19 pandemic, travelers and consumers have experienced changes in their preferences and the entire global tourism industry experienced a paradigm shift towards the adoption of service automation technologies such as service robots. The absence of service automation technologies in hotels in the city of Durban results in them not being competitive in the global tourism industry as travelers now are relying on the use of technologies for safer tourism experiences which is expected to continue post-pandemic. There remains a need for hotels in Durban to introduce new smart service automation technologies and attributes post-pandemic, which includes the introduction of contactless services that are driven by robotics and AI-smart technologies.

5.6 CONCLUSION

This chapter discussed, in detail, the findings of the study results from the data that was collected through online questionnaires and structured interviews with the hotel managers in the city of Durban. The findings were categorized into four main themes, following a thematic analysis and discussion. The study findings were discussed in line with the study objectives and the available body of literature to ascertain whether the findings are accordance with the literature. Key issues can be elicited from the above discussion. The respondents (hotel guests) are in favor of SATs over human beings (employees) to reduce the chances of being infected with the COVID-19 virus. However, the same guests prefer human employees on the basis that they offer high levels of interactivity than the repetitive services of SATs. Secondly, the guests are of the view that hotels that introduce SATs should charge lower premiums as

they benefit from reduced operational costs, and thus are not willing to pay higher premiums. Thirdly, most hotel managers are of the view that they are human-orientated and offer traditional hotel services. Fourth, hotel managers indicated that capital and financial difficulties are the most common barriers that impede the adoption of SATs followed by a lack of IT skills and infrastructure. Overall, there is potential for the adoption of SATs by the hotels in the city of Durban, attributed to some hotel managers stating that draft plans are already in place to introduce SATs such as digital door locks and a service robot. From the above discussion, it is mainly noted that no proper adoption of SATs guidelines is available for the tourism industry. In conclusion, the city of Durban is lagging the adoption of technologies. The next chapter, Chapter Six, will present the achievements of the study in relation to the proposed aim in detail.

CHAPTER SIX
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The previous chapter discussed the findings of the study based on the analysis and interpretation of data from the sampled 11 General Hotel managers by means of structured interview questions and online questionnaires for the target population from Durban. The study adopted a convergent parallel mixed method. This chapter serves presents an overview of the study, including a summary of the attainment of study objectives and questions, a synopsis of the study findings, and then proceeds to draw attention to the proposed conclusions and recommendations. In addition, it proposes areas for future research as a contribution to the body of literature within the context of tourism and technology adoption in South Africa.

The aim of the study is to promote a technologically driven tourism industry post-COVID-19 in South Africa. In order to achieve this aim, the study set out five main research objectives: examine COVID-19 as a driver of service automation technologies in hotels and the impact of such technologies in the tourism industry in Durban; assess the attitudes of hotel guests' in Durban towards the use of service automation technologies in hotels; analyse the role of service automation technologies in achieving guest hygiene, and cleanliness in hotels operating in Durban and lastly, examine the barriers that affect the implementation of service automation technologies in hotels operating in the city of Durban. The next section of the study will outline an overview of the study, evaluate the achievements of the study objectives and research questions and elucidate how each of the objectives was achieved.

6.2 OVERVIEW OF THE STUDY

The research study is made up of six chapters. An overview of the chapters is provided below:

Chapter 1: This chapter provided the research context of the study variables and the background from which this study originates. The chapter also provided the nature of the research problem which was the main reason this study was undertaken, the rationale for the study and the research objectives which were translated into relevant research questions were presented.

Chapter 2: The literature review was arranged in line with the research objectives and the aim of the study is to promote a technologically driven tourism industry post-COVID-19 in South Africa as proposed in Chapter 1. This chapter highlighted and discussed previous research findings that relate to

the variables that are relevant to the study. Existing literature on COVID-19, the hotel and the tourism industry and technology adoption were discussed.

Chapter 3: This chapter provided sufficient discussion around the methodology that was applied in this study to attain the proposed aims and objectives. A parallel convergent mixed-method approach was adopted, and its benefits were outlined in detail. In addition, the study used both non-probability and probability sampling techniques through the application of purposive sampling techniques for the hotel managers and simple random sampling techniques for the hotel guests. All these methods were supported by relevant literature.

Chapter 4: This chapter presented the analysis and interpretation of the primary research findings from the online questionnaires and structured interviews used to elicit information relevant to achieving the study's aim and objectives. The findings were presented with the aid of statistical analysis (descriptive statistics and inferential statistics) and thematic analysis for the qualitative data. The findings were presented in themes relating to the objectives and the research questions.

Chapter 5: This chapter presented a discussion of the study findings by drawing out major themes that emerged from the findings that were presented in the previous chapter. Literature was used to ascertain and compare the study findings with the findings of other previous research studies and the work of other authors. The discussion of results was presented under four major themes with the use of graphical figures and tables to emphasize the study findings, especially in relation to the objectives.

Chapter 6: The concluding chapter of this study provides a synopsis of the entire research study. This chapter also presents an overview of the major primary findings of this study. In addition, the chapter presents the limitations of the study and the recommendations according to the study findings pertaining to the adoption of service automation technologies by the hotels in the city of Durban. The areas that require future research attention are also outlined.

6.3 ACHIEVEMENT OF STUDY OBJECTIVES AND RESEARCH QUESTIONS

This study was directed at setting out to promote a technologically driven tourism industry post-COVID-19 in South Africa.

The study applied a thematic approach which categorized the study into four major themes that emerged from the study objectives. Primary data collected through online questionnaires and structured interview

questions were analyzed in accordance with the identified themes. From the empirical data analysis, major findings that were present were corroborated by existing academic literature and the findings of scholars and researchers who conducted similar studies. It is important to emphasize that data was collected on two separate occasions, using online questionnaires for hotel guests and structured interviews with 11 General Hotel Managers from 4- and 5-star graded hotels in the city of Durban. SPSS version 20 was used to analyze quantitative data and NVivo software was used to analyze qualitative data of the study. This section draws attention to the major findings identified by the researcher in relation to the objectives, and they are discussed below:

6.3.1 OBJECTIVE 1: EXAMINE COVID-19 AS A DRIVER OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS AND THE IMPACTS OF SUCH TECHNOLOGIES IN THE TOURISM INDUSTRY IN DURBAN.

This objective sought to understand the extent of the influence of COVID-19 as a driver of service automation technologies in hotels. In order to achieve this objective, the research question "how *has COVID-19 accelerated service automation technologies and what impact will such technologies have on the tourism industry in KZN?" was developed*. Therefore, the following findings can be reported:

I. Quantitative results advised that there was a high level of agreement amongst the respondents that COVID-19 is a driver of SATs in hotels.
II. There were high levels of agreement that due to the outbreak of the COVID-19 pandemic, there was an introduction of innovative technologies among which include cashless and contactless payments and the use of health and travelling Apps
III. The respondents appeared to be unsure of whether the adoption of service robots and related robotic technologies was a result of the COVID-19 pandemic.

Similarly, hotel managers were asked, *"Covid-19 has been noted as a driver of service automation technologies in hotels. How true do you think this statement is?"* Different hotel managers presented different views regarding COVID-19 as a driver of SATs in the hotel. The findings are as follows:

IV. The majority of the hotel managers were in agreement that COVID-19 is a driver of SATs in hotels. The hotel managers were of the view that the pandemic has forced hotels to be innovative in order to attract travelers in the midst of the pandemic.
V. Due to the pandemic, one hotel property introduced an automated booking system which allows guests to choose their own preferred hotel rooms prior to arrival and check-in and five hotel properties introduced automatic sanitizing stations, which eliminate frequent human touch. The hotel managers indicated that they could only afford such technology due to it being much more

affordable compared to the rest of the available technologies, one hotel property introduced an Easy Application System, which is an on-the-go system for seamless hotel operations and management. Lastly, one hotel property introduced the Omni Online System which is used by housekeeping and maintenance teams to track the status of guest rooms just to avoid long queues and waiting times before guests can occupy their hotel rooms. This eliminates overcrowding in the hotel lobby, which is against the COVID-19 protocols.

VI. The majority of the hotel managers reported that the outbreak of the pandemic made hotel administrative staff realise the importance of technology, for innovation within the tourism and hospitality industry and futureproofing it for future pandemics similar to COVID-19. In this regard, some of the hotels indicated that plans are in place to introduce service automation technologies which include a service robot, three hotels indicated they are planning to install digital door locks for hotel rooms and three hotels stated that they will introduce UV lighting technology systems for enhanced cleaning measures.

6.3.1.1 IMPACTS OF SERVICE AUTOMATION TECHNOLOGIES

Part of objective one was to determine what impacts will the adoption of service automation technologies have on hotels in Durban and the city's tourism industry. The hotel managers were asked what impacts they thought the adoption of SATs will have on their hotels and the tourism industry in Durban. The findings are as follows:

I. 63% of the hotel managers highlighted the positive impact which includes, their hotels and the tourism industry in Durban becoming extremely competitive within the global tourism platform, offering guests convenience during their hotel stay, utilizing human employees more in other areas of the hotel such as guest relations, improved hotel services and efficiency, limited human errors during service delivery, appeal to international travelers, especially those who are technologically inclined and savvy, and the reduction of operational costs, especially labor costs.

II. As there are a lot of positives about the adoption of SATs, the main negative concern that emerged was the loss of employment. The hotel managers explained that through automation, there will be job losses and human substitution, loss of the human touch in tourism experiences within the hotels and the city may result in travelers being reluctant to travel.

III. In addition, quantitative results presented that a total of 80.8% of the respondents were concerned that there will be job losses in the hotels in the city of Durban due to SATs.

IV. Findings revealed that amongst the impacts of SATs in the tourism industry in Durban would include guests' being assured of their health and safety through improved sanitization protocols.

This is supported by the Maslow's Theory of Needs presented , level 2 (health and safety) which is presented in Figure 2. The second level of needs are defined as an individual seeking security and safety from danger, illnesses and viruses. Guests and travellers are seeking safety and security from the infection of COVID-19 virus during travelling. Technology has emerged as an ultimate tool which the tourism industry can use to thrive on assuring guests of their health, safety and security.

From the above findings, the attainment of this objective was achieved and the research question was adequately answered. The findings identified that COVID-19 is indeed a driver of SATs in hotels as it is evident with some of the hotels developing plans for the introduction of SATs such as a service robot, digital door locks and UV lighting technology for enhanced cleaning.

6.3.2 OBJECTIVE 2: ASSESS THE ATTITUDES OF HOTEL GUESTS IN DURBAN TOWARDS THE USE OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS.

S research question was developed to address research objective two, which was to assess consumer attitudes and perceptions towards the use of service automation technologies in hotels.

The research question was "What are the attitudes of hotel guests' in Durban towards the use of service automation technologies in hotels?" The attitudes of hotel guests were measured using five different subthemes. The findings are presented below:

I. **Perceived usefulness of technologies:** Overall, the analysis suggests that respondents prefer human interactive services over automation which could be attributed to the fact that hotel service automation technologies only offer programmed answers (4^{th} statement). Hence, respondents noted that they could not interact with hotel service automation technologies as they would with human employees (5^{th} statement) as shown in Table 4. 9. Respondents were of the view that human employees are more useful than SATs as they do not provide repetitive and programmed answers. Similarly, five hotel managers presented that leisure tourists favour human employees due to being addressed by their names unlike business travelers who are always on the go and in favour of SATs due to their usefulness of affording them the pleasure of saving time.

II. **Perceived ease of use of technologies:** The level of agreement on the perceived attitudes towards the use of technology in hotels. There was significant agreement (75.6%) that technology is perceived with ease of use, with the results yielding ($M=2.00\pm0.880$; $p<0.001$).

In terms of the statement "It is easy to learn to use hotel technology, a significant number of the respondents were in agreement (68.4%), with the results given as ($M=2.18\pm0.895$; $p<0.001$). Overall, it is sufficient to conclude that respondents had a positive attitude towards the use of technology in hotels. It was found that the 5th statement which refers to using hotel automation technology will enable me to save check-in and check-out time had the most support for the use of technology in hotels and had high levels of agreement as shown in Table 4. 10.

III. **Privacy and Security concerns associated with the use of SATs in hotels:** quantitative data indicated that there was significant agreement (62.1%) among the respondents that using hotel automation technology infringes on privacy, resulting in as ($M=2.21\pm0.929$; $p<0.001$). Similarly, there was significant agreement (50%) that respondents did not feel safe when using automation technology, resulting in as ($M=2.48\pm1.085$; $p<0.001$) as shown in Table 4.11 and Figure 4.5 to hacks and cyber-attacks which could result in their personal information being wrongly used. Overall, this suggests that the respondents are genuinely concerned about the privacy of their personal information, as there was significant agreement that the use of service automation technologies requires too much personal information.

IV. **Attitudes towards using technology (preference between human employees and SATs):** Concerning hotel guests' preferences between human employees versus service automation technologies, there was significant agreement amongst the respondents that they prefer human hotel employees. They highlighted that they believe that human employees provide a degree of attention that no technology can provide. In addition, they also indicated that human employees provide quality services that no technology can provide. There was also a significant agreement amongst the respondents that service automation technologies do not bear the risk of COVID-19 infections compared to human employees. This is critical and suggests that respondents prefer service automation technologies to human employee counterparts mainly due to the risks of COVID-19 infection in the latter and pay more for human-driven services in hotels.

V. **Actual use of technologies (Purchase intentions):** The pricing of hotel services often influences the purchase intentions of consumers and travelers. The respondents presented that the adoption of service automation technologies by hotels is just a ploy for guests to pay higher premiums, as a result, there was significant agreement amongst the respondents that they have no intentions of paying higher premiums due to service automation in hotels. In

this regard, respondents believed that hotels that adopt service automation technologies should charge lower premiums because of lower operational costs. Overall, the results indicated that respondents always compare prices before they make a booking and a purchase since service automation technologies are just not important. In conclusion, the study results advised that younger travelers and generations had more positive attitudes towards service automation technologies in hotels than the older travelers and generations. This is in line with most studies and was supported by the relevant literature.

The TAM presented in Figure 2. 3 was applied to the study to assess the attitudes of hotel guests in Durban towards the use of SATs and the above summarised findings were concluded. However, the study deviated from the TAM to assess privacy and security concerns associated with the use of SATs in hotels. This deviation was motivated by the POPI Act which is explained in detail in section 2.4. The POPI Act promotes the right to privacy and protection of personal information. The results presented that the was a high agreement amongst the respondents that SATs are susceptible to cyber-attacks and hacks which could result with their personal information being wrongly used. The results implied that there is a need for hotels that adopt SATs to comply with the POPI Act as far as the guests' personal information is concerned. In order to attain the above objective and research question, an ANOVA test was carried out. In addition, to ascertain the attitudes of the hotel guests toward the use of SATs in hotels, a regression test analysis was also carried out to adequately address the research questions and develop a conceptual research framework

6.3.2.1 ANOVA TEST OF SOCIO-DEMOGRAPHIC AND THE PERCEIVED ATTITUDES TOWARDS THE USE OF SATS IN HOTELS

Regarding the age group and the respondents' perceived attitudes towards the use of technology, the data obtained indicates that there was a statistically significant difference ($p<0.001$). The analysis indicated that the respondents within 41-50 years had the lowest mean value ($M=1.71\pm0.9$) while the highest value was found for the respondents within 51-60 years of age ($M=2.75\pm0.9$). This suggests older respondents (51-60 years) perceived attitudes toward the use of technology in the hotel were less favourable when compared to other age groups. Similarly, Vitezić and Perić (2021: 932) state that Generation Z members who were born into a digital world and are exposed to various types of technologies, often have positive attitudes towards adopting technology when compared to their older counterparts. For the respondent's highest level of education, the data indicated that there was a statistically significant difference with

respect to their perceived attitudes towards the use of technology (P=0.021). The analysis of the mean value indicates that respondents with a high level of education (M=1.83±0.4) had a more favourable attitude towards the use of technology in a hotel when compared to other groups. The data is presented in Table 4. 14.

6.3.2.2 REGRESSION ANALYSIS OF THE ATTITUDES OF HOTEL GUESTS TOWARD THE USE OF SATS IN HOTELS

Regression analysis tests were carried out on the following attributes that determine the attitudes of hotel guests towards the use of SATs in hotels. The findings are as follows:

I. **Perceived usefulness of technology:** in an attempt to answer Research Objective 2, it was imperative for the researcher to gain an understanding of the perceived attitudes of hotel guests towards the use of service automation technologies in hotels concerning the perceived usefulness of technology when compared to humans. Table 5.2 indicates the regression coefficient ($r=0.370$; $p<0.001$), which suggests a relationship between interactivity and humans. The beta coefficients for human service preference ($\beta =0.365$) were positive and significant ($p<0.001$). This means that there is agreement that human services increase interactivity. In contrast, the beta coefficients ($\beta=0.056$) measured for service automation preference (machine) although positive was, however, not significant ($P>0.05$). The R^2 values measured suggest that there was a strong explanatory power (14.3%). The above regression analysis advises and suggests that the hotel guests in the city of Durban agree that human employees in the hotels were within enhanced levels of interactivity compared to service automation technologies.

II. **Safety and security concerns:** Table 5.3 indicates the regression coefficient ($r=0.318$; $p<0.001$), which suggests a causal relationship in the predicted model. The beta coefficients for human service preference ($\beta =0.317$) were positive and significant ($p<0.001$). This means that there is agreement that human services increase safety and security. In contrast, the beta coefficients ($\beta=0.007$) measured for service automation preference (machine) although positive was, however, not significant ($P>0.05$). The R^2 values measured suggest that there was a strong explanatory power (10.1%). The results advise that hotel guests in the city of Durban should have more trust in human employees than service automation technologies due to privacy and security risks which influence their purchase intentions.

III. **Actual use of technologies (purchasing intentions):** Table 5.4 indicates the regression coefficient (r=0.561; p<0.001), which suggests a causal relationship in the predicted model. The beta coefficients for both safety (β =0.230) and interactivity (β=0.452) were positive and significant (p<0.001). The R^2 values measured suggest that there was a strong explanatory power (31.1%). Overall, the results suggest that interactivity constitutes the strongest predictor of hotel guests' pricing and purchase intentions towards the use of service automation technologies in hotels.

From the above, the attainment of this objective was achieved and the research question was adequately answered as the findings were subjected to regression analysis and ANOVA test. The tests revealed that younger respondents had a more positive attitude towards SATs than older respondents. Respondents with high levels of education also showed a positive response toward the use of SATs. Regression analysis results advised that human employees are preferred due to high levels of interactivity. More so, respondents had a more positive attitude towards human employees as they believed they do not pose a threat to their personal information since SATs can easily be hacked and their personal information be misused. Lastly, the findings advised that the levels of interactivity were the strongest predictors of hotel guests' pricing and purchasing intentions in hotels. This is further presented in Figure 6. 1.

6.3.3 OBJECTIVE 3: ANALYSE THE ROLE OF SERVICE AUTOMATION TECHNOLOGIES IN ACHIEVING GUEST HYGIENE AND CLEANLINESS IN HOTELS OPERATING IN DURBAN

This research objective sought to analyse the role of service automation technologies in achieving guest hygiene and cleanliness in hotels operating in the city of Durban. The objective translated into the following research question, *"What is the role of service automation technologies in achieving guest hygiene and cleanliness in hotels in Durban?"* The outbreak of the COVID-19 pandemic heightened the importance of hygiene and cleanliness in hotels, and the everyday lives of travelers and hotel guests in general. The qualitative findings are as follows:

I. The hotel managers indicated that hygiene and cleanliness are extremely important at their respective hotel properties, even way before the pandemic, but the outbreak of the pandemic forced them to be innovative in introducing measures that will enhance their current cleaning and hygiene measures.
II. The 11 hotels that were part of this research study introduced measures such as the use of screen barriers between employees and hotel guests, physical distancing stickers, regular sanitizing protocols of hotel buildings, the use of stronger detergents, automatic hand sanitizing stations,

the hotel guest screenings and temperature checks, and the discontinuation of buffet services to eliminate frequent human contact.

III. Only one hotel property out of the 11 hotel properties, introduced the electrostatic spraying technology system for enhanced cleanliness and hygiene in guest rooms. This highlighted a gap within the city of Durban as the study identified the absence of cleaning technology systems such as service cleaning robots, UV lighting technologies and the use of electrostatic spraying technologies.

IV. The majority of the hotel managers are of the view that there is no need for their hotels to introduce service automation technologies such as technological cleaning systems. In this regard, the managers emphasized that the current cleaning methods in place for enhancing cleaning and hygiene standards are much more effective than the use of cleaning technologies such as robots.

V. The hotel managers emphasized that humans (housekeeping teams) understand the nature of the COVID-19 pandemic and they are committed to measures and protocols in place, which cannot be achieved through the use of service cleaning robot technologies.

VI. There were concerns about cleaning robots malfunctioning and conducting repetitive tasks that might result in poor hygiene and cleanliness standards within the hotels. The managers concluded that the adoption of cleaning technology systems would only enhance their current hygiene and cleanliness protocols, however, they would still require support from housekeeping teams. Therefore, this means that technology cleaning systems are not much more effective than the measures facilitated by housekeeping teams.

In addition to the above, the respondents (hotel guests) presented a much more positive attitude towards cleaning technologies as a tool for enhanced hygiene and cleanliness standards. The findings are as follows:

I. The quantitative results presented the trend that there was significant agreement amongst the respondents that hotel cleaning technology systems would carry out sanitizing activities much more effectively than human employees.

II. Results regarding technologies for cleanliness and hygiene advised that the respondents believed in the clarity and reliability of hygiene and cleanliness information provided by cleaning technological systems, as well as believing that cleaning technology systems will be much more effective than human housekeeping teams.

III. The respondents were, however, neutral in their thoughts regarding technological systems having a better understanding of the importance of hygiene and cleanliness than human employees.

In conclusion and in relation to the proposed objective and research question, travelers and hotel guests placed their trust in technological cleaning systems more than in human housekeeping teams as far as cleanliness and hygiene are concerned in hotels. The respondents strongly believed that the role of cleaning technology systems is to eliminate the spread of the COVID-19 virus in and around the hotels in Durban by providing state-of-the-art and world hygiene and cleanliness standards that cannot be achieved through the use of human labour. The above findings ascertained that the above objective was attained and the research question was adequately answered. The findings suggest that guests are in favour of cleaning technological systems over human beings for higher standards of hygiene and cleanliness. The hotel managers maintained the view that housekeeping teams clean better, however, technological cleaning systems can further enhance their hygiene and cleanliness efforts.

6.3.4 OBJECTIVE 4: EXAMINE THE BARRIERS THAT AFFECT THE IMPLEMENTATION OF SERVICE AUTOMATION TECHNOLOGIES IN HOTELS OPERATING IN THE CITY OF DURBAN.

This objective sought to identify barriers that hotels that participated in the study from Durban are facing in terms of the adoption of SATs. The research question that led this objective was "What are the barriers that affect the implementation of service automation technologies in hotels operating in Durban?". Therefore, through the interviews with 11 General Hotel Managers, the following barriers were identified and reported:

I. **Financial difficulties:** All the 11 General Hotel Managers attributed financial difficulties to the pandemic which affected revenue income streams. Due to the lockdown regulations, hotel booking cancellations occurred with resulted with extremely low capital level flows. General Hotel Managers pointed out that SATs are expensive and they are struggling with keeping their open for business.

II. **Lack of IT knowledge and Infrastructure:** South Africa is experiencing a deficit in IT skills and related infrastructure. The General Hotel Managers in Durban reiterated that their hotel buildings were not designed to incorporate or support the adoption of SATs, thus resulting with insufficient infrastructure. Legislation also poses a challenge as the Labour Relations Act 66 of 1995 prohibits South African employers from employing a foreign national within the jurisdiction of the country. It was also uncovered that the hotels lack organisational readiness to adopt SATs. The Innovation Process in an Organisation Theory presented in Figure 2.5 under the Theoretical Framework section of the study highlights four key factors for organisational innovation: (1) Employee Skills, (2) Strategic Advantages, (3) Organisational Capabilities and, (4) Decision-

Making Procedures. These key factors are absent in hotels in Durban. Some General Hotel Managers reported that decisions about the adoption of SATs can only me made by regional head office since they belong to a Chain Hotel Group.

III. **Guest and Employee Resistance:** Through interviews it was discussed that the employees will reject the adoption of SATs as they may fear losing their jobs. In addition, the hotels in Durban primarily serve the domestic tourism market especially during the COVID-19 pandemic, which may not be inclined with the use of technology which will lead to them resisting their use. This was attributed to the fact that they were previously disadvantaged and have low levels of education.

IV. **Lack of government support:** Lack of government support was identified as the fourth barrier confronting hotels in Durban in terms of the adoption of SATs. The 11 General Hotel Managers expressed that there are no clear guidelines from the government in terms of the adoption of SATs and support such as grants and funding, information dissemination and training. Lack of government support deviates from Legislation, particularly, the Broad-Based Black Economic Empowerment (BBBEE) Act no. 46 of 2013 which promotes access to finance for black economic empowerment. In addition, The National Department of Tourism introduced a Tourism BBBEE Charter which expresses the commitment of the government and other stakeholders towards transformation, and empowerment through enterprise and people development within the South African tourism sector. The government has directed little effort and minimal resources towards the tourism development and innovation in South Africa.

The objective was successfully achieved and the research question " What are the barriers that affect the implementation of service automation technologies in hotels operating in Durban?" prompted the 11 General Hotel Managers to point out barriers that each of the respective hotels are facing. The Legislative Framework was also applied to ascertain the barriers and challenges towards the adoption of SATs in Durban.

6.3.5 OBJECTIVE 5: TO DEVELOP A CONCEPTUAL FRAMEWORK FOR THE SUCCESSFUL IMPLEMENTATION OF SERVICE AUTOMATION TECHNOLOGIES FOR HOTELS AND THE TOURISM INDUSTRY IN DURBAN.

This objective sought to develop a conceptual framework for the successful implementation of service automation technologies for the hotels and the tourism sector in Durban. Therefore, this study proposes a SATs Adoption framework which is presented in Figure 6.1 below:

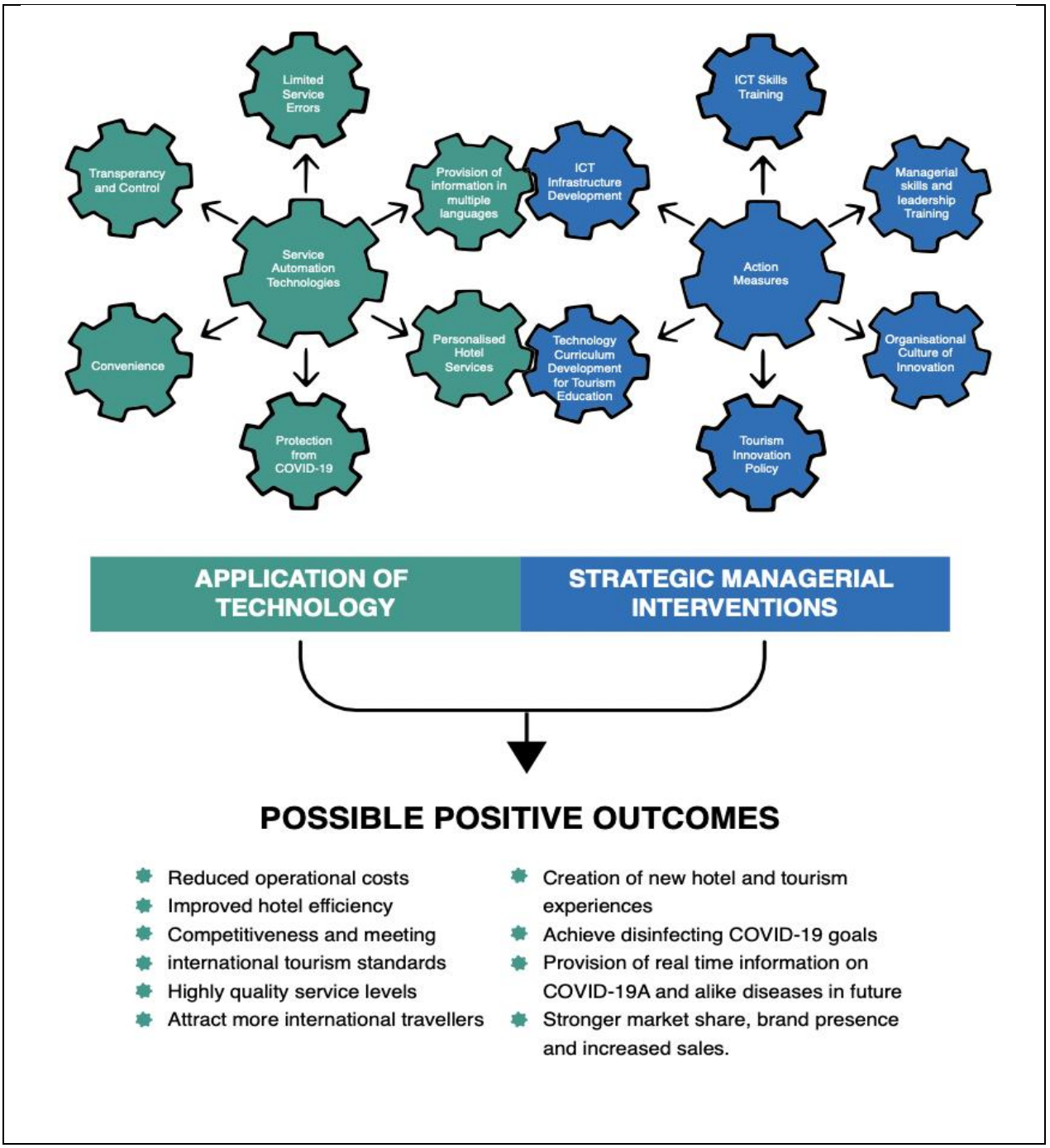

Figure 6. 1: SATs Adoption Framework
Source: Author's own impression

6.3.5.1 Description and Summary of SATs Adoption Framework

The SATs Adoption Framework illustrates the efforts and the relationship that must exist between the application of technology and the need for strategic managerial interventions in hotels in Durban. The framework clearly explains that in order for the hotels in Durban to adopt SATs, there is a need for strategic managerial interventions, which some are internal interventions (Organisational culture of innovation, Managerial skills and leadership training, and ICT skills training) while some interventions are external (Tourism innovation policy, Technology curriculum development for tourism education, and ICT infrastructure development). Synergy and collaboration to action these strategic managerial interventions will result with the successful adoption of SATs by hotels and the tourism industry in Durban at large.

6.3.5.2 BENEFITS FOR ADOPTING SATS

The adoption of technology by hotels in the city of Durban offers hotel guests benefits such as enjoying service with limited errors, convenience, the provision of personalized hotel services, protection from COVID-19, and most importantly, transparency and control over hotel and tourism services. Hotel guests cannot enjoy such benefits offered by SATs in hotels if key strategic managerial interventions are not in motion. Hotels also get to benefit from possible positive outcomes such as reduced operational costs (through reduced labor costs), improved hotel efficiency (maximize available resources to produce high-quality guest services), Competitiveness (ability to successfully achieve customer preferences and needs over other hotel competitors), Maintaining international tourism standards (improve hotel sustainability and provision of the utmost hotel products and services that instill confidence in travelers) amongst others, as shown in Figure 6.1.

6.3.5.3 NAVIGATING TOWARDS SATS ADOPTION IN HOTELS

In order for the SATs Adoption Framework to be beneficial to hotels and to ensure the successful adoption and implementation of SATs, Hotels need to engage with the below checklist as a quest to ensure organisational technology readiness. The above proposed SATs Adoption Framework further proposes guidelines for the adoption of SATs in Hotels in Durban. In order for hotels to overcome challenges associated with the adoption of SATs, the below checklist should be used as a compass and a blueprint for hotel managers when they adopt SATs.

I. **Plan (which technology is relevant in our setting?):** It is imperative to conduct a SWOT Analysis so that insight can be gained into the type of SATs that best suits the nature and type of the respective hotels. The size of the hotel will influence the relevant technologies that a hotel should adopt.

II. **Identify/target population (who are the target population? Who are the stakeholders, what are the immediate needs?):** Hotel guests' needs play a pivotal role in the running of a hotel. Through market research and carefully analysing guests' profiles and needs, preferences and attitudes, the adoption of SAT's by hotel managers could address the immediate needs of their hotel guests and also resonate with their target market.

III. **Engage/consult (develop an engagement strategy with stakeholders e.g., employees, trade unions and government):** The adoption of SATs may result in debates around the issues of job losses, however, the adoption of SAT's will open more employment opportunities for the sector, such as jobs in ICT and related areas. Hotel managers need to engage in stakeholder dialogues to harness the possible collaboration between employees and SATs. The development of a Tourism Innovation Policy/Strategy remains urgent. This is further explained in the recommendations section.

IV. **Confront (recognize the problems and develop strategies to confront those problems e.g., skills, etc.):** South Africa is facing a challenge of ICT skills deficit. Hotel managers alongside the government should harness Public-Private Partnerships to facilitate skills training and the provision of grants and financial support. The findings noted lack of financial capacity and lack of ICT skills, as the key challenges that impede the development of SATs.

V. **Develop (develop managerial strategies e.g., financial, governance etc. long term goals vis a vis short and medium terms goals):** There remains a deficit in the literature pertaining to how hotels should go on about the adoption of SATs. It is imperative to develop internal technology plans that act as managerial strategy, which comprises both short and long term goals. Hotels should adopt SATs in phases in relation to the available finances

VI. **Risk (identify risk and strategize on mitigation):** Through planning and consultations with stakeholders, hotel managers should be in a position to identify the risks that are associated with the adoption of SATs such as the emerging threat of loadshedding in South Africa and the ongoing support needed for the functioning of SATs. The two common risks that should be planned for by hotel managers are guests' and employees' resistance once SATs are introduced.

6.4 LIMITATIONS OF THE STUDY

The study has the following limitations:

I. The study samples present themselves as a limitation to this study due to their nature. The study population includes 4- and 5-star graded hotels. In this regard, the study results cannot be confidently generalized to the entire province of KwaZulu-Natal and South Africa as a country. The findings of the study can only be generalized within the borders of the city of Durban.

II. The majority of the hotels included in the study were 4-star graded properties, with only one hotel property being a 5-star graded property. Most 5-star graded properties turned down the invitation to participate in the study. In this regard, the results may be biased as the majority of the hotels included in the study are 4-star graded properties since they have different sets of operational standards for services and amenities compared to 5-star graded hotels.

III. The study results cannot be generalized to 1-3-star graded hotels as operational norms, facilities, amenities and services are not of the same standard.

IV. Lastly, the study is restrictive in terms of its research design, technique, data collection tools, and data analysis methods. All these were selected and arranged based on the nature of the study, aim and outcome thereof, guided by the study objectives.

6.5 RECOMMENDATIONS

Having discussed the findings with subsequent conclusions drawn by the researcher, the following recommendations are suggested to hotel managers, tourism developers, tourism policymakers and the government. The recommendations are divided into two categories, internal environment (hotels) recommendations and external environment (tourism industry) recommendations.

6.5.1 INTERNAL ENVIRONMENT

The internal environment includes all the internal actions that the hotel, through the leadership of the general manager, can facilitate and coordinate for the successful adoption of service automation technologies. It is important to note that the hotel managers have full control over the internal environment. These are as follows:

I. **Research and Development (R&D):** The hotels in the city of Durban should engage and direct efforts toward research and developmentactivities. Throughresearch and development , hotels in

the city of Durban will be in a position to compare and conduct research on various technologies. Technology remains expensive. The hotel's executive management team will be able to explore avenues such as why some types of service automation technologies are relevant and resonate with the travel market that they are currently catering to; the role of that particular technology in providing synergy and integration between various departments of the hotel for improved total hotel efficiency; and determining the return on investment of the technology.

II. **Skills Training and Workshops:** Hotels in the city of Durban need to train employees on new skills that are related to new business and the hotel's journey to embracing technological innovation. The hotel managers should be responsible for enhancing their employees' lifelong education and development surrounding their set of soft skills which includes creativity, innovation and empathy. In addition, the hotel managers should focus on developing their employees' key skills in areas such as communication, customer-centricity, marketing and promoting the use of service automation technologies to the hotel guests. Skills training should also be centred around hard skills such as the abilities of employees to maintain and operate service automation technologies to assist hotel guests in the event they get confused when using them. Hotels in the city of Durban should also develop their own internal blueprints for upskilling and reskilling their employees to future proof them and their hotels for the ongoing digital transformation that continues to characterise the tourism and hospitality industries.

III. **Organizational Culture of Innovation:** In order for the hotel managers of the 11 properties to seize full advantage of technological innovation opportunities, they should develop and harness an internal organisational culture of innovation within their respective hotels. This will assist them in preparing for similar future pandemics, such as the ongoing COVID-19 pandemic. Harnessing an organisational culture of innovation by executive management, especially for the hotels in the city of Durban that are chain affiliated will positively impact the hotel managers' intentions to adopt service automation technologies.

6.5.2 EXTERNAL ENVIRONMENT

The external environment comprises all the activities that are beyond the control of the hotel managers in Durban but would impact their ability to adopt service automation technologies. It is important for the internal and external environmental actions to be in synergy to facilitate the smooth adoption of service automation technologies. The study makes the following recommendations:

I. **Government Support:** Government support can also be seen through the promotion of technology for the tourism industry and the cultivation of a culture of embracing technologies within the tourism industry in Durban. One of the ways in which the government can support the

adoption of service automation technologies is through tax rebates. Hotels in the city of Durban can be offered special tax rates for technology adoption or even contribute less towards the tourism levy. The government should consider the development and introduction of technology innovation awards, grading and labels for the hotels in Durban that adopt service automation technologies. Most importantly, the government should support the hotels in Durban by directing efforts toward providing the hotels with relevant information and knowledge, facilitating awareness programmes and conducting training sessions for hoteliers and hotel managers on the adoption of technology to train staff on the adoption of service automation technologies and the actual tangible benefits thereof. There should also be a legislative framework that harnesses technology adoption within and by the tourism industry in Durban.

II. **Public-Private Partnerships (PPP):** Through PPPs, efforts and actions will be directed towards embracing smart technologies for the hotels and the tourism industry in Durban by providing solutions to the challenges that hotels in the city of Durban are facing regarding the adoption of various technologies. Most importantly, build stronger relationships between the public and private sectors. This study also proposes a call for the creation of multi-stakeholder partnerships between private and public tourism organizations to rigorously engage in robust conversations with technology partners that need to be identified in order to facilitate the successful adoption of technologies. All these actions will bridge the technology adoption gap within the city of Durban and South Africa at large.

III. **Technology for Tourism Policy Formulation:** Through the development of policy, issues and challenges such as lack of adequate skills, barriers to adopting technologies, the future of work in tourism, upskilling and reskilling of hotel employees should be addressed. Such a policy should also harness an environment for digital transformation within tourism organizations such as hotels. Technology for tourism policy will also be a tool to promote the potential of innovative technologies and digital transformation for the tourism sector and facilitate the creation of more jobs and provide guidelines for sufficient support through the transition of future work within the South African tourism sector.

IV. **Hospitality and Tourism technology education and curriculum:** South Africa's tourism landscape is characterized by a lack of proper education and curriculam that promotes professional development opportunities concerning digital hospitality and tourism technology. There is a dire need for hospitality and tourism technology education and curricula to provide adequate knowledge on the latest technology innovations adopted by the tourism industry, the

ones that are yet to be developed, and best practices for the adoption of technology in the hospitality industry, especially in hotels.

V. Such curricula and education are needed and would be important for educating hotel managers in Durban along with future hoteliers and hotel managers on the importance of technology for the development and growth of their businesses and the tourism industry at large.

6.6 AREAS FOR FUTURE RESEARCH

This research study was limited to the hospitality sector, specifically hotels. In future, scholars can explore how best hotels can foster and harness collaborations between human employees, especially housekeeping teams, and robotic technologies about how they can work in teams with AI for advanced cleaning measures and protocols. The study identified concerns surrounding job losses as a result of the adoption of service automation technologies in hotels. Therefore, one research area worth exploring is how technology will transform the labour needs of the tourism and hospitality industry and what types of new job roles will emerge from the prevalent outbreak of technologies such as AI as they continue to be embraced and adopted by the tourism and hospitality industry. Lastly, future empirical studies can direct efforts and attention to cross-cultural issues that may act as a barrier to technology adoption in hotels. Furthermore, research can be conducted to ascertain how the adoption of technology will transform back of the house hotel operations and the impacts thereof on the general well-being of employees.

6.7 CONCLUDING REMARKS AND CONCLUSION

This research study intended to promote a technologically driven tourism industry post-COVID-19 with a focus on hotels in Durban. There was a pressing need for this type of study due to the COVID-19 pandemic. Nevertheless, the pandemic has accelerated a digital transformation not only in the tourism and hospitality industry but across all sectors of the economy. South Africa formulated the National E-strategy, which aimed to position South Africa as an active and valuable role player in the development of various ICTs throughout all sectors of the economy including tourism. Nonetheless, South Africa is still lagging in terms of technology adoption, especially in the tourism sector when compared to developed and developing countries. Even with the abundance of literature pertaining to COVID-19 accelerating the adoption of service automation technologies within the tourism sector, this study was limited as it was confined to parameters of Durban using a few selected 4- and 5-star graded hotels . The

study findings serve as a foundation and can be selectively applied to other hotels across the province of KwaZulu-Natal and South Africa at large even beyond where possible. Most importantly, the study made a significant contribution to the body of literature on how technology has transformed the tourism industry amid the ongoing COVID-19 pandemic and how it will continue to transform it post-pandemic. In conclusion, through coordinated efforts and effective political leadership, an enabling environment for technology adoption by the South African tourism sector is very possible.

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Annexure 1 - Reliability and Validity Test

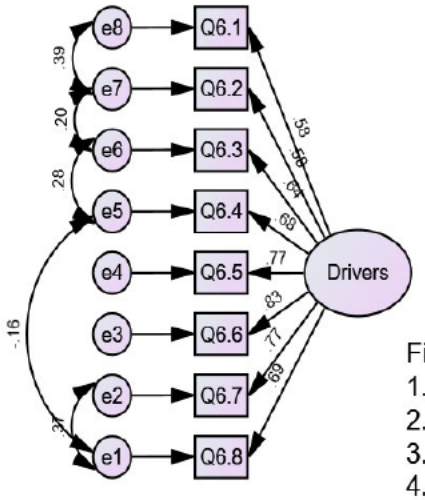
Validating Covid-19 as a driver of technological innovation

Using the eigenvalues greater than one, the PCM for the extracted items Covid-19 as a driver of technological innovations revealed a single-component dimension explaining 56.8% of the total variance.

Table 4. 16: Factor loading for Covid-19 drivers of technological innovation

	Component 1	Composite reliability	Cronbach alpha	Average variance extracted (AVE)
Q6.7	.827	0.903	0.903	0.511
Q6.6	.819			
Q6.9	.807			
Q6.5	.778			
Q6.8	.749			
Q6.3	.727			
Q6.4	.708			
Q6.2	.683			
Q6.1	.670			
Extraction Method: Principal Component Analysis.				

Cronbach's alpha score for the dimension was above the recommended value of 0.70. This suggests that the construct Covid-19 as a driver of technological innovation has excellent reliability. Confirmatory factor analysis (CFA) was further used to validate the EFA analysis. The model revealed a good fit to the data (Chi Square=72.147; df=17; P=0.018; cmindf=2.061; RMSEA=0.046; CFI=0.992; TLI=0.985; GFI=0.983). As shown in Figure 4.1, all items loaded significantly on their hypothesized latent constructs that demonstrate a construct's validity. It is worth mentioning that the standardized factor loading with a value of 0.50, or higher, provides strong evidence of convergent validity (Hair et al. 2010). As shown in Table 4.17, the average variance extracted (AVE) had factor loadings above the recommended value, which suggests adequate convergent validity.



Showing Covid-19 as a technological

Fitness Indexes:
1.P-value=.018
2.CFI=.992
3.GFI=.983
4.TLI=.985
5.RMSEA=.046
6.ChiSq/df=1.902

CFA analysis of driver of innovations

Figure 4. 9: Validating attitudes towards the use of service automation technology in the hotel

Using the eigenvalues greater than one, the PCM for the extracted items measuring attitudes towards the use of service automation technology in the hotel revealed a seven-component dimension explaining 63.5% of the total variance.

Table 4. 17: Factor loading for attitudes towards the use of service automation in the hotel

			Component						
			Ease of use	Low interactivity	High Interactivity	Human preference	Machine preference	6	Safety concerns
Q8.5	Ease of use	0.867	.797						
Q8.6			.788						
Q8.4			.728						
Q8.7			.726						
Q8.2			.666						
Q8.1			.647						
Q8.3			.544						
Q11.7	Low interactivity	0.826		.792					
Q11.5				.786					
Q11.4				.774					
Q11.6				.763					
Q11.2				.612					
Q9.8		0.771			.735				
Q11.1					.733				

Q11.3	High interactivity				.657				
Q9.6					.639				
Q9.4									
Q9.2	Human preference	0.826				.814			
Q9.1						.788			
Q9.3						.785			
Q9.5									
Q9.10	Machine preference	0.751					.721		
Q9.9							.691		
Q9.7							.677		
Q10.4								.810	
Q10.5								.785	
Q10.3									
Q10.2	Safety concern	0.726							.787
Q10.1									.780
Q10.6									.522
		Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.							

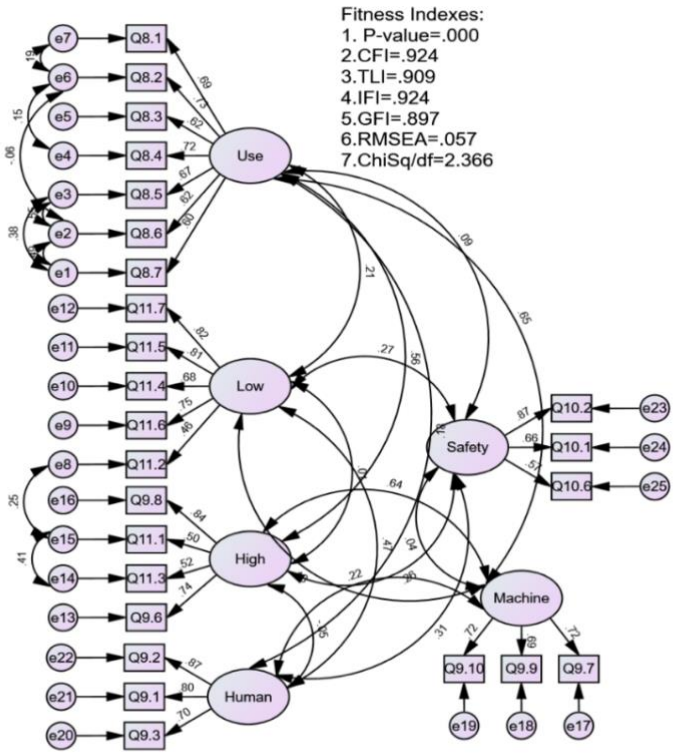
As a basic principle, only the factor with loading 0.5 and above was retained and used for further analysis while items below the recommended value were dropped from the original constructs. Also, further with less than three items were deleted and discontinued from further analysis. Factor 1 had seven items and loaded strongly into the original dimension “attitude towards ease of use. The emerged Factor 2 contained five items which categorized under the low interactivity. The emerged Factor 3 had four items which is a variant of the level of interactivity (Item Item 11.1 and 11.3) and preferences between human versus service automation categorized under high interactivity (Item 9.6 and Item 9.8) categorized under high interactivity. The emerged Factor four had three items categorized under human preferences. The emerged Factor five had three items regrouped into a new dimension of “service automation”. The emerged Factor six had two items and was therefore removed from further analysis. The emerged factor seven had three items categorized under safety concerns. The Cronbach’s alpha score for all the emerged dimensions was above the recommended value of 0.70. This suggests that the construct attitudes towards the use of service automation in the hotel have acceptable reliability.

Confirmatory factor analysis (CFA) was further used to validate the EFA analysis. The model revealed a good fit to the data (Chi Square=72.147; df=17; p<0.001; cmindf=2.061; RMSEA=0.046; CFI=0.924; TLI=0.909; IFI=0.924). As shown in Figure 4.2, all items loaded significantly on their hypothesized latent constructs that demonstrate a construct's validity. It is worth mentioning that the standardized factor

loading with a value of 0.50, or higher, provides strong evidence of convergent validity (Hair et al. 2010). As shown in Table 4.19, the average variance extracted (AVE) for Factor 2, 4, 5, and 7 had factor loadings above the recommended value, which suggests adequate convergent validity. However, the AVE value measured for Factor 1, and 3 failed to support the convergent validity. Nevertheless, all factors had MSV values lower than AVE values which support the discriminant validity.

Table 4. 18: Showing the convergent and discriminant validity for attitudes towards service automation in the hotel

	CR	AVE	MSV	MaxR(H)	Machine	Ease of Use	Low interactivity	High interactivity	Human	Safety
Machine preference	0.752	0.502	0.428	0.752	**0.709**					
Ease of Use	0.847	0.443	0.428	0.852	0.654	**0.666**				
Low interactivity	0.837	0.515	0.219	0.865	0.135	0.207	**0.717**			
High interactivity	0.752	0.442	0.410	0.810	0.640	0.563	0.011	**0.665**		
Human preference	0.832	0.625	0.219	0.852	0.222	0.179	0.468	-0.052	**0.791**	
Safety	0.749	0.506	0.099	0.815	0.043	0.090	0.271	0.259	0.315	**0.711**



Showing CFA analysis of the attitudes towards the use of service automation technologies in hotels

Figure 4. 10: Validating the perception of pricing and purchase intentions towards the use of technology in hotel

Using the eigenvalues greater than one, the PCM for the extracted items measuring attitudes towards the use of service automation technology in the hotel revealed two-component dimensions explaining 59.5% of the total variance. As shown in Table both the Cronbach alpha and the AVE measured were below the accepted value. Hence, it is suggested that caution be applied in the interpretation of the result.

Table 4. 19: Factor loading for pricing and purchase intention constructs

			Component		Cronbach alpha	CR	AVE
			1	2			
Q12.6	0.679	Price sensitive	.772		0.679	0.684	0.357
Q12.5			.761				
Q12.3			.729				
Q12.2			.531				
Q12.1				.875			
Q12.4				.783			

Annexure 2 - Letter of Information- Hotel Managers

LETTER OF INFORMATION

Title of the Research Study: The promotion of a technologically driven tourism industry post covid-19: A case study of hotels in Durban, South Africa

Principal Investigator/s/researcher: Siphiwe William. Btech: Tourism Management

Co-Investigator/s/supervisor/s: Dr Erasmus Mnguni: PhD
Dr Emema Anwana: PhD

Brief Introduction and Purpose of the Study: This research study is motivated by the outbreak of the COVID-19 outbreak and how it has accelerated the use of digital technologies within the tourism industry. The COVID-19 pandemic has altered how tourism will be consumed and has influenced new consumer behaviors and preferences for tourism products. Digital technologies are now making its way on the operational and marketing activities of hotels and travel consumers are responding positively to them, because they ensure their health, safety, and hygiene. The main purpose of this study is to assist hotels on becoming COVID-19 compliant suing service automation technologies thus remaining competitive

Greeting: Dear Hotel Manager/ Departmental Manager

Introduce yourself to the participant: I am a 2nd year student at DUT doing research for my Master of Management Sciences degree in hospitality and tourism.

Invitation to the potential participant: I would like to invite you, in your capacity as a hotel manager to participate in the research as per the above title of the study.

What is Research: Research can be defined as a systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions.

Outline of the Procedures: This study will adopt structured interviews as a measuring instrument. The researcher will conduct an interview with you after a suitable appointment has been scheduled. Due to the COVID-19 pandemic, you have the option to choose to have the interview via MS Teams to avoid human-to-human direct contact. The researcher will travel to the respective location of the hotels that are part of the study. The interview process will take place in non-contrived settings with minimal interference from the researcher. Lastly, as, and when necessary, follow-up information will be requested to conclude the study.

Risks or Discomforts to the Participant: You will not be forced to take part in the study without their permission or consent thereof. Should the participant feel any form of discomfort in participating in the study, their wish will be respected and there are no risks that may impact on the health of the participants or whatsoever, as there are no medical or scientific procedures involved with the data collection process of this research study.

Explain to the participant the reasons he/she may be withdraw from the Study: Should you wish to withdraw your participation in the study, there will be no consequences involved and participants may do so. The researcher may also choose to disqualify participants should they be found guilty of not being honest and providing misleading information. Honesty is of paramount importance to the conduct of this study

Benefits: Benefits for you taking part in this study might involve might include the ability to respond positively to the impacts of the COVID-19 on the marketing and operations of hotels after the results of the study has been made available upon request. There is also a possibility of publications by the researcher after the study. Should there be any publications after the study be concluded, it will solely be for academic purposes and nothing bey

Remuneration: There will be no form of remuneration involved in participating in this research study. Participation is solely voluntary and not considered compulsory at all.

Costs of the Study: You will not be expected to cover any expenses related to the conduct of this study. The costs involved in this study will be that of the responsibility of the researcher**.**

Confidentiality: You will remain strictly anonymous and there will be no mention of names, and the data collected will be accessed by the researcher and the supervisor directly involved in this study. Data will be handled in such a way that it does not infringe or impact on your well-being and should there be a need to discard data after the study has been concluded, this will be done based on university procedures so not to expose the participants and the information they provided or whatsoever.

Results: The research results will be available upon request and will be shared via mail. Alternatively, they can be accessed from the DUT online repository.

Research-related Injury: Since this study is not a scientific or medical research type of study, there will be no injury sustained by the participants as there are no experiments or medical procedures that might require medical samples to be drawn from the participants. This research study is that of a social science**.**

Storage of all electronic and hard copies including tape recordings: Only the researcher will have access to all data collected and intended for the purpose of this research study. Electronic data will be stored on Google Drive until the results for this study are provided by the examiners.

Persons to contact in the Event of Any Problems or Queries: Please contact the researcher: Mr. Siphiwe William (073-811-5540/21533005@dut4life.ac.za), my supervisor: Dr Erasmus Mnguni (0313735507/erasmus@dut.ac.za) or the Institutional Research Ethics Administrator on 031 373 2375.

Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

General:

You are reminded that their participation on the study is voluntary and not compulsory. A copy of the information letter will be made to the participants for them to refer to the relevant type of information that they might need clarity on. The participants of this study will include hotel managers and hotel guests.

CONSENT

Full Title of the Study:

Names of Researcher/s:

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, _____ (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: 146/21_,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, _____ (name of researcher) herewith confirm that the above participant has been fully

informed about the nature, conduct and risks of the above study.

Full Name of Researcher	**Date**	**Signature**
Full Name of Witness (If applicable)	**Date**	**Signature**
Full		

Annexure 3 - Letter of Information- Hotel Guests

LETTER OF INFORMATION

Title of the Research Study: The promotion of a technologically driven tourism industry post covid-19: A case study of hotels in Durban, South Africa

Principal Investigator/s/researcher: Siphiwe William. Btech: Tourism Management

Co-Investigator/s/supervisor/s: Dr Erasmus Mnguni: PhD
Dr Emema Anwana: PhD

Brief Introduction and Purpose of the Study: This research study is motivated by the outbreak of the COVID-19 outbreak and how it has accelerated the use of digital technologies within the tourism industry. The COVID-19 pandemic has altered how tourism will be consumed and has influenced new consumer behaviors and preferences for tourism products. Digital technologies are now making its way on the operational and marketing activities of hotels and travel consumers are responding positively to them, because they ensure their health, safety, and hygiene. The main purpose of this study is to assist hotels on becoming COVID-19 compliant suing service automation technologies thus remaining competitive

Greeting: Dear Hotel Manager/ Departmental Manager

Introduce yourself to the participant: I am a 2nd year student at DUT doing research for my Master of Management Sciences degree in hospitality and tourism.

Invitation to the potential participant: I would like to invite you, in your capacity as a hotel manager to participate in the research as per the above title of the study.

What is Research: Research can be defined as a systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions.

Outline of the Procedures: This study will adopt structured interviews as a measuring instrument. The researcher will conduct an interview with you after a suitable appointment has been scheduled. Due to the COVID-19 pandemic, you have the option to choose to have the interview via MS Teams to avoid human-to-human direct contact. The researcher will travel to the respective location of the hotels that are part of the study. The interview process will take place in non-contrived settings with minimal interference from the researcher. Lastly, as, and when necessary, follow-up information will be requested to conclude the study.

Risks or Discomforts to the Participant: You will not be forced to take part in the study without their permission or consent thereof. Should the participant feel any form of discomfort in participating in the study, their wish will be respected and there are no risks that may impact on the health of the participants or whatsoever, as there are no medical or scientific procedures involved with the data collection process of this research study.

Explain to the participant the reasons he/she may be withdraw from the Study: Should you wish to withdraw your participation in the study, there will be no consequences involved and participants may do so. The researcher may also choose to disqualify participants should they be found guilty of not being honest and providing misleading information. Honesty is of paramount importance to the conduct of this study

Benefits: Benefits for you taking part in this study might involve might include the ability to respond positively to the impacts of the COVID-19 on the marketing and operations of hotels after the results of the study has been made available upon request. There is also a possibility of publications by the researcher after the study. Should there be any publications after the study be concluded, it will solely be for academic purposes and nothing bey

Remuneration: There will be no form of remuneration involved in participating in this research study. Participation is solely voluntary and not considered compulsory at all.

Costs of the Study: You will not be expected to cover any expenses related to the conduct of this study. The costs involved in this study will be that of the responsibility of the researcher**.**

Confidentiality: You will remain strictly anonymous and there will be no mention of names, and the data collected will be accessed by the researcher and the supervisor directly involved in this study. Data will be handled in such a way that it does not infringe or impact on your well-being and should there be a need to discard data after the study has been concluded, this will be done based on university procedures so not to expose the participants and the information they provided or whatsoever.

Results: The research results will be available upon request and will be shared via mail. Alternatively, they can be accessed from the DUT online repository.

Research-related Injury: Since this study is not a scientific or medical research type of study, there will be no injury sustained by the participants as there are no experiments or medical procedures that might require medical samples to be drawn from the participants. This research study is that of a social science**.**

Storage of all electronic and hard copies including tape recordings: Only the researcher will have access to all data collected and intended for the purpose of this research study. Electronic data will be stored on Google Drive until the results for this study are provided by the examiners.

Persons to contact in the Event of Any Problems or Queries: Please contact the researcher: Mr. Siphiwe William (073-811-5540/21533005@dut4life.ac.za), my supervisor: Dr Erasmus Mnguni (0313735507/erasmus@dut.ac.za) or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

General:

You are reminded that their participation on the study is voluntary and not compulsory. A copy of the information letter will be made to the participants for them to refer to the relevant type of information that they might need clarity on. The participants of this study will include hotel managers and hotel guests.

CONSENT

Full Title of the Study:

Names of Researcher/s:

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, _____ (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: 146/21_,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, _____ (name of researcher) herewith confirm that the above participant has been fully

informed about the nature, conduct and risks of the above study.

Full Name of Researcher	**Date**	**Signature**
Full Name of Witness (If applicable)	**Date**	**Signature**
Full		

Annexure 4 - Research Questionnaire – Hotel Guests

Research Topic: Promoting a technologically driven tourism industry post COVID-19: A case study of hotels operating in Durban, South Africa.

Dear Participant

This questionnaire is designed to study the adoption of technology by hotels beyond the COVID-19 pandemic. The information that you are going to provide will assist with a better understanding of how consumer travel purchase decisions will be like post COVID-19 and how hotels can adapt the use of technology in order to guarantee their guests health and safety as much as possible. I kindly request that you answer the questions honestly and ask for clarification where necessary.

Thank you very much for your time and cooperation. I greatly appreciate the help of your organization and yourself in furthering this research endeavour.

ETHICAL CONSIDERATIONS AND DECLARATION:

i. The primary responsibility of the researcher as far as this study is concerned is to treat the information given by the respondent as confidential as possible.
ii. Personal or seemingly intrusive information will not be solicited, and if it is necessary for the project, it will be tapped upon with high sensitivity to the respondent, offering specific reasons.
iii. The self-esteem and self-respect of the subjects involved will not be violated.
iv. If a respondent does not wish to participate or avail themselves for an interview/ completion of questionnaires, the individual's desires will be respected and will not be forced to participate.
v. There will be no misrepresentation or distortion in reporting the data collected during the study.
vi. The data collected from this study is solely intended for academic purposes, no other reasons that.
vii. The results of the study will be made available upon request by the respondents who took part in the study

INSTRUCTIONS FOR COMPLETION:

i. Please indicate your answers clearly.
ii. Indicate your answers making use of the sign "X" or "√" to indicate your answer Please make use of a black or blue ink pen, it will be provided upon request.
iii. Please kindly complete all questions.
iv. Provide a justification where necessary.
v. Where necessary, please ask for assistance or clarity with questions that you might find it difficult to understand.

1. **Please indicate your age group.**

18-21	21-30	31- 40	41-50	51-60	61-70	>70

2. **Please indicate your gender.**

Male	
Female	

3. **Highest level of education attained.**

No formal education		Completed high school		Higher certificate/diploma	
Undergraduate Degree		Postgraduate Degree		Other	

4. **What type of accommodation do you usually stay in?**

1 Star		2 Star		3 Star		4 Star		5 Star	

5. **Please rate the importance of the following attributes when choosing a hotel brand especially beyond COVID-19.**

	Not Important	**Important**	**Very Important**
Hygiene and Cleanliness			
Health and safety			
Hotel facilities			
Service quality			
Sanitization standards			
Limited human contact			
Hotel brand			
Service automation			
Adequate social distancing practices amongst guests and staff			

6. **COVID-19 has been considered as a driver of technological innovation. Indicate the level of your agreement for the following statements.**

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
A move towards a cashless society and the use of contactless payments					
The adoption of health and travelling apps for travelers and hotel guests					
Drones serving as delivery tools for contactless delivery in hotels and the tourism industry at large					
A wide adoption of robotics in hotels to eliminate physical human contact					
The use of 3-D scanners to obtain the health status of tourists and guests					
The emergence of collaboration between human employees and artificial intelligence					
The use of mobile apps for contactless guest room controls and personalization features					
The emergence of wireless e-menus in hotel owned restaurants					
The use of autonomous delivery carts to deliver guests' luggage in their rooms without any physical contact					

7. **Rate the level of agreement with the following statements to measure your perceived attitudes towards the use of technology in hotels in terms of ease of use…**

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Technology is perceived with ease of use					
It is easy to learn to use hotel self-service technology					
Much conscious efforts are not needed when using any hotel self-service technology					
I do not find using hotel self-service technology difficult					
Using hotel automation technology enables me to save check-in and check-out time					
Using hotel automation technology makes my check-in and check-out easier					
Overall, hotel automation technology limits unnecessary processes					

8. **Rate your level of agreement with the following statements in terms of attitudes towards using technology (preference between humans and service automation technologies)**

	Strongly agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
I prefer interacting with human employees at a hotel					
Human employees provide a degree of attention that no technology use can provide					
Human employees can provide quality service that no technology can provide					
Robots will be faster than human employees					
Service automation technologies can malfunction during service and employees do not.					
Hotel service automation technology can satisfactorily cater for my needs like human employees					
Hotel service automation technologies limits unnecessary human employee contact					
Robots will be able to understand guests' level of satisfaction than human employees					
Service automation technologies do not have a high risk of infection of COVID-19					
Service automation technologies are able to provide information in different languages than human employees					

9. **Indicate your level of agreement in terms of the following statements in relation to privacy and security issues…**

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Using hotel automation technology infringes on my privacy					
I do not feel safe when using hotel automation technology					
Hotel service automation technology can store my personal data safely					

Hotel service automation technology can easily be hacked, and my personal information be wrongly used					
hotel service automation technology requires too much of my personal information					
I prefer sharing my personal information with human employees than service automation technologies					

10. Indicate your level of agreement in terms of the following statements in relation to perceived usefulness of technologies

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Robots are more interactive than human employees.					
Hotel service automation technologies offer low levels of interactivity.					
Hotel service automation technologies offer high levels of interactivity.					
Hotel service automation technologies only offer programmed answers.					
I cannot interact with hotel service automation technologies like I would with human employees.					
The quality of hotel service automation technologies is poor					
Hotel service automation technologies do not offer active communication					

11. Indicate your level of agreement for the following statements in terms of actual use of technology (purchase intensions)

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
I would pay a high premium for a service automated hotel					
Service automated technologies are a ploy for guests to pay higher prices					
I have no intensions of paying higher premiums for service automation technologies in hotels					
Price does not matter as long as I receive excellent hotel service					
Hotels should charge lower prices if they use service automation technologies because of reduced operational costs.					

I always compare prices for different hotels before I book. Service automation technologies are not important					

12. Indicate your level of acceptance of the following smart technologies to achieve and promote hygiene and cleanliness should they be introduced in hotels.

	High acceptance	**Moderate acceptance**	**Neutral**	**Low acceptance**
Smart cameras with facial-recognition capabilities for contactless check-in and check-out processes				
The use of e-housekeeping app to avoid overcrowding before checking-in				
Autonomous cart integrated with lifts for room and bell services				
Artificial intelligence enabled chat-bots for guests to electronically lodge their concierge queries				
Wireless e-menus for food and beverage orders to be placed via mobile devices				
Contactless payments integrated seamlessly with the kitchen management and point-of-sale systems				
The use of secure autonomous in-room dining robots for delivery to guest rooms				
automatic sanitizing stations around the hotel property				
Artificial intelligence enabled dashboard integrated with internet of things to manage in-room controls				
Voice activated systems for opening hotel room doors instead of traditional key cards				
The use of robots to automatically sanitize guest rooms and disinfect surfaces				

13. Please indicate if you agree with the following statements or not on the use of technological systems to enhance hygiene and cleanliness …

	Yes	**Not sure**	**No**
I think that hygiene and cleanliness information offered by technological systems is clear, sincere, and reliable			
I think that hotel technological systems will carry out sanitizing activities more effectively than human employees			
I think that hotel technological systems have a better understanding of the importance of hygiene and cleanliness than human employees			
I think that hotel technological systems can easily detect hygiene and cleanliness risk hazards than human employees			

I think that hotel technology systems can better maintain high standards of hygiene and cleanliness than human employees			
I think the use of cleaning robots will carry out effective sanitization practices in hotel rooms than housekeeping teams			

14. There are often barriers associated with the use and adoption of technologies. Aa a hotel guest, the following are barriers to adopting to the use of technology

	TRUE	**FALSE**
An innovative technological hotel product is associated with high price value		
There is often privacy and security issues related with the use of various service automation technologies		
The use of service automation technologies results with lack of interaction with trained human employees		
Services automation technologies provide poor service quality compared to human employees		
Lack of skills and knowledge that associated with operating service automation technologies in hotels is a barrier		
The use of automated service technologies is associated with job losses therefore I have no interest in using them		
Maintenance and network challenges that are associated with service automation technologies impede on satisfaction		
Technology is rapidly advancing therefore this will result with guests exposed to too many technologies that might confuse me		

Annexure 5- Hotel Managers' Interview Guide

HOTEL MANAGERS-STRUCTURED INTERVIEW QUESTIONS

Research Topic: Promoting a technologically driven tourism industry post COVID-19: A case study of hotels in Durban, South Africa.

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ETHICAL CONSIDERATIONS AND DECLARATION:

- The primary responsibility of the researcher as far as this study is concerned is to treat the information given by the respondent as confidential as possible.
- Personal or seemingly intrusive information will not be solicited, and if it is necessary for the project, it will be tapped upon with high sensitivity to the respondent, offering specific reasons.
- The self-esteem and self-respect of the subjects involved will not be violated.
- If a respondent does not wish to participate or avail themselves for an interview/ completion of questionnaires, the individual's desires will be respected and will not be forced to participate.
- There will be no misrepresentation or distortion in reporting the data collected during the study.
- Data collected from this study is solely intended for academic purposes, no other reasons than that. The results of the study will be made available upon request by the respondents who took part in the study.

Date of Interview: _____

Time of Interview: _____

Name of Organization: _____

SECTION A: RESPONDENT AND HOTEL PROFILES

1. **What is your age group?**

Under 30 years		31-35 years	
36-40 years		41-50 years	
51-60 years		More than 60 years	

2. **What is your Gender?**

Female	
Male	

3. **How long have you been in the position of a manager in your hotel?**

1-5 years		6-10 years	
11-15 years		16-20 years	
More than 20 years			

4. **What is your highest level of qualification?**

High School		Diploma	
Higher Certificate		Undergraduate Degree	
Postgraduate Degree		Other	

1. **What is the star category of this hotel?**

1 Star		2 Star		3 Star		4 Star		5 Star	

2. **Which traveller market does this hotel cater for?**

Business travellers		Leisure travellers		Both business and leisure travellers	

3. **Which of the following facilities does this hotel offer?**

Restaurant		Swimming pool		Business centre	
Spa		Conference rooms		Gym	
Shops		Theatre		Other, please specify	

4. **What type of ownership is this hotel under?**

Independently owned		Family owned		Chain Hotel	

5. **How many guestrooms does this hotel consist of?**

SECTION B: INTERVIEW QUESTIONS

Objective 1: Examine COVID-19 as a driver of service automation technologies in hotels and the impacts of such technologies in the tourism industry in Durban?

1.1 What impacts did the hotel experience as a result of the COVID-19 pandemic?

1.2 COVID-19 has been noted as a driver of service automation technologies in hotels. How true do you this is and what are your views regarding this matter and is technological innovation a concern for your hotel?

1.3 What impacts do you believe service automation technologies will have on your hotel and the tourism industry in Durban?

1.4 Are there any service automation technologies introduced in your hotel as a result of COVID-19? Please elaborate on them.

1.5 Has COVID-19 made your hotel realize the importance of introducing service automation technologies?

Objective 2: Assess the attitudes of hotel guests in Durban towards the use of service automation technologies in hotels.

2.1 How are hotel guests' attitudes and perceptions measured in this hotel and how often are they measured?

2.2 How is it important for your hotel to have such information from guests' and will such information help determine the future of service automation technology in this hotel?

2.3 Do hotel guests' perceptions and attitudes impact on the running and management of your hotel? How have their attitudes and perceptions impacted the running and management of your hotel?

2.4 Based on your hotel guests' profiles, what do you think perceptions and attitudes are or will be towards service automation technologies in this hotel?

Objective 3: Analyse the role of service automation technologies in achieving guest hygiene and cleanliness in hotels operating in Durban

3.1 To what extent is guests' hygiene and cleanliness important in this hotel? What innovative measures are in place to ensure highest standards of hygiene and cleanliness?

3.2 How affective your hotel's current hygiene and cleanliness practices? Do you think they are more effective than the use of technology and vice-versa?

3.4 Investments in technology by hotels and tourism sector will be crucial beyond COVID-19 to assure guests of health, hygiene, cleanliness, and improved sanitization practices. What plan has been developed by the hotel and how will it be implemented?

SECTION B: INTERVIEW QUESTIONS

Objective 1: Examine COVID-19 as a driver of service automation technologies in hotels and the impacts of such technologies in the tourism industry in Durban?

1.1 What impacts did the hotel experience as a result of the COVID-19 pandemic?

1.2 COVID-19 has been noted as a driver of service automation technologies in hotels. How true do you this is and what are your views regarding this matter and is technological innovation a concern for your hotel?

1.3 What impacts do you believe service automation technologies will have on your hotel and the tourism industry in Durban?

1.4 Are there any service automation technologies introduced in your hotel as a result of COVID-19? Please elaborate on them.

1.5 Has COVID-19 made your hotel realize the importance of introducing service automation technologies?

Annexure 6 - Gatekeeper Letters

Annexure 7 - Ethics Clearance Letters

Annexure 8 - Editor's Report

Sury Bisetty Academic Editing Services

The pen is mightier than the sword

To whom it may concern,

I have edited a dissertation entitled: *Promoting a technologically driven tourism industry post COVID-19: A case study of hotels in Durban, South Africa*_by **Siphiwe William**, student number: 21533005, submitted in fulfilment of the requirements for a **Master of Management Sciences Degree in Hospitality and Tourism** Management in the Faculty of Management Sciences, Durban University of Technology.

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