

Digitalization-A Strategic Approach to Promote the Hospitality Industry in Order to Increase Tourism in Sri Lanka with Monetary Gain

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ABSTRACT

The purpose of this research was to empower hospitality management and because of that increase tourism attraction. In 2018 direct contribution to GDP was 4.9% It was decrease to 4.3% after the 2019 Easter attack. In 2020 this hugely decreased to 0.8% according to the Tourism Authority of Sri Lanka. Covid 19 impact was affected by that.

This study aims at explaining in detail how technology can use to improve the tourism sector. Therefore, the digitalized hotel management system was implemented as a solution for that.

Keywords— Tourism Industry, Hotel Management, IoT, Hospitality, Economy Growth

implemented in 1977. Between 1977 and 1982, there was an increase in visitor arrivals of 153,665 to 407,230, a 23% average annual rise. It is possible to think of the years 1978 to 1982 as a rather wealthy time in early history. Also, In, 1986 Sri Lanka Tourism Board has been established. When riots broke out between ethnic groups in July 1983 and the LTTE-led separatist conflict in the North and East became more intense, the first tourism boom, which lasted from 1966 to 1982, came to an end. Between 1983 and 2009, this separatist conflict had a substantial negative impact on Sri Lanka's tourism sector and drastically tarnished the image of the nation as a safe travel destination. The Sri Lankan tourism industry suffered between 1987 and 1989 as political upheaval moved to the country's south as well as its north and east.

After the brutal conflict in Sri Lanka between the government security forces and separatist militants concluded in May 2009, the island country saw an unprecedented post-conflict tourism boom. There are currently much more foreign visitors to Sri Lanka than ever before, both annually and monthly.

In 2015, Sri Lankan tourism rose to a new high of 1,798,380. As a result, Sri Lanka's tourism sector now plays a significant role in the country's foreign exchange earnings, job growth, and ability to attract foreign direct investment. Both direct and indirect employment opportunities related to tourism increased by 319,436 in 2015, while foreign exchange receipts increased by Rs. 405,492 million (US\$ 2,980.6 million).

In the contemporary world, tourism is largely responsible for human mobility. According to the World Tourism Organization (2020), the global tourism industry has been growing for ten years straight, with 1.5 billion foreign tourists predicted in 2019 and 1.8 billion expected by 2030. Sri Lanka's tourism industry is expanding yet but, the country is still not fully digitized. In 2020, the coronavirus caused a further decline in Sri Lanka's tourism industry. Then, in 2022, tourism somewhat grew but did not expand as much as previously. As a result, our hotel management system was put into place as a means of luring travelers back to Sri Lanka.

I. INTRODUCTION

Establishing a tourism business and preserving it for the benefit of the nation is referred to as tourism development. Today, tourism serves as a significant source of income for many nations throughout the world. Tourism is the main source of income in Sri Lanka.

Since Sri Lanka's history dates back more than 2500 years, travelers have come here for a variety of reasons. As a developing country, Sri Lanka has seen significant growth in the tourism industry. The hotel management sector of the tourism business is crucial. The grounds that draw many foreign investors and tourists to Sri Lanka include the provision of decent meals, room amenities, and other entertainment facilities in the hotel management. Sri Lanka is currently in an excellent position in terms of hospitality.

The introduction of a ten-year master plan for tourism development in Sri Lanka in 1966 marked the start of the industry's commercial growth. The number of visitors increased significantly from 18,969 in 1966 to 153,665 in 1977. In other words, at a pace of 21% on average every year, Sri Lanka welcomed more foreign visitors over this period. Sri Lanka's tourism sector continued to grow after open economic policies were

II. LITERATURE REVIEW

The development of the tourism industry depends on the integration of information and communication technology (ICT) with tourism. ICT's effects on the tourism industry have been extensively researched. Fast information diffusion decreased distance between nations, and enhanced transparency is some of the advantages of ICT for the tourism industry. The investigation was conducted to clarify how the digital economy is affecting the travel and tourism sector. The study emphasized how technology was adopted by businesses like airlines, hotels, auto rentals, and tour and travel operators, which led to a change in how they conducted business. According to the survey, standards need to be established for the industry's successful adoption of digitalization [2]. The inspection was aimed at how the digitalization of the hospitality industry has led to the growth of electronic client relationships. The study investigated the relationship between hotel promotion and financial outcomes as well as websites, social media, and other electronic marketing efforts [3]. The inspection was aimed at how ICT affected the productivity and competitiveness of a travel agency firm. The study concluded that, despite having less of an effect on efficiency and competitiveness, digitization has nonetheless transformed the market share of travel firms [4]. An evaluation has been made of the opportunities, advantages, and difficulties of near-field communications in the travel and tourism sector. The report recommended using consistent business models in conjunction with push and pull market strategies to facilitate the industry's adoption of new technology [5]. The inspection was aimed at how young, educated people used their mobile phones to use smartphone booking services. The study concluded that price level, relative advantage, and complexity had a big impact on smartphone booking [6]. The investigation was conducted to clarify how information and communication technologies are currently used and used in Zimbabwe's tourism industry. The study found that some of the barriers to technology adoption in the tourism industry include a lack of government policy, ICT regulation, intermittent network supply, and organizational commitment [7]. The development of many industrialized economies has been significantly influenced by the service sector. The concept of the sharing economy, which has been rising in the hospitality sector thanks to innovation through digitalization, was one of the trends detected by the study. The survey also makes the point that consumers now want greater digitization [8]. ICT is used in the hospitality sector, notably in the hotel sector. The study recommended using ICT in hotels to raise the level of service. The need for finance was also seen as a significant obstacle to ICT implementation in the hotel business [9]. The European tourism industry's market actors have been compelled to innovate both in terms of their products and how they serve their clients due to the

decline in tourists, their average stay times, and sales. The study's findings suggest that additional investigation into innovation in the tourist and hospitality industries is necessary. In addition, the policies should concentrate on middle and small-scale businesses in the tourism sector [10]. The function and significance of ICT and its effects on the travel and tourism sector are well known. The purpose of the study was to ascertain how ICT impacts the hospitality industry and managers' perspectives on ICT's place in the travel and hospitality sectors [11]. The effects of automation and digitization on the travel and tourism sector using a case study approach. According to the study, stakeholders should welcome digitization rather than fight it. By doing so, future research opportunities in the area would be made possible and customer satisfaction would rise [12]. The effects of the digital revolution on the tourist sector through initiatives like Digital India outlined the advantages that the sector has benefited from. Digitalization has changed the way people travel by offering advantages including simpler payment systems, better-informed travel decisions, and the development of new travel trends [13]. The impact of digital forgetfulness on potential tourists the study showed that digitalization has an impact on how tourists make decisions, how marketers communicate with them, and how they remember their travel experiences [14]. An empirical study was conducted in Germany to ascertain the potential benefits that digitization might offer the travel and tourist industry. The study also covered the progress made in the tourism sector's digitalization as well as the remaining work that has to be done. With the aid of the structural equation modeling technique, the study also determined the primary factors driving digitalization in the travel and tourism sector [15]. The inspection was aimed at how Italy's growing telecom infrastructure and digital endowment affected the demand for domestic travel. The study found that digital endowment has a good effect on domestic visitor arrivals. The domestic tourist business benefits from both rising levels of consumer affluence and knowledge [16]. The investigation was conducted to clarify how mobile technology and the internet affect the number of tourists visiting Africa. According to the study, there is a bidirectional causal association between internet usage, squared internet usage, and tourism as well as a unidirectional and bidirectional causal relationship between mobile penetration and tourism [17]. The impact of ICT on travel demand was examined. According to the study's findings, destination revenue has a short-term favorable impact on tourism demand. As the study's findings indicate, ICT also had a causal impact on tourism demand [18]. On the websites, the expensive hotel's measures and features were more significant than those of the budget hotel. a study that examined the relative importance of metrics and quality from the viewpoint of website users [19]. The investigation suggested a computational model enhances the customer's propensity to return to hotel websites to make hotel room reservations [20]. Chain hotels seem to pay more

attention to the services provided by the website [21]. Web design characteristics are crucial for online partnership marketing, and web design is a key component of a web marketing strategy in the tourism sector. In terms of advertising and providing services for hotels, hotel portals are the leader. In the rapidly evolving information age of today, a well-designed website is the hotel's most important marketing tool. Website design is attracting the attention of more and more researchers [22]. offered a tool for examining the websites of foreign tourist hotels and tour companies in Taiwan [23]. The evaluation of the level of electronic amenities on the travel platform should be seen as a multi-criteria decision-making process. Performance, enforcement, device availability, security, privacy, accessibility, communication, and benefit are the prerequisites [27]. The hotel's website must be both usable and accessible to be effective [24]. The inspection was aimed at the intentions of 638 visitors to Hong Kong regarding their desire to purchase a hotel website. Their empirical investigations have demonstrated that the knowledge content on the hotel website most strongly predicts visitors' intentions to make a purchase. According to the research that follows, a good hotel website's accuracy of information is its most important feature [25]. The metrics with the highest and lowest weights, indicating the perceived importance of the dimension, were reservation information and website administration, respectively. This study, as opposed to past ones, primarily focuses on one component of the destination knowledge dimension, namely the cultural characteristics [26].

III. METHODOLOGY

A. The Idea

Sri Lanka's hotel business required a new resurgence. As tourism has decreased, the objective is to recapture that appeal.

The project's scope calls for the integration of a hotel management system to address the aforementioned issue. An integrated web application called HMSI (Hotel Management System Intergraded) offers hotel management services for small- and medium-sized hotels.

B. Requirements Analysis

The top main functions that are highly affected by the HMS implementation are listed and grouped below user-wise.

| Role | Description | Main Functions |
|--------------------|--------------------|-------------------------|
| HSMI Administrator | Hotel Admin | -Hotel staff management |
| HSMI Manager | Hotel Manager | -Room Management |
| | | -Room type Management |
| | | -Floor Management |
| | | -Service Management |
| | | -Food Management |
| HSMI Receptionist | Hotel Receptionist | -Booking Management |
| | | -Check-in room |
| | | - Manage room service |
| | | -Checkout |

Table 1: Top main functions

C. Developing Environment

This section explains how technology was utilized to build and develop the desired outcome that satiated the client's requirements.

A group of technologies known as the MERN stack (Frontend Framework – React.js, Backend Framework – Node.js/ Express.js, Database Management with MongoDB) makes it possible to construct applications more quickly. Worldwide, developers use it. The fundamental goal of the MERN stack is to create apps that solely use JavaScript. This is because all four of the technologies that comprise the technology stack are JS-based.

When creating those kinds of processes, version control is a task that should be given great attention. therefore, implementation is done by using git and GitHub.

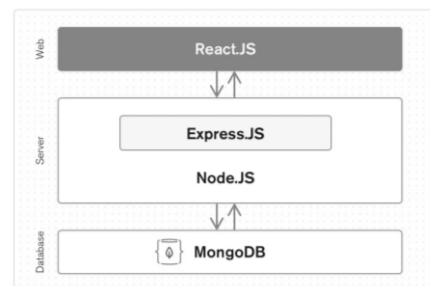


Figure 1: High Level Architecture Diagram

React.js is a prescriptive JavaScript framework for creating dynamic client-side HTML (Hypertext Markup Language) apps. React allows you to connect simple components to data on your back-end server, then connect complex interfaces to those connections and render those interfaces as HTML.

Express.js, which server-side framework inside a Node.js server, is the next to others. Express.js indeed describes itself as a "fast, unopinionated, minimalist web framework for Node.js." Express.js offers robust models for handling HTTP requests and responses as well as URL routing (correlating an incoming URL with a server function).

If your application stores any data then the system wants a database that's just as easy to work with as React, Express, and Node. MongoDB can help with this since it allows JSON documents written in React.js front end to be forwarded to the Express.js server for processing and, if they're valid, direct storage in MongoDB for later ret

Version control systems, often known as VCSs, are a group of different software tools that permit experts to track the changes made to the corresponding documents and files by modifying the program code. One of the key reasons a VCS is required is that many software products are created by a team of developers who may be located all over the world. The changes must be shared with other team members because each of them contributes to the software code and keeps

making updates. This enhances management and effectiveness while the software is being developed.

VCS has a three-tier architecture. Including working directly, staging area, and local repository. The below figure shows how they are binding together and perform

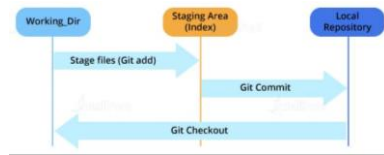


Figure 2: Git Architecture

Key features of Git

- Works on a distributed system
- Allows for non-linear development
- Powerful and lightweight tool

D. Hardware Requirement

The proposed system requires;

- Intel x86 or compatible processor
- Minimum of 512 MB RAM
- Minimum of 50 MB hard drive space
- TCP/IP protocol support
- Compatible operating systems: -
An x86 Linux operating system.
An x64 Windows operating system.

E. Design Implementation

When it comes to design, web app sketches may serve as a launching point. However, sketches could be avoided or prepared in the previous phase of planning, and design necessarily involves prototypes or wireframes. Web application design should be user-friendly and intuitive, so wireframes, prototypes, or mockups must be strictly tested before moving to the next stage. As usual, for this stage designers use such tools as Figma and Adobe XD.

Once the requirements are documented, planning is finished, and a design with texts is approved, it is high time to start coding. The implementation phase depends on applied technologies.

F. Testing

The system's code testing step is crucial, to say the least. Testing might also cover a system's dependability, security, and maintainability.

SonarQube enhances workflow and is toughened for the stability and strong performance of the business. It is a platform for continuous code quality inspection created by Sonar-Source. Sonar does static code analysis and produces a complete report of errors, code smells, vulnerabilities, and code duplications.

IV. PROPOSED SYSTEM

A. System Overview

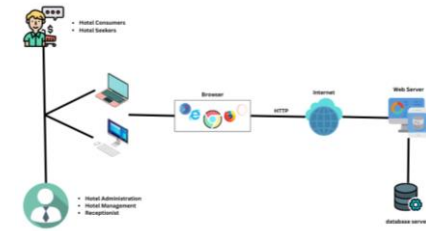


Figure 4: Overall system architecture

This sort of graphic is used to represent overall systems using Service Oriented Architecture (SOA) in Function-Based Development (FBD).

Consumers and Administrators are the two types of users in this HMSI system. Any seekers can visit this website and get some basic knowledge about what's happening here and if they want to perform any task they should register to thy system. After that, they can view our facilities they can inquire about those, can navigate throughout the system.

The HMSI manager adds room to the system by providing the necessary details. They can perform update operations and delete operations as well. To easy to use every fetch data from the database is shown in tabular format. And any facility reports can be generated by the system if they want.

The consumer can book a room by doing an online payment. They can maintain their own profile to manage their payments as well as they can view their ongoing bookings as well.

The HMSI receptionist manages the room services using the system. When they got a food order from a consumer, they can view the order details and prepare to fulfill that order.

B. Class Diagram

The class diagram depicts a static or structural representation of the system by displaying the system's classes, characteristics, operations, and object relationships. It fails to demonstrate the dynamic nature of communications between the objects of the classifications depicted in the figure Also Class diagrams are an essential component in Object Oriented design. They aid in the execution of conceptual / domain modeling.

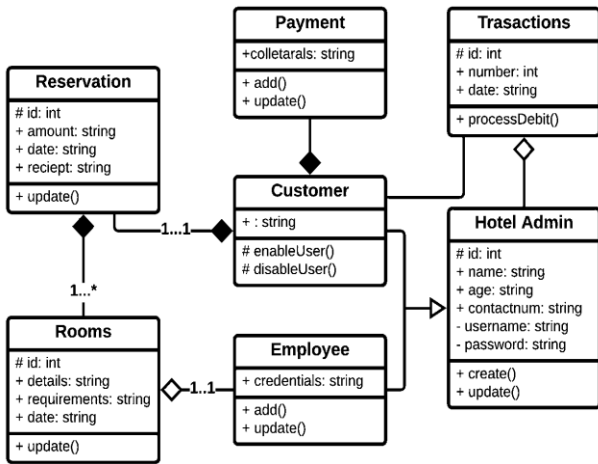


Figure 5: Class Diagram

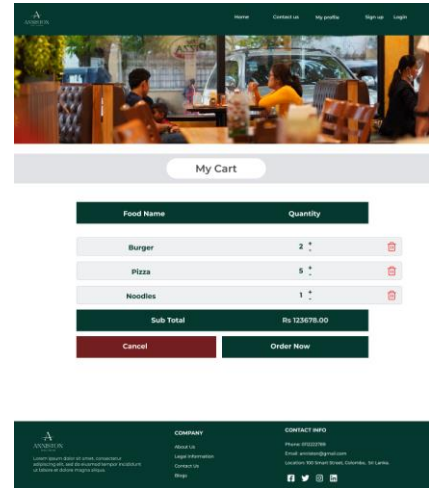


Figure 9: Food Cart

C. User Interfaces

This interface is used to display the Food cart to the customers.

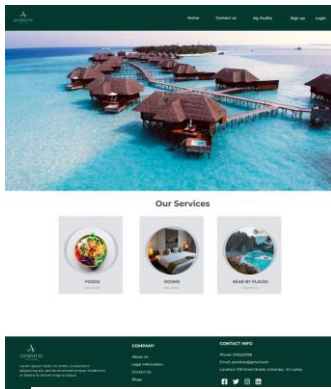


Figure 6: Home Page

This interface is used to display the website's home page to the customers.

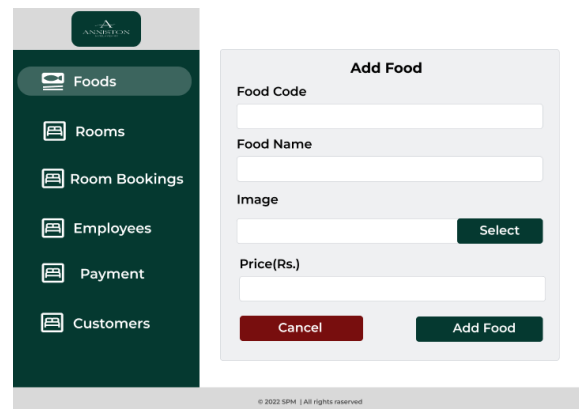


Figure 10: Add Food Form

This interface is used to add food items to the system.

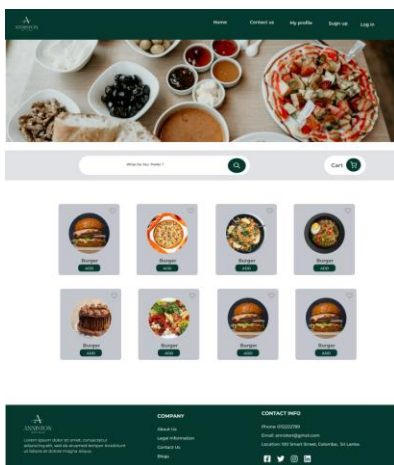


Figure 7: Food List

This interface is used to display the food items to the customers.

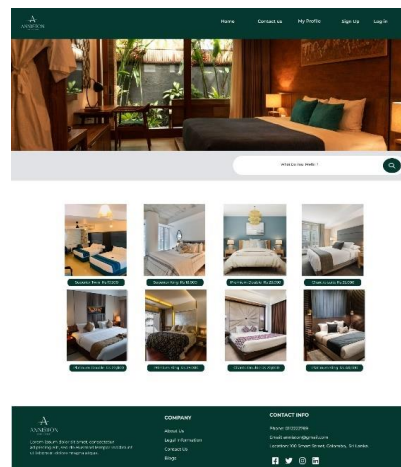


Figure 11: Room List

This interface is used to display the available rooms to the customers.

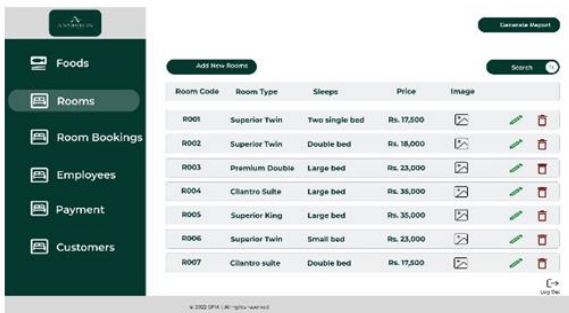


Figure 12: Admin View Room List

This interface is used to add, view, update, and delete the added room details.

V. DISCUSSION

The "jewel of the Indian Ocean" and the "teardrop of India" are two nicknames for Sri Lanka. Due to the nation's stunning natural surroundings, extraordinary biodiversity, and exports of priceless jewels, the nation receives its first nickname. The reason for its second moniker is the location and shape of the nation.

However, there are several reasons why tourism to Sri Lanka has dropped in recent years. According to the graph below from SLDTA, tourism significantly decreased from the beginning of 2019 first quarter.

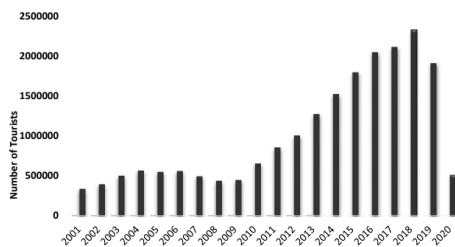


Figure 13: Tourist Arrival 2001-2020

COVID-19's possible long-term global effects are unknown. The global virus epidemic is affecting the island nation's tourism industry the most, and it is projected that this will have a considerable impact on tourism profits for the remainder of the year (Xinhua, 2018). Due to the epidemic's significant economic impact on the nation, it is crucial to consider how the tourism industry's resilience may affect the recovery of its important sub-sectors once it has passed.

The United Kingdom, India, and China are Sri Lanka's three biggest tourist markets, making up about 5% of the nation's GDP. Sri Lanka is presently dealing with its worst foreign exchange crisis due to the COVID-19 pandemic's effects on the island nation's tourism and remittance industries.

There were 60% fewer tourists in June than there were in May, according to the Sri Lanka Tourism Development Authority (SLTDA).

106,500 visitors came in March 2022 compared to only 32,856 in June, according to SLTDA data. This much of decreasing tourist arrival will be hugely affected the Sri Lankan economy. Because Sri Lanka is an economically middle-class country, therefore, we don't have the capacity to survive this much bigger impact.

The third-largest source of foreign exchange earnings in Sri Lanka is the tourism industry, which had one of Asia's fastest growth rates. Following the three five-star hotels and churches in Colombo that were bombed on April 21, 2019, tourism has steadily decreased, severely hurting hotels that are finding it harder and harder to stay afloat. As a result, the Easter attack had a severe influence on the Sri Lankan tourism business.

Tourism authorities predicted Sri Lanka will welcome 2.5 million visitors in 2019 before the terrorist attacks, however actual visitor numbers in 2019 were lower than the 2.3 million predicted before the assaults. 1.6 million visitors arrived between January and November of 2019 according to the Tourism Development Authority (SLTDA), down from 2 million visitors during the same time in 2018. Also, Tourist arrivals decreased by 9.5% in November 2019

The three months that followed the assaults experienced the biggest beatings. Compared to May 2018, there was a startling 70.8% decrease in visitor arrivals, followed by a 57% decline in June, and a 46.9% decline in July.

Sri Lanka is home to 22 million people, but due to protesters' curfew violations and the departure of several government officials, the island country is currently experiencing a political and economic crisis.

South Asia is currently experiencing its biggest economic crisis since gaining independence in 1948 because of devastating inflation driving up the price of products.

Due to a persistent shortage of fuel, gas, and other needs brought on by a dearth of foreign cash, Sri Lanka is currently in this predicament. The country and its people don't have many options for resolving the issue. An IMF bailout is now required since currency swaps with China and India have failed to fix the foreign exchange issue. However, the IMF will impose severe guidelines, such as the requirement that creditors come to a debt restructuring agreement. That aim currently appears to be unachievable due to a lawsuit brought against Sri Lanka for a bail payment due in July 2022. Sri Lanka cannot get any international assistance or debt relief without large and radical reforms to its policies.

Sri Lanka is regarded as a nation with a middle-income economy. However, this position hides the war-torn north and east, the tea-growing regions o

Sri Lanka, a well-known vacation destination, ought to be thronged with travelers at this time of year. Instead, a severe economic downturn and political upheaval have all but decimated the country's tourism

industry, with current pre-booking cancellation rates hovering around 40%.

The technology is connecting devices to devices through the internet or cloud service by fitting the sensors into machines to gather and disseminate data and make the analysis easier, more accurate, and in real-time. The devices are not only communicating the numbers but supporting brittle usage of machinery in industries, customer service in consumer-focused companies, and overall analytics. As per the forecast report of [statista.com](https://www.statista.com), the installed base of the Internet of Things devices will reach almost 31 billion worldwide by 2020 and the annually projected worth is more than one billion U.S dollars annually [1]

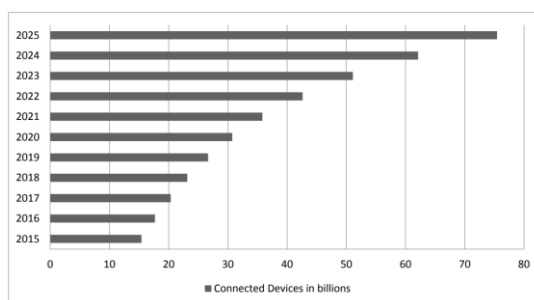


Figure 14: Chart Number of connected devices

The rapid growth of technology has altered the landscape of all sectors. The tourist business is no exception. Technology not only helps businesses with day-to-day operations, but it also dramatically improves the consumer experience. As a result, it is critical that resorts, hotels, airlines, restaurants, and other hospitality firms stay current on industry technology advances. This is especially important in the COVID era when customer expectations are evolving to prioritize contactless, paperless solutions. And overall analytics.

- Mobile Technology
- Contactless Payments
- Internet of Things (IoT)
- Virtual Reality
- Robot Technology

While IoT technology can assist many industries, the travel and tourism industry stand to benefit the most. IoT can decrease frequent touchpoints while also enabling increased automation and customization. The use of an in-room tablet, which allows guests to manage the curtains, temperature, and lighting from a single device, is an example of IoT technology in hotel rooms.

As a result, utilizing modern technologies is another excellent strategy for stabilizing tourism in Sri Lanka better than in previous years. Tourists will be able to travel more comfortably if these technological approaches are improved. This is a little start toward a new technological path for increasing tourism in Sri Lanka.

VI. FUTURE WORKS

After an investigation of our implemented system wants more features to go ahead and archive some incredible goals. For that, we are planning to use some modern technologies like AI and Robot Technology for that. Gather the user's preferences using an AI and suggest our key features to them through a bot system so any users can easily find their own thinking as they preferred. Hence that the user will be able to achieve their needs more easily and efficiently and the business activities of the service provider will be more successful.

VII. CONCLUSION

This study will investigate the Sri Lankan tourism industry and the effective ways to develop it. Today Sri Lankan tourism industry hugely collapses because of some incidents. Those are the 2019 Easter attack, Covid 19 impact, and the economic crisis in Sri Lanka. Before these incidents, tourism contribute 4.8% to our national GDP but after those, it dropped to 0.8%. Therefore, as a country, we need to find ways to rebuild the tourism industry in Sri Lanka. Technology can be used as an effective solution for that. Therefore, we developed a web application for the hotel management system. The main target of this application is helpful to the visitors do their work easily. Through that, we can increase hospitality and services and that will provide huge support for developing tourism.

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