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# TECHNOLOGICAL ADVANCEMENTS IN THE HOSPITALITY INDUSTRY OF THE 21ST CENTURY

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**TECHNOLOGICAL ADVANCEMENTS IN THE HOSPITALITY INDUSTRY OF THE 21ST CENTURY**

This dissertation aims to obtain a doctoral (PhD) degree in the scientific field of "Management and Business"

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## DECLARATION

I, the undersigned Nirmeen Elmohandes (Date of birth: September 5, 1993), declare under penalty of perjury and certify with my signature that the dissertation I submitted to obtain a doctoral (PhD) degree is entirely my work.

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- I handled the technical literature sources used in my dissertation fairly, and I conformed to the provisions and stipulations related to the dissertation;
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# Abstract

**Purpose** – The overarching aim of this study is to gain insight into the intentions of hospitality managers to adopt new technologies, factors that influence their intentions, potential outcomes, the implications for the future of the hospitality workforce, and new labour management strategies in this era.

**Design/methodology/approach** – In this study, a qualitative research methodology was employed to explore the influence of managers' intentions to adopt advanced technologies on the future of the hospitality workforce. The study employed the purposive sampling method to conduct semi-structured interviews with 27 participants at the managerial level in the United Kingdom restaurants. Additionally, non-participant observations were conducted to provide further support for the study. The acquired data were subjected to thematic content analysis.

**Findings** – This study thoroughly explored managers' intentions on the adoption of advanced technologies and presented them comprehensively using the Technology Acceptance Model (TAM) model as a framework. The study presented three primary scenarios for the future of the labour force in the restaurant industry, each of which was thoroughly and individually examined along with strategies to effectively manage each scenario. These findings hold significant importance. The study underscored the requisite skills that employees must possess to secure a job in the era of technological advancements.

**Originality/value** – The majority of research using TAM has focused on examining the individual acceptability of technology in consumer and guest contexts. This study is among the initial ones to employ the Technology Acceptance Model (TAM) to examine managerial viewpoints. This study aimed to identify the factors that influence managers' intentions to adopt advanced technologies in restaurants using TAM. It emphasised that there are hidden factors that impact intentions to use technologies from a managerial perspective that have not been previously explored from a customer perspective. This study is among the first to explore the impact of managers' intentions to adopt advanced technologies on the future of the labour force. It delves into three primary scenarios and provides strategic recommendations for managing these scenarios from a managerial standpoint. This study has identified the necessary technological competencies that hospitality practitioners must possess in the current era, as well as the impact of these competencies on employee remuneration.

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# Dedication

*This thesis is dedicated to my beloved father **Mohamed**, my cherished mother **Nabila**, my supportive husband **Mostafa**, and my precious daughter **Malk**. Your unwavering love and encouragement have been the guiding light throughout my academic journey.*

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# List of Abbreviations

Artificial Intelligence (AI)

Augmented Reality (AR)

Customer Relationship Management (CRM)

Cyber-Physical Systems (CPS)

Fourth Industrial Revolution (FIR)

Human Resources (HR)

Human Technology Interaction (HTI)

Human-Robot Interaction (HRI)

Industrial Revolutions (IRs)

Information Technology (IT)

Internet of Things (IoT)

Key Performance Indicators (KPIs)

Perceived Ease of Use (PEOU)

Perceived Usefulness (PU)

Point-of-Sale (POS)

Radio Frequency Identification (RFID)

Research Objective (RO)

Return on Investment (ROI)

Technology Acceptance Model (TAM)

Virtual Reality (VR)

# Chapter One: Introduction

## 1.1 Research Background

The hospitality industry ranks as the sixth largest employer in the United Kingdom. In September 2023, the tourism and hospitality sector in the United Kingdom made a significant contribution of 2.8 million employment opportunities, representing approximately 7.6% of the country's total workforce. The term "hospitality" encompasses a wide-ranging industry that encompasses hotels, restaurants, cafes, bars, and pubs. The food and accommodation services sector made a significant contribution of £73.8 billion to the UK economy in 2023. Concurrently, the hospitality sector has consistently experienced a shortage of staff, and a higher rate of job openings compared to other economic sectors (Hutton *et al*., 2024).

The hospitality industry consistently demonstrates a proactive approach to adopting cutting-edge technological advancements to enhance service quality, productivity, and financial performance for enterprises (UK Government, 2021). In recent years, there have been significant advancements in various technological solutions, including artificial intelligence (AI) (Wang & Uysal, 2024), robotics (Liu *et al.*, 2024), mobile applications, and cloud-based platforms (Li *et al.*, 2024). These advancements have significantly transformed the dynamics of the hospitality sector, thereby creating new opportunities for growth and presenting new obstacles, particularly in relation to the future of the labour force (Seyitoğlu *et al.*, 2023; Pericleous *et al.*, 2025; Shin *et al.*, 2025).

According to Belanche *et al.* (2021) and Lock (2022), the utilisation of digitalisation is being employed to enhance and optimise hospitality services for customers and guests. The Henn-Na hotel achieved the distinction of being the world's inaugural hotel operated exclusively through advanced technological systems in 2015. In addition, robots are employed as personnel in Malaysian coffee shops to cater to customers (Sadangharn, 2021; Yang & Chew, 2021). The hotel industry has witnessed widespread implementation of robotics and AI since 2016, leading to significant changes in the field globally, not limited to China, Japan, and Malaysia (Koo *et al.*, 2021). Liu *et al.* (2022a) and Seyitoğlu *et al.* (2023) have also underscored the increased utilisation of diverse advanced technologies in the restructuring of the hospitality sector directly after the COVID-19 pandemic. These technologies are highly adaptable and can be used in various capacities, such as cooking, front-desk clerking, personal shopping, and couriering, among other

functions. Nozawa *et al.* (2022) stated that hotels employ the latest technologies to optimise the check-in/out procedure, provide amenities, welcome guests, guide visitors, maintain cleanliness in public areas, and facilitate meal preparation.

In recent decades, there has been a proliferation of literature on advanced technologies in the hospitality field (Ivanov *et al.*, 2017; Drexler & Lapré, 2019; Ivanov, 2019; Ivanov & Webster, 2020) that focuses on guests' acceptance of these technologies (Ivanov *et al.*, 2018; Gursoy *et al.*, 2019; Hou *et al.*, 2021), advanced technologies impact on service enhancement and productivity (Kuo *et al.*, 2017; Belanche *et al.*, 2021), hospitality key challenges in the era of industry 4.0 (Moktadir *et al.*, 2018; Balasubramanian & Ragavan, 2019; Mingotto *et al.*, 2021; Nam *et al*., 2021), advanced technology and hospitality competitiveness (Chan & Tung., 2019; Yang *et al.*, 2021). Undoubtedly, the hospitality industry has experienced notable advantages as a result of technological advancements (Ivanov & Webster, 2024; Santiago *et al.*, 2024). However, concerns have arisen regarding the potential for substantial alterations in hospitality employment and the potential dehumanisation of the client experience. According to Chan and Tung (2019), Cheong and Lee (2021), and Cheong *et al.* (2023), the advent of self-service technologies such as automated check-in kiosks, chatbots, and food delivery systems has significantly diminished the need for front-line employees in the hospitality industry. This has raised concerns regarding the future of the labour force (Pericleous *et al.*, 2025) and the overall quality of the guest experience.

According to Stock (2018) and Tussyadiah and Park (2018), there is no obstacle to substituting humans with advanced technology in hotels. This is because robots can perform front desk tasks, provide room service, and establish social connections with clients. It has been asserted that the ongoing debates and perspectives surrounding this matter will persist until unexpectedly advanced technology supplants human beings, leading to disastrous consequences. Contrarily, Choi *et al.* (2020) and Kim and Cha (2024) noted that the efficacy of human-technology interactions surpasses that of human replacement, particularly in the context of the hotel industry, where the presence of human personnel is indispensable. This viewpoint is based on the premise that robots will assist managers in addressing human resources (HR) challenges such as recruiting temporary employees, coordinating work schedules during the offseason, and enhancing hotel reputation. Conversely, robots will perpetually be incapable of completely substituting humans in the labour force, and occupations will continue to necessitate human involvement for the foreseeable future. Both

Ivanov (2020) and Ghosh *et al.* (2024) participated in this controversy and forecasted that digitalisation would bring about substantial transformations in the service sector, encompassing both front-end and back-end operations. These changes would involve the introduction of new job roles and the elimination of existing ones. Consequently, the nature of the service and the prerequisites for performing the tasks will undergo a transformation.

Although the authors hold differing viewpoints on this matter, they can concur that technological progress will influence managers' mindset to encourage the adoption of technology in the hospitality sector and exert control over the three primary aspects of operation, employees, and guests. Furthermore, the impact of this phenomenon extends to the transformation of work nature, job opportunities, and the skill sets for securing employment (Ivanov, 2020).

The preceding debate signifies that current hospitality research pertaining to cutting-edge technologies is typically distinguished by (1) a lack of examination regarding the prospects of hospitality managers in relation to the recent technological era, specifically in terms of their acceptance (Ivanov *et al.*, 2018; Pizam *et al.*, 2022; Tussyadiah *et al.*, 2022; Shin *et al.*, 2025); (2) a dearth of lucidity regarding the ultimate ramifications of advanced technologies on the workforce within the hospitality industry (Erebak & Turgut, 2021; Nam *et al.*, 2021; Pillai *et al.*, 2022; Vatan & Dogan, 2021; Cheong *et al.*, 2023); (3) new labour force management strategies are needed (Shin *et al.*, 2019; Choi *et al.*, 2020; Tuomi *et al.*, 2021; Shin *et al.*, 2025); (4) a dearth of understanding regarding the skills needed of employees in the era of advanced technologies (Murphy *et al.*, 2017; Shin *et al.*, 2025). This study enhances the existing research by exploring the intentions of hospitality managers to adopt new technologies, the factors that influence their intentions, potential outcomes, consequences for the future of the hospitality workforce, and new labour management tactics in this era.

## 1.2 The Research Significance

The extant body of literature in the field of hospitality substantiates the dearth of advanced technological research within the hospitality domain (Park, 2020; Shin & Jeong, 2020; Cheong *et al.*, 2023) and lacks examining the hospitality managers' prospects in matters related to the recent technological epoch in terms of managers' acceptance (Ivanov *et al.*, 2018; Pizam *et al.*, 2022; Tussyadiah *et al.*, 2022), labour-related concerns (Drexler & Lapre, 2019; Seyitoğlu *et al.*, 2023),

new labour force management strategies (Shin *et al.*, 2019; Choi *et al.*, 2020; Tuomi *et al.*, 2021), and the skills required of employees in the era of technological breakthroughs (Murphy *et al*., 2017). Tuomi *et al*. (2021) revealed that despite the wide range of research conducted on new technologies in the hospitality sector, still, more research in various contexts is needed, especially exploring new strategies in the hospitality sector.

The current body of research on technology in the hospitality industry has primarily emphasised the technology acceptance model (TAM). However, it has mainly concentrated on the individual acceptability of technology in the context of consumers and guests. These studies have predominantly relied on quantitative methods and a single data source, as demonstrated by studies conducted by Nizar and Rahmat (2018), Pillai and Sivathanu (2020), and Yang *et al.* (2021). The hospitality literature has provided limited evidence on the prospects of hospitality managers in relation to the recent technological era, specifically in terms of their acceptance (Ivanov *et al.*, 2018; Pizam *et al.*, 2022; Tussyadiah *et al.*, 2022). The aforementioned gaps indicated that further research is required to explore the role of the Technology Acceptance Model (TAM) in examining the intentions of hospitality managers to adopt new technologies, factors that influence their decisions, potential outcomes, the implications for the future of the hospitality workforce, and new labour management strategies in this era.

Consequently, this study aims to investigate the role of the TAM model in comprehending the factors that affect the intentions of hospitality managers to adopt new technologies, the factors that influence their decisions, potential outcomes, the implications for the future of the hospitality workforce, and new labour management strategies in this era. The research will utilise qualitative methods and collected data from various sources. Using the Technology Acceptance Model (TAM) as a framework, we will examine the intentions of hospitality managers to adopt advanced technologies and the factors that influence those intentions. This suggests the possibility of extending the TAM model by incorporating new constructs or introducing additional elements to the original constructs. An examination of managers' intentions and consumers' acceptance of advanced technologies in the hospitality industry, from a managerial standpoint, can serve as a reliable foundation for assessing whether these technologies displace human labour, create new jobs or work together with humans to enhance productivity, level of service, and employment

opportunities. The findings of this study provide evidence-based insights that can aid business managers, especially those who are new in the market, as well as policymakers, in making informed decisions regarding technology investments. The findings obtained from this study provide strategies for managers in effectively navigating the future of the labour force. The study findings provide managers with guidance on the important skills they should prioritize when choosing job candidates.

## 1.3 Research Aim and Objectives

Consistent with the gaps mentioned above and unanswered questions, the overarching aim of this study is to gain insight into the intentions of hospitality managers to adopt new technologies, factors that influence their intentions, potential outcomes, the implications for the future of the hospitality workforce, and new labour management strategies in this era. While numerous questions could be relevant to this thesis, the following have been chosen to provide some focus while still allowing for extensive exploration:

**How will managers' intentions to adopt advanced technologies impact the future of the hospitality workforce?**

In order to ensure that the research aim is met, the following objectives were developed:

- Use the TAM model as a lens through which to examine hospitality managers' intentions for the adoption of new technologies, including the factors that influence their decisions.
- Acquiring comprehensive and analytical understanding of how managers' intentions to embrace advanced technologies affect the future of the workforce in the hospitality industry.
- Gain an understanding of the most recent strategies for managing hospitality workers in the age of technological advancement.
- To explore the new skills required in the technological advancement era and how employees’ salaries affected in this era.

## 1.4 Research Contributions

This research presents a number of potential contributions. From a theoretical standpoint, this study is one of the first to examine the intentions of hospitality managers to adopt new technologies using the Technology Acceptance Model (TAM) framework. Moreover, it examines the determinants that impact the decision-making process of hospitality managers, the possible results of their intentions, and the implications for the future of the hospitality workforce. Additionally, this investigation enhances understanding of the current labour management strategies and employee competencies necessary in the hospitality industry in this era. As a final point, this research uses a detailed qualitative methodology. Data was collected via interviews with managers, assistant managers, and supervisors and observations at the UK restaurants where cutting-edge technology was adopted to glean rich data. The research findings not only make theoretical contributions but also offer comprehensive guidance to hospitality employers in the United Kingdom regarding the projected future scenarios of the sector's workforce. Additionally, the findings provide recommendations for managing hospitality labour. The findings of this research provide supported empirical evidence that can aid business managers, especially those who are new in the industry, as well as policymakers, in making well-informed decisions regarding technology investments. These decisions should aim to not only promote business advancement but also protect the well-being of employees.

## 1.5 Structure of the Thesis

This section will present a comprehensive outline of the thesis's structure and a summary of the forthcoming chapters. The study is systemically organised into six chapters. The subsequent chapters encompass a comprehensive examination of existing literature, research methodologies, research findings, a discussion, and a conclusion.

The second chapter employed a critical literature review. The process begun with a thorough search of academic databases such as Emerald, Elsevier. Boolean Research's applied to filter through many articles. Boolean searches included keywords, such as advanced technologies, manager acceptance, job insecurity, employment and hospitality, technological unemployment, the TAM model. Citing high-quality publications from the last decade was essential for reflecting current insights in the hospitality field. The topic-related articles were thoroughly read, and the

key aspects, such as objectives, methodology, findings, contribution, and any literature gaps were summarised. This aided in evaluating the strengths and weaknesses of the existing literature, allowing for a better understanding of which areas require further exploration. A significant amount of literature was synthesised. The researcher was able to identify the themes to cover in the literature review chapter in a logical order, gaps in knowledge, and the theoretical framework for the study. Literature review organised logically to shed light on existing knowledge and emphasise the significance of this research. This process facilitated the flow of arguments and laid the groundwork for the research stages.

Chapter two provides an overview of the existing literature pertaining to the historical development of advanced technologies, the various components of advanced technology, the digitisation of the global hospitality industry, the advantages, and disadvantages of implementing advanced technology in the hospitality sector, the obstacles encountered during its implementation, and the factors that necessitate careful consideration before adopting advanced technologies. Given the long-standing understanding that the initial impression formed by guests and consumers during their interactions with human employees is a critical determinant of the success of investments in the hospitality industry, it was imperative to assess the level of guest willingness to engage with advanced technologies in service. The examination of guests' widespread acceptance shed light on the debate surrounding the expected outcomes and impacts of its extensive implementation on the hospitality workforce. The researcher shaped the controversy by considering three significant prospective scenarios, one of which is anticipated to occur within the hospitality sector. After identifying the gaps in the existing literature on the adoption of technological advances in the hospitality industry, the chapter concludes by identifying the direction of this research and the research gaps and questions to be answered.

Chapter three of this study provides a comprehensive defence and elucidation of the methodology and methods employed in the research. The initial section of this chapter presents a succinct overview of the research strategy and methodologies employed, followed by a comprehensive examination and justification of these selections. First, the initial stage involves an examination of the ontological and epistemological underpinnings of the research. This exploratory qualitative investigation gathers data by conducting twenty-seven comprehensive interviews and six observations. The utilisation of this qualitative methodology enables a comprehensive and precise

exploration of participants' viewpoints on their inclination to embrace technological advancements within their organisations, as well as the consequences of these intentions on the hospitality workforce. The study was carried out in the UK restaurants that utilise cutting-edge technologies, including robots, kiosks, and chatbots. After a comprehensive examination of the data collection process for the study, the chapter proceeds to elucidate the thematic content analysis technique employed for the analysis of the collected data. This chapter concludes by examining the researcher's role and the significant emerging concerns regarding trustworthiness, ethics, research limitations, and the summary of the chapter.

Chapter four subsequently delves into the findings derived from the observations and semi-structured interviews. The areas covered in this study can be categorised into five primary themes: Managers' intentions towards technological advancements adoption, tech- related joblessness in the hospitality industry, Human Technology Interaction (HTI), two opposite phenomena; unemployment and jobs creation, and tech mastery in hospitality: navigating the modern skill set for job security. Thematic content analysis is employed to extract themes from the data and to initiate the process of gaining understanding regarding the intentions of hospitality managers to adopt new technologies, factors that influence their decisions, potential outcomes, the implications for the future of the hospitality workforce, and new labour management strategies in this era.

Chapter five of this study provides an interpretation of the findings and conducts a comparison with existing literature. The purpose of this comparison is to elucidate the areas in which the findings align, conflict, or add new insights about the intentions of hospitality managers to adopt new technologies, factors that influence their decisions, potential outcomes, the implications for the future of the hospitality workforce, and new labour management strategies in this era. The structure of this chapter aligns with the primary research objectives and key themes identified in the preceding chapter.

In conclusion, chapter six presents a comprehensive summary of the research objectives and questions outlined at the beginning of the thesis, explaining their attainment and elucidating the significant theoretical and empirical contributions to knowledge resulting from this study. The subsequent section provides a reflection of the limitations of the study and the identification of potential avenues for future investigation.

# Chapter Two: Literature Review
# Advanced Technology in the Hospitality Sector in 21st Century

## 2.1 Introduction

Technological progress is a factor in competitiveness, travel facilitation, making customers' stays more comfortable, and creating unforgettable experiences. It influences the organisation by improving training objectives and day-to-day operations in the hospitality industry. Although it was challenging to automate social and abstract functions, jobs that require human interaction have been replaced by machines so that work can be done with fewer people. Consequently, technology-related unemployment is a much more serious problem than retraining workers. By using advanced technologies, workers will likely face the risk of technological unemployment or find new job opportunities that require them to learn new skills to deal with the new technologies. As a result, it was essential to get a comprehensive understanding of this problem and investigate the strategies developed to tackle this obstacle shortly.

The TAM is a reliable model that investigates the elements influencing intentions to adopt/use advanced technology in services, such as Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) (Li *et al.*, 2024). Numerous studies have utilised TAM to investigate service users' (consumers' or guests') acceptance of technology in service contexts (Zhang *et al.*, 2019; Pillai & Sivathanu, 2020; Labus & Jelovac, 2022; Liu *et al.*, 2022b; Li *et al.*, 2024). This chapter adopts the Technology Acceptance Model (TAM) to investigate the possibility of this model extension and explore the antecedents of the TAM model constructs from a managerial standpoint by exploring hospitality managers' intentions to adopt new technologies, the factors that influence their choices, potential outcomes, consequences for the future of the workforce, and new labour management tactics in this era.

Beginning in Section 2.2 and continuing through Section 2.6, this chapter provides a comprehensive overview of advanced technology in the hospitality industry. Then, the implementation of advanced technology in the various hospitality institutions and the studies examining the degree of openness and acceptance of guests and clients were examined (Section 2.7). This section's purpose is to support the logic of the search, where the acceptance of the guests and customers is a significant factor that will influence the logical sequence of the search. Moreover, the literature authors' controversies regarding the future of the workforce in the hospitality industry were reviewed in the form of future scenarios, one of which is anticipated to

occur soon (Section 2.8). After that, the applied theoretical lens (Section 2.9) and gaps (Section 2.10) were discussed. The chapter ends with a summary (Section 2.11).

## 2.2 Technological Advancements Background

### 2.2.1 Origins of High-Tech

There are numerous new words in common usage today due to technological advancements; one of these is "Industry 4.0," which has become a hot topic in recent years because of its impact on manufacturing, business, and commerce in general, and the hospitality industry in particular. Technological advancements, or the "Industry 4.0" concept, are frequently referenced in scholarly writing to describe cutting-edge technological innovations in the commercial sector (Pereira & Romero, 2017; Chatterjee *et al*., 2021). Throughout history, the business world has experienced three Industrial Revolutions (IRs), or periods of significant change brought about by new technologies. It was not until 2011, when Germany's high-tech strategy for 2020 was formulated, that the term "industry 4.0" was first published. The earliest IR can be traced back to England in the 18th century due to the steam engine's invention (Ceruzzi, 1998). Late in the nineteenth century, Europe and the United States witnessed a second revolution characterised by mass production. In this century, we no longer rely on steam to power machines, but on chemical and electrical energy (Rosenberg, 1982). The goal at this time was to boost production to keep up with demand, and thus new technologies emerged, such as the microprocessor, which ushered in the third industrial revolution. The world's industrialised countries in the 20th century (3rd IR) were marked by the widespread use of automation in production (Schwab, 2017; Frey & Osborne, 2017). By analysing the first three IRs, we can see that the foundation of all of them was the use of new technologies to boost production and efficiency (Pereira & Romero, 2017; Shamim *et al*., 2017; Sima *et al*., 2020; Chatterjee *et al*., 2021). Smart factories, services, and enterprises are at the forefront of Industry 4.0, also known as the Fourth Industrial Revolution (FIR), which is predicated on a complex technical infrastructure. This term is a catch-all for a wide variety of cutting-edge technologies (Osei *et al.*, 2020a; Chatterjee *et al.*, 2021; Yang *et al.*, 2021), including but not limited to mobile technologies (Li *et al.*, 2024), Cyber-Physical Systems (CPS) (Lee *et al*., 2015), Clouds, Robotics, Augmented Reality (AR), and Virtual Reality (VR) (Hoyer *et al.*, 2020), the Internet of Things (IoT) (Gubbi *et al.*, 2013), Artificial Intelligence (AI) (Buhalis *et al.*, 2019; Majid *et al.*, 2024), Sensors and Actuators and 3D printing (Weller *et el.*, 2015), and Big Data

Analytics (BDA) (Buhalis & Amaranggana, 2015). This forever altered the way we live and interact with one another. Consecutive technology developments and their innovative capacity have inevitably altered the companies and service industry landscape (Balasubramanian & Ragavan, 2019; Zengin *et al*., 2021).

### 2.2.2 Advanced Technology Definitions

In academic research, technological advancement has numerous terms, such as Industry 4.0, the Fourth Industrial Revolution (FIR), the Digital Age, and the Second IT Revolution (Osei *et al*., 2020a). Despite researchers' efforts to indicate a unified definition for technological advancements in the literature review, there has yet to be a generally accepted definition among scholars. The reason is that it was defined based on different dimensions, such as digitisation, the communication element, the system's intelligence, and autonomy (Osei *et al*., 2020b).

Hofmann and Rüsch (2017) defined the Fourth Industrial Revolution as a shift in manufacturing logic for value creation based on a self-regulated approach based on technologies such as robots, the Internet of Things (IoT), Cyber-Physical Systems (CPS), Cloud, and Artificial Intelligence (AI) to meet production and service demands. It is a transition based on digitised business and processes, as well as CPS deployment and intelligent production (Shamim *et al*., 2017). According to Jones and Pimdee (2017) and Lee *et al*. (2018), *FIR* is a smart industry revolution characterised by short-term innovation with varying speed levels, depth, and trust, and it has a significant impact on companies and communities. Verevka (2019) defined *Industry 4.0* as comprehending companies' management and production of value-generating activities from the product cycle, which relies on data exchange platforms and automation improvements. According to Sima *et al*. (2020), *Industry 4.0* is a mix of technical breakthroughs primarily based on the internet to operate specialised technologies in which integrating intelligent machines and human actors relies on embedded systems to generate value. Zeqiri *et al*. (2020) reflected that *Industry 4.0* is a system that promotes information sharing in order to increase the value of consumers and guests, as well as the value of the ecosystem and stakeholders. Duy *et al*. (2020) defined *Web 4.0* as machine intelligence utilised for commercial and efficient reasons, and it is programmed to have human intelligence, acting, cognitive, and emotional abilities. Sony *et al*. (2021) defined *technological advancements* as the digitalisation of conventional industries to provide IT-enabled services and manufacturing, new business models, and new services.

### 2.2.3 Advanced Technology Elements

The technological features have considerably impacted the hospitality operations and workforce (Ghosh *et al.*, 2024). Facial recognition, robots, Artificial Intelligence (AI), Big Data Analytics (BDA), fingerprints, face ID, cloud storage, location-tracking via GPS, sensors, Virtual Reality (VR), Augmented Reality (AR), Internet of Things (IoT), 3D printing, cloud computing, chatbots, Cyber-Physical Systems (CPS), mobile phones, Radio Frequency Identification (RFID), service kiosks, cybersecurity, and blockchain are all included in the broader category of "advanced technology" (Balasubramanian & Ragavan, 2019; Yu, 2020; Pencarelli, 2020; Ivanov, 2020; Pillai *et al*., 2021; Majid *et al.*, 2024). This study will go over an overview of each element of advanced technology in alphabetical order through Section 2.2.3.1 to 2.2.3.10.

#### *2.2.3.1 Artificial Intelligence (AI)*

Artificial intelligence (AI) consists of two words: artificial, which refers to something developed by people, and intelligence, which refers to the capacity to think independently. Therefore, AI is characterised as a thinking power generated by humans (Limna *et al.*, 2023; Russell, 2010; Mingotto *et al.*, 2021; Santiago *et al.*, 2024). John McCarthy first used the term "AI" in the 1950s to describe the field devoted to investigating and creating artificially intelligent devices (Mingotto *et al.*, 2021). AI has the capacity of machines to learn how to perform specific tasks without any direct human input (Lukanova & Ilieva, 2019; Morosan & Dursun-Cengizci, 2024). Artificial intelligence can learn independently based on their experiences (Mingotto *et al.*, 2021).

Applications based on AI range from simple machines like kiosks to complex ones like humanoid robots that can interact with humans (Chi *et al.*, 2020). The ability of an AI system to explain its inputs, learn from data, and effectively apply this learning to various tasks has made the primary functions of an artificially intelligent computer system problem-solving, data storage, and language comprehension. Hence, there is a lot that artificial intelligence might do for the hotel industry, like maximising occupancy rates and predicting prices and fares (Al Shehhi & Karathanasopoulos, 2020). From the guest's perspective, it facilitates the selection of the best deal that falls within their price range (Kiliçhan & Yilmaz, 2020). In the hospitality sector, providing highly personalised and timely communications to clients using a conversational marketing

platform powered by artificial intelligence is the most effective approach (Buhalis & Moldavska, 2022) to build relationships with guests (Salazar, 2018). AI has enabled hotels to reduce their employment costs while providing their guests with a higher-quality service (Chen *et al.*, 2022). Hotels may supply guests with information using AI-powered apps and technology.

Statista found that 43% of users now prefer AI voice search over typing in a query and visiting a website or using an app (Salazar, 2018; Buhalis & Moldavska, 2022). Customers could use voice search for various purposes, including researching potential vacation destinations, learning about their recent trips, locating nearby hotels and restaurants (Salazar, 2018), reading the news, checking the forecast, setting alarms and timers, and adjusting the lights (Buhalis & Moldavska, 2022). This trend is predicted to alter customer behaviour and the hotel industry. In addition, virtual reality allows visitors to look around a hotel, museum, or other tourist attraction without leaving their living room. The idea is to give people a taste of what they can expect on their trip. As a result of the digital revolution, introverts who enjoy travelling no longer have to interact with other people at any point in the process, from booking to bedtime, as they can depend on artificial intelligence voice search. For example, over 5,000 rooms are equipped with Amazon Echo for voice control in Wynn Las Vegas. Considering the growing need for individualised care (Salazar, 2018).

#### *2.2.3.2 Biometric Technologies*

Biometrics is defined as "the science of identifying or verifying the identity of a person based on physiological or behavioural characteristics" (Chirillo & Blaul, 2003, p. 3). Hand geometry, iris scan, retinal scan, signature/handwriting, keystroke pattern (Chirillo & Blaul, 2003; Murphy & Rottet, 2009), face recognition (Liu *et al*., 2020; Morosan, 2020), fingerprint scanning, and voice recognition (Liu, 2018) are all biometric technologies that can authenticate a user and carry out specific tasks (Cavusoglu, 2019; Cheong *et al*., 2023). In biometrics and personal recognition technologies, a facial recognition device can be used in place of traditional authentication methods, like keys and magnetic cards (Yang *et al*., 2021). Biometrics holds the potential to evolve into a holistic solution that streamlines the entire guest experience. KFC uses it in Beijing to cater to customers by age and gender while making orders. When guests check in or out at Fairmont Singapore, they can use this cutting-edge technology. The Chinese FlyZoo hotel's use this technology to allow guests to pick and book individual rooms (Kiliçhan & Yilmaz, 2020; Urban & Łukaszewicz, 2021). Guest-host transactions are based on biometric technologies include things

like paperless transactions, contactless identification and payment, proximity transaction services, self-directed experiences e.g. Starwood's keyless mobile entry, and indoor/outdoor visitor tracking without the user's active participation (Stankov *et al*., 2019).

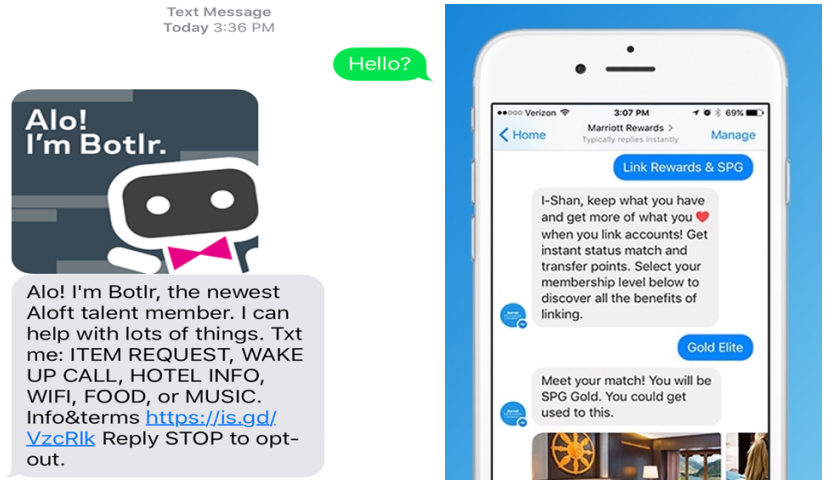
#### *2.2.3.3 Chatbots (Virtual Assistants)*

Chatbots are AI-powered computer programs that may interact with users in many ways (Chen *et al*., 2021), including answering inquiries, sending responses to text messages, carrying out tasks, and providing recommendations (Lukanova & Ilieva, 2019; Um *et al*., 2020; Elmohandes & Marghany, 2024). Chatbots comprehend the request by inferring various pieces of information, such as focusing on specific keywords from the dialogue between the bot and each user. The chatbot must plan and carry out the current one prior to moving on to the next assignment. In order to carry out its major functions, it must choose the best order to carry them out (Dash & Bakshi, 2019). Guests and consumers can connect with chatbots and "virtual agents" on websites and apps in their native language, making them a form of self-service software (Kiliçhan & Yilmaz, 2020; Pillai & Sivathanu, 2020).

Chatbots can be broken down into three distinct categories (Buhalis & Cheng, 2020). The most basic form of chatbot is the scripted version. It is impossible to deviate from those scripted paths when chatting with a chatbot. The user will be presented with a few options at each conversational level and must choose one to advance. The user's interaction possibilities (such as voice command and touch command) will vary depending on the platform and the chatbot's design. Intelligent chatbots are a step up from basic chatbots. These chatbots are more accommodating to their users since they can take various responses. Phrases or complete sentences can be spoken or typed in by the user and this chatbot learns from user interactions to improve its service (Salazar, 2018). Its intelligence, however, is restricted to the constraints imposed by the chatbot's programming. Therefore, it is a challenging task for a bot to comprehend ambiguity or context (Ahmad *et al*., 2018). In addition to the scripted and intelligent chatbot capabilities, the application chatbot is utilised following a predetermined set of graphical interface instructions. Some people mistakenly believe that a system is more intelligent if it can be operated with fewer human inputs. However, human oversight is always necessary to ensure that any given system performs as intended (Buhalis & Cheng, 2020). A chatbot can streamline a visitor's trip by answering basic questions or

fulfilling real-time requests. They also free up staff to provide superior, individualised service to customers by relieving them of mundane responsibilities, such as in Marriott (Acosta, 2017).

**Figure 2.1:** Aloft's ChatBotlr joins Marriott's. Acosta (2017).




### *2.2.3.4 Gamification*

A *game* is an entertaining activity approached with a playful attitude. At the same time, *gamification* refers to game mechanics and metaphors applied to non-game contexts to elicit intrinsic motivations through using games' diverse characteristics in areas outside the entertainment industry (Negruşa *et al*., 2015; Bravo *et al*., 2021; Pasca *et al*., 2021). While games are typically played for fun, gamification aims to enhance guests and consumers engagement and loyalty (Xu *et al.*, 2013; Xu *et al*., 2017), raise brand awareness (Xu *et al.*, 2017), encourage positive changes in behaviour (Sigala, 2015), new knowledge acquisition, the generation of original ideas (Parapanos & Michopoulou, 2023). The term "gamification" has been used interchangeably with "game-based learning,", "pervasive games." (Xu *et al*., 2017), and "serious games" (Sigala, 2015; Xu *et al*., 2017).

Hoteliers are capitalising on the gamification trend in the hospitality sector. Using this "enjoyability" indicator, hotels can tap into a previously untapped data stream, differentiate themselves from the competition, achieve remarkable outcomes (Negruşa *et al*., 2015), and for the purpose of generating more interest in and commitment to specific travel locations (Xu *et al.*, 2017; Bravo *et al*., 2021). Hotels may provide games to customers as an incentive to book a room with

them. To tempt guests, hotels use games that take a few seconds but offer a highly coveted grand prize, like a discount on their most excellent room, virtual currencies, or physical rewards (Xu *et al.*, 2013; Xu *et al.*, 2017). Even though most participants will not win the ultimate prize, everyone who enters will receive some sort of bonus from the hotel, such as an extended checkout time, a complimentary breakfast, a discount on sightseeing trips, or even free parking (Xu *et al.*, 2017). Regarding gamification applications at the front offices, when visitors must wait a while to check in, hotels try to make the experience more pleasant by providing amenities like inviting guests to online games (Xu *et al.*, 2017; Parapanos & Michopoulou, 2023).

Numerous elements of working life in the hospitality industry have been made more fun with the help of games; from interviewing candidates to assigning tasks and keeping track of team members to memorising the layout of a hotel, anything can be made into a game. A highly motivated and expertly trained team is a must in the hospitality sector, and games can be a reliable method to attract and retain such employees. In addition to making both employees and consumers happier, these positive interactions also boost productivity (Lee, 2019; Wünderlich *et al.*, 2020). For example, Marriott International has developed the "My Marriott Hotel" virtual game, which provides a virtual experience of the hotel, kitchen, and ingredients to generate interests to work in hotels (Xu *et al.*, 2017). Furthermore, HR experts have embraced virtual reality (VR) in performance measurement, a gamified performance appraisal that focuses on providing quick feedback (Shabani *et al.*, 2018; Koivisto & Hamari, 2019; Pillai *et al.*, 2022).

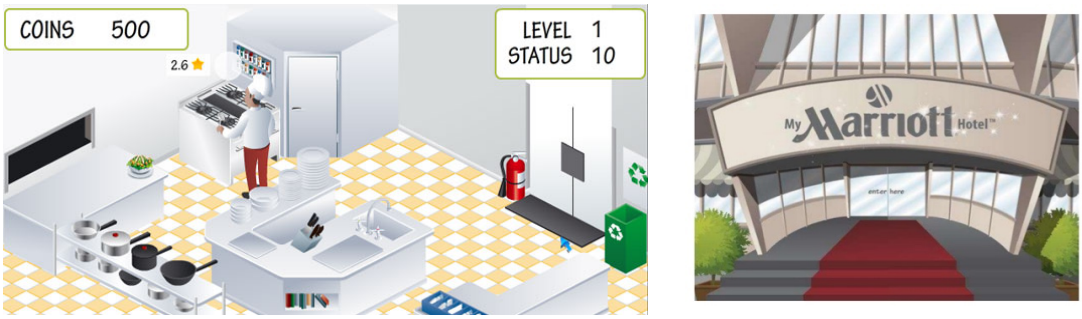



**Figure 2.2:** My Marriott Hotel Gamification

### *2.2.3.5 Internet of Things (IoT)*

In their definitions of the Internet of Things, many authors (Moktadir *et al.*, 2018; Balasubramanian & Ragavan, 2019; Pillai *et al.*, 2022; Chen *et al.*, 2022) defined it as a network of physical things equipped with electronics, sensors, and network connections to collect and share data. Buhalis and Moldavska (2021) and Pillai *et al.* (2022) expanded on the concept of the *Internet*

*of Things* and added that it is a network of interconnected computing devices that can be used to improve business procedures and workflow, and reduce unnecessary labour costs (Buhalis & Moldavska, 2021; Chen *et al*., 2022).

It is only natural that the travel and hospitality sector would start utilising IoT data (Ozdemir *et al.*, 2023) to enhance the visitor and guest experience as it becomes more widely available (Salazar, 2018; Chen *et al*., 2022). For instance, Marriott is ready to roll out its "Internet of Things room", which will feature amenities like interactive mirrors with on-demand yoga tutorials and digital photo frames for guests to submit photos of themselves and their loved ones while staying at the hotel (Salazar, 2018). Using IoT data, resort or hotels may send a proactive message to a returning customer, asking whether he/she would like to rebook his/her stay. That eliminated unnecessary motion on the part of the consumer and ensured that a room would be reserved for them. The same principle may be applied to taking advantage of details regarding the hotel's dining options, tours, and in-room conveniences. As soon as they check-in, guests can resume their favourite Netflix series or Spotify playlist, creating numerous opportunities for upselling and enhancing the overall customer experience. In addition, sensors in the beds will detect if the occupant is awake or asleep, allowing the environment to be heated or cooled and the lights to be dimmed as needed (Salazar, 2018; Jabeen, 2022; Buhalis & Moldavska, 2021). As part of the hotel IoT deployment, proximity sensors are also used in front desk applications; these enable guests to pinpoint their location within the hotel for purposes such as navigation and contextualised service recommendations. The Marriott app, for example, uses a user's location to notify them when they are near a discounted restaurant or other attraction. Other apps allow parents to keep track of their children. Another innovative IoT application in hospitality is Starwood Hotels' smart door lock system, which enables keyless entry for the chain's loyalty members with a simple gesture of their smartphones (Nadkarni *et al.*, 2020). Daylight Harvesting, which Starwood Hotels and Resorts uses to automatically adjust LED lighting (Ozdemir *et al.*, 2023) based on natural light in the room and reduce energy use, is one such example (Chen *et al*., 2022).

#### *2.2.3.6 Public Terminals with Screens (Digital Kiosks)*

Self-registration using digital kiosks, a multilingual innovation, has allowed customers to skip the check-in, room-key, checkout, and payment processes, which traditionally required human assistance. It is used extensively by hotels such as Marriott, Hilton, Sheraton, and Hyatt, as well

as in many countries. It helps guests by providing more options and lessening their wait time (Lukanova & Ilieva, 2019). Service kiosks and chatbots can converse in a wide variety of languages, unlike the often-small number of languages human employees speak. These innovations in service delivery add value for customers by making their experiences more exciting and enjoyable (Yoon, 2023). Additionally, firms in the hotel and tourism industries that implement these technologies will enjoy the same highly perceived image and positive word-of-mouth as any other high-tech company (Osei *et al.,* 2020a). According to a study by Kim and Qu (2014) perceived usefulness, perceived ease of use, compatibility, and perceived risks have a significant direct impact on tourists' attitudes toward using hotel self-service kiosks.

#### *2.2.3.7 Robots*

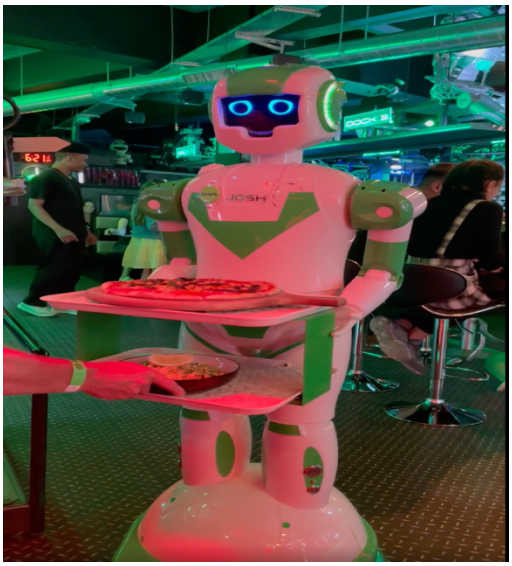
Numerous terms are used to describe robots, the most common of which are machines equipped with electronics, software, and motors to carry out pre-programmed actions because of their autonomy and wealth of features; a feature-rich system can interact with the physical world, communicate with consumers, and provide services more quickly and efficiently than now possible (Lukanova & Ilieva, 2019; Reis *et al*., 2020; Leung *et al.*, 2023). A further definition is given by (Choi *et al*., 2020), who described robots as "An autonomous or semi-autonomous robot that interacts and communicates with humans by obeying behavioural standards expected by the people with whom the robot is designed to interact, and this is what is called "service robots." Previous studies (Wirtz *et al*., 2018; Ivanov & Webster, 2020; Kiliçhan & Yilmaz, 2020; Hou *et al.*, 2021; Luo *et al*., 2021; Mingotto *et al.*, 2021) mostly defined robots as system-based equipment that can talk to and help guests and customers without the help of a person and carry out specialised services and duties thanks to the intelligence, mobility, and sensory capabilities.

The following are some of the ways researchers have approached the classification of robots from various points of view. As Lukanova and Ilieva (2019) and Jung *et al.* (2023) discussed, industrial and service robots are the two main robotics groups. Industrial robots (mobile or stationary robots) carry out various tasks in the manufacturing sector. In comparison, service robots perform jobs requiring them to interact physically and socially with humans (Lee *et al.*, 2021). Non-commercial robots, such as robots used as assistants, can be distinguished from commercial robots used in industries like cleaning, distribution, and firefighting. On the other hand, Luo *et al*. (2021) addressed the classification of robots based on the nature of their work: firstly, representation:

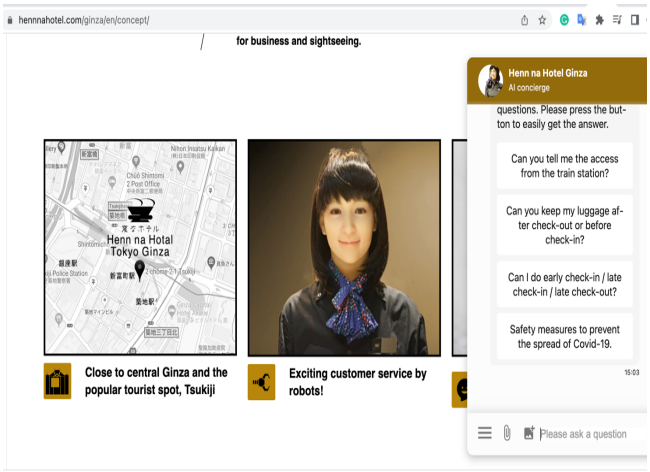
humanoid robots like receptionist robots (Yu, 2020) and non-humanoid robots like cleaning robots or cognitive analytical tasks and emotional-social tasks robots (Liu *et al.*, 2022c); secondly, anthropomorphism: robots that mimic human characteristics and behaviour; finally, task orientation: robots direct guests inside and outside hotels, airports, and restaurants.

Recently, a new robot restaurant opened in the UK. It sounds like something from a science fiction movie. Robots named Josh and Molly bring food to people who are sitting at tables. They talk to customers like real people do by taking orders and delivering food. There are more robots available in the restaurant to do different tasks. Similar settings are at the Henna Hotel in China (Lee *et al.*, 2021).

**Figure 2.3:** Instances of Robots in Service



**Source:** Robotazia (2022). Josh Waiter Robot. Official Website.




**Source:** Henna Hotel (2022). Henna Hotel Service Robots and AI bots. Official Website.

### *2.2.3.8 Virtual Reality (VR)*

Both Lukanova and Ilieva (2019) and Pillai *et al*. (2022) agreed that virtual reality (VR) is a technology rooted in the metaphysical world of data information systems, a computer-generated visual and auditory material intended to simulate an environment in which a human being can interact (De Lurdes Calisto & Sarkar, 2024; Rafdinal *et al*., 2024). VR is a big part of how employees learn and improve at their jobs. McDonald's have taught employees how to do their jobs by giving them tasks and turning the whole place into a virtual game. Scores were given to employees who had made mistakes but had learned from them, followed by feedback. This practice helped the company make much more money (Lukanova & Ilieva, 2019; Pillai *et al*., 2022). The

Best Western hotels have employed virtual reality to showcase their rooms, lobby, and facilities, which may give potential visitors a better idea of what they can expect even before registering (Flavián *et al.*, 2021). Virtual reality (VR) presents promising prospects for self-regulated training, particularly in occupations that necessitate elevated levels of sensitivity, discretion, judgment, and rapid decision-making (Lui & Goel, 2022).

#### *2.2.3.9 Cell Phones*

With mobile devices, hotel visitors may easily locate their preferred rooms, eating areas, and additional services. Also, visitors can check in, get in touch with the staff, and access a wealth of information (Ozturk *et al.*, 2016), including deals, weather forecasts, and local attractions (Parapanos & Michopoulou, 2023). Digital check-in and check-out via smartphone significantly decrease wait times (Aggarwal & Mittal, 2024). The best thing about mobile technology is wireless connection to the internet, no matter where or when, as smartphones depend on three critical technologies: third-, fourth-, and fifth-generation wireless, Wi-Fi, and Bluetooth. As a result of the widespread availability and convenience of mobile devices, information may be sent to a large audience in a short amount of time. Hotels like Marriott, Hilton, and Movenpick use it frequently (Lukanova & Ilieva, 2019; Parapanos & Michopoulou, 2023).

#### *2.2.3.10 Other Advanced Technology Elements*

The academic literature on technological advances in the hospitality industry has focused on robots, AI, VR, IoT, gamification, chatbots, and biometric technologies. However, the definitions of other parts of technical progress are murky in this area. Therefore, we searched for service sector references and obtained the following information:

An *augmented reality* (AR) display incorporates computer-generated elements to enhance users' perceptions of their physical surroundings. It connects the information acquired and the virtual reality analysis with the end goal of reworking the product or service. Displaying the details of each product and service makes it easier for customers to buy what they want while also enhancing their ability to solve problems and learn about new options for improving existing offerings (Moktadir *et al.*, 2018; Moro *et al.*, 2019; Jingen Liang & Elliot, 2021; Orús *et al.*, 2021; Ali, 2022). It is claimed that augmented reality is rarely utilised in the tourism industry due to its novelty, perceived complexity, and technical resources (Mohanty *et al.*, 2020).

*Big data and analytics* are also helpful 4.0 components that can be used to study data sets beyond the scope of conventional methods. It is a turning point in terms of our knowledge, capacity for innovation, ability to make forecasts, Etc. (Moktadir *et al*., 2018). The term "cloud" describes cloud computing and the services offered by companies that offer this model. The cloud's core features are the ability to streamline operations, reduce IT costs, and streamline service delivery (Moktadir *et al*., 2018; Pillai *et al*., 2022). *Cyber-physical systems* connect physical things and infrastructure to the internet and each other. They also use sensing, computation, control, and networking to improve the basic understanding and infrastructure needed to make cyber-physical systems work (Pillai *et al*., 2022). Brands, designs, creations, and production processes are all vulnerable to hacking, yet *cyber security* safeguards this information very well (Moktadir *et al*., 2018).

*The Global Positioning System* (GPS) can determine its users' location, velocity, and time by using a network of satellites in Earth's orbit (Fitsilis *et al*., 2018). *Radio Frequency Identification* is a method in which a small electronic device is attached to an object or person and then sends out a radio signal. This feature lets a computer find out where the object or person is and get more information (Öztayşi *et al.*, 2009). *Sensors and actuators:* physical stimuli can be used to regulate environmental conditions like temperature, lighting, and audio with the help of devices equipped with sensors and actuators (Nayyar & Kumar, 2020; Elmohandes & Csobán, 2022).

## 2.3 The Hospitality Sector Digitalisation Worldwide

The term "hospitality industry" refers to businesses like hotels, restaurants, tourist attractions, and amusement parks (Lee *et al.*, 2018; Lock, 2022). Globally, digitalisation is being used in hospitality industry to improve and streamline the hospitality services for customers (Belanche *et al.*, 2021; Lock, 2022; Nozawa *et al.*, 2022). In 2015, the Henn-Na hotel became the world's first hotel run solely by cutting-edge technological systems. Moreover, at Malaysian coffee shops, robots are used as staff to serve clients (Sadangharn, 2021; Yang & Chew, 2021). Since 2016, advancements in robotics and AI have begun to be implemented widely in the hotel business, prompting shifts in the field worldwide, not just in China, Japan, and Malaysia. After COVID-19, there was an uptick in the use of various forms of advanced technology in the reorganisation of the hospitality industry.

It is versatile enough to serve as a cook, front-desk clerk, personal shopper, and courier, among other roles (Liu *et al.*, 2022a & Seyitoğlu *et al.*, 2023).

Robots are widely utilised in countries such as the Netherlands and Singapore to reduce human interaction. Meituan Dianping is a Chinese delivery giant that uses autonomous delivery robots to bring prepared meals directly to customers' homes (Koo *et al*., 2021; Khaliq *et al.*, 2022). Thirty hotels around the United States had incorporated cutting-edge technology like AI, such as the Sheraton in San Gabriel, California, the Westin in Buffalo, New York, and the Hilton Garden Inn in Gilroy, California, by 2021. These hotels collectively possessed 39 million robot units. Moreover, Marriott uses "The Bot Experience" robots at locations including the Ghent Marriott Hotel in Belgium (Koo *et al.*, 2021).

The use of chatbot software that can connect with guests verbally and in writing is one way that artificial intelligence (AI) is improving the hospitality sector for guests, such as Hilton's Connie, the world's first concierge robot, which recommends local attractions and recreational spots (Tussyadiah & Park, 2018; Koo *et al.*, 2021). AI and robotics technologies were used in front-facing roles at Starwood Aloft hotels, as robots were used to bring customers complimentary items (Tussyadiah & Park, 2018; Chan & Tung, 2019). Chan and Tung (2019) added that Royal Caribbean's Quantum of the Sea has robot bartenders.

The following summary reveals the most notable and widely used cutting-edge technology implemented in hotels, as compiled by Nam *et al*. (2021). Firstly, in the FlyZoo hotel, check-in and check-out are accomplished by facial recognition (Face ID). Secondly, in the Alofa hotel style, delivery robots transport guests' meals, bags, and other necessities. Next, guests can use a voice-recognition chatbot to request room service, dinner bookings, television viewing, and concierge assistance. Finally, hotels like Intercontinental and Starwood use analytics to improve their guest experience by personalising their offerings, maximising occupancy rates, and reducing energy use. According to the research by Park *et al*. (2021) and Sadangharn (2021) in Singapore, the Jen Orchard Gateway Hotel provides guests with two robots to assist with, for instance, the delivery of hotel services.

## 2.4 The Brightest Sides of Advanced Technology in the Hospitality Sector

The rising adoption of digitalisation is no passing craze; rather, it is driven by its many benefits over human effort. Modern technology's processing speed and AI-enabled capabilities allow for

rapidly delivering high-quality services. The hospitality industry also benefits from low operational costs (Ivanov *et al.*, 2017; Shamim *et al.*, 2017; Gursoy *et al.*, 2019; Ivanov, 2019; Ivanov & Webster, 2024). Furthermore, managers can benefit from the availability of ethical work features in robots and artificial intelligence, including the inability to continue rumour spreading, strikes (Ivanov, 2019; Ivanov & Webster, 2020), resignations with no notice, work shirking, and guest discrimination.

According to multiple sources (Ivanov & Webster, 2020; Parvez, 2020; Pencarelli, 2020; Lin & Mattila, 2021; Nissim & Simon, 2021; Pillai *et al*., 2022; Sony *et al*., 2021; Tuomi *et al*., 2021; Jung *et al.*, 2023; Santiago *et al.*, 2024) workforce and security, visitor happiness, cost savings and operational efficiencies, and a competitive edge are areas that stand to gain from technological advancements. (1) In terms of the workforce and security, Ivanov (2019) mentioned that new technologies provide a constant, never-ending source of workers, eliminating the need for permanent staff. On the other hand, humans may work up to 60 hours a week depending on their mental and physical health, positions, and the urgency of their work. Moreover, one kiosk can perform the tasks of five employees for nonstop working receptionists. Kiosks and chatbots, for example, technologies need new software and upgrades to perform these activities. Adhering to scripted service procedures can ensure a consistent and improved quality of work that is unaffected by software updates and can be implemented effectively and on time. At the same time, humans need time and training to learn how to do them. Further, advanced technologies aid in the security of earnings and prevent theft; (2) When seen from the visitor's perspective, the advantages of sophisticated technologies stem from their humanoid appearance, interaction, and communication, which are essential to the guests' experience, contentment, and the quality of the service provided (Kiliçhan & Yilmaz, 2020). Another crucial factor is that Industry 4.0 benefits are diversified because the goal of implementing it lies in its productivity, velocity, flexibility, and better quality (Pencarelli, 2020); (3) Production, sales cost savings, time-saving, and operational efficiencies went up (Sony *et al*., 2021; Jung *et al.*, 2023). In contrast, labour and inventory costs went down. Since these technologies may be activated and deactivated unilaterally, they help mitigate issues associated with employment law when recruiting and discharging personnel. In addition, eliminating mundane activities is still the best and most fundamental (Nam *et al.*, 2021); (4) Competitive advantage: advanced technologies can improve a business brand (Kiliçhan & Yilmaz, 2020) or provide a competitive edge (Ivanov& Webster, 2024).

## 2.5 The Dark Sides of Technological Advancements in the Hospitality Sector

A dehumanising trend in business is one of the risks associated with advanced technology. In the 4.0 era, dehumanisation is exemplified by the absence of a warm, human greeting for customers or guests in the hospitality industry (Chi *et al.*, 2020). Data protection and safety is another risk since visitors feel betrayed and lose trust due to previous data breaches (Chi *et al.*, 2020; Christ-Brendemühl, 2022), which enable hackers to obtain sensitive information about customers and guests that they can then use for blackmail (Wirtz *et al.*, 2018; Chi *et al.*, 2020).

Wirtz *et al.* (2018), Chi *et al.* (2020), Ivanov (2019), Ivanov and Webster (2020), Sadangharn (2021), Brylska (2022) and Ghosh *et al.* (2024) highlighted the link between sophisticated technology and rising unemployment as low-skilled and low-wage jobs are predicted to vanish in the future, leading to an increase in unemployment and a widening income gap and inequality. Wirtz *et al.* (2018), Ivanov *et al.* (2017) and Tsvetkova (2017) added that costs associated with acquiring, installing, maintaining, programming, insuring, training, and rehabilitating personnel to work with cutting-edge technology have been documented to be quite significant. Consequentially, some opt to rent materials from specialised companies to ease the financial burden of materials. Fitsilis *et al.* (2018) and Sony *et al.* (2021) identified other challenges, such as clarity of technology implementation vision, digital culture, and return on investment (ROI) clarity that are all likely to arise throughout the introduction of cutting-edge technologies.

## 2.6 Factors to Think About When Deploying New Technologies

In their investigation of the factors affecting the success of technology implementation in the hotel industry, Ivanov *et al*. (2018) focused on the demographics of guests in terms of their gender, level of education, and average age. Technology autonomy grade, human-robot interaction (HRI) quality, and attention to guests' acceptance and interaction are critical to successful technology implementation. Since customers place almost all the blame on workers rather than on high-tech solutions, it is crucial to build the interaction between workers, customers, and technology to ensure a positive outcome. Another thing to consider is whether the system can identify and respond to positive or negative feelings conveyed by gestures, facial expressions, and words. To rephrase, it must try to serve as a human as much as possible (Choi *et al.*, 2020; Sadangharn, 2021). According to Sun *et al*. (2020), other factors have been drawn out, such as cultural values and employees' technological experiences, which are fundamental to the success of technology implementation. They continued by explaining that understanding how to execute and having

expertise are fundamental to overcoming the challenges of technology adoption. Due to a lack of knowledge and specialists, it is both expensive and dangerous. When it comes to technology improvements in the hotel industry, two things matter most: (1) providing services at reasonable prices without sacrificing quality; and (2) ensuring that any potential problems are contained within reasonable parameters.

In order to provide a more holistic view, Lin *et al*. (2020), Lin and Mattila (2021), Nam *et al*. (2021), Sony *et al*. (2021) and Ghosh *et al.* (2024) emphasised that the following are critical success elements for introducing new technologies: (1) The benefits of technology: the advantages of technology can be classified in terms of three broad categories: revenue generation, cost savings, and the quality of the guests' experience. If cutting-edge technology can make all three of those things a reality, then the technology deployment was a success in the hospitality sector; (2) Technical difficulty: a concern when integrating an older hotel's technology with newer hotel systems would be difficult because of the complement factor. Some visitors may be unable to use the guests' high-tech gadgets, such as cell phones, which is a serious worry. As a result, they have no use for the newly enhanced hospitality industry; (3) Proficient understanding of information technology: access to information technology (IT) professionals who can direct and implement solutions and align the high-technology implementation initiative with the organisation's strategy are essential, especially now that so many kinds of technology programs compete for users' attention; (4) A monetary motivation: the value of technology in a corporation is often debated based on the potential return on investment in newer, more advanced technologies; (5) Workers' reluctance: workers' scepticism of new technologies is expected, but it would not be enough to halt widespread implementation. Once workers realise what they can gain from cutting-edge technology, they will not fight it. Resistance is more likely to occur at budget hotels than at five-star ones because of thoughts of human substitution. Managers' reluctance to adopt new technologies is another form of resistance, especially when the return on investment (ROI) does not convince them to use these technologies; (6) Guests' role in a smooth technology rollout: guests' readiness to accept the service through modern technology and their impression of the benefits they will gain from the service using artificial intelligence and robots were mentioned as two crucial aspects affecting customers and guests; (7) Competition: rivalry alone is not enough to justify spending money on new technology; instead, the potential return on investment (ROI) and value addition must also be taken into account; (8) Legal matters: the legality of using cutting-

edge technology in hotels is a major issue when protecting visitors' personal information. Different guests have various levels of faith in cutting-edge technologies, as some components are just like people and, therefore, capable of inspiring trust. Contrarily, a distrust of advanced technology in service areas still exists. Therefore, managing data security against cyber-attacks is required; (9) The value of recency: cutting-edge technological components are still uncommon, fuelling people's desire to learn as much as possible about them; (10) Rapport: Rapport is when customers or guests feel they are being treated with warmth and kindness even though they are being serviced by cutting-edge technology designed to meet their every demand.

## 2.7 Reasons of Guests' Advanced Technology Acceptance

There are several similarities between Tussyadiah and Park (2018), Luo *et al*. (2021), Wang and Shao (2022), Li *et al.* (2023), Molinillo *et al.* (2023), Song *et al.* (2024a) and Pizam *et al.* (2024) in terms of primary criteria that affect visitors' openness to the use of cutting-edge technology in hotels, restaurants, and other hospitality venues. (1) Anthropomorphism involves assigning human traits to inanimate objects to make them more approachable, elicit a more positive emotional response, and promote a sense of harmony between the user's mental model and the service's actual implementation (Yu, 2020). While consumers have shown a preference for animated robots, they may not always prefer them to more realistic models. The Uncanny Valley theory proposes that humans are willing to tolerate robots that look more human until they reach a point where they start to find them unsettling. Historically, the term "technological anxiety" has been used to describe the terrible emotions that certain people may experience while interacting with new technology. Technological anxiety affects both the ease of use and the perceived usefulness of technology; (2) Animacy: animacy denotes the capacity to emotionally engage visitors by demonstrating physical reactions and verbal skills, influencing guest behaviour (Tussyadiah & Park, 2018); (3) Likeability: guests' opinions of robot service are strongly influenced by the degree to which they find it likeable. It may lead to fears about technology (Cobos *et al.*, 2016); (4) perceived intelligence and security: visitors' perceptions of the risk and comfort level when interacting with a robot and the robot's capacity to apply knowledge and abilities across a variety of service situations (Luo *et al*., 2021).

An additional element that Hou *et al.*'s (2021) research revealed was the presence of numerous guests. When crowds are present, a prominent environmental feature that reduces guests' motives

for engaging with humans. Hence, guests prefer technological developments in guest service. Interestingly, hotel guest acceptance and predisposition for frontline service automation grew after the COVID-19 issue (Yoganathan *et al*., 2021). On the other hand, Mingotto *et al*. (2021) expanded the discussion in consideration of these factors. They reflected that numerous factors influence whether customers are receptive to dealing with robots and whether human-machine collaborations are productive, particularly in the service and tourism industries. User factors include his outlook on technology, his acquaintance with different tools, and his understanding of their advantages. The nature of the robot's or advanced technologies' work is a significant factor in customers' opinions. Customers have positive opinions about technologies in services, such as housekeeping, information provision, booking processing, payment processing, and document distribution.

## 2.8 Hospitality Labour Force Issue in Advanced Technology Epoch

Unlike the other sectors, guests and consumers may defy anthropomorphic technologies like robots, as human value is the hospitality sign. As a result, practitioners and academics called for studies on guests' acceptance of technologies in serving them (Choi *et al.*, 2020). Studies show that cutting-edge tech is broadly welcomed as follows:

Ziemke and Thill (2014), Kuo *et al*. (2017), and Wirtz *et al*. (2018) indicated that human-like robots are more feasible than others, especially in handling seasonal hotel employment. However, they warned that it leads to guests' dissatisfaction if they do not perform like humans. They confirmed that advanced technology elements could autonomously interact, communicate, and deliver service at the reception desk, including rooms and lodging, goods delivery, and entertainment. Then, the studies followed up over time and agreed with this opinion; Ivanov (2019) supported this opinion and drew attention to the fact that there may be slight errors in technology at present, but this does not negate the fact that this may be developed shortly. Its shortcomings would be turned into advantages and become more attractive to hospitality managers as an alternative to the hiring costs and their requirements. Artificial intelligence-based robots can be service providers and customers in the hospitality and tourism industries. Many participants in the Choi *et al.* (2020) and Zhong *et al.* (2020) studies described the factors contributing to their acceptance of advanced technology through their use of terminology like "new" and "fun" expressions to describe their experiences with advanced technologies. The participants also approved that their dealings with advanced technology enhanced their experience and pleasure during their accommodation. Specifically, children feel delighted with this experience—advanced

technologies used for marketing. Both Kiliçhan and Yilmaz (2020) and Yu (2020) came after them to support this viewpoint.

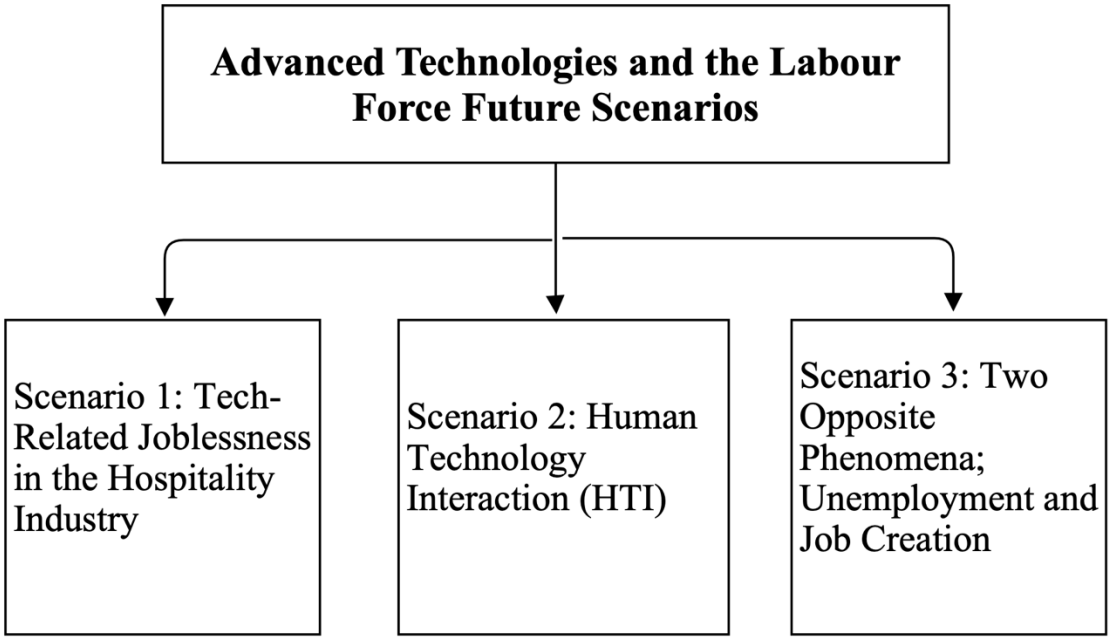
Furthermore, the study by Sadangharn (2021) deployed a robot in hotels as part of research in Thailand. In this research, it is confirmed that the ease of use and usefulness of robots are decisive factors for advanced technology acceptance in hotels, and they accept robots even if their performance is lower than anticipated. Guests recommended that robots can be developed with higher capabilities in the actual application and then there was a continued support for this opinion through Brylska's (2022) study, which reflected a positive perception and behaviour towards using one of the advanced technology elements, robots in the hospitality sector. Specifically, this study emphasised that the hospitality industry was affected by the swift tectonic shifts that characterised the COVID-19 period, such as lockdowns, social distance, homestays, and travel limitations. After the pandemic, robots and other advanced technologies showed a more optimistic side and were met with surprisingly good customer responses. For instance, because of their superior artificial intelligence, robots were adequate for sanitising, providing services, and ensuring security.

While the authors' perspectives on this issue are divergent, they can agree that technological advancements will alter the nature of work, the available jobs, the skills that are necessary for employment, and even the mindset of managers to promote the use of technology in the hospitality industry and exert command over the leading three dimensions of operation, employees, and guests, according to research by Ivanov (2020). Technological advances outperform humans in routine tasks based on their computerised and analytical nature. In some cases, advanced technology maturity for substitute employees is not at the required level. This point does not contradict the idea that it can replace human employees in terms of emotional intelligence (Reis *et al.*, 2020). We are witnessing an epoch in which the hospitality field's technological capacity to provide fully automated frontline services is increasing. It is anticipated that advanced technologies will gradually become more social (Reis *et al.*, 2020; Molinillo *et al.*, 2023). Hospitality establishments are between completely replacing employees with advanced technology or slowing down and choosing a balanced system such as the human-robot system (Reis *et al.*, 2020).

Because of the rapid pace of technological change in the hospitality industry, this research focuses on the future of the industry's labour force as one of the dimensions that must be managed. Due to these previous studies' findings of the broad use and acceptance of cutting-edge technologies by

hotels and restaurants, we are on the cusp of one of the following scenarios regarding the hospitality industry's labour force.

**Figure 2.4:** Hospitality Industry Labour Force Future Scenarios




**Source:** Compiled by the author

### 2.8.1 Tech-related Joblessness in the Hospitality Industry (Technological Unemployment)

#### *2.8.1.1 The Meaning and Root Causes of Technological Unemployment*

Due to the lack of a young workforce and experience (Ivanov, 2020; Lima *et al.*, 2021), hotels would broaden their recruitment to include people of all ages and technology, which is seen as a human substitution in this context, to reduce the required staff (Tussyadiah *et al.*, 2022). The human labour cost and the inefficiency of manual labour have made advanced technology have far-reaching ramifications for the hospitality industry's labour force (Solnet *et al.*, 2016; Schneider, 2017; Hamarat *et al.*, 2024). In turn, these causes will contribute to a phenomenon known as technological unemployment. Ivanov (2020), Lima *et al*. (2021) and Widuckel and Bellmann (2023) highlighted the origins of technological unemployment: First, service providers frequently invest in cutting-edge technology to increase their earnings. Some economists have suggested that

this could benefit the economies of developed nations while ignoring the potential adverse effects on developing nations due to human substitution. Second, a skills gap because of rapid technological changes outpacing employees' abilities to keep up with the pace. Finally, rapid technological changes mean that the more technology develops, the more human labour is reduced. According to Schneider (2017), 85% of customer and visitor interactions are predicted to occur without human agents.

In light of these reasons, this study defined technological unemployment as a rise in the unemployment rate caused by substituting humans for machines in previously human-only tasks. Ivanov *et al.* (2018) and Ivanov and Webster (2020) noted that many hotels are trying to automate their services even though the Henna hotel crisis in Japan showed that many processes still call for human workers. We must pay attention to the economics of robotic technologies (Ivanov & Webster, 2020), as there is no barrier to replacing humans with some form of advanced technology in hotels (Tussyadiah & Park, 2018), given that robots can handle front desk duties, deliver room service, and socially connect with clients (Stock, 2018; Tussyadiah & Park, 2018). The debates and views on this issue would continue until surprisingly advanced technology replaces humans and creates catastrophic results (Tussyadiah & Park, 2018). Employees at risk of losing their jobs must aspire to be equipped with new and robust skills suitable for this era to survive (Balasubramanian & Ragavan, 2019; Li *et al.*, 2019).

Studies (Ivanov, 2020; Pillai & Sivathanu, 2020; Bucak & Yiğit, 2021; Nam *et al*., 2021; Vatan & Dogan, 2021) show that these authors all share this view. They discussed how hospitality industry workers worry that robots may take their jobs. Pillai and Sivathanu (2020) revealed that today's tourists are tech-savvy and comfortable using a variety of devices from the time they begin planning their trip to the time they say goodbye at the airport. Customers have shown they are very comfortable with these technologies, and their use has made it possible for them to replace human travel assistants. Cheong and Lee (2021), Cheong *et al.* (2023), Jung *et al.* (2023), Hamarat *et al.* (2024) and Wang (2024) expressed concerns about the potential negative impact of robot development on youth employment and its subsequent consequences for society. They acknowledged that societal transformations occur regularly, and substantial long-term changes are unavoidable.

#### *2.8.1.2 Potential Threats and Suggestions for the Technological Unemployment Phenomena*

Job instability is termed "job insecurity," which refers to the worry that one's employment might be terminated (Erebak & Turgut, 2021; Kang *et al.*, 2024). Technological unemployment has many ramifications, as it can devastate a person's physical and mental health. Constant worries about job safety can negatively impact happiness, life satisfaction, and burnout. If employees are worried about finding work, they might be unable to think clearly or creatively, which mitigates their performance (Kang *et al.*, 2024). As with any potential threat to one's livelihood, losing one's profession can elicit a range of negative emotions, including anger, concern, anxiety (Wang & Shao, 2022; Xu *et al.*, 2023), depression, hostility and resentment (Koo *et al.*, 2021; Erebak & Turgut, 2021). For some people, the fear of unemployment is far more crippling than the actual loss of employment (Zhang & Jin, 2023). Furthermore, job insecurity is essential in determining organisational results, such as the corporation's efficiency, commitment, work participation, turnover intentions, and job satisfaction (Darvishmotevali *et al.*, 2017; Erebak & Turgut, 2021; Koo *et al.*, 2021; Zhang *et al.*, 2023).

Several papers (Lu & Gursoy, 2016; Chen & Wu, 2017; Balasubramanian & Ragavan, 2019; Koo & Curtis, 2020; Koo *et al.*, 2021; Mingotto *et al.*, 2021) indicated that professionals in the hospitality business need to realise that a pleasant workplace is key to retaining workers. It is the hotel manager's responsibility to do the following:

The first is to initiate new labour force policies and employee incentive structures while applying advanced technology in a manner proportional to preserving employment stability and continuity (Kang *et al.*, 2024). Secondly, to train and educate workers on the latest technological developments so they can transition into the current era. Third, they need to strike a balance between their workforce and the new technologies being implemented (Pan *et al.*, 2025). Fourth, the hotel's stakeholders need to use cutting-edge technology to deliver a genuine guest experience, increase profits and output, and always maintain sight of the importance of people. There must be a shift in how hospitality services are viewed to compete globally. Finally, hotel schools must also focus on preparing future leaders for the challenges posed by AI and other forms of cutting-edge technology (Hamarat *et al.*, 2024). This will boost worker happiness and reflect job security, lowering the turnover rate and technological unemployment that could otherwise emerge from using technology to replace humans in the workforce and the economy.

### 2.8.2 Human Technology Interaction

Ivanov and Webster (2019), McLeay *et al*. (2021) and Tuomi *et al*. (2021) revealed that advanced technology is a double-edged weapon as it has substitution and enhancement influences. Substitution occurs when it substitutes humans entirely on tasks, and enhancement happens when it just surges productivity instead of eliminating it. Huang and Rust (2018), Lu *et al*. (2019), Choi *et al*. (2020) and Sadangharn (2021), Kim and Cha (2024) reported that the interaction between humans and advanced tech robots is more efficient than human replacement and the nature of hotel business necessitates the presence of human staff. This opinion is built on the foundation that robots will help managers with human resources (HR) difficulties like hiring temporary workers, scheduling work for the offseason, and enhancing the hotel's reputation. On the other hand, robots will never be able to replace humans in the workforce fully, and jobs will still require humans for the foreseeable future. The reason for this belief is that it will not affect management and human resources (HR) processes, and advanced technologies cannot accurately capture human feelings and thoughts and cannot deal with unprogrammed cases (Xiao & Kumar, 2021). These studies confirmed that employees are not afraid of unemployment and consider robots like workmates. These perspectives are consistent with those of Decker *et al*. (2017), Delvaux (2017), Wirtz *et al*. (2018), and Lin and Mattila (2021), who confirmed that despite the substantial influence of AI and service robots on work productivity, the more considerable influence would be a complementing role, not a replacement.

Ivanov and Webster (2019), McLeay *et al*. (2021), and Tuomi *et al*. (2021) highlighted the urgent need to balance technological enhancement and substitution effects. Moreover, Wirtz *et al*. (2018) and Lin and Mattila (2021) reflected that the nature of hospitality work necessitates the division between tasks suitable for advanced technologies (dealing with routine and dangerous tasks) and humans (dealing with add-value tasks).

### 2.8.3 Two Opposite Phenomena: Marginal Unemployment and Job Creation

These authors (Zalama *et al*., 2014; Kilihan & Yilmaz, 2020; Oželienė *et al*., 2020) concurred that it is worthwhile to ensure that technological advances result in a decline in hospitality industry employment. On the other hand, advanced technologies are opening new career prospects (Tian, 2024), such as technology concierge and technology manager, that will attract the younger generation and provide them with room for innovation. Ivanov (2020) and Ghosh *et al.* (2024)

recently discussed this issue from a broader perspective in terms of job level, highlighting the fact that low-skilled jobs like receptionists, sales agents, cooks, waitpersons, room service delivery staff, food order delivery staff for restaurants, cashiers, accountants, drivers, cleaners, gardeners, Etc will remain in demand. Even so, it will be reduced because automation makes it possible. They predicted that the service sector, at the front and back of the house, would undergo significant changes because of digitalisation, including introducing new positions and eliminating others. As a result, the nature of the service and the requirements for doing the work will shift (Tian, 2024).

## 2.9 The Study's Theoretical Framework Selection

### 2.9.1 Technology Acceptance Model

Davis (1985) built this model to foresee how often people would use the system and predict system usage. TAM has become increasingly significant in information systems studies in the last two decades and has served as a theoretical foundation for investigating factors influencing technology adoption in businesses. Studies have shown that it accurately predicts users' intents and actions about 40% of the time (Venkatesh & Davis, 2000). Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) are the two variables on which TAM analysed a person's intention to adopt new technology (Davis, 1989; Davis *et al*., 1989; Adam *et al*., 1992; Venkatesh, 2000; Venkatesh & Davis, 2000; Wirtz *et al*., 2018; Pillai & Sivathanu, 2020; Sun *et al*., 2020; Song *et al.,* 2024b). The objective is to offer a theory of technology adoption that can be used to explain user behaviour across a wide variety of end-user computing technologies and demographics (Davis *et al*., 1989; Van Slyke, 2008).

### 2.9.2 TAM's Tenets

According to Davis *et al*. (1989), Perceived Usefulness (PU) is the extent to which an individual thinks employing a particular system will improve their performance at work. Perceived usefulness is crucial in shaping usage intentions (Venkatesh & Davis, 2000; Sohn, 2017; Zhang *et al.*, 2019; Santiago *et al.*, 2024). Davis *et al*. (1989), Venkatesh (2000), Venkatesh and Davis (2000) and Zhang *et al.* (2019) defined Perceived Ease of Use (PEOU) as the extent to which a person believes that using the system will not require any effort. PEOU is believed to have a direct influence on PU. The paradigm posits that PU and PEOU mediate the impact of extrinsic variables on behavioural intention, such as the features of technology. Venkatesh *et al*. (2007) demonstrated

that TAM incorporated a variety of theoretical approaches to build a model that is substantially simpler than more intricate models, such as the Theory of Planned Behaviour (TPB) and Theory of Reasoned Action (TRA). Due to the limited direct link between perceived usefulness and attitude and the high direct link between perceived usefulness and intention, Davis *et al*. (1989) removed attitude toward adopting technology from their final model (Bae & Kim, 2024). It was explained that this occurred when people planned to utilise technology while having a negative attitude towards doing so just because it was worthwhile. By removing attitude from the model, we can concentrate on the effects of perceived ease of use and perceived usefulness on the intention that matters (Venkatesh, 2000). Advanced technologies are novel occurrences; therefore, TAM, despite the availability of various frameworks, has emerged as the most frequently employed approach for studying a user's inclination to adopt technological advances (Scherer *et al.*, 2019; Santiago *et al.*, 2024; Li *et al.*, 2024) and the elements that influence the intention to adopt it (Santiago *et al.*, 2024). This research relies on TAM for multiple reasons. TAM is widely regarded as a significant model in the hospitality industry information systems (Cheong *et al.*, 2023; Li *et al.*, 2024; Bano & Siddiqui, 2024). It is widely popular for numerous reasons, such as this model being IT-specific and concise. It can investigate and forecast the acceptability of a variety of technologies. It is advantageous to explain the adoption of any technology in a versatile manner, with a solid theoretical and psychometric foundation and a high explanatory power (Chatterjee *et al*., 2021; Santiago *et al.*, 2024).

**Figure 2.5:** Original TAM Model (Davis *et al.*, 1989).

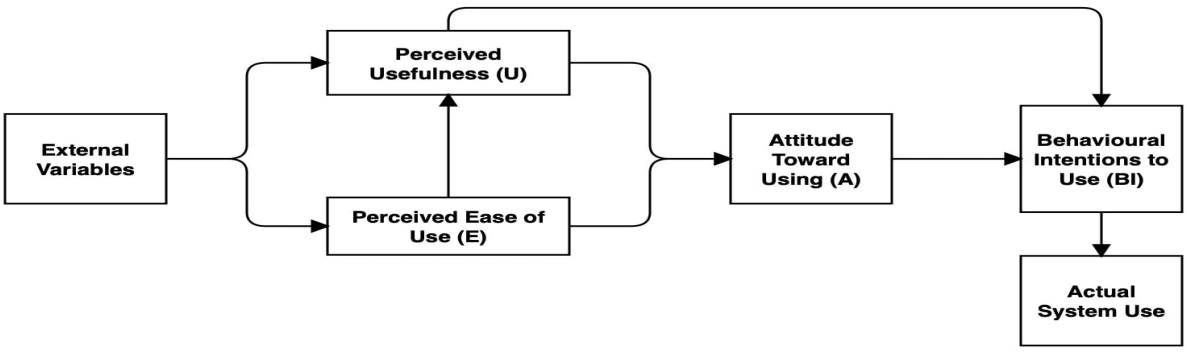
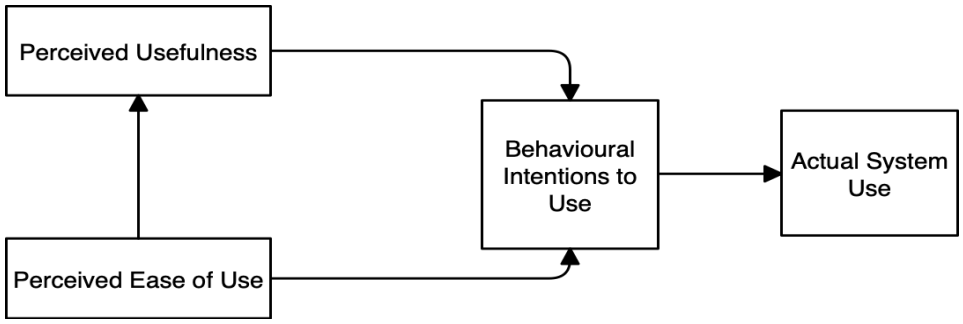


**Figure 2.6:** The Final TAM Model Venkatesh and Davis (1996)




### 2.9.3 Controversies About TAM

TAM is a valid and reliable model of user technology adoption. However, it has been criticised for providing overly broad insights into users' perspectives on novel technologies, taking a deterministic approach that ignores users' unique characteristics, and presuming that usage is voluntary and unconstrained. One of the main complaints against TAM is that it fails to provide practitioners with any concrete recommendations or instruction and considers any variables in addition to cognitive beliefs as potential explanations (Santiago *et al.*, 2024). Parsimony (final model) is a strength of the model. However, it also means that it needs to include more aspects to explain users' adoption behaviours fully, and those factors are not particularly helpful to practitioners (Zhang *et al.*, 2019; Xu & Lu, 2022; Santiago *et al.*, 2024). Davis (1989) argued that future studies must account for these factors to fully understand the factors that influence PU, PEOU, and adoption. Consequently, studies adopting TAM's fundamental tenets, such as (Kim, 2016; Huang *et al.*, 2019) have frequently added other factors.

The extant literature provides compelling evidence regarding the TAM framework's broad applicability. Davis *et al*. (1989) and Slade *et al*. (2015) indicated that although initially intended as a model to predict users, such as employee acceptance and usage of technology in the organisational context, most TAM studies have examined the individual acceptability of technology in the consumer and guests context, such as (Nizar & Rahmat, 2018; Huang *et al.*, 2019; Pillai & Sivathanu, 2020; Yang *et al*., 2021). Existing literature on technological advancements needs more clarity regarding the elements influencing managers' adoption intentions through the TAM lens in the hospitality industry and the effects on the future of the hospitality labour force.

## 2.10 Focus of this Research

Through this chapter's literature review, suitable knowledge gaps have been identified for this research to contribute to the domain of technological advancement adoption in the hospitality sector, focusing specifically on hospitality managers' intentions to adopt new technologies, the factors that influence their intentions, potential outcomes, and consequences for the future of the workforce and new labour management tactics in this era. This section establishes the scope of the research and identifies the gaps in the literature that will be addressed.

### 2.10.1 Managerial Level Knowledge Gaps

**Understanding the factors influencing hospitality managers' intentions to adopt new technologies, their perspectives regarding the implications of advanced technology adoption, labour force concerns, new labour force management strategies and the skillsets needed to succeed in the post-industrial 4.0 era.**

The views of hotel staff and management on the use of cutting-edge technology and the best use of such tools in the hospitality industry are hot topics for future research (Lukanova & Ilieva, 2019). Examining the hotel managers' prospects in matters related to the recent technological epoch equips us with the foundational knowledge to deeply comprehend the hospitality future (Choi *et al*., 2020). At the forefront, Murphy *et al*. (2017) advised future research subjects relating to the effects of technology on financial operations, employee training, the skills required of employees in the era of technological breakthroughs, employees and managers between resistance and acceptance, effective management (Ivanov *et al*., 2018), various management and labour-related concerns (Drexler & Lapre, 2019).

Existing literature on hospitality technological improvements needs more clarity about hotels' managerial procedures related to implementing advanced technology in terms of the organisation and the future of the labour force (Shin *et al.*, 2019). Recently, Choi *et al*. (2020) and Tuomi *et al*. (2021) indicated the same gap as little research attempts were made to comprehend service quality and implications from managers' and employees' perceptions of robots and the era of Artificial Intelligence (AI) in hospitality. Tuomi *et al*. (2021) revealed that despite the wide range of research conducted on new technologies in the hospitality sector, more research in various contexts is needed especially exploring new strategies in the hospitality sector.

### 2.10.2 Workforce Knowledge Gaps

**Although the technological advances in hospitality have caught researchers' eyes, research on the dimensions and implications of service automation in terms of those who work in the sector and the new technology's multifaceted functions are scarce.**

Adopting advanced technology in the hospitality sector highlighted technological unemployment and job insecurity. If this does not affect the employees' intentions to leave the job, it will affect at least their job performance. From this point, controversy arose about whether applying advanced technology in hotels would improve the quality of services or pose a threat to employees' work as a catalyst for job loss. Despite these promising innovations in the hotel industry, questions remain unanswered about its ability to threaten human jobs based on its ability to mimic human thought processes and reasoning ability (Kilihan & Yilmaz, 2020; Koo *et al*., 2021).

Despite the rising application of new technology in the worldwide hospitality industry, most research has focused on the impressions of guests and consumers. The research suffers from a lack of knowledge in terms of the following: first, the relationship between advanced technologies and trust, morality, unemployment, and empathy, which are understudied (Pillai *et al*., 2022; Vatan & Dogan, 2021). Second, there still a lack of clarity about how AI and robotics will ultimately affect those who work in the hospitality industry (Erebak & Turgut, 2021; Nam *et al*., 2021; Cheong *et al.*, 2023). Finally, the inclination to replace human personnel with advanced technology in service is contingent on their capacity to execute the service on all levels, including the physical, social, and emotional. Despite this fact, there is a dearth of research on the multifaceted functions of new technology in the hospitality and service industries, which can result in technological unemployment (Gursoy *et al*., 2019; Mingotto *et al*., 2021; Kong *et al.*, 2024).

Although technological advancements in the hospitality industry have gained the attention of scholars, little is known about the dimensions and ramifications of service automation and the various uses of new technologies (Frey & Osborne, 2017; Ivanov *et al.*, 2017). Therefore, Parvez (2020) proposes investigating the technological effects on employment in the hotel industry. In addition, Chi *et al*. (2020) suggested that future research should shed light on how to govern the deployment of sophisticated technologies in the hotel industry to avoid future problems with technological unemployment and a lack of available jobs.

### 2.10.3 Research Approach Gap

**There is a dearth of empirical research that assess the full scope of the hospitality industry's sophisticated technology deployment.**

The literature review shows that new sophisticated technologies in service and tourist businesses are the subjects of very little empirical research focusing on automation and innovation (Ivanov & Webster, 2020; Reis *et al*., 2020; Mingotto *et al*., 2021). More studies are needed on linking advanced technology to topics such as customer and worker sentiment, the shifting roles that customers and workers may take on during a service encounter, service design, the effects on processes, operations, jobs, and organisational redesigning, and the workers' education and development. Despite the abundance of conceptual articles, empirical research appears to be less advanced, and research methodologies like action research and projective techniques still need to be employed (Mingotto *et al*., 2021).

**Table 2.1:** Summary of Research Gaps and Initiatives to Fill Them.

| Gap(s) and Key literature | Filling the research voids |
|---|---|
| A lack of clarity on the ultimate impact of sophisticated technologies on the hospitality industry labour force (Erebak & Turgut, 2021; Nam *et al*., 2021; Pillai *et al*., 2022; Vatan & Dogan, 2021; Cheong *et al.*, 2023). Concerns exist over its potential to undermine human employment (Kilihan & Yilmaz, 2020; Koo *et al*., 2021; Kong *et al.*, 2023; Pericleous *et al.*, 2025) and the skills required of employees in the era of technological breakthroughs (Murphy *et al.*, 2017; Shin *et al.*, 2025). | This study explores the prospects for hospitality managers concerning the current technological era by illuminating the elements influencing managers' adoption intentions through the TAM lens, labour-related concerns, mainly focusing on their job future, new strategies of labour force management, and exploring the various functions of new technologies in the hospitality context. |
| Lacks examining the hospitality managers' prospects in matters related to the recent technological epoch in terms of managers' acceptance (Ivanov *et al*., 2018; Pizam *et al.*, 2022; Tussyadiah *et al.*, 2022; Pericleous *et al.*, 2025; Shin *et al.*, 2025), labour-related concerns (Drexler & Lapre, 2019; Seyitoğlu *et al.*, 2023; Pericleous *et al.*, 2025), new labour force management strategies (Shin *et al.*, 2019; Choi | |

| | |
|---|---|
| *et al*., 2020; Tuomi *et al*., 2021; Pericleous *et al.*, 2025; Shin *et al.*, 2025). | |
| Exploring the multifaceted functions of new technology in hospitality (Gursoy *et al*., 2019; Mingotto *et al*., 2021; Cheong *et al.*, 2023). | |
| Lacks advanced technology research in the hospitality context (Park, 2020; Shin & Jeong, 2020; Cheong *et al.*, 2023). | |
| Despite TAM's origins as a model to predict user acceptance and usage of technology in the workplace, Davis *et al*. (1989) and Slade *et al.* (2015) noted that the majority of TAM studies have also investigated the individual acceptability of technology in the consumer and guest context, such as in (Nizar & Rahmat, 2018; Pillai & Sivathanu, 2020; Yang *et al.*, 2021) studies. | The Technology Acceptance Model (TAM) paradigm is employed in this inquiry. The purpose of this study is to determine if PEOU and PU influence the managers of hospitality venues' decisions to implement/use advanced technology in service and to explore the other elements that influence their decision and projected implications on the labour force. |
| The hospitality industry's future workforce needs to be investigated in more depth, hence more empirical research is necessary (Cobos *et al.*, 2016; Ivanov & Webster, 2020; Reis *et al*., 2020; Mingotto *et al*., 2021; Pericleous *et al.*, 2025). | Unlike the vast majority of hospitality studies, which have relied on quantitative techniques, this one takes a qualitative, in-depth approach. |

## 2.11 Chapter Conclusion

Technological advancements serve as game-changers in the hospitality industry. AI, robots, chatbots, and sensors impact the operation of the travel and tourism industry. Industry 4.0 alters how services are rendered to customers and guests. For instance, robots are utilised in concierge, delivery, pool cleaning, and self-check-in/check-out. AI, robots, and other components of contemporary technology have evolved into machines that can learn independently and perform human-like tasks. Therefore, the managers' intentions to adopt advanced technology affect the future of the hospitality workforce. This chapter examined the foundations of advanced technologies in the hospitality sector, focusing on the future of the labour force. Several gaps and limitations were identified concerning the focus, theory, and methodology of the existing research on technological advancements in hospitality. As a result, specific research questions to be addressed by this study were formulated. Therefore, the purpose of this qualitative study was to

explore the intentions of hospitality managers to adopt advanced technologies, as well as the factors influencing their decisions, projected outcomes, and their implications for the future of the labour force.

# Chapter Three: Research Methodology

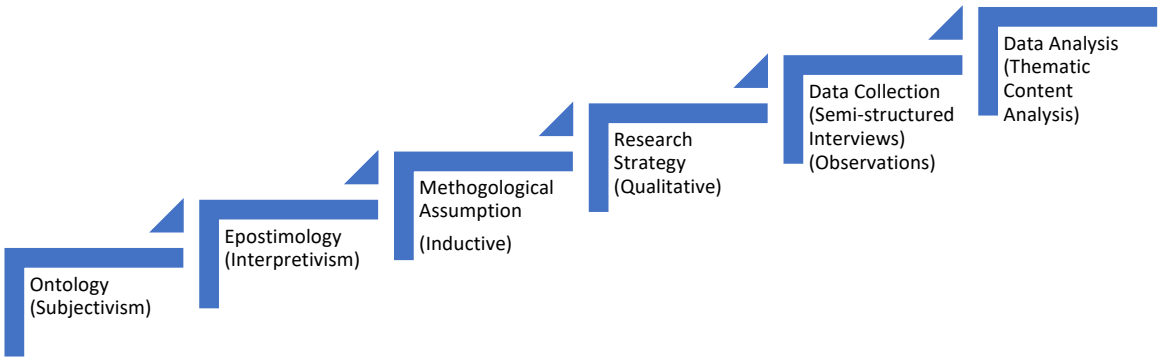
## 3.1 Introduction

The subsequent chapter will demonstrate the alignment between the research question, methodology, and methods. Therefore, it will begin with an overview of the research strategy, including the methodological foundations emphasising ontology and epistemology and the research design perspective. The methods of data collection and analysis will then be defended, and research ethics and limitations will be discussed.

## 3.2 Overview of the Research Approach

The following is a summary of the chapter on research methodology and the overall research design. This summary gives the reader a sense of the overall project before diving into the methodology and the method's detailed explanation and justification (see Figure 3.1).

**Figure 3.1:** Methods Map



*Epistemological Position*

This thesis is a qualitative investigation employing an interpretivism perspective. This position will be discussed in greater depth below.

*Overall Research Strategy*

The overall research strategy is qualitative, with an inductive, interpretative approach to the topic.

*Data Collection*

Six observations and twenty-seven semi-structured interviews (including two pilot interviews) were utilised to collect data.

The semi-structured interviews were conducted over four months. Twenty-seven semi-structured interviews were conducted with restaurant managers, assistant managers and supervisors where advanced technology was implemented. The two initial interviews served as a pilot study to validate the proposed method. However, the pilot study revealed that only a minor modification was necessary. This indicates that the data from these two interviews can be included. The justification for this strategy will be discussed in Section 3 of this chapter.

The study observed participants in their natural environment. The non-participant observation method was used for the study. The researcher observed in the social setting but was not employed. The researcher observed a restaurant ambiance, automated tasks, the ratio of human personnel to advanced technology, changes in job responsibilities, staff-technology interaction, task-related skills, staff satisfaction and adaptability, new roles, impact on workforce structure, customer interaction, service quality, productivity and efficiency, and customer satisfaction.

*Data Analysis and Presentation*

Content analysis with coded themes was used to analyse the transcripts of the semi-structured interviews. The data for this came from the analysis and transcription of audio recordings. Intelligent verbatim, directly quoted from the texts, and interspersed with interpretations from the researcher are used to present and analyse the findings.

This section will provide a comprehensive explanation and defence of the methodology and method, following a brief description of the research design. The methodological positioning of the thesis will be discussed in the subsequent section.

## 3.3 Methodological Underpinnings of the Thesis

This section establishes the methodological foundations of the thesis with respect to the research ontology and epistemology. These include the theory of knowledge and our view of reality, which serve as the foundation for the theoretical perspectives of research and comprehensive methodology. The adopted research perspective will be described, with this perspective informing the design, data collection, and analysis. The following discussion will provide crucial context for the rest of this thesis.

### 3.3.1 Research Ontology: Subjective

Ontology studies the nature of reality (Marsh & Furlong, 2002, p. 18; Creswell & Poth, 2016, p. 45) and what we think is real (Marsh & Furlong, 2002, p. 18). In other words, ontology examines what kinds of things exist and how (Miller & Brewer, 2003) and our assumptions about reality (Hirschheim, 1992; Bhattacherjee, 2012). For instance, how can we understand existence? Is there a "real" world outside of our knowledge? (Marsh & Furlong, 2002, p. 18). Objectivism and subjectivism are the two leading schools of thought in ontology. Objectivism says that social phenomena exist apart from how people think and act in society. On the other hand, according to subjectivism, they are only social constructs that are based on the perceptions and actions of social actors (Orlikowski & Baroudi, 1991; Bryman & Bell, 2011).

This investigation adopts a 'subjective' ontological stance (Creswell, 2007). This ontological stance builds "reality" via social interactions in which social actors (people) generate common meanings and realities and form the subjective meaning of their experiences oriented toward certain objects (Creswell, 2007; Bhaskar, 2013). Subjectivism emphasises that social reality consists of the perceptions and acts of social actors. Furthermore, this perspective shows and emphasises the connotation of phenomena and logic (Bryman & Bell, 2011; Schwartz-Shea & Yanow, 2013). This study aimed to comprehend and interpret reality based on the perspectives, interactions, and narratives of restaurant managers, assistant managers, and supervisors regarding the issue under

investigation. The implementation of the data collection method aims to amass a substantial body of evidence from which a better comprehension of participants' perspectives can be drawn. Thematic content analysis, discussed in detail below (section 3.7), was subsequently the most fruitful approach to comprehending this.

### 3.3.2 Research Epistemology: Interpretivism

The epistemological stance is predicated on the ontological stance. After discussing ontology as the nature of being and how reality is represented, we turn to epistemology, which is the study of the connection between the researcher and the world (Hirschheim, 1992; Carson *et al*., 2001; Denzin & Lincoln, 2018) and the most effective means of acquiring reliable information about it (Hirschheim, 1992; Carson *et al*., 2001; Creswell, 2018). It seeks to provide a philosophical basis for choosing what sorts of knowledge are feasible and how to verify that they are sufficient, legitimate, and trustworthy (Maynard, 1994). According to Crotty (1998), ontology complements epistemology by informing the theoretical stance and directing the overall research design. Generally, positivism and interpretivism are the two most well-known epistemological approaches (Carson *et al*., 2001; Jankowicz, 2005; Bryman & Bell, 2011; Wheeldon & Ahlberg, 2012).

Positivism asserts that society mirrors nature. This epistemological concern advocates using natural science methods to observe social reality (what happens), not interpret it. Positivists, therefore, attempt to keep an objective and independent stance (Collis & Hussey, 2009; Bryman & Bell, 2011) to enable objective analysis and to view knowledge as independent of people (Girod-Séville & Perret, 2001; Levin, 1988). This viewpoint dominates the natural sciences and posits a single objective reality applicable to all study situations, irrespective of the researcher's perspective (Hudson & Ozanne, 1988). Positivist studies test theory to enhance predictive comprehension of the social phenomena under study (Myers, 1997; Straub *et al*., 2004). They are concerned with the rigor, validity, and replicability of the research (Orlikowski & Baroudi, 1991; Bryman & Bell, 2011; Gray, 2017). On the other hand, there has been a considerable debate about how positivism has several flaws, the most notable of which are its deterministic explanations of phenomena and its disregard for historical and contextual conditions (Orlikowski & Baroudi, 1991).

According to interpretivism, the social world does not resemble the natural world because it is a product of social actors and social processes, necessitating a different orientation. This epistemological concern asserts that subjective interpretation is necessary for the study of social reality. In other words, the study of social reality needs to be interpreted in a personal way (Bryman & Bell, 2007). Consequently, interpretivists attempt to reduce the distance between the researcher and the object of study (Collis & Hussey, 2009; Creswell, 2012). Interpretivist studies typically seek to comprehend social phenomena through the meanings individuals ascribe to them (Lee, 1991). It is common practice for researchers to spend time with participants being researched in the field and at the sites where data is collected to get to know them better and learn more about their experiences (Bryman & Bell, 2011). The researcher's objective is to facilitate knowledge development throughout the process, with the overarching goal of interpreting and making sense of time-bound and subjective experiences (Hudson & Ozanne, 1988). However, interpretivism has been criticised for several reasons, including its inability to explain the historical change, the introduction of bias through researchers' interpretations, and the failure to account for cases in which participants' accounts of their actions and intentions contradict their actual behaviour (Orlikowski & Baroudi, 1991).

This study's epistemological stance is interpretivism. According to the interpretive stance, things are meaningful entities apart from awareness and experience (Crotty, 1998, p.4). According to Bryman and Bell (2011), the interpretive epistemological stance rests on the meanings people give to phenomena. Interpretivism depends on the people who participate in the research and acknowledges how they affect it (Creswell, 2012). Unlike positivism, which seeks a single fact to explain phenomena, interpretivism seeks a commonly held interpretation of those phenomena. Taking an interpretivist epistemological stance would allow for a richer, more nuanced examination of differences and similarities in knowledge.

### 3.3.3 Research Strategy: Qualitative

Last but not least, the research paradigm is accompanied by a set of philosophical underpinnings known as the methodological assumption, which emphasises on the question of what methods are best suited collecting empirical evidence - the research process (Orlikowski & Baroudi, 1991). Each school has its own approach to the development of methodology, which results in a number

of distinctions between the research methods, types of data, and analysis techniques typically adopted by each philosophy. Two methods exist: deduction and induction (Bhattacherjee, 2012; Jankowicz, 2005). The deductive method starts with an existing body of knowledge, such as an existing theory. It entails making hypotheses based on theory and then checking those hypotheses through empirical scrutiny of collected data using statistical analysis (Bhattacherjee, 2012; Bryman & Bell, 2007). Since the inductive method relies on exploratory studies to generate theories, it is more inductive when fewer facts are known about the subject (Bhattacherjee, 2012; Bryman & Bell, 2007). Neither method is guaranteed linear, as unexpected connections between variables or a need to switch gears between data and theory may necessitate non-linear thinking. Thus, it is more accurate to view the deductive and inductive methods as trends rather than absolute processes (Bryman & Bell, 2007).

Quantitative and qualitative approaches are the primary research methods (Venkatesh *et al*., 2013). Qualitative studies typically take an inductive approach and a subjective ontological stance (Bryman & Bell, 2007). It is characterised by any epistemological philosophies (Straub *et al*., 2004). In contrast, quantitative studies typically take a positivist epistemological stance and use a deductive method grounded in objectivity regarding ontology. Discovery, as in exploratory studies, is best accomplished through qualitative research. Nonetheless, confirmatory studies rely heavily on quantitative research and are better suited for testing propositions or hypotheses. Qualitative research is associated with difficult-to-quantify phenomena and typically emphasises words and themes (Collis & Hussey, 2014). Quantitative research, on the other hand, collects data that can be expressed numerically. In-depth information on a limited number of characteristics can be obtained through qualitative research, which helps unearth previously concealed motivations and values (Yilmaz, 2013). Quantitative research, on the other hand, provides summaries of findings on many different characteristics and is, as a result, helpful for analysing trends. Qualitative research uses more naturalistic and unstructured ways to collect data that must be interpreted subjectively. There is more of an emphasis on how trustworthy respondents are, and the researcher may be seen as part of the research, giving them an "insider's view" (Bryman & Bell, 2007; Jankowicz, 2005; McDaniel & Gates, 2010; Bryman & Bell, 2011; Creswell, 2012; Yilmaz, 2013). Quantitative research, in contrast, is characterised by a greater emphasis on structure in data collection via controlled measurement. Large-scale data collection allows for

more generalisable findings, a higher priority is placed on ensuring reliability and validity, and the researcher is removed from the research process (Bryman & Bell, 2011; Bhattacherjee, 2012; Gray, 2017).

Several techniques can also be used to collect qualitative data. In qualitative research, interviews are frequently unstructured or semi-structured—the greater the interview's lack of structure, the more fluid the information exchange. Interviews allow for asking more complex and follow-up questions, but they are ineffective for collecting data from a large sample in a short period (Bryman & Bell, 2007). Interviews can be used independently or in combination with other qualitative techniques. Case studies yield theoretical insights rather than statistical norms by examining a phenomenon in its natural environment. One drawback of case studies is that their findings often depend on the "observational and integrative ability of the researcher" (Bhattacherjee, 2012, p.40). Ethnographic studies require the participant to spend significant time in the environment being studied. The researcher's role may be overt or covert, with the latter having ethical ramifications. In addition to producing results that are highly dependent on the specifics of the study's setting, this kind of investigation is also relatively time- and resource-consuming compared to other methods (Bhattacherjee, 2012; Bryman & Bell, 2007). While group interviews and focus groups may seem similar at first glance, the main difference is that the latter is conducted to delve more deeply into a topic or theme and is not conducted to save time or money. Further, the researcher is always more interested in the group dynamic and the members' contributions than the individual members. Therefore, the researcher takes the moderator role rather than the interviewer and steers the group in the right direction without being overbearing and intrusive. However, the effectiveness of focus groups can be hindered by influential group members who direct the discussion and co-produce meaning – a phenomenon known as "group think" (Bhattacherjee, 2012; Bryman & Bell, 2007; Collis & Hussey, 2009).

A multitude of methodologies exist for gathering quantitative data. Surveys are an effective method for swiftly collecting data from a large population while ensuring uniformity in the phrasing and sequence of questions. Surveys mostly employ closed-ended questions and can be administered through various channels such as email, postal mail, telephone, or in-person interactions (Fowler, 2013). Surveys can be conducted either at a given point in time (cross-sectional) or over an extended period (longitudinal) (Bhattacherjee, 2012; Bryman & Bell, 2007).

Due to their numerous benefits, cross-sectional surveys are preferred among marketing professionals and academics. The advantages encompass reduced expenses, increased levels of respondent cooperation, and a more expedited process for generating results (Rindfleisch *et al.*, 2008). Another viable quantitative method that demands fewer resources and grants access to data that the researcher may not be able to gather is conducting a secondary analysis of pre-existing data. Nevertheless, challenges related to data accuracy may occur due to insufficient familiarity with the technique and a deficiency in oversight (Bhattacherjee, 2012).

The current research is an exploratory qualitative inductive study that aims to interpret the intentions of hospitality managers to adopt new technologies, the factors that influence their intentions, potential outcomes, consequences for the future of the hospitality workforce, and new labour management tactics in this era. A complete picture of the participants' perspectives on the topic can be gleaned through the qualitative method (Creswell, 2012). Qualitative methods are recommended for helping researchers "empower individuals" by gaining insight into their points of view (Creswell, 2012, p. 48). This study's inductive design influenced the collected and analysed data and established the discussion's overarching themes (Yilmaz, 2013). The difficulty in generalising qualitative research stems from the fact that qualitative researchers typically do not adhere to structured and predetermined formats (Creswell, 2012). The current research does not seek to generalise but rather to investigate the intentions of hospitality managers to adopt cutting-edge technologies and their potential effects on the future of the industry's workforce.

According to Strauss and Corbin (1998), "statistical procedures or other means of quantification" are not applied to qualitative research (p.11). Conversely, it draws attention to specific phrases and words within the relevant data (Bryman & Bell, 2011). According to Denzin and Lincoln (2005), qualitative researchers examine phenomena in their natural contexts to interpret and make sense of them. In this regard, the purpose of this qualitative study was to investigate respondent experiences to enhance the understanding of the phenomenon under investigation, as opposed to merely assessing agreement or disagreement with the prior work - as quantitative studies would (Lincoln, 1995; Denzin & Lincoln, 2003). In addition, the selected methods (interviews and observations in this study) based on this methodology provide the descriptive, interpretive, and detailed data required to deepen understanding of individual variation. For instance, the theme of Human Technology Interaction (HTI) in the hospitality industry is highlighted by conducting

interviews with managers, assistant managers and supervisors and by observing them in their work environment. Themes and patterns emerged from the data analysis. (Creswell, 2007). Direct quotes and documentation of participants' perspectives, thoughts, and meanings about the phenomenon on a personal level were included in the presentation of findings (Denzin & Lincoln, 2005; Yilmaz, 2013). In Table (3.1) below, we outline the most salient features of the qualitative method.

**Table 3.1:** Qualitative Methodology Characteristics

| Characteristic | Explanation | Relevance to the current investigation |
|---|---|---|
| **Subjective** | Emphasise the subjective interpretation of the data by the researcher. | Bring own experiences, values, and perspectives to the research to uncover rich and complex data that might not be revealed through more objective methods. |
| **Constructivist** | Recognise that meaning is created through interaction between the researcher and research participants, as opposed to being objectively given in the data. | Researchers have interviewed and observed restaurant managers, assistant managers, and supervisors in their "workplace." |
| **Interpretive** | Emphasise the use of natural language data for the purpose of comprehending and making sense of human experiences and points of view. | Utilise the thematic content analysis technique to gain a comprehensive and nuanced understanding of the research participants' experiences and perspectives. |
| **Contextual** | Recognise the significance of context in human experience and perspective comprehension. | Focusing on the experiences and perspectives of managers, assistant managers, and supervisors who work in restaurants where advanced technologies are implemented. |
| **Inductive** | Construct theories and interpretations based on the gathered data, beginning with the collected | New insights and perspectives that may not have been initially anticipated emerged from the data analysis, such as labour force |

| | | |
|---|---|---|
| | data and progressing to generalisations and theories. | management strategies for the age of advanced technologies presented in the findings chapter using quotes from participants. |
| **Flexible** | Permit alterations to the research question and methods as the study develops. | During the interviews, the researcher asked about the second scenario rather than the first to make the conversation flow more naturally and accommodate the participants' responses based on their responses to the first block of questions, as seen in Appendix 3.3. |
| **Data rich** | Generate extensive and detailed data, typically in the form of natural language. | The researcher gained multiple perspectives on the data and developed a richer and more nuanced understanding of the investigated phenomenon. |

**Source:** Adopted from (Lincoln & Guba, 1985; Lofland & Lofland, 1995; Strauss & Corbin, 1998; Denzin & Lincoln, 2011; Yin, 2014; Silverman, 2015; Creswell, 2018).

## 3.4 Methods: Data Collection

### 3.4.1 Introduction

This study's overall research strategy is qualitative, based on the methodological position thoroughly discussed previously. Due to the interpretive and inductive nature of the research, the methods should reflect this. Interpretivism is typically associated with qualitative data collection techniques such as focus groups, participant observation, ethnography, and interviews (Bryman & Bell, 2011). In this instance, there were two phases of data collection, so the following research methods were chosen:

- In-depth, semi-structured interviews with restaurant managers, assistant managers, and supervisors who use innovative technologies to serve guests. The semi-structured, in-depth interview was chosen due to its suitability for the epistemological position and the research perspective.

- Observations of the frontline areas of restaurants to determine restaurant ambience, automated tasks, the ratio of human personnel to advanced technology, changes in job responsibilities, staff-technology interaction, task-related skill, staff satisfaction and adaptability, new roles, impact on workforce structure, customer interaction, and service quality, productivity and efficiency, and customer satisfaction.

Data collection methods and analyses that were used, aligned, and adapted during the development of this research will be explained and justified in the following section. The use of a pilot study and interviews will be discussed along with the protocols, sampling, coding, and validation of these methods. Finally, trustworthiness, research limitations, and ethical considerations will be discussed, as well as the themes and questions used in the study and their justifications.

The study's overarching purpose was to gain a deeper understanding of the intentions of hospitality managers to adopt new technologies, the factors that influence their intentions, the potential outcomes, the ramifications for the future of the workforce, and new labour management strategies in this era. Accordingly, this study's methods centre on the perspectives and interpretations of managers who oversee using cutting-edge technology to serve customers at restaurants. This study employed two strategies derived from prior qualitative research in the hospitality industry that examined intentions related to advanced technologies (Montargot & Lahouel, 2018) in order to accomplish the purpose of the study as follows:

## 3.5 Semi-structured Interviews

As previously mentioned, the study's overarching purpose was to gain a deeper understanding of the intentions of hospitality managers to adopt new technologies, the factors that influence their intentions, the potential outcomes, the ramifications for the future of the workforce, and new labour management strategies in this era. The semi-structured, in-depth interview was chosen due to its suitability for the epistemological position and the research perspective. For instance, interviewing is considered a proper method of qualitative inquiry for obtaining descriptive data, and insights into the values, human interaction, ethics, perspectives, and actions of organisational members through its flexibility for follow-up questions and probes (Cornelissen, 2017; Easterby-Smith *et al.,* 2002; Rubin & Rubin, 2004; Brinkmann, 2013; Denzin & Lincoln, 2018). For instance, it was possible to ask participants to provide examples of jobs that have been eliminated due to

technological advancements and to elaborate on the reasons for this substitution of humans in subsequent questions. In addition, the number and wording of questions may change, allowing for the addition or omission of questions during the interview (Bryman & Bell, 2011). In this study, one question inquired about the new skills required of employees, followed by a series of questions probing the methods for upgrading these skills and the job positions in which they are required. According to Liedtka (1992), the personal interview is ideally suited for complex and exploratory research in the social sciences on topics such as studying intentions and decision-making.

**Table 3.2:** The Pros and Cons of Semi-structured Interviews

| Pros | Cons |
|---|---|
| Semi-structured interviews are frequently used in interpretive research because they provide a level of structure while still allowing the researcher to gain a deep understanding of the participants' points of view (Guba & Lincoln,1989). | Interviews can be time-consuming because the interviewer may need to ask follow-up questions or dig deeper into topics of conversation (Creswell & Clark, 2011). |
| Semi-structured interviews bridge the gap between the spontaneity of unstructured interviews and the rigidity of a survey, making them ideally suited for interpretive research. Researchers can use them to investigate a wide range of topics and go into greater depth into those that particularly interest them systematically and consistently (Lincoln & Guba,1985). | They put an emphasis on the interviewer's skills in asking open-ended questions and interpreting responses, which can introduce bias or produce inconsistent results. Moreover, since they are typically employed for in-depth examinations of smaller groups of people, they may not be suitable for research with a large sample size (Kvale, 1999). |
| Semi-structured interviews are a valuable tool in qualitative research because they allow researchers to ask participants open-ended questions that give them room to share their perspectives and experiences in their own words while also providing a standard set of questions that can be asked to all participants (Merriam & Tisdell, 2015). | Transcribing and analysing interviews can be challenging because of the potential for varying responses and incomplete information in the interviewer's notes (Neuman, 2014). |
| As a common method in interpretive research, semi-structured interviews allow the researcher to probe further into participants' responses, discover new perspectives, and build a complete picture of the participants' experiences (Creswell, 2014a). | Participants may be reluctant to open up or feel uncomfortable discussing certain issues, making them unsuitable for researching sensitive or controversial topics (Flick, 2009; Neuman, 2014). |

When conducting research for a business, interviews are a common qualitative technique (Gray, 2017). Creswell (2012) argued that by asking a series of questions in an unconventional order, interviews could shed light on hidden information that cannot be observed (Creswell, 2007; Bryman & Bell, 2011; Denzin & Lincoln, 2018). Similar to qualitative studies in the hospitality industry (Cobos *et al.*, 2016; Shamim *et al*., 2017, Mingotto *et al*., 2021; Vatan & Dogan, 2021), semi-structured interviews were used to gain insight into the varying viewpoints and meanings held by managers regarding the managers to adopt new technologies, the factors that influence their intentions, the potential outcomes, the ramifications for the future of the workforce, and new labour management strategies in this era.

### 3.5.1 Data Collection Process: Interviews

#### *3.5.1.1 Number and Date of Interviews*

The interviews were conducted in December 2022 for the pilot study and from early January 2023 to mid-April 2023. Twenty-seven interviews with restaurant managers, assistant managers, and supervisors, including two pilot interviews. Consequently, the study population consists of restaurant managers, assistant managers, and supervisors in the United Kingdom who employ advanced technology in their service operations. Each interview duration varied between 35 and 40 minutes, with an average of 45 minutes. All interviews were recorded digitally for accuracy, and transcribed.

#### *3.5.1.2 Research Population*

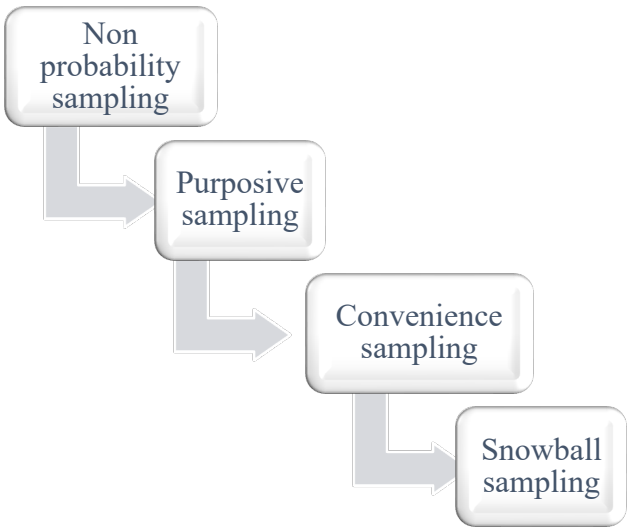
The study's primary objective was to explore more about hospitality managers' plans to adopt new technologies, the factors that influence their intentions, the possible outcomes, the implications for the future of the workforce, and new forms of labour management in this era. Multiple search terms, including "artificial intelligence in the UK restaurants", "robots in the UK restaurants", and "advanced technologies in the UK restaurants", were used to conduct an initial, comprehensive online search. It was looked for if there was a standard list of eateries that use cutting-edge service technology. This search was sufficient because it returned results from news outlets (like https://www.bighospitality.co.uk/Article/2022/03/07/Rise-of-the-machines-Boparan-Restaurant-Group-trials-service-robots) rather than official, government-funded sources.

This official news website provided the names of a few restaurants that utilise advanced technology, such as Robotiza. Based on this, the official Robotiza website was examined, providing a solid path for acquiring the remaining sample. In order to list the names of these eateries, the official websites of the restaurants were accessed. Relevant results are displayed after entering a keyword, such as robot waiters/waitresses in the United Kingdom. The presented results include the official websites of restaurants that employ advanced technologies. Upon examining each website separately, it is confirmed that these restaurants use a variety of advanced technologies, such as robots and kiosks to serve customers in the front and back areas. Then, during the interviews, some managers mentioned other restaurants and recommended them.

#### *3.5.1.3 Research Sampling Technique*

Interviews were conducted primarily within and around London and Milton Keynes due to the widespread use of advanced technologies in UK restaurants utilising purposive, convenience, and snowball sampling. The techniques utilised are depicted in Figure 3.2 below. The selected sampling method is consistent with qualitative research in the hospitality industry that focuses on the sector's advanced technologies (Cobos *et al.*, 2016; Shamim *et al.*, 2017; Mingotto *et al.*, 2021; Vatan & Dogan 2021).

**Figure 3.2:** Research Sample Selection Criteria and Procedures

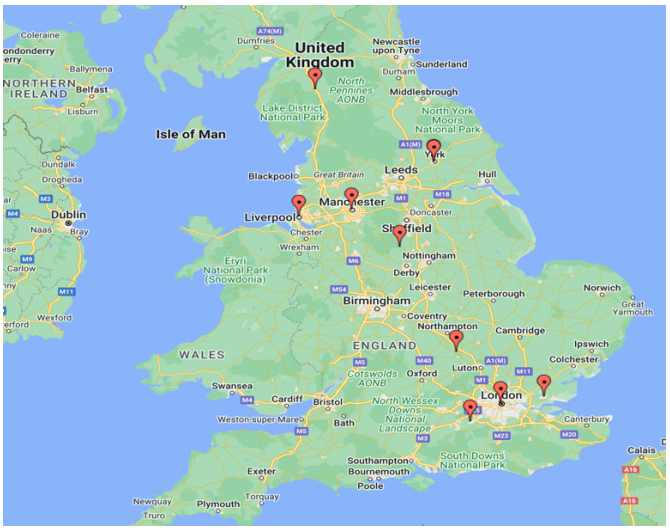


The interviewing procedure began with selecting suitable candidates to represent restaurant managers, assistants, and supervisors in settings where advanced technology is implemented. Consequently, participants were contacted directly via email (see Appendix 3.1) using a non-probability, purposive technique known as convenience sampling. This sample is "simply available to the researcher by virtue of its accessibility" (Bryman & Bell, 2011, p. 190). In a non-probabilistic sampling strategy known as purposive sampling, the researcher deliberately selects study participants based on predetermined criteria. Study goals and population characteristics inform the sample selection (Creswell, 2014b; Neuman, 2014; Yin, 2014), and it was supplemented by additional snowball sampling.

Creswell (2012) emphasised the need for researchers to make clear the procedures they followed to gain entry and permission to study at specific institutions. During the accessibility journey, the researcher emailed several UK restaurants in an attempt to conduct a series of interviews and observations with managers, assistant managers, and supervisors, but never heard back from any of them. Due to the sample's location in a different country (the United Kingdom) than the country of study (Hungary), the researcher was not in an excellent position to directly contact the people who can help in these restaurants.

As a result, the researcher gained access to the restaurant through connections made through their academic network in the United Kingdom. Emails were sent from the networking group to the management of each restaurant to initiate communication (see Appendix 3.1 - emails sample). Afterwards, the researcher followed up with them to see if they were ready to participate in the research and arrange interviews, allowing the researcher to plan the observations (see Appendix 3.2 - the timetable of interviews and observations). The researcher did not specify how many people would be ideal to have maximum leeway with the restaurants. Participants were assigned by the management team and identified by those interested in participating in the study.

**Figure 3.3:** Restaurants' Geographical Distribution




### *3.5.1.4 Participants Profile*

Twenty-seven restaurant managers, assistant managers and supervisors were interviewed using a semi-structured format. The years of experience of each participant are listed in Table 3.3 below. Qualitative research, as was previously mentioned, typically uses a small, well-defined sample to collect detailed information from a select group of participants. This approach can yield significant insights, particularly when dealing with information-dense cases (Patton, 2015). Additionally, other studies, such as Gay and Diehl (1992) and Guest *et al*. (2006), highlighted the fact that the qualitative sample can emerge with thematic codes by the end of the initial twelve interviews.

The argument that data collection should continue until theoretical saturation is reached was followed to guarantee an adequate sample size (Strauss & Corbin, 1998; McGinley *et al*., 2021). When using a qualitative methodology to study culturally similar groups of people, it is generally agreed that a total of 12 semi-structured interviews is sufficient to collect a reliable sample of their attitudes and behaviours (Guest *et al*., 2006; Baker, 2012). However, recent analyses of sample sizes in qualitative research have revealed a shift toward slightly larger samples, with numbers hovering around 15–20 (Braun & Clarke, 2006; Marshall *et al*., 2013; Neuendorf, 2016; Creswell, 2018). The sample size used in this study represents what is typically used in qualitative research

projects, and a substantial amount of useful, relevant data was collected. With this study, the number of interviews was not decided in advance; instead, interviews were conducted until a sufficient number of participants had been interviewed. It was suggested that when no new patterns or trends emerge from the data, the collection should be stopped out of saturation (Lincoln & Guba, 1985; Miles & Huberman, 1994; Strauss & Corbin, 1998; Guest *et al*., 2006; Guest *et al*., 2013; Gray, 2017; Creswell & Clark, 2017; Denzin & Lincoln, 2018; Flick, 2018). As a result, the study followed the same patterns as other qualitative studies in the hospitality industry by stopping once sufficient information was gathered (Mingotto *et al*., 2021; Vatan & Dogan, 2021).

**Table 3.3:** Interview Participant Profiles

| Participant Number | Position | Year of experience |
|---|---|---|
| **P1** | Supervisor | Three years |
| **P2** | Manager | Six years |
| **P3** | Manager | Five years |
| **P4** | Supervisor | Three years |
| **P5** | Assistant Manager | Five years |
| **P6** | Manager | Seven years |
| **P7** | Assistant manager | Three years |
| **P8** | Assistant Manager | Four years |
| **P9** | Supervisor | Three years |
| **P10** | Assistant Manager | Five years |
| **P11** | Manager | Eight years |
| **P12** | Manager | Five years |
| **P13** | Manager | Six years |
| **P14** | Assistant manager | Five years |
| **P15** | Supervisor | Four years |
| **P16** | Manager | Seven years |
| **P17** | Supervisor | One year |
| **P18** | Assistant Manager | Two years |
| **P19** | Supervisor | Five years |

| | | |
|---|---|---|
| **P20** | Supervisor | Three years |
| **P21** | Assistant manager | Six years |
| **P22** | Supervisor | Two years |
| **P23** | Manager | Ten years |
| **P24** | Supervisor | Two years |
| **P25** | Manager | Seven years |
| **P26** | Manager | Fifteen years |
| **P27** | Manager | Twenty years |

### 3.5.2 Interview Research Protocol

#### *3.5.2.1 Pilot Study*

This study's piloting procedure included two preliminary pilot interviews. The two pilot interviews allowed for refining the interview's main themes, which were then used to structure the interviews. Additionally, the emergent research strategy allowed the flexibility to ask additional questions or address issues in subsequent interviews if necessary. Consequently, including two pilot interviews was deemed necessary and essential in order to test the interview schedule and determine whether it was feasible for restaurant managers (Holloway, 1997; Bryman & Bell, 2011). The purpose of the first two interviews was to serve as a sort of pilot project, allowing the researcher to do things like

- determine the interview length,
- gauge the appropriateness of questions,
- highlight any ambiguous questions,
- determine whether specific questions were repeated,
- determine whether the wording used was suitable,
- determine whether the question structure was logical, and
- indicate whether the interview lasted for the allotted time.

The interviewing procedure began with email and concluded with either in-person or online meetings to complete the pilot interviews (London and Milton Keynes). Two thirty-five-minute interviews were conducted with managers at two restaurants in the United Kingdom that use

artificial intelligence, robots, and other forms of advanced technology to serve customers in December 2022. Before and after the pilot, the supervisory team discussed the pilot questions and developed enhancements to the questions' appropriateness, structure, and content.

As suggested by many authors (Oppenheim, 2000; Creswell, 2014b; Denzin & Lincoln, 2018; Flick, 2018), the incorporation of a pilot study into the research was advantageous for various reasons. The approach was validated by utilising the first two interviews as a pilot, and several issues to be aware of and modify for subsequent interviews were revealed. For instance, a number of questions elicited similar responses, and certain words were omitted due to respondents' ambiguity, resulting in the rephrasing of some questions.

The structure of the questions was also modified to increase fluidity; for instance, the questions regarding the future scenarios of the labour force were grouped to present and highlight each scenario separately rather than being asked in an interrupted format. However, the interviews' semi-structured design allowed for the flexibility in terms of both the number and wording of questions. Thus, the findings of the pilot studies necessitated only minor adjustments to the interview schedule. This also indicated that the two interviews' transcribed data were to be integrated into the primary interview data analysis.

#### *3.5.2.2 Interview Structure*

Interviews were semi-structured, so their duration and flow greatly varied depending on the individual. The interview was conducted with the intention of delaying the introduction of explicit terms such as 'human substitution', 'job creation' and 'HTI' until its conclusion. This allowed the research to remain in its exploratory phase for longer, as open questions helped with the investigation without forcing the conversation in a particular direction. The interview's first question and the overarching theme were open-ended to get a feel for initial topics associated with managers' intentions to adopt advanced technology.

**Example: What technological factors influence restaurant managers' intention to adopt advanced technologies?**

As is evident, the term human substitution was not used; instead, participants were asked about their general perceptions and intentions to determine what managers intuitively consider future labour force scenarios. The researcher initially concentrated on the themes that participants in the open-ended question deemed most important. Based on the answer to this question, the rest of the questions were posed. One respondent, for instance, provided a detailed response in which he mentioned trust as a factor influencing his intent to implement advanced technologies. Following the participant's response, the researcher posed the question, "What types of errors can impact managers' trust in advanced technologies?" before moving on to the next predetermined inquiry.

One set of interview questions (see Appendix 3.3 of Interviews Questions) was used for all managerial positions (managers, assistant managers, and supervisors). There were five main parts to the version. Open-ended questions were used to elicit narratives from the study participants and deeper insights from the researcher. The participant's personal information was collected in the first section. The interview's outline covered a wide range of topics but centred on these:

(1) Managers' intentions regarding the adoption of technological advances;

(2) Innovative technologies and anticipated future scenarios for the hospitality labour force;

(3) New skills and strategies to manage the future workforce in the era of technological progress.

More specific inquiries acted as probes and prompts, which were made under each question. However, this was done not with the intention of asking every participant the same questions but instead with the hope that the interview would flow naturally, with questions being added or omitted where appropriate. Many authors, such as (Teddliei, 2009; Creswell & Clark, 2017; Denzin & Lincoln, 2018) opined that prompts were crucial in stimulating and maintaining the flow of further conversation in case participants felt unclear on a question or were asked to clarify what was being asked. See (Appendix 3.2 and 3.3) for details about the interviews.

#### *3.5.2.3 The Role of the Researcher*

Particularly with interpretive research topics such as advanced technologies that significantly impact the future of the labour force, interviews are helpful in exploring the motivations behind certain actions and decisions. The researchers in this study gathered information by conducting

semi-structured interviews and keeping careful field notes on everything they saw and heard. Throughout this data collection process, the researcher had to carefully select open questions and remain flexible during the conversational turns of the participants (Liedtka, 1992), remain unbiased (Silverman, 2019) to foster conversational style interviews (Spence & Rutherfoord, 2001) and to elicit free-flowing responses (Brinkmann, 2018; Creswell, 2018). This allowed for the examination of discrepancies between participants working in each restaurant.

Each interview began with an opening question to focus the conversation on the participants' professional experiences and convey the researcher's motivation for asking further questions. Initial inquiry: " Could you please tell me your level of experience working in the restaurant industry? ". Moreover, to maintain the flow of the conversation and make a smooth transition from one participant's experience to the next, subsequent questions were carefully selected based on the opening question. In other words, flexibility was maintained by pursuing specific issues raised by respondents and varying the order of interview questions as needed (Bryman & Bell, 2011). In addition, the interviewer's role as an active listener rather than a talker was crucial in interviews (Creswell, 2007) in order to encourage the participants to fully narrate their experiences instead of providing limited responses (Josselson, 2013).

Even though it was time-consuming, the researcher ensured that the interviews were conducted ethically, respected the participants' rights, protected their confidentiality, and transcribed the data accurately (Lincoln & Guba,1985; Patton, 2015; Neuman, 2014). To provide a complete picture of the research topic, the researcher decided to conduct observations in addition to the interviews discussed in section 3.6 of this chapter.

## 3.6 Observation

### 3.6.1 The Non-participant Observations

According to Corbetta (2003), researchers can analyse a social phenomenon by first becoming a part of it through observations. This allows them to gain an insider's perspective and provide a more accurate description of the phenomenon. According to Bernard (1994) and Bryman and Bell (2011), there are two primary considerations when designing an observation plan. Before recording anything in a setting, the observer must comprehend who or what is being observed and

why. Second, it is crucial to define the research problem so that the observer does not stray from the topic and collect irrelevant information.

Consistent with qualitative studies of advanced technologies in hospitality (Ozgit & Caglar, 2015; Çalişkan & Sevim, 2023), this study collected data by observing participants in their natural environment (Creswell, 2007). The study employed a method of non-participant observation, which, according to Strauss and Corbin (1990), Bernard (1994), Lofland and Lofland (1995) and Bryman and Bell (2011), permits observation without participation in the social setting. While the researcher was present in the social setting for observations, the researcher was not an employee or otherwise involved for an extended period. This research investigates managers' intentions to adopt new technologies, the variables influencing their decisions and the consequences regarding labour force future. In this study, observation enabled the researcher to note the restaurant ambience, automated tasks, the ratio of human personnel to employed advanced technology, changes in job responsibilities, staff-technology interaction, task-related skills, staff satisfaction and adaptability, new roles, impact on workforce structure, customer interaction, and service quality, productivity and efficiency, and customer satisfaction.

In the era of technological advancements, the researcher became more familiar with the restaurant atmosphere, which aided the researcher in interpreting the interviews and vice versa. In actual research settings, interviews and observations are complementary. The difference between the two is that interviews can reveal events that are not visible unless questions are asked to collect detailed information regarding a person's thoughts, feelings, and experiences. At the same time, observations can reveal events, behaviours and actions already in plain sight and consistent with what respondents shared (Bryman & Bell, 2011; Creswell, 2018; Denzin & Lincoln, 2018). As evidenced by observations, guests found the service of robots amusing and enjoyable. These examples align with what respondents shared about the significance of guest satisfaction when contemplating the implementation of innovative technologies. They reflected that most of their guests appreciated and enjoyed this new experience. Researchers can learn more about the phenomenon by triangulating data from multiple sources (Denzin & Lincoln, 2011, Neuman, 2014; Patton, 2015).

According to Miles and Huberman (1994), Holstein and Gubrium (1995), Yin (2003), and Kawulich (2005), non-participant observation does not require observers to remain in the setting for an extended period. Instead, they could conduct multiple similar observations in the same environment to ensure the accuracy of their findings. The findings of the observations are presented in the analysis as field notes. A notebook and photographs were used to document each visit as it happened to safeguard against forgetfulness (see Appendix 3.4– Photos from the fieldwork).

### 3.6.2 The Role of the Researcher

Observations of the implementation of advanced technologies in restaurants (e.g., technology roles, new jobs, employee numbers) constituted a second aspect of the researcher's responsibilities. The research was conducted by observing participants in their natural working environments, where their activities and interactions could be recorded (Bryman & Bell, 2011; Merriam, 2018). In order to better predict the future of the labour force, researchers used interviews and paired them with observations (Strauss & Corbin, 1990; Creswell, 2018; Merriam, 2018). Closely observing the quantity of personnel in the front area who cordially welcomed customers and assisted them in utilising these technologies facilitated the understanding of their proficiency in these areas that has been reflected during the interviews. During the observation phase, the researcher observed that customers expressed satisfaction when being served by advanced technologies and enjoyed taking photos with robots. This finding is supported by a study participant's comment that customers do not feel annoyed when receiving service from robots. During the interview phase, two participants reflected that the number of servers had decreased since the introduction of robot waiters. During the observation phase, the researcher verified that there are typically two to four human servers in addition to robots. These individuals are simultaneously working in both the kitchen and the dining area.

Much work was involved in analysing and interpreting the data, and the themes that emerged from that process were developed through intensive immersion in the data (Friese *et al.,* 2018; Braun & Clarke, 2021). The transcripts of interviews were thoroughly cross-referenced to determine which best reflected the interviewees' views. Because of the constant comparison, the phenomena comparison was able to maintain a close relationship between data and conceptualisations

(Bryman & Bell, 2011). There were also no attempts to hide anything or omit findings (Miller & Brewer, 2003), and the findings chapters show both participants' divergent and similar viewpoints.

## 3.7 Data Analysis

### 3.7.1 Content Analysis

It was necessary to make sense of a large quantity of complicated data as a result of the large amount of qualitative data derived from interviews. Data reduction is a method of analysis that streamlines the process of drawing "final" conclusions by eliminating unnecessary information and focusing on the most relevant (Miles & Huberman, 1994; Krippendorff, 2018), manageable and understandable facts (Creswell, 2013). Content analysis is one method for performing this data reduction. Content analysis can be defined in a variety of ways. However, at its core, it is "any methodological measurement applied to text or other symbolic materials for social science purposes" (Shapiro & Markoff, 1997, p. 14) to inspect all empirical data for recurrent instances, like themes, words, or discourses (Eriksson & Kovalainen, 2008; Neuendorf, 2016).

The content analysis relies on a few fundamental tenets. Fundamental to this study is the idea that language plays a crucial role in human cognition (Duriau *et al.*, 2007). The transcription of the voice recordings is one type of textual data that can be analysed to gain insight into participants' cognitive schemas (Gephart, 1993; Hsieh & Shannon, 2005). The researcher can use the occurrence and frequency of words to infer the participants' cognitive centrality (Huff, 1990) or importance (Abrahamson & Hambrick, 1997). In addition, content analysis recognises that the recurrence of grouped language can shed light on underlying themes and concepts (Huff, 1990; Weber, 1990; Creswell, 2007).

According to Duriau *et al.* (2007), content analysis is a useful technique for "gaining access to deep individual or collective structures such as values, intentions, attitudes, and cognitions" (p. 6). Due to a greater understanding of restaurant managers' intentions to adopt new technologies, the factors influencing their decisions, and the consequences regarding the labour force's future, content analysis is particularly suited to this type of research. Managers' roles as decision-makers and their business intentions, which have a significant bearing on the future of the restaurant workforce, are distinctive features of high-tech restaurants. Therefore, content analysis is well-

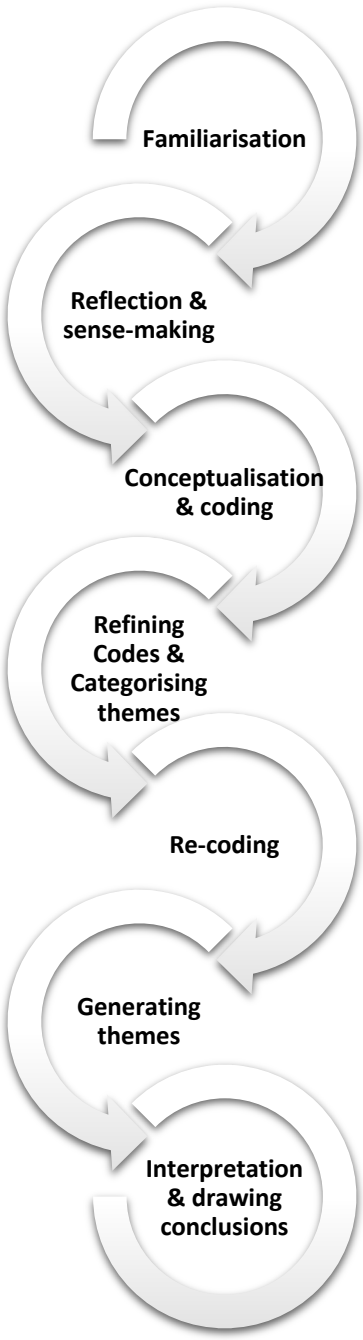
suited for use in the management context (Gephart, 1991; Ullmann, 1985), in particular, to provide a thorough investigation of topics like cutting-edge technologies and labour management, which can be challenging to study with more conventional quantitative approaches (Duriau *et al*., 2007).

Digital devices were used to record all interviews, and the resulting "intelligent verbatim" transcripts were reviewed and edited for accuracy. As will be discussed in greater detail in the section on ethics (section 3.10), prior to the interviews, permission was sought from all respondents to record them. A total of twenty-seven interviews were recorded, clocking in at nearly twenty hours; the transcription process took nearly forty-five days. The researcher listened to the recordings and read the transcripts multiple times to ensure accuracy and a natural flow of the conversations (NVivo 12 was utilised solely for the organisation and management of data). This allowed the researcher to dive headfirst into the data right from the start of the analysis process. Also, the researcher returned to the field notes and reorganised them to continue drawing parallels between the participants' words and the observations.

### 3.7.2 Data Analysis Process

Figure 3.4 below depicted the iterative steps taken during the data analysis and coding procedure for interview data.

**Figure 3.4:** Procedures of Analysing Data




***Step one: Familiarisation (Easterby-Smith et al., 2012)*** - This began with the collection of research data and carried on through interview transcription and the classification of observations. All interviews were recorded and transcribed with intelligent verbatim for later analysis. This allowed for an uninterrupted narrative and a more accurate conversations account (Bryman & Bell, 2011), as the proceedings were not halted for excessive notetaking. Listening to the voice recordings, transcribing them into Word documents, and reading the transcripts multiple times

constituted the initial step of data analysis to gain a thorough understanding of the content (Saldaña, 2021). This allowed for the coding of the transcriptions, which was necessary for the thematic content analysis to take place (Ryan & Bernard, 2003).

***Step two: Reflection and Sense-making*** - Taking the time to transcribe interviews, take notes, and read and reread data was laborious and time-consuming. However, it was necessary for the researcher to make sense of the data when juxtaposed with the existing literature on technological advancements and the future of the workforce. This enabled a critical comparison to determine whether the data supported or challenged our current understanding. It also highlighted any novel deviations from these or identified answers to knowledge gaps.

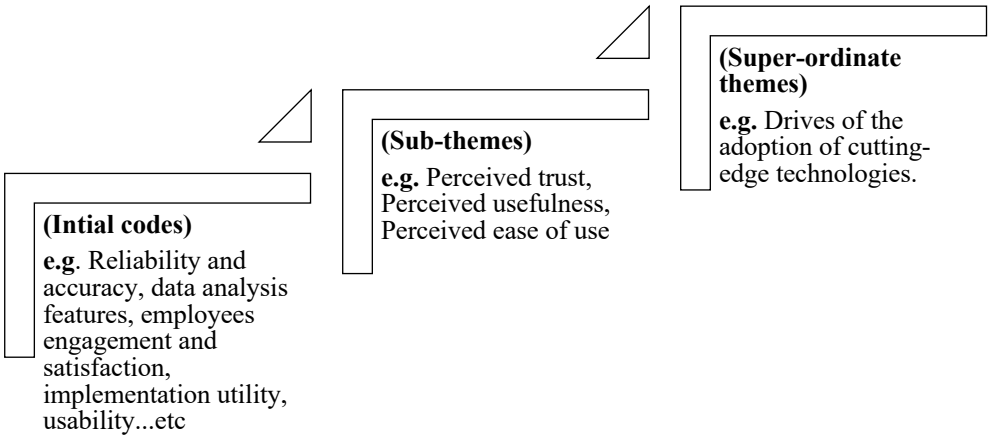
***Step three: Conceptualisation and Coding (Easterby-Smith et al., 2012; Miles & Huberman, 1994) -*** It is a common practice in qualitative content analysis to use coding to classify extensive datasets (Bryman & Bell, 2011). In order to make sense of the transcripts at this point, they had to be coded, which entailed labelling words, lines, or chunks of text (Patton, 2002). The data can be clustered (Miles & Huberman, 1994; Charmaz, 2006) to create categories and sub-categories.

Open or initial coding is the first type of coding (Strauss & Corbin, 1998), which entails analysing the transcripts line by line and assigning codes as they are deemed necessary. It is described as an unrestricted initial coding designed to generate provisional descriptions of concepts that correspond to and match the data (Strauss, 1987). This inductively opens the enquiry and permits text segments to be assigned meaning, with provisional codes refined to the most appropriate after sufficient coding has been completed. Because of the proximity of the codes to the raw data, the analysis can be trusted (Thomas, 2006) also allowed for the assignment of new codes in cases where the interview guidance codes did not cover all data relevant aspects. The open coding procedure served as a springboard for further exploration of the emerging concepts and themes (Ryan & Bernard, 2003; Saldaña, 2021), providing the research questions' foundations.

***Step four: Refining Codes and Categorising of Themes -*** The richness of the qualitative data was captured by the open coding stage (Miles & Huberman, 1994). Following this initial coding, the second process consisted of advancing to higher levels of abstraction by differentiating between basic-level codes that link to higher-level codes (Corbin & Strauss, 2008). Tree coding (Bryman

& Bell, 2011; Neuendorf, 2016) and pattern coding (Lincoln & Guba, 1985; Miles & Huberman, 1994; Tesch, 2013) are two terms that describe the hierarchical structure in which analytical sub-themes subordinate the higher-level themes (see Figure 3.5). This facilitates the development and interpretation of the data.

**Figure 3.5:** Coding Levels




An illustration of these levels derived from the interview data includes reliability and accuracy, usability, implementation utility, competition, employees' engagement and satisfaction, solving labour issues, cost saving, data analysis features, and reputation enhancement as explanatory factors that contributed to the formation of perceived trust, perceived usefulness and perceived ease of use as sub-themes. These sub-themes were encompassed within the broader theme of drives of the adoption of cutting-edge technologies. During the analysis, the codes were integrated and elevated to higher levels in order to establish prominent themes. Appendix 3.5 contains an example of thematic content analysis, encompassing the initial coding process, the refinement of codes into subthemes, and the extraction of super-ordinate themes.

***Step 5: Re-coding*** - Due to the iterative nature of the coding process, codes and categories were refined and revised over time. However, as Saldaña (2021) points out, this refinement and revision process was more cyclical than linear, involving constant data comparisons and codes (Corbin & Strauss, 2008). When analysing data, it is helpful to reread the interview transcripts iteratively to derive themes, as Spence and Rutherfoord (2001), Braun and Clarke (2006), and Neuendorf (2016) explain. This method is analogous to Goffman's (1974) work on 'frames.' It also permits

uniformity, as well as the continuous comparison and reanalysis of codes (Spence & Rutherfoord, 2001).

***Step six: Theme Extraction and Data Linking -*** This phase consists of identifying connections and patterns between the categories and the major themes of the data Braun and Clarke (2006) and Neuendorf (2016). The fourth chapter presented the findings from the interviews with full explanations of the main themes.

***Step seven: Interpretation and Conclusion-drawing*** - The use of thematic coding necessitated more interpretation by the researcher. Because "the analyst is searching not just for manifest but latent content as well" (Bryman & Bell, 2011, p. 298). This point was supported by Miles and Huberman (1994), Coffey and Atkinson (1996), and Silverman (2015). Therefore, this stage required the researcher to illustrate each theme and provide interpretations for making an argument based on delving deeper into and going beyond the data to reveal underlying meanings and concepts that support the aim of the research.

## 3.8 Trustworthiness of the Research

Lincoln and Guba (1985) reported criteria for evaluating the trustworthiness of studies used here because of their originality, widespread acceptance, and widespread recognition. Lincoln and Guba (1985) argued that while reliability and validity are commonly used in quantitative research, it is crucial to specify alternative methods for establishing and evaluating the quality of qualitative research. Lincoln and Guba (1985), Moustakas (1994), and Holstein and Gubrium (1995) identified the most essential four criteria for trustworthiness: dependability (related to reliability which assures the stability and consistency of findings over time), credibility (related to internal validity, which validating the veracity and precision of the data), transferability (related to external validity/generalisability, which assessing the applicability of findings to other contexts), and confirmability (ensuring that the data and findings are objective). Several strategies to establish trustworthiness were considered in this research.

Miles and Huberman (1994), Creswell and Miller (2000), Shenton (2004), Denzin and Lincoln (2011), and Creswell (2014b) all recommended using triangulation to prove trustworthiness and bolster the validity of a study (Shenton, 2004). Evidence was gathered from a variety of restaurant

managers, assistant managers, and supervisors for this study. Moreover, evidence was gathered through a variety of methods, including interviews and observations. Evidence for the trustworthiness of this study relies heavily on voice recordings, field notes, and photographs taken during the data collection period.

Iterative questioning is a method for establishing credibility, as stated by Shenton (2004). Interviews with managers, assistant managers, and supervisors were probed, prompted, and followed up on to elicit specific information about their experiences, as explained by (Corbin & Strauss, 2008; Guest *et al*., 2013). This helped find new contradictions, clarify the final research findings, and come up with possible explanations. For instance, the researcher engaged in discussions and posed follow-up inquiries regarding the causal factors behind the effects of technological advancements on the remuneration of human workers in the restaurant industry.

Second, the study was described in sufficient detail so that its findings could be applied to other settings or contexts (Lincoln & Guba, 1985; Koch, 1994; Stake, 1995; Creswell & Miller, 2000; Bryman & Bell, 2011; Creswell, 2014b). This approach can be a crucial provision for facilitating transferability, as it aids in communicating the specific situations under consideration and, to some extent, the contexts that encompass them (Shenton, 2004). The theoretical underpinnings, the creation of research instruments, the rationale behind participant selection, the techniques used to collect data, the identification of overarching themes, and the seven stages of data analysis. The study's findings also included participants' words expressed in quotes about their experiences were included.

Finally, an audit trail was established by keeping all research documents (phase by phase) to show the research's reliability and confirmability (Lincoln & Guba, 1985; Koch, 1994; Creswell & Miller, 2000; Denzin & Lincoln, 2011; Creswell, 2018). This comprised a logical narrative derived from the research question, literature review, and pilot study to guide the observations and interview questions. Coding procedures were backed by qualitative researchers (Miles & Huberman, 1994; Strauss & Corbin, 1998; Braun & Clarke, 2006), and the analysis followed previous studies' lines (Yu, 2020; Han *et al.*, 2021). The study drew findings and interpretations from the data collected, and research decisions and justifications were defended (Koch, 1994).

## 3.9 Limitations and Boundaries of the Research

Through the development of a rigorous research design, attempts have been made to eliminate as many limitations as possible from the study. According to Krippendorff (1980), cited by Liedtka (1992), the difficulty of analysing data in its "original manifestation" is due to the nature of the data and the fact that it originates from "complex symbolic forms in an indigenous language" (p. 170). Moreover, it is interesting to note that the interpretivist nature of this research perspective and methodological approach can also be viewed as its most significant limitation. Conducting and analysing interpretivist research depends on the interpretive skills of the researcher. They play a vital and substantial role in the whole study. However, the researcher's role has limitations, as acknowledged previously in this chapter. Efforts have been made to address these issues by strengthening reliability, confirmability, transferability, and credibility.

In addition, this study is qualitative, employing a small sample of restaurants in the United Kingdom that use advanced technologies to serve customers. Consequently, it may be challenging to generalise and transfer the findings to other nations, as reflected by (Creswell, 2013). Instead, Guba and Lincoln (1994) suggest that the breadth of the research should be emphasised. This requires dense descriptions and detailed accounts of the studied social world. This level of detail provides a foundation upon which others can evaluate the potential transferability to other settings.

This study is also restricted by what participants were willing to reveal about their opinions and experiences, as well as the degree to which the disclosed information was sensitive (Campin *et al.*, 2013). As described in the preceding paragraphs, steps were taken to eliminate such issues; however, it is essential to recognise these obstacles when analysing and discussing the phenomenon's findings. This acknowledgement will aid in conveying a more accurate comprehension of the issue.

Considering the abovementioned obstacles, these limitations are outweighed by the benefits of an in-depth qualitative approach, which was required to answer the research questions. Cornelissen (2017) further explains, "The hallmark of qualitative research in producing rich and detailed explanatory accounts of management and organisational phenomena is under pressure" (p. 369). He argued that perhaps we should not favour or stubbornly argue for any one method or style of theorising but rather learn to weigh the pros and cons of different approaches to science to gain a

deeper understanding of the phenomena we are studying (Abbott, 2004; Cornelissen, 2017). The study will benefit from deeper comprehension and more nuanced contributions if the chosen methods are consistent with the story and allow the researcher to say everything they want with methodological rigour. This study is one of the few qualitative studies in a field dominated by quantitative research. As a result, this provided an opening to craft a qualitative strategy predicated on exhaustive investigation and a contextualised comprehension of the complex phenomenon through the constant comparison of respondents' viewpoints. It is hypothesised that new insights can be obtained from a qualitative research approach (Cornelissen, 2017).

## 3.10 Ethical Considerations

This research was not viewed as posing any ethical issues to society as a whole; anonymity and confidentiality of interview participants were the primary concern. Likewise, it is crucial in qualitative research that the participant be protected from any potential harm that may result from their testimony being used in the study subsequently (Rubin & Rubin, 2004). Regarding the future use of data, careful consideration was given to informed consent, confidentiality, anonymity, and honesty (Kirk & Miller, 1986; Denzin & Lincoln, 2017; Neuman, 2014).

The researcher informed the participants of the interviews' qualitative nature and that their responses would be incorporated into a PhD dissertation when they were approached. Then, at the beginning of each interview, a verbal explanation of the proceedings and assurance of confidentiality were provided. Each respondent signed a consent form in the participant booklet (see Appendix 3.6), indicating whether they wished to have their interviews recorded. Everyone agreed to their voices being recorded. Individuals were also given unique labels beginning with P1 and ending with P27 to ensure their anonymity throughout the data collection phase. Any other hints, names, or references that could reveal the identities of the individuals or their organisations were changed. This ensures anonymity and confidentiality by removing the identifying information of the people involved.

## 3.11 Chapter Conclusion

This chapter has provided an overview of the research's ontological and epistemological stance, outlined the study's methodology, and explained the reasoning behind the methods and analysis

used. The subjective and interpretive stance was deemed suitable for deriving the level of detail required to investigate the managers' intentions to adopt new technologies, the factors that influence their intentions, potential outcomes, consequences for the future of the hospitality workforce, and new labour management tactics in this era. Ethical concerns have been outlined, and the issue of trustworthiness has been discussed at length to ensure methodological rigour. The main themes that emerged from the in-depth interviews will be presented and analysed in the next chapter of this thesis.

# Chapter Four: Interview Findings

## 4.1 Introduction

The present chapter provides an exposition of the outcomes derived from extensive thematic content analysis conducted to elucidate the hospitality managers' intentions to adopt new technologies, the factors that influence their intentions, potential outcomes, consequences for the future of the workforce, and new labour management tactics in this era.

As we examine the findings of this study, it is imperative to acknowledge that the incorporation of advanced technology has significantly altered the dynamics of the hospitality industry. The intentions of hospitality managers to incorporate advanced technology are becoming increasingly ambiguous, resulting in a complex landscape of opportunities and challenges for hospitality businesses and their employees. This chapter represents a critical juncture in our exploration, wherein we elucidate the patterns and ramifications arising from the data gathered, scrutinised, and interpreted throughout this scholarly undertaking.

The utilisation of thematic content analysis, a rigorous methodology implemented in this study, has facilitated the examination of extensive qualitative data collected from various stakeholders within the hospitality industry. The dataset comprises diverse perspectives, including those of restaurant managers, assistant managers, and supervisors. These individuals collectively contribute to a comprehensive response to the research questions. An inductive approach was utilised in this thesis to analyse the evidence and establish the overarching themes for discussion. The eventual themes are prefigured in assessing the existing theories, models, and frameworks for the research, but this should not cloud the fact that they arose from the issues prioritised by the respondents. The analysis is structured according to five superordinate themes that comprise the remainder of this chapter (see Table 4.1). As shown in the table below, each superordinate theme is subdivided into a group of subthemes that direct the theme content.

**Table 4.1:** Interviews: Summary of Super-Ordinate Themes

| Super-Ordinate themes | Sub-Themes |
|---|---|
| **Managers' Intentions Towards Technological Advancements Adoption** | • Executives' openness to adopting cutting-edge tech.<br>• Trendy restaurant tech.<br>• Drivers of Cutting-edge Technologies Adoption.<br>• Customer receptivity for advanced technology in service. |
| **The First Scenario: Human Technology Interaction (HTI)** | • The root causes of this scenario.<br>• Advice on effectively navigating this scenario: suggestions for actions. |
| **Second Scenario: Tech- related Joblessness in the Hospitality Industry** | • The root causes of this scenario.<br>• Guidance for navigating this scenario: recommended actions. |
| **Third Scenario: Two Opposite Phenomena; Unemployment and Job Creation** | • Participants' perspective in this scenario.<br>• Advice on effectively navigating this scenario: suggestions for actions |
| **Tech Mastery in Hospitality: Navigating the Modern Skill Set for Job Security** | • Technical and technology-related skills<br>• Interpersonal and soft skills |

## 4.2 The Utilisation of Advanced Technology in the Context of Restaurants

The restaurants observed in this study were established before implementing advanced technologies. These establishments have successfully retained their original characteristics while integrating cutting-edge technologies like robotics. One example is a restaurant where the ambience is a delightful synthesis of old-world grace and cutting-edge style. Decorated in a vintage style, the interior features soft seating, elaborate teacups, and small flower arrangements. The gentle, ambient lighting sets the perfect mood for a classic tea ceremony by creating a warm and welcoming atmosphere. The low and gentle voices of instruments add to the air of refined relaxation (see Figure 4.1 photos below, considering the confidentiality and anonymity of restaurants).

**Figure 4.1:** Restaurant Ambiance

Significantly, the restaurant demonstrates and effectively implements technology integration as robot assistants augment the gastronomic encounter. A service robot navigates gracefully between tables while delivering orders and interacting with customers. The inclusion of this robot in the conventional tea setting imparts an original and futuristic touch. The robot is responsible for delivering orders to approximately 12 tables, equipped with around 60 seats. Throughout the observation, it appears that the staff is attentive and well-coordinated. The staff members' attire complements the dining establishment's traditional motif, which improves the overall aesthetic appeal (see Figure 4.1). Three core personnel are assigned to the kitchen during a single shift. In addition to preparing the food that the robot will serve, they also engage in cleaning activities and assist customers in picking up their food from the robot tray if they are unfamiliar with the process.

The presence of the robotic assistants appears to captivate and amuse the patrons, as numerous individuals capture photographs and videos of the extraordinary dining experience.

A restaurant that serves fast food is an additional example. Instead of waiters, two robots have been designated to deliver customers' orders. Roughly 150 seats are available at the restaurant. Cat-like in form, the robot navigated the restaurants with ease. It is capable of simultaneously transporting four trays. The dining experience delighted customers, particularly children (see Figure 4.2). During the observed shift, only two human employees are present; they are primarily responsible for kitchen duties and packing while supervising the robot, which reflects changes in waiters' responsibilities. Evidently, the personnel were well-trained, at ease when interacting with these robots, and possessed exceptional digital expertise. The researcher has not observed the creation of new positions, including maintenance, due to the staff's proficiency in operating these robots.

**Figure 4.2:** Restaurant Ambiance and Robot Shape

The field notes revealed that another dining establishment implemented robots to bolster its reputation, aid in marketing purposes through word of mouth, and provide assistance to the human staff. The robot assisted in serving tables alongside a team of four human staff members, while three individuals staffed the kitchen. The waiter demonstrated ease and proficiency in engaging with robots while serving more than 100 customers. The staff's responsibilities encompassed routine tasks; however, their skills in technology are well-suited. There have been no observed new positions. The consumers expressed satisfaction with the timely and high-quality delivery of the food.

## 4.3 Managers' Intentions Towards Technological Advancements Adoption

### 4.3.1 Executives' Openness to Adopting Cutting-edge Tech

There is a consensus among participants regarding adopting advanced technology in the restaurant industry, albeit with varying degrees of agreement. Their perspectives were categorised into various levels of acceptance.

A few participants indicated that the advanced technologies implementation could reach up to 100% depending on the allocation of the business budget and the organisational level. The individuals who expressed this perspective did not acknowledge any difficulties that may encounter the implementation of these technologies, as elucidated by the following quotes:

> *P26 "If I general manager in fine dining, I'd pretty much want the whole restaurant to be automated. If my restaurant is a lower classified restaurant, I'd be looking for assistive technology".*

> *P27 "It has to be evaluated case by case. But again, from zero to 100 according to the establishment".*

A significant group of participants shared a common perspective, wherein they expressed that the advanced technologies implementation in restaurants could reach up to 75% of the operations owing to its inherent value and associated benefits. One such benefit is the potential increase in productivity by providing rapid and highly efficient service. Moreover, it is widely acknowledged as a form of entertainment due to its appeal:

> *P14 "They can increase productivity by serving more customers in a shorter amount of time and help to improve operational efficiencies. This could contribute to the restaurants making more money".*

*P19 "Robot service was really attractive because customer did not need to talk with staff".*

On the other hand, this viewpoint reflects only one obstacle: the inflexibility of these technologies compared to humans, as expressed by the following quote:

*P11 "Some customers prefer human service to advanced technologies such as robot service because staffs are much more flexible and can receive requests quickly".*

Many participants indicated that the acceptance of advanced technologies implementation in restaurants is limited. This perspective is supported by participants who have observed several challenges, including concerns about job displacement and unemployment, limitations in recipe creation with chef robots, and the potential for guest dissatisfaction. These concerns were expressed by the following quotes:

*P3 "… A robot to replace humans in a restaurant is not only probable but has already been done to some extent….".*

*P12 "Robot waiters can be advantageous and timesaving, but using robot chefs can be problematic because there may be restrictions on recipes and no room for customisation".*

### 4.3.2 Trendy Restaurant Tech

When the participants conveyed their varying levels of agreement regarding the adoption of advanced technology in restaurants, they identified the primary technologies prevalent in the current era of restaurant operations as follows:

The participants elucidated the notion of a robot server as a technological device capable of aiding, serving individuals, and engaging in interactions with them, as expounded in these quotes:

*P13 "These robots are equipped with sensors and cameras to navigate the restaurant and avoid obstacles, and they can also interact with customers using speech or touchscreens".*

*P3 "These robots are designed to help humans in a variety of ways, including assisting with customer service and even waiting on tables".*

There exists a commonly held perspective that AI chatbots created to engage with customers, address inquiries, and help in various aspects about dining experiences, as evidenced by the subsequent quotations:

*P2 “Chatbots can handle customer questions and provide customer service without the need for a human”.*

*P9 “They can answer questions about menu items, hours of operation, and other restaurant-related information, and they can even make recommendations based on the customer's preferences”.*

Automated kitchen equipment are appliances designed to perform cooking, food preparation, or related tasks with a high degree of automation and minimal manual intervention. These appliances and devices have various technological features enabling them to execute cooking processes, monitor and control temperatures, and adjust settings autonomously. Such equipment includes automated ovens, grills, deep fryers, and even robotic chefs that can prepare specific dishes with minimal human involvement. Automated kitchen equipment is frequently utilised in restaurants due to its superior efficiency in comparison to human chefs, as indicated by the following quotations:

*P1 “…. Including vegetable-chopping robot arms and pizza-cooking ovens. These machines are designed to work more quickly and efficiently than human chefs, and they can also help us reduce labour expenses. In addition, certain automated kitchen appliances can improve food safety by reducing the risk of cross-contamination”.*

*P16 “Can boost food safety by keeping cross-contamination to a minimum”.*

There is agreement that digital menus presented to customers through electronic devices, including tablets, smartphones, or specialised menu boards, are a substitute for conventional paper menus and can yield diverse advantages for both customers and managers of restaurants, such as reducing paper waste, providing comprehensive dish descriptions, accessibility to a wide range of customers, and presenting nutritional information as explained by the following quotations:

*P4 "Electronic menus, also referred to as e-menus. They provide patrons with an intuitive interface that facilitates menu navigation and order placement".*

*P20 "Display dishes utilising interactive elements including videos, animations, and images. Moreover, the ability to transcribe into multiple languages increases their accessibility to a wide range of customers. This can help patrons with dietary restrictions or allergies by furnishing it with items descriptions, including allergen*

*warnings, nutritional information, and ingredient lists. Digital menus can reduce paper waste by eliminating the need for printed menus. It may advertise special offers and opportunities for upselling".*

The utilisation of tablets within the context of restaurant operations is common. The tablets serve a multitude of functions, including but not limited to, facilitating ordering processes, processing payments, gathering feedback through customer satisfaction surveys, and providing entertainment and engagement opportunities as supported by P1 and P16:

*P1 "Enable customers to place orders, pay for their meals, inform customers about the upcoming events, and even play games or access social media. Additionally, customer can fill satisfaction survey through it".*

*P16 "They eliminate the need for paper menus and speed up the ordering and payment processes by allowing customers to directly interact with the restaurant's digital system".*

A shared connotation that restaurant food tracking applications are employed widely by restaurants for monitoring and managing the order flow, tracking the progress of food preparation, and ensuring the accurate delivery of dishes to the appropriate tables or customers within a designated timeframe, thereby optimising efficiency, as explained by the quotations below:

*P14 "These apps can notify customers when their orders have been placed, when their food is being prepared, and when it has arrived".*

*P16 "It helps keep track of orders, inventories, and other important data to ensure that business operations run smoothly and that customers receive superior service".*

Augmented reality technology within restaurants environment enriches the dining experience, captivating customers, and offering supplementary information or entertainment. Augmented reality (AR) is a technology that superimposes computer-generated content onto the physical environment, enhancing the user's perception of reality when observed through devices such as smartphones, tablets, or AR glasses (Tom Dieck *et al.*, 2024) Within restaurants, augmented reality (AR) can be employed in a multitude of manners, including menu visualisation, entertainment, customer engagement, marketing, and promotion, as explained below:

*P13 "AR is being used to display information about menu items or to provide customers with a virtual tour of the restaurant".*

*P16 "Using their smartphones or specialised devices, customers can access additional information, view virtual dishes, and get personalised recommendations using augmented reality, creating a more exciting and interactive dining experience".*

Self-ordering kiosks in restaurants refer to interactive touchscreen terminals that enable customers to peruse the menu, submit orders, personalise their meals, and complete payments autonomously, thereby eliminating the requirement for human intervention as indicated by the following quotations:

*P12 "Kiosks streamline the ordering process and reduce wait times, as customers can quickly enter their orders and pay for their meals without having to interact with a cashier".*

*P16 "Customers use the kiosk in place of a waiter or waitress to peruse the menu, place their orders, and pay for their meals to make the ordering process faster, decrease the amount of time customers have to wait, and improve their overall dining experience".*

### 4.3.3 Drivers of Cutting-edge Technologies Adoption

After thoroughly examining contemporary technological components in restaurants, participants assessed the various factors that impact their decision-making process regarding implementing advanced technology in consumer service. The participants also assessed the level of customer acceptance from their perspectives, which will be detailed in the forthcoming sections (4.3.3 and 4.3.4).

#### *4.3.3.1 Technology Adoption is Primarily Driven by Trust.*

Managers contemplating the implementation of advanced technology in restaurants evaluate the technology trust factor, which pertains to their certainty regarding the technology's security, dependability, and capacity to fulfil operational objectives and improve the customer experience. Managers require confidence that the technology will securely protect sensitive data while integrating seamlessly with existing systems. Additionally, they require substantiation that the technology will enhance operational effectiveness, diminish expenditures, and positively impact customer contentment. A robust trust in technology is an indispensable factor that enables managers to make well-informed decisions concerning the implementation of advanced restaurant technology that is in line with their business goals and yields a concrete return on investment, as supported by the P1 and P3 viewpoints:

*P1 "I see that management may have had to put their faith in the efficacy and dependability of the cutting-edge technologies they deployed".*

*P3 "…. Trust that the advanced technologies used at the restaurant would perform their intended functions reliably, accurately and contribute to customer satisfaction".*

#### *4.3.3.2 Usability is the Second Key to Technology Adoption*

There exists a commonly held perspective that the factor of technology ease of use holds significant importance when considering the implementation of advanced technology within the restaurant industry. This indicates the degree to which the technology demonstrates user-friendliness and its potential for seamless integration within established restaurant operations. Managers exhibit a greater propensity to adopt technology that possesses intuitive qualities, necessitates minimal training, and streamlines daily tasks for both personnel and customers. The higher the ease of implementation and navigation of a technology, the greater the likelihood of its adoption, as it minimises operational disruptions, enhances staff productivity, and enhances the overall customer experience. This factor is substantiated by the evidence provided by P3, P14:

*P3 "We look for technologies that are easy for the staff to use and that don't require a lot of training. Complex and hard-to-use technologies may slow down adoption because of worries about making operations more complicated and staff resistance".*

*P14 "The technologies would need to be simple enough for humans to use and interact with for the benefit of all the staff, the customers and guests".*

#### *4.3.3.3 Usefulness*

There is a prevailing perspective that managers prioritise usefulness as a determinant in their decision-making process regarding implementing advanced technology within the restaurant industry. The individuals actively search for technological solutions that specifically target operational challenges and yield concrete advantages. Managers exhibit a greater propensity to embrace technological solutions that optimise operational procedures, enhance the precision of orders, diminish labour expenditures, augment customer service, and furnish valuable information and perspectives to inform decision-making. This factor can be supported by the following quotations:

*P2 "The evaluation of advanced technologies is based on their capacity to improve efficiency, reduce costs, and enhance the overall dining experience".*

*P6 ".... Enhance the operations and performance, improve efficiency, reduce costs including labour expenses, or provide a competitive advantage."*

#### *4.3.3.4 Brand Image and Reputation*

Innovative technology can enhance the perception of restaurants as modern, forward-thinking, and customer centric. By adopting technology that aligns with a positive brand image, they can attract tech-savvy customers and create a sense of trust in the restaurant's ability to meet evolving customer needs. Moreover, leveraging advanced technology can lead to positive reviews and word-of-mouth recommendations, which further bolster the restaurant's reputation and contribute to its long-term success. This can be supported by the following participants' perspectives:

*P7 "We knew that using these technologies could make a big difference in how people saw our brand and how well we were known. We wanted to get the attention of both current and potential customers by presenting ourselves as leaders in the restaurant industry when it comes to new ideas and technology. We also thought that this strategic move would get good press and reviews, which would further solidify our restaurant's reputation as a forward-thinking place to eat".*

*P16 "We considered how adopting advanced technologies could improve the restaurant's image and reputation by establishing it as a leader in innovation and technology and attracting positive media coverage and reviews".*

#### *4.3.3.5 Competitive Advantage through Technology*

The participants expressed that the compelling factor of competitive advantage for managers drives the adoption of advanced technology in restaurants. By adopting cutting-edge technological solutions, restaurant managers have the potential to distinguish their establishment from competitors by providing distinctive features. Advanced technologies possess the potential to allure and retain customers, enhance operational efficiency, and enable restaurants to maintain a competitive edge in an industry characterised by rapid evolution. Moreover, using advanced technology can offer significant insights and analytics, empowering managers to make well-informed decisions, optimise the range of menu offerings, and refine marketing strategies. Thus, advanced technology emerges as a strategic resource that amplifies a restaurant's competitive stance and distinguishes it within a crowded market. The following participant viewpoints demonstrate this:

*P2 "We view the adoption of technologies as a means of gaining a competitive advantage in the restaurant by differentiating our restaurants from those of competitors and attracting customers with an interest in technology and innovation".*

*P6 "How using new technologies can give us an edge over competitors".*

#### *4.3.3.6 Innovation and Experimentation*

A consensus among participants asserted that adopting advanced technology in restaurants is motivated by innovation and experimentation. Managers acknowledge the necessity of adopting innovative solutions and engaging in technological experimentation to maintain a competitive edge within the industry. Through this approach, individuals can explore innovative strategies to improve the overall customer experience, optimise operational processes, and identify more effective approaches for restaurant management. Using technologies such as artificial intelligence (AI) and automation enables managers to discern the most effective strategies for their organisation, thereby customising their methods to align with their customer's changing demands and preferences. The subsequent quotations substantiate this viewpoint:

*P4 "The restaurant's leaders tend to test the limits of what's possible by trying out novel tools and techniques for managing the establishment".*

*P14 "The introduction of innovative technologies is being seen as a way to pique the interest and enthusiasm of staff by giving them the chance to become familiar with and proficient in the use of cutting-edge tools".*

#### *4.3.3.7 Employees Engagement and Satisfaction*

Implementing technological advancements that aid in task simplification, process streamlining, and reducing repetitive work can potentially enhance employee job satisfaction. When employees experience satisfaction and active involvement, the rates of employee turnover tend to diminish, resulting in time and resource savings for the restaurant in terms of recruitment and training efforts. Moreover, the utilisation of advanced technology has the potential to equip employees with various tools that augment their productivity and significantly enhance service provision, thereby leading to an overall enhancement in customer satisfaction. Consequently, this results in favourable evaluations, thereby fortifying the restaurant's prosperity and fiscal viability, as seen in the two separate extracts below:

*P1 "New technologies is a way to increase employee engagement and satisfaction by giving workers the chance to gain experience with and mastery of these innovations".*

*P14 "The introduction of innovative technologies is being seen as a way to pique the interest and enthusiasm of staff".*

#### *4.3.3.8 Labour Market Conditions*

Labour market conditions, encompassing elements such as escalating labour expenses, scarcities in labour, and evolving labour policies, constitute substantial incentives for restaurant managers to implement cutting-edge technology. These obstacles have led managers to pursue novel approaches that can diminish their reliance on manual labour, improve operational efficacy, and preserve cost-effectiveness. Simplifying labour-intensive duties with advanced technology, such as self-ordering kiosks or kitchen automation, can enable current personnel to allocate their time and effort towards customer service and more valuable responsibilities. The following quotations prove this perspective:

*P7 "The influence of labour market conditions, such as a shortage of qualified workers or rising labour costs have made the adoption of advanced technologies more attractive as a way to reduce labour costs and improve operational efficiency".*

*P25 "Using new technology is not just a choice because of the constantly changing nature of work conditions; it is a strategic necessity. It helps us deal with problems like rising labour costs and a lack of workers, so we can keep providing excellent service to our customers and protect the long-term health of our business".*

#### *4.3.3.9 Cost-effectiveness*

Cost-effectiveness is being seen as a driver for managers considering the adoption of advanced technology in restaurants. While the initial investment in technology may seem substantial, managers recognise that, in the long run, technology can reduce operational costs and enhance profitability. Whether through labour-saving automation, streamlined inventory management, or efficient order processing, technology can optimise resources, minimise waste, and reduce errors, contributing to cost savings. Additionally, technology can improve the customer experience, leading to higher customer retention, increased revenue, and a faster return on investment. These perspectives can serve as a means of highlighting this factor:

*P14 "... Efficiency, cost savings, and a better overall dining experience are all factors that should be considered when choosing the advanced technologies element".*

*P15 "The key to a successful restaurant is finding ways to cut costs without sacrificing quality. Investing in technology isn't just a novel idea; it's a smart move that boosts profits through savings on overhead, more efficient processes, and happier clients. It's the secret to the restaurant industry's long-term health and success".*

### 4.3.4 Customer Receptivity to the Use of Cutting-edge Service Technologies

There is consensus that restaurant customers welcome advanced technologies in service under the following varying conditions of acceptance:

The initial group, comprising the majority of participants, suggested that the presence of humans is positively associated with the perception of advanced technology. Personalisation, emotional connection, and nuanced understanding that human staff bring to dining are common reasons for this perspective. Technology may lack warmth, empathy, and adaptability, but human servers can. Customers may also appreciate personalised recommendations, special requests, and handling unexpected situations, which humans can handle more easily. A desire for human service reflects a desire for interpersonal and social nuances that technology may not fully replicate, as exemplified by the following quotations:

*P2 "It is a source of entertainment and novelty that necessitates the presence of human employees".*

*P26 ".... In this restaurant, the food whizzes around the room and then lands at your table. We have not saved any staff at all because all that food comes around. There are so many errors and so many problems with the tech that the thing gets stuck in the tracks. Someone's got to go and get it. So, we have as many staff as we had not before".*

Another group, comprising the second majority, argued that cultural, demographic, and income factors influence consumers' acceptance of advanced technologies. They acknowledge that age groups, cultural backgrounds, and technological literacy levels can influence individuals' comfort and enthusiasm toward technological innovations. Younger generations raised in a digitally immersive environment may demonstrate a greater degree of ease and willingness to adopt advanced technologies in restaurant service. In contrast, older age groups may have different levels of familiarity with technology and prefer traditional service models. Cultural factors also contribute to this phenomenon, as cultural norms and expectations regarding dining experiences can shape individuals' attitudes toward technology. Furthermore, individuals with a greater level

of technological literacy are likely to have a stronger inclination toward recognising and embracing advancements in restaurant service, as explained by this quote:

> *P22 "It depends on the age, education level, and income of the target consumers".*

The last group, comprising a limited number of participants, emphasised the widespread acceptance of advanced technologies without human staff. This preference arises from an inclination towards efficiency and expediency in service. Automated systems can optimise processes, minimise waiting periods, and provide a prompt and convenient dining experience. Furthermore, certain clients value technology's uniformity and exactitude in tasks such as ensuring order correctness and processing payments. The inclination towards limited human contact may also be influenced by a longing for a more engaging and innovative experience, as advanced technologies contribute to a distinct and contemporary atmosphere. In addition, some customers prioritise the perceived sanitation and tidiness linked to automated systems, especially regarding food preparation and delivery, as demonstrated by this excerpt:

> *P11 "Customers are receptive to receiving service through advanced technologies because they perceive it as an enjoyable and innovative experience that does not necessitate the physical presence of human staff".*

Based on the participants' perspectives, it is possible to identify three anticipated scenarios that may happen in the future of the labour force within this industry. A comprehensive analysis was conducted for each scenario individually to gain a deeper understanding of its characteristics and participants' recommendations in case of occurrence. The scenarios are organised based on the participants' perspectives of their likelihood to occur.

## 4.4 Scenario 1: Human Technology Interaction (HTI)

### 4.4.1 The Root Causes of this Scenario

Emerging technologies can fully engage with human labourers across all occupational levels, ranging from entry-level to managerial positions, according to the majority of participants who put forth this scenario. For instance, automated order processing systems and self-service kiosks can enable front-line employees to concentrate on customer service by streamlining their workload. Smart appliances and automated cooking systems are technological advancements that can aid chefs and kitchen staff in food preparation. Managers may employ technological advancements to

facilitate inventory management, data analysis, and decision-making. In addition, online reservation systems, mobile applications, and digital menus all contribute to an improved customer experience. The following quotations provide evidence for this:

> *P2 "I anticipate that technology can assist humans in restaurants at all job levels, including entry-level, supervisory, and managerial, and this is true in our restaurants".*

> *P6 ".... It can happen at any level, from entry-level to supervisory to managerial".*

A few participants expressed the view that the interaction between technology and humans is advantageous primarily in supervisory roles:

> *P24 "I believe that technology combined with cooperation of human will enhance the level of supervision".*

Some individuals argued that interaction in entry-level positions is essential, while they believe that such interaction is not required in supervisory and managerial roles, as demonstrated by this excerpt:

> *P1 "Entry-level jobs can be made better by how tech and human employees work together".*

According to the majority of respondents, advanced technologies can collaborate effectively with humans on any task nature. The task natures that receive the most attention are as follows:

Advanced technologies operate in concert with human personnel to streamline mundane duties in dining establishments by automating repetitive and labour-intensive procedures. This enables personnel to allocate their efforts towards more intricate and customer-oriented facets of their positions. For example, self-service kiosks and automated order processing systems streamline the ordering procedure, thereby minimising errors and waiting times. By fostering collaboration, this method optimises daily restaurant operations by integrating human expertise and technological capabilities in a symbiotic manner, thereby enhancing overall efficiency and accuracy. This can be evidenced by the following quotation:

> *P6 "I can see how that can happen with tasks that need to be done in a routine".*

Advanced technologies engage in collaborative efforts with human operators to enhance and automate a wide range of labour-intensive duties performed in restaurants. For instance, robotic systems can reduce the manual labour force of kitchen staff by assisting with repetitive tasks like dishwashing. Automated food preparation equipment, such as chopping and slicing machines, improves productivity and accuracy, enabling restaurant personnel to concentrate on more complex facets of the cooking process. Technologies such as self-service stations and conveyor belt systems streamline front-of-house operations by reducing the need for restaurant staff to engage in physical labour when serving and restocking food. The collaboration between advanced technologies and human labourers in physical labour streamlines processes, diminishes the likelihood of repetitive strain injuries and improves the restaurant's overall operational capability. This can be supported by the provided quotation below:

> *P20 "When machines do the hard physical work, people can focus on being creative and caring for customers".*

In restaurants, advanced technologies assist personnel with time-sensitive duties by coordinating accurate and efficient operations. Kitchen display units and automated order processing systems facilitate communication, thereby ensuring the punctual preparation and delivery of orders. Point-of-sale (POS) technology streamlines transactions and decreases customer wait times. Inventory management systems in the back-of-house facilitate rapid restocking, thereby averting service interruptions. Moreover, real-time data analytics provide managers with the ability to promptly make decisions, thereby optimising the allocation of resources and staffing during periods of high demand. Integrating advanced technologies with human proficiency in time-critical duties optimises the operational efficiency of restaurants, ensuring customers have a seamless and punctual dining experience. This can be substantiated by the following quotation:

> *P14 "Together, they compose an excellent dining experience where efficiency meets excellence, and every moment is a well-timed note in the melody of hospitality".*

In the restaurant industry, advanced technologies assist personnel with cognitive tasks by enhancing analytical capabilities and decision-making processes. With automated data analysis tools, managers can assess customer preferences, sales trends, and operational efficiency, which all contribute to developing strategic plans. AI-powered systems improve menu planning and recipe creation by optimising offerings following market trends and customer feedback. Customer service can allocate human staff to more complex interactions by utilising chatbots and digital

assistants to handle routine inquiries. By combining advanced technologies with human cognitive capabilities, this partnership cultivates a vibrant atmosphere in which technology enables innovative ideation, strategic foresight, and customised customer interaction, ultimately augmenting the dining experience. The following quotation can substantiate this:

> *P7 "The combination of advanced technologies and human expertise creates a perfect setting for cognitive tasks, where data-driven insights and creativity work together to make every dining experience amazing".*

A few respondents suggested that advanced technologies and humans can collaborate on the following tasks:

In the context of restaurants, advanced technologies assist personnel with unexpected problems and circumstances by providing flexible solutions that augment human proficiency in unforeseeable circumstances. For example, AI-driven chatbots can manage distinctive enquiries and intricate requests in the domain of customer service, thereby delivering prompt support that surpasses mundane problem-solving processes. Additionally, chefs are aided in developing novel recipes and fulfilling specific dietary needs through advanced cooking appliances boasting adjustable programming. Moreover, dynamic scheduling software and predictive analytics assist managers in making decisions regarding unanticipated circumstances, such as personnel adjustments in response to a sudden surge in customer numbers and events that may be held in restaurants. The subsequent quotation can corroborate this:

> *P25 "New technologies and creative people create adaptability for non-routine tasks".*

Advanced technologies and human workers engage in collaborative multitasking within the restaurant industry, synergistically enhancing and optimising various operational aspects. By utilising POS technology and automated order management systems, the waitstaff can efficiently manage numerous customer requests and orders, facilitating seamless coordination between the front-of-house and kitchen departments. Moreover, cooking automation aids in managing various orders and guarantees adherence to exact timing during food preparation. The following quote evidence this:

> *P14 "Advanced technology and human collaboration in the restaurant industry make multitasking appear effortless. They ensure the smooth operation of the kitchen, the continuous flow of orders, and the provision of seamless service. This is the secret to the success of any restaurant".*

The significance of the human element in service led many participants to emphasise the potential occurrence of this scenario more than others. This suggests there will be no termination of employees, and technological advancements will merely serve to enhance and support human workers in their respective roles:

> *P12 "There are some tasks in which we cannot totally rely on the machines; thus, a human-technology interaction can be a better combination for increasing the accuracy of the tasks. As a result, humans and technology can collaborate to provide better results".*

> *P16 "To achieve better results, I believe there should be a proper balance between human and technological involvement".*

### 4.4.2 Advice on Effectively Navigating this Scenario: Suggestions for Actions

The participants have provided recommendations for addressing this scenario and maintaining the future of the labour force within the industry. These recommendations include:

#### *4.4.2.1 Prioritising Human Value*

Participants underscored the importance of the human staff in cultivating authentic customer connections, providing tailored recommendations, and curating memorable dining experiences. An important area of emphasis should be customer engagement and hospitality, in which human personnel excel at delivering warmth, empathy, and a personalised experience that technology may not possess. This may entail assigning human staff members to welcome and aid customers, manage special enquiries, and guarantee a smooth dining experience. Furthermore, it is crucial to prioritise human intervention in areas that involve intricate decision-making, creativity, and adaptability, such as managing distinct customer preferences or resolving unforeseen problems, as elucidated by the participants:

> *P9 "Managers should highlight the importance of human employees in providing high-quality service".*

#### *4.4.2.2 Allocating Resources Towards Training Programs*

Investing in training programs that specifically target the improvement of human-technology interaction in restaurants is crucial to maximising the integration of technological efficiency and human service. These programs ought to prioritise the development of soft skills and technical

proficiency. This guarantees that employees are proficient in its operation and application, enabling them to incorporate it into their daily work processes effortlessly. The promotion of soft skills training, which entails the development of qualities like empathy, communication, and adaptability, is of equivalent significance. These programs must enable personnel to utilise technology to augment human interaction instead of supplanting it. Through customer interaction simulations, scenario-based training, and role-playing exercises, employees can hone their skills in engaging with customers, comprehending their needs, and utilising technology to provide attentive and personalised service, as seen in the extracts below:

> *P18 "Provide regular training sessions to employees on how to effectively use the technology to serve customers and to maintain a balance between human interaction and technology".*

#### *4.4.2.3 Fostering Collaborative Culture and Transparency*

The participants emphasised that restaurants could foster collaboration and transparency to facilitate human-technology interaction by promoting shared learning and open communication. Promoting open dialogues regarding how technology can improve operational efficiency and customer service is paramount. Promoting a sense of ownership and comprehension entails the active participation of personnel in decision-making processes concerning the implementation and utilisation of technology. Embracing a culture that promotes ongoing education and encourages employees to freely exchange knowledge and experiences regarding technology utilisation facilitates the collaborative identification of optimal methodologies. It is possible to utilise collaborative platforms or conduct regular team meetings as forums for sharing success stories, addressing challenges, and collectively problem-solving to foster a sense of inclusivity and support among the human workforce in their technological interactions, as evidenced in the provided excerpts:

> *P2 "In restaurants, a transparent and collaborative culture is the secret for harmonising human touch with technology".*

#### *4.4.2.4 Human-technology Interaction Ratio Assessment*

Monitoring the human-technology interaction ratio requires regular assessments and feedback mechanisms; setting up key performance indicators (KPIs) for customer satisfaction and

operational efficiency enables quantifiable evaluations of the influence of technology on human interaction. Continuous monitoring of these metrics provides real-time insights into the effectiveness of the current setup. Additionally, gathering direct feedback from customers and staff regarding their experiences with technology ensures a more nuanced understanding of its role in the overall service delivery. Flexibility is key, and businesses should be prepared to adapt and iterate based on the feedback received. This iterative approach allows for the refinement of technology integration, ensuring that it complements rather than replaces human interaction, as demonstrated in the provided excerpts:

> ***P6 "****Managers should routinely assess the contribution of technology and human workers to the service delivery process".*

#### *4.4.2.5 Establish Rewards*

Establishing incentives to promote human engagement with technology entails acknowledging occurrences in which technology improves the calibre of human interactions. One approach is implementing performance metrics that measure the successful integration of technology into customer service, such as increased customer satisfaction scores, shortened response times, or personalised customer experiences. Employees who exhibit remarkable proficiency in integrating technological tools with human interaction may be duly recognised via incentive schemes, awards ceremonies, or bonuses, as exemplified in the excerpts provided:

> *P18 "Recognise and incentivise employees who embrace technology and use it to improve their performance. Recognise their efforts in adapting to new systems or discovering innovative ways to utilise technology to enhance customer service or operational efficiency. Incentives can encourage employees to engage actively with technology and foster a positive attitude towards its implementation".*

## 4.5 Scenario2: Tech- related Joblessness in the Hospitality Industry

### 4.5.1 The Root Causes of this Scenario

Emerging technologies have the potential to fully replace human workers in entry-level occupations, such as waitstaff, bartenders, and hosts. This is particularly relevant as these roles typically require minimal or no prior experience. Furthermore, supervisory-level positions can become entirely obsolete, whereas the same cannot be said for managerial-level roles. The following quotes can evidence this:

*P9 "I observe that the restaurant industry's entry-level positions are the most affected. These positions typically require little to no prior experience and serve as entry-level positions for those seeking a career in the restaurant or hospitality industry".*

*P25 "Assuming that each shift consists of four employees. One is the supervisor, while the remaining individuals are waiters. After the introduction of cutting-edge technology, there was one manager and three robot waiters. it worth to mention that now partially robots for example can perform cognitive tasks and non-routine tasks as well such as handling complaints and train staff virtually."*

This scenario is further substantiated by perspectives positing that the occurrence of this scenario is contingent upon the nature of the vacancies. The majority of participants indicated that advanced technologies could replace human involvement in tasks that are considered routine, involving well-defined processes such as P8 and P14. Additionally, they can take over physical tasks that require manual effort, such as P3 and P15, as well as tasks that are time-sensitive and need to be completed within a specific timeframe, such as P11 and P19. A few respondents suggested that advanced technologies could eventually replace humans in cognitive tasks, necessitating mental exertion such as P7 and P11 and multi-tasking, requiring concurrent execution of multiple tasks such as P4 and P16:

*P8 "It will completely substitute human in tasks that are done often and have a clear plan for how to do them. Taking orders, making and cooking food, cleaning tables, and restocking supplies are all examples of routine tasks in restaurants".*

*P14 "Tasks with a set of protocol".*

*P3 ".... Tasks that require physical effort, like standing for long periods of time, lifting heavy objects, and moving around the restaurant".*

*P15 "Examples of physical tasks in restaurants include carrying trays of food, cleaning floors, and restocking supplies".*

*P11 "Tasks that need to be done quickly include taking and delivering orders quickly, making food quickly, and making sure that bills are paid quickly".*

*P19 "Tasks that need to be completed within a specific timeframe".*

*P7 "Cognitive tasks which require mental effort and may involve problem-solving, decision-making, and communication skills. Here cognitive tasks include handling*

*customer complaints, making decisions about menu changes, and training new staff to use chatbot".*

*P11 "Activities that call for the use of one's brain, such as those that demand the ability to think critically and communicate effectively".*

*P4 "Need to perform multiple tasks simultaneously, such as taking orders while clearing tables, or cooking multiple dishes at the same time".*

*P16 "Restaurant work necessitate doing more than one thing at once".*

The significance of the human element in service, with varying ratios of human-technology balance, led the second majority of participants to emphasise that this scenario will partially happen. This suggests that substitution will occur to some extent, reaching up to 75% while still retaining a weak presence of the human element. This can be evidenced by the participants' perspective as follows:

*P1 "I think that advanced technologies will be able to do up to 75% of what people do, but it depends as in some situations, it's possible that technology can completely replace the need for people to work".*

*P15 "I think technology will continue to play a bigger role because, in addition to many other advantages, it will enhance management and boost consumer engagement".*

### 4.5.2 Guidance for Navigating this Scenario: Recommended Actions

Both the current scenario and the previous one have common recommendations, including emphasising the areas where human employees contribute significant value, allocating resources to training programs, and fostering a culture of collaboration. Additional recommendations for mitigating the issue of employment reductions within the hospitality sector are delineated as follows:

#### *4.5.2.1 Promote Innovation and Creativity*

Promoting creativity and innovation in restaurants is a strategic approach to avoid technological unemployment. This can be accomplished by initially establishing a culture that fosters a willingness among employees to exchange ideas and engage in innovative methodologies. Implementing regular brainstorming sessions to facilitate the generation of innovative solutions to

operational challenges and the effective utilisation of technology by staff members. Recognising and rewarding innovative ideas to incentivise creativity. Furthermore, customer feedback and preferences should be considered as a means of inspiration, and menus and services should be modified following insights derived from data analysis. The following quote substantiates this recommendation:

> *P6 "Even though technology can automate many tasks, it's still important for employees to be able to think creatively and find new ways to make the restaurant experience better. Managers can encourage innovation by giving employees chances to share ideas, try out new ways of doing things, and take responsibility for their work".*

#### *4.5.2.2 Upskilling and Reskilling*

It is critical to establish pathways for skill development and retraining that furnish the labour force with the requisite proficiencies to mitigate the risk of human substitution while integrating cutting-edge technology. Training modules may comprise technical and soft skills pertinent to the new technology. Software proficiency and adaptability are examples of such soft skills. Promote voluntary employee participation in these programs by underscoring the advantages associated with skill acquisition. Motivate employees to upskilling and reskilling by providing additional incentives, such as salary increases or promotions. Facilitate self-improvement by establishing a nurturing learning environment with online courses, workshops, and mentorship programs. Finally, ensure that the workforce maintains agility and adaptability by actively evaluating and revising the training program following emerging technological developments. The following excerpt can evidence this:

> *P7 "In order to remain competitive in today's global economy, businesses must ensure that their employees have access to upskilling and reskilling opportunities. Managers can facilitate skill development by arranging for employees to participate in training programs or to rotate through different positions or departments".*

#### *4.5.2.3 Solicit Employee Feedback*

Organisations can effectively respond to concerns, furnish essential training, and modify the technology adoption process by proactively soliciting and attentively considering employee feedback. This practice guarantees that employees' perspectives are not only considered but also effectively integrated into the workplace as a means of making them feel appreciated and heard.

Moreover, feedback can provide insights into potential areas for retraining and reskilling, enabling staff members to adjust to evolving technological demands effectively and thereby bolstering employment stability and mitigating the likelihood of layoffs. Fundamentally, employee feedback promotes an environment conducive to collaboration and adaptability, thereby mitigating the adverse consequences of technology integration and bolstering enduring employment security. The following quote substantiates this recommendation:

> *P2 "Regularly getting employee feedback enables managers to better understand employees' needs, concerns, and suggestions for improvement. This can help to build employee trust and engagement, as well as provide valuable insights that can inform technology adoption and workforce management".*

#### *4.5.2.4 Plan and Clear Goals Setting*

Establishing specific goals and key performance indicators (KPIs) that highlight how technology will improve efficiency, streamline workflows, and boost overall organisational outcomes is essential. To achieve this, create a strategic plan with precise dates and benchmarks for technology integration. Consistently evaluate progress made and make necessary adjustments to align with the strategy's goals. Ongoing efforts are being made to effectively communicate with the workforce to address concerns and ensure alignment with the technology's objectives. Organisations can guarantee a smooth shift to advanced technology, enhance workforce adaptability, and safeguard employment stability by meticulously crafting and executing a technology implementation strategy with well-defined objectives. The following quote supports this recommendation:

> *P20 "Be very careful when planning to adopt this strategy as it can make or break the business".*

## 4.6 Scenario 3: Two Opposite Phenomena; Unemployment and Job Creation

### 4.6.1 Emerging Jobs

As they not only streamline operations but also foster innovation and broaden the industry's horizons, advanced technologies in restaurants generate employment opportunities, according to the participants in discussing this scenario. Proficient individuals are necessary to oversee, uphold, and enhance automated order processing systems, digital marketing platforms, and data analytics tools, all introduced due to technological advancements. The seamless integration and proper functioning of these advanced solutions necessitate the presence of IT specialists, data analysts,

and tech support teams. In addition, the adoption of digital payment systems, user experience design, and app development by restaurants increases the demand for professionals in these fields. Furthermore, implementing robotics and automation within the restaurant sector may give rise to professional roles specifically designed to supervise and uphold these advancements. Moreover, as dining establishments adopt technological advancements to improve their offerings and expand their customer base, there is an increasing demand for experts in menu engineering, digital marketing strategy, and social media management. This can be demonstrated in the provided excerpts:

> *P7 "Yes, employees with technical experience who can effectively manage and utilise it were hired".*

> *P15 "We have employed people with the necessary expertise to handle the new tools and technologies".*

### 4.6.2 Unemployment Risk

The incorporation of advanced technologies within the restaurant industry, although yielding significant advantages, can potentially result in the displacement of specific employment positions. Implementing automation in various tasks, including order processing, payment transactions, food preparation, self-service kiosks, mobile applications, and online ordering systems, can potentially decrease the requirement for human intervention in particular functions such as order takers and cashiers. Furthermore, the integration of robotics and intelligent kitchen appliances has the potential to optimise cooking procedures, thereby influencing the tasks historically performed by kitchen personnel. Adopting automated inventory management systems can potentially decrease the need for manual stock control, thereby impacting the responsibilities associated with stock monitoring and replenishment. This can be demonstrated in the provided excerpts from participants in discussing this scenario:

> *P2 "Yes, when tasks completely automated, it destroys jobs because waiters are replaced by robots".*

> *P16 "We have eliminated a small number of staff members by replacing many of them with robots".*

### 4.6.3 Tech Affects Jobs by Level

The impact of advanced technologies on restaurant jobs is nuanced, varying based on job levels and establishment types. At the entry-level, routine tasks like order taking and payment processing can be automated, potentially reducing cashier and order clerk positions. In contrast, technology creates new opportunities in roles like IT support for maintaining and troubleshooting automated systems. Adopting self-service kiosks and automated cooking processes in fast-food chains and quick-service establishments may decrease the demand for kitchen and counter staff involved in routine tasks. However, these advancements also drive the creation of jobs in software development, system maintenance, and digital marketing, reflecting a shift toward technology-focused roles. Technology may complement rather than replace human roles in upscale or fine-dining restaurants, where personal touch and specialised skills are emphasised. The demand for customer service and experience-focused roles, such as sommeliers and concierge service, remains essential. These quotes are evidence from a few participants' perspectives:

> *P26 "So I would say upper management is actually going to be a very nice place to be in the future. Very high levels of pay, but they will need high levels of skill. Mid management is probably under some threat, but operational I can see all those jobs disappearing".*

The significance of the human element in service, with varying ratios of human-technology balance, led some participants to emphasise the potential occurrence of this scenario. This suggests that substitution will occur to some extent, reaching up to 50% while still retaining the presence of the human element. This can be evidenced by the participants' perspectives as follows:

> *P2 "Because AI is replacing more and more fields of work, there has been significant job loss in my restaurant since the implementation of an automated AI workforce."*

> *P4 "The results of increased automation in my restaurants have an impact on job loss because AI has replaced many of the human labour tasks but has also created a few new job opportunities for managing this AI-driven workforce".*

### 4.6.2 Advice on Effectively Navigating this Scenario: Suggestions for Actions

The current scenario and the previous two have common recommendations, including allocating resources to training programs and fostering a culture of collaboration. However, there are supplementary steps that should be implemented in the event of two opposite phenomena "unemployment and job creation scenario", which are outlined below:

#### *4.6.2.1 Offer Support for Affected Employees*

Restaurant managers have a critical responsibility to support staff members impacted by the implementation of advanced technology. They achieve this by cultivating an environment that values empathy, transparency, and proactive aid. Prioritising transparency in communication is critical. Managers ought to unambiguously articulate the rationales underlying technological advancements, emphasising the organisation's dedication to assisting staff members during the transition process. By implementing support mechanisms, such as specialised training programs and workshops, organisations can guarantee that personnel impacted by the changing environment obtain the necessary competencies. Promoting an attitude of perpetual learning cultivates resilience and enables personnel to acclimatise to novel responsibilities effectively. Moreover, managers can establish mentorship initiatives that pair personnel with advanced technological expertise with those requiring assistance. Demonstrating a dedication to the welfare of the workforce can be achieved by engaging in open dialogue and addressing concerns while providing emotional support.

Furthermore, the manager's commitment to the future success and professional growth of impacted staff is exemplified through the facilitation of internal mobility opportunities and support in securing external job placements. This can be evidenced by the participants' perspectives as follows:

> *P1 "Help employees who lose their jobs because of new technology. This could mean giving out severance packages, helping people find new jobs, or giving them access to retraining programs".*
>
> *P18 "Employers should be transparent about any potential job losses and provide support and resources for displaced workers such as compensation".*

#### *4.6.2.2 Exploring New Roles*

It is imperative to thoroughly examine the restaurant's operational processes to pinpoint specific areas where technology integration can optimise efficiency and engender novel job opportunities. This may encompass roles pertaining to the management of technology, analysis of data, implementation of digital marketing strategies, and improvement of customer experience. The restaurant must collaborate with technology vendors and industry experts to stay updated on recent

advancements and trends and maintain a leading position in technological innovation. It is advisable to contemplate the implementation of pilot programs aimed at assessing the viability and operational impact of newly introduced roles. Promote active employee engagement in the process, fostering an environment that encourages the generation of ideas and sharing insights pertaining to prospective domains for employment expansion. Furthermore, it is crucial to investigate potential avenues for diversification, such as the expansion of online services, the implementation of novel technologies in food preparation, or the integration of sustainability initiatives that necessitate specialised positions, as elucidated by the following quotations:

> *P1 "Instead of focusing only on the loss of jobs, managers can look for ways to create new roles that use the strengths of both people and technology. For example, managers can focus on making new jobs like robotics maintenance technicians, data analysts, or customer experience managers".*
>
> *P6 "Managers should look for ways to develop new positions".*

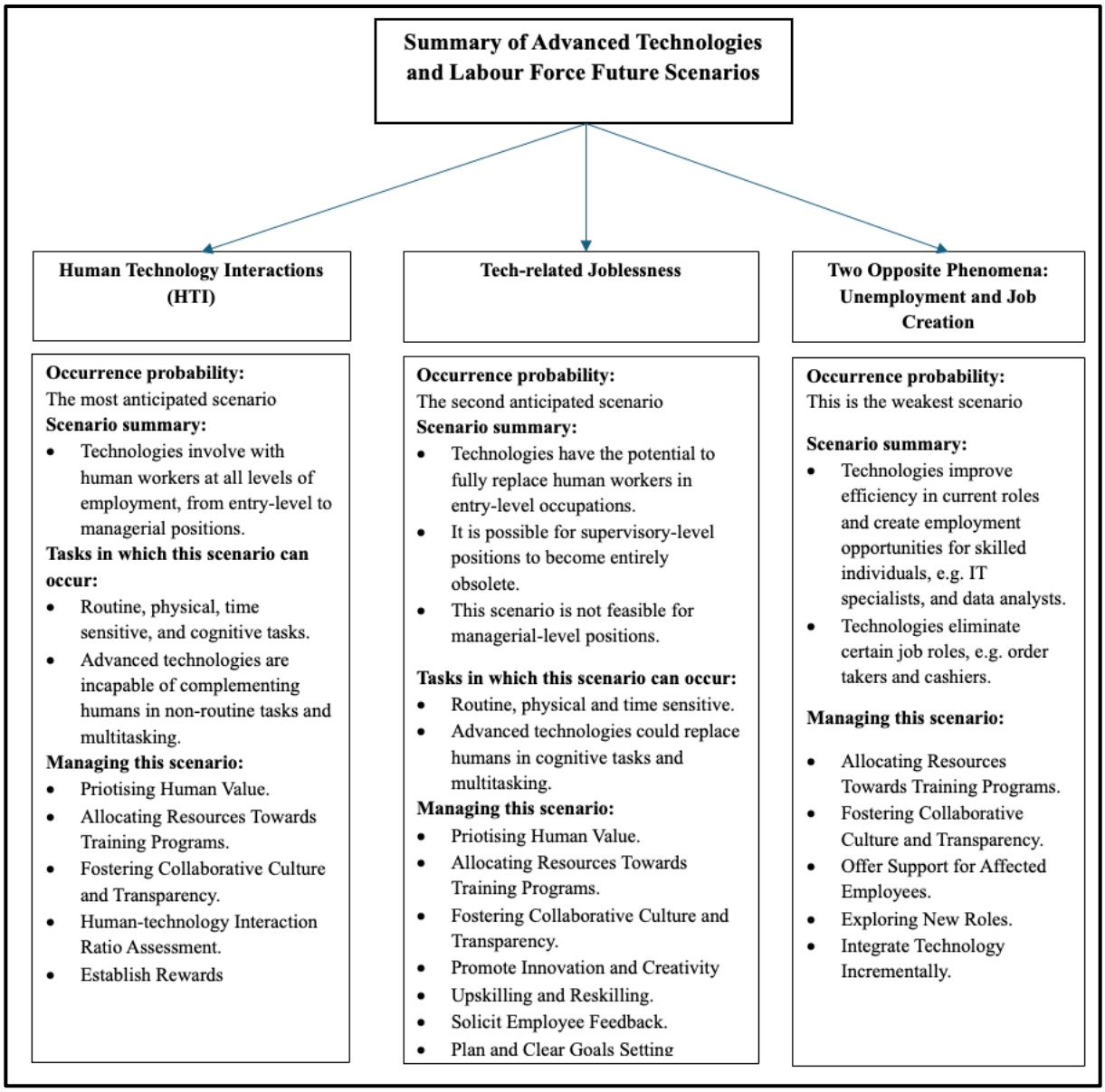
#### *4.6.2.3 Integrate Technology Incrementally*

Gradual adoption allows for a phased integration, which reduces the impact on current roles and allows staff to enhance their skill sets. This methodology promotes an easier transition, guaranteeing that personnel can acclimatise to the evolving technological environment without excessive strain or loss of employment. A gradual implementation also allows managers to evaluate the effects of technology on operations and workforce dynamics, which in turn allows them to pinpoint potential areas for creating new positions. By systematically integrating technology, managers can engage employees in the process of learning, thereby fostering an environment that values flexibility and inventive thinking. As an added benefit, this methodical approach allows managers to refine their strategies, confront emerging obstacles, and strategically align technological advancements with the organisation's objectives. This can be evidenced by the participants' perspective as follows:

> *P23 "By introducing advanced technology gradually, we not only embrace progress but also prioritise our people. This approach allows our dedicated staff to grow with the changing times, fostering a culture of continuous learning and adaptability".*
>
> *P26 "I guess it has to be done step by step and you do not want to just remove all of your stuff, bring in these robots and then it does not work, and you have got to get all*

*those stuffs back and you could really do yourself some damage if you just push a button".*

**Figure 4.3:** Key Findings from Labour Force Future Scenarios



## 4.7 Tech Mastery in Hospitality: Navigating the Modern Skill Set for Job Security

The participants exemplified employee skills that are highly demanded in the era of technological advancements. The following describes the explanation of each individually:

### 4.7.1 Technical and Technology-Related Skills

#### *4.7.1.1 Technological Skills*

It is highlighted that employees working in the restaurant industry will possess a diverse set of technological skills to maintain competitiveness and enhance operational efficiency. The technological skills encompass a high level of competence in point-of-sale (POS) systems to facilitate streamlined transactions, comprehension of reservation and table management software to enhance seating arrangements and understanding of online ordering interfaces and delivery systems. For personalised customer interactions and loyalty programs, customer relationship management (CRM) software proficiency is vital. In addition, for effective internal communication, collaboration, and customer service, personnel should possess a high level of proficiency in utilising digital communication tools. Comprehending and operating automated cooking equipment and inventory management systems are becoming increasingly critical in the restaurant domain. It is fundamental to possess a rudimentary comprehension of cybersecurity measures to preserve the integrity of digital systems and protect customer information. This can be evidenced by the following quotes:

> *P10 "Employees need to learn point-of-sale (POS) technology, scheduling software and online ordering integration, and perhaps even reservation software".*

> *P25 "It is important that employees possess fundamental digital literacy skills. This includes proficiency in operating computers, smartphones, and other digital devices, in addition to the ability to work on online ordering systems and resolve technical complications".*

#### *4.7.1.2 Data Analytics Skills*

Personnel must possess a high level of proficiency in utilising data analytics tools to extract meaningful insights from customer behaviour, sales patterns, and operational metrics and translate findings into actionable strategies. Further, personnel must possess the skill of utilising data effectively to guide decisions, improve customer satisfaction, and streamline restaurant processes.

Additionally, employees must possess communication and data visualisation abilities so that they can effectively convey complex findings to a variety of stakeholders, as exemplified in the excerpts provided:

> *P6 "Employees must have a proper knowledge about the data analytics to manage and store data".*

> *P13 "As online ordering systems and customer loyalty programs help restaurants collect more data, they will need people who can analyse that data. These workers will be able to look at data to find patterns and insights that can help businesses make choices like what to put on the menu and how to market themselves".*

#### *4.7.1.3 Problem-solving Skills*

Workers need to be good at spotting, understanding, and fixing problems that develop in the context of technical interactions as chatbots, AI, and robots become more integrated into businesses. This involves fixing technical issues, responding to consumer complaints about automated services, and ensuring processes that rely on technology run smoothly. Furthermore, employees must demonstrate a proactive mindset to anticipate potential issues and proactively implement preventive measures to mitigate any disruptions that may arise in the workflow. The acquisition of problem-solving skills is of great significance in situations with an intersection between technology and customer service. These skills enable employees to effectively navigate intricate scenarios, provide efficient resolutions, and uphold a favourable customer experience, as seen in the extracts below:

> *P18 "A variety of skills, including technical proficiency, problem-solving ability, and adaptability".*

#### *4.7.1.4 Language Skills*

Personnel must possess proficient language abilities to engage in effective customer communication and collaborate with technologically advanced systems, thereby guaranteeing a smooth and favourable encounter. Proficient personnel in multiple languages enhance customer service by effectively communicating in various languages and attending to the needs of various customers. Moreover, language skills help employees manage and interpret data produced by technological platforms; this enables them to extract significant insights and arrive at well-informed decisions. This can be supported by the following quote:

> *P1 "The ability to work with a number of programming languages".*

### 4.7.2 Interpersonal and Soft Skills

#### *4.7.2.1 Emotional Intelligence Skills*

Employees must possess enhanced interpersonal and empathetic abilities to comprehend and resolve customer concerns, particularly in technology-related situations. It is important to understand when it is advantageous to utilise technology for efficiency and when it is more suitable to employ human interaction, as in situations involving personalised recommendations or resolving complex problems. When customers are frustrated or confused by technology, managing such situations requires employees to demonstrate patience, active listening, and effective communication, all of which raise the importance of emotional intelligence. This can be demonstrated in the provided excerpts:

> *P19 "Things technologies do not have, such as technological information emotional intelligence".*

> *P26 "… So skills, hard skills, yeah, emotional skills, aesthetic skills".*

#### *4.7.2.2 Communication Skills*

Staff members must be proficient in guiding and instructing customers to ensure that consumers have a positive experience while utilising technology-driven services. It is critical to use clear and concise language, for example, when conveying complex information regarding menu options influenced by AI-driven recommendations or responding to customer enquiries regarding chatbot interactions. Furthermore, in restaurant environments, where collaborative teamwork continues to be of the utmost importance, staff members are required to express their thoughts when collaborating with automated systems or coordinating tasks involving technology-dependent processes. The ability to communicate is crucial, as it enables staff to customise their exchanges according to the context, be it direct customer interaction or collaborative work with colleagues in a technologically advanced workplace. This can be evidenced as follows:

> *P19 "Communication skills remain essential for employees in all roles".*

> *P21" Gesture, understanding behaviour, feeling themselves in customer shoes, react according to situation, customer, smile".*

#### *4.7.2.3 Creative Skills*

Employees are required to demonstrate creativity in formulating novel approaches to improve customer experiences and adjust to the ever-changing technological environment, for example, innovative problem-solving to create captivating interactions with automated services. Moreover, utilising technology for marketing and customer engagement requires the development of compelling digital content, such as visually appealing menus or captivating social media campaigns, which places a premium on creative abilities. A dining experience that is both dynamic and memorable is enhanced by personnel who can integrate innovative technologies with ingenuity. Furthermore, the ability to devise innovative recipes or optimise kitchen processes using automation becomes critical. The following participant's perspective serves as evidence for these points:

> *P16 "We need workers who are able to be creative in the use of technology".*

### 4.7.3 Advanced Tech and Employees' Pay

The findings indicate that a significant proportion of respondents acknowledged the influence of advanced technology on employees' salaries within the restaurant. Specifically, participants noted that individuals possessing relevant technical and technological skills and strong interpersonal and soft skills were more likely to command higher salaries. Conversely, those lacking such skills were not observed to experience commensurate salary increases. This is evident from the following quotations:

> *P7 "As there's high request for skilled workers, due to innovation, it leads to an increment of compensation. However, for less skilled labour, compensation has diminished due to less demand as technology covers the most of their duties".*

> *P20 "Technological advancements can be a boon or a curse to people depending upon the type of job they do. If their skill is way beyond the technology their salary will increase and vice versa".*

A minority of respondents suggested that advanced technologies hurt employee salaries by reducing pay because technologies alleviate employees of the burden of performing tasks. This is apparent based on the subsequent quotations:

> *P5 "There's no doubt that it hurts some restaurant workers, and we have already seen wage and job cuts in both our restaurants and the business as a whole."*

*P10 "At my restaurants, the workload of certain employees has decreased because a significant portion of their workload has been managed by high tech, leading to a reduced salary".*

A smaller portion of participants revealed that advanced technologies have a favourable impact on employee salaries by augmenting wages. This assertion stems from the notion that when personnel are freed from mundane and repetitive duties through automation, they can concentrate on more intricate and value-enhancing responsibilities, thereby bolstering their overall performance. The heightened level of productivity may give rise to a situation wherein employees assume more specialised positions, consequently leading to enhanced recognition and appreciation of their skills and contributions, thereby warranting salary increases. Moreover, with the advancement of technology, there is a potential for increased efficiency in various processes, enhanced customer engagement, and improved service quality. Consequently, the financial benefits of these advancements can be allocated to the employees through bonuses, incentives, or salary adjustments. Moreover, there may be a rise in the need for individuals possessing technological proficiency capable of efficiently managing and upkeeping these sophisticated systems. The increase in the need for specialised skills frequently aligns with an elevation in remuneration to allure and retain proficient individuals. This can be deduced from the following subsequent quotations:

*P9 "Technology advancement has a positive impact on the salary of human employees as technology helps to boost efficiency and creativity as well as reduce production cost which leads to hike in salary".*

*P11 "When we adopt new technology, we need to recruit specialised employees who require high salaries, so I think wages have increased as a result of higher skilled employees receiving higher compensation".*

## 4.8 Chapter Summary

The analysis of the data provided indicates that there are different levels of acceptance of advanced technology implementation in service (wide, moderate and limited), which can be attributed to the perceived advantages, difficulties, and drawbacks associated with its use. The initial group posits a stance of complete embrace, driven by the advantages of technology, whereas the subsequent group reflects a more measured acceptance, accompanied by a singular challenge. The third option demonstrates a restricted level of acceptance due to the presence of identified drawbacks.

The data analysis conducted in this study highlighted a predominant theme cantered around the incorporated technology in restaurant environments. Specifically, the focus is on the utilisation of various technological advancements such as robots, chatbots, augmented reality, digital kiosks, digital menus, tablets, automated kitchen equipment, and food applications. These technologies are utilised for diverse objectives, encompassing the enhancement of operational effectiveness, customer engagement, and the holistic dining encounter.

The analysis of the data provided indicates that the adoption of advanced technology in restaurants is influenced by various factors from a managerial standpoint. These factors include the perceived usefulness of the technology, the importance of ease of use, trust, brand image and reputation, competitive advantage, innovation and experimentation, employee engagement and satisfaction, labour market conditions, and cost-effectiveness. The aforementioned factors encompass the pragmatic considerations that influence the decision-making process regarding the adoption of technology within the restaurant industry.

The analysis of thematic content within the given data demonstrates a range of viewpoints among managers regarding the extent to which consumers embrace technology in providing services. Certain individuals have observed that consumers perceive advanced technologies as supplementary to human presence, whereas others have stated that consumers find them to be effective in and of themselves. Recognising the influence of individual factors on these preferences, the third viewpoint emphasises the variability of customer acceptance of advanced technologies in relation to demographics, culture, and prior experiences.

In case of HTI scenario, emerging technologies have the capability to actively involve human labourers at every occupational level, from entry-level to managerial positions. Certain participants articulated the opinion that the convergence of technology and human beings confers benefits predominantly in the realm of supervision. There exists a school of thought that contends interaction is unnecessary in supervisory and managerial positions but deems it indispensable in entry-level positions. The majority of respondents believe that advanced technologies can effectively collaborate with humans on any given task. Cognitive tasks, time-sensitive tasks,

routine tasks, and physical tasks are the ones that receive the most focus. A few participants proposed that humans and advanced technologies could work together to accomplish non-routine tasks and multitask. Numerous actions must be considered in the event of this scenario occurrence, including prioritizing areas where human employees contribute significant value, allocating resources towards training programs, fostering a collaborative culture and transparent, maintaining an ongoing assessment and modification of the human-technology interaction ratio, and establishing rewards.

In the tech-related Joblessness scenario, emerging technologies have the potential to fully replace human workers in entry-level occupations. Furthermore, it is possible for supervisory-level positions to become entirely obsolete, whereas the same cannot be said for managerial-level roles. The majority of participants indicated that advanced technologies have the capability to replace human involvement in tasks that are considered routine, physical, and time-sensitive tasks. A few respondents suggested that advanced technologies could eventually replace humans in cognitive tasks, and multi-tasking. The significance of the human element in service, with varying ratios of human-technology balance, led the second majority of participants to emphasise that this scenario will partially happen. This suggests that substitution will occur to some extent, reaching up to 75% while still retaining a weak presence of the human element. Numerous actions must be considered in the event of this scenario occurrence, including prioritizing areas where human employees contribute significant value, allocating resources towards training programs, fostering a collaborative culture, which are similar for the previous scenario. Further actions include fostering an environment that promotes innovation and creativity, providing opportunities for upskilling and reskilling, include and solicit employee feedback, and implementing a technology plan with clear goals.

In case of the unemployment and job creation scenario, there are three distinct viewpoints. Initially, the majority of respondents stated that the introduction of advanced technologies in the restaurant sector has generated new employment prospects. However, the second majority argued that while the integration of advanced technologies may bring about notable benefits, it may also lead to the elimination of certain positions. A limited number of respondents suggested that the effects of advanced technologies on employment vary by job level. While the proportion of human-to-

technology balance varied, the importance of the human element in service prompted some participants to emphasise the possibility that this scenario could occur. This implies that substitution may take place to a certain degree, potentially reaching 50%, with the human element remaining partially. The participants suggested the following measures to support the workforce in the event of this scenario: allocating resources to training programs, fostering a transparent and collaborative culture, offering support to affected employees, exploring new opportunities and roles, and facilitating the incremental integration of advanced technologies.

The participants demonstrated the highly sought-after skills of employees in the age of technological progress. The required skills encompass both technical and technology-related proficiencies (such as technological skills, data analytics skills, problem-solving skills, and language skills) as well as interpersonal and soft skills (including emotional intelligence skills, communication skills, and creative skills). Most participants observed that individuals who possessed pertinent technical and technological expertise, along with robust interpersonal and soft skills, were more inclined to receive higher salaries. In contrast, individuals who did not possess these skills were not found to receive equivalent salary raises. A small proportion of participants proposed that advanced technologies have an adverse impact on employee salaries by diminishing remuneration because technologies alleviate employees of the burden of performing tasks. A minority of participants expressed the belief that advanced technologies positively affect employee salaries by increasing wages, as it improves their overall performance, resulting in greater recognition and appreciation for their skills and contributions.

# Chapter Five: Discussion

## 5.1 Introduction

There are various possible structures for organising this discussion chapter, each offering potential benefits. However, the subsequent content will be organised following the primary research objectives to expand upon the findings and analysis presented in chapter four and guarantee lucidity.

The initial section (Section 5.2) will pertain to the broader findings of the research context, aiming to figure out the factors that influence the intentions of hospitality managers to embrace advanced technologies using the TAM model lens. The subsequent section will examine prospective labour force scenarios that were systematically arranged to facilitate discussions based on the participants' perspectives regarding the probability of their occurrence. This will be partitioned into three segments, spanning from 5.3 to 5.5. In conclusion, section 5.6 will discuss the evolution of the skill set demands placed on employees in this industry, as per the managers' perspectives on how to thrive in the current era.

## 5.2 Decoding Managerial Intentions for Advanced Technology Adoption

Davis (1985) constructed the TAM model to forecast the frequency of system usage and predict user behaviour. The Technology Acceptance Model (TAM) analyses an individual's intention to adopt new technology based on two variables: Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) (Davis, 1989). Davis *et al. (*1989), Venkatesh (2000), and Venkatesh and Davis (2000) provided a definition for Perceived Ease of Use as the degree to which an individual believes that utilising the system will not necessitate any exertion. Perceived usefulness (PU) refers to the degree to which an individual believes using a particular system would enhance their job performance (Davis, 1989; Li *et al.*, 2024).

### 5.2.1 Perceived Ease of Use (PEOU)

The study affirmed that Perceived Ease of Use (PEOU) impacts intentions to adopt advanced technologies in the restaurant industry. The higher the ease of implementation and navigation of technology, the greater the likelihood of its adoption, as it minimises operational disruptions, enhances staff productivity, and enhances the overall customer experience. For example, one of the participants indicated that restaurant managers are more likely to implement technologies that

require minimal training and emphasised the" User-friendly" concept. Another participant expressed "usability," which confirms this perspective. This finding aligns with the study conducted by Pizam *et al.* (2022), which indicated that complexity has a notable adverse effect on the willingness to embrace robotic technology. This suggests that hotel managers are less inclined to adopt robotic technologies when they perceive them as intricate and struggle to incorporate robots into their work routines. In addition, our findings are consistent with research by Chatterjee *et al.* (2021) on the application of artificial intelligence in the manufacturing and production sectors. However, the existing literature has presented inconsistent findings regarding the relationship between complexity and adoption. For instance, Ahmadi *et al.*'s (2017) research did not reflect any correlation between complexity and adoption in the specific context of health information systems. Our study uniquely highlighted one factor that influences the perception of ease of use, particularly from a managerial perspective, which will be comprehensively discussed in Section 5.2.1.1

#### *5.2.1.1 Antecedents of PEOU*

##### *5.2.1.1.1 Employees Engagement and Satisfaction*

Our research findings within the Technology Acceptance Model (TAM) demonstrated the impact of employee engagement and satisfaction on managers' inclination to adopt advanced technologies in the restaurant industry. The participants noted that employee active engagement tends to reduce employee turnover rates, leading to time and resource savings for the restaurant regarding recruitment and training. Furthermore, using advanced technology can provide employees with a range of tools that increase their efficiency and improve service delivery, resulting in customer satisfaction. This underscores the importance of employee engagement and satisfaction as determinants of perceived ease of use in the Technology Acceptance Model (TAM). This finding is in line with the research by Li *et al.* (2019), which showed that technological advancements impact employees' commitment and satisfaction and noted that most employees perceive these advancements as a threat, leading to an increase in employee turnover. Furthermore, this finding aligns with the study conducted by Parves *et al.* (2022), which emphasised the influence of employees' satisfaction with the usability of technologies on their behavioural intentions to utilise robots.

### 5.2.2 Perceived Usefulness (PU)

Perceived usefulness, as defined by Davis *et al.* (1989), refers to an individual's belief that using a specific system will enhance their work performance. Our study found that managers consider the usefulness factor to be a key factor in their decision-making process when deciding whether to implement advanced technology in the restaurant industry. Managers are more likely to adopt technological solutions that improve operational procedures, increase order accuracy, reduce labour costs, improve customer service, and provide valuable information and insights for decision-making. As an illustration, a specific participant expressed the concept of 'cost reduction'. Another participant highlighted the importance of 'efficiency'. This finding is consistent with the results of a study conducted by Sadangharn (2022), which examined the perspectives of employees and found that individual perceptions of the robot's usefulness and ease of use substantially influence its acceptance. A similar study by Zhong *et al.* (2022) found that perceived usefulness significantly determines technology acceptance. Our study specifically emphasises the antecedents of perceived usefulness from a managerial point of view. These factors will be thoroughly discussed in section 5.2.2.1.

#### *5.2.2.1 Antecedents of PU*

##### *5.2.2.1.1 Perception of the Brand*

Our research findings within the Technology Acceptance Model (TAM) demonstrated the impact of brand perception on managers' intentions to adopt and utilise advanced technologies. More precisely, the interviewees stated that incorporating cutting-edge technology can improve the image of restaurants as contemporary, progressive, and focused on customer satisfaction. This highlights the significance of the brand's perception in influencing perceived usefulness (PU). The participants disclosed that integrating technology that corresponds with a favourable brand image enables them to allure tech-savvy customers, distinguish themselves from rivals, and build confidence in the restaurant's capacity to cater to changing customer demands. This finding aligns with the research conducted by Cruz-Jesus *et al.* (2019) in the information technology context and Kim *et al.* (2021) and Soliman *et al.* (2024) in the hospitality context, who reflected that brand reputation is among several factors, which call for the utilisation of robots. This, nevertheless, is expanded in our research, where we emphasise the importance of cutting-edge technologies in establishing the reputation of restaurants as frontrunners in innovation and eliciting positive media coverage and reviews.

*5.2.2.1.2 The Significance of Competition*

Our research findings within the Technology Acceptance Model (TAM) demonstrated the impact of competition on managers' intentions to adopt advanced technologies in the hospitality industry. The interviewees emphasised that restaurant managers can differentiate their establishments from competitors by implementing contemporary technological solutions that offer unique features. Consequently, managers perceive advanced technology as a valuable tool for achieving a competitive advantage, leading to higher perceived usefulness. This highlights the significance of competition as a factor influencing the perceived usefulness of the Technology Acceptance Model (TAM). This finding is in line with the research by Ivanov (2020), Chatterjee *et al.* (2021), Pizam *et al.* (2022) and Chen *et al.* (2023), which emphasised that managers are more likely to adopt technology if it strengthens the company's competitive position. Contrarily, Nam *et al.* (2021) suggested that competition does not provide a compelling rationale for investing in technological adoption.

*5.2.2.1.3 Innovations in Technology*

In the context of the Technology Acceptance Model (TAM), our research revealed a substantial influence of innovation on managers' inclination to embrace cutting-edge technologies in the restaurants sector. The interviewees stressed the importance of restaurant managers embracing innovative solutions and actively participating in technological experimentation to stay ahead in the industry. This approach enables individuals to examine inventive tactics for enhancing the overall customer experience, streamlining operational processes, and identifying more efficient approaches to restaurant management. This highlights the importance of innovation as a factor that influences the perceived usefulness in the TAM model. Participants stated that the use of technologies like artificial intelligence (AI) and automation allows managers to identify the most efficient strategies for their organisation, allowing them to adapt their methods to meet the evolving needs and preferences of their customers. This resulted in an increased perception of usefulness as managers discovered that these technologies allowed establishments to efficiently adapt to changing trends and maintain a prominent position in the field. This finding is consistent with the research conducted by Yuen *et al.* (2021), which demonstrated that the perception of usefulness is affected by the perceived qualities of innovation in the context of Engineering. Nevertheless, our research broadens this comprehension to encompass the hospitality sector, proposing the inclusion of the innovation element when selecting and implementing advanced technologies.

*5.2.2.1.4 Labour Market Dynamics*

Our research findings within the Technology Acceptance Model (TAM) demonstrated the impact of labour market dynamics on managers' propensity to adopt advanced technologies in the restaurant industry. The participants highlighted that the current state of the labour market, which includes factors such as rising labour costs, labour shortages, and changing labour policies, motivates restaurant managers to adopt advanced technology. Due to the abovementioned obstacles, managers have been forced to seek new methods to reduce their dependence on manual labour, enhance operational efficiency, and maintain cost-effectiveness. Consequently, there was a heightened perception of usefulness, as managers expressed that streamlining labour-intensive tasks through advanced technologies allows existing staff to dedicate their time and energy to customer service and more valuable duties. This underscores the importance of labour market dynamics as a determinant that impacts the perceived usefulness of the TAM model. This finding is consistent with the research conducted by Tussyadiah *et al.* (2022) and Tian (2024), which revealed that the most extensively discussed factor influencing the adoption of automation is the severe or persistent labour shortage. This shortage is attributed to various interconnected factors, including demographic changes, liveability, labour migration, and political and regulatory concerns. Moreover, Abdelhakim *et al.* (2023) pointed out that utilising service robots within the fast-food industry could potentially address the issue of labour scarcity.

*5.2.2.1.5 Cost Efficiency*

Our research findings within the Technology Acceptance Model (TAM) indicated the impact of cost-effectiveness on managers' inclination to adopt advanced technologies in the restaurant industry. The interviewees stressed that technology has the potential to decrease operational expenses and increase profitability. Technology can enhance resource utilisation, minimise inefficiencies, and decrease inaccuracies, resulting in cost reduction. This can be achieved through labour-saving automation, streamlined inventory management, and efficient order processing, ultimately leading to a higher perceived level of usefulness. This emphasises the significance of cost efficiency as a factor that influences the perceived usefulness of the TAM model. This finding is consistent with the research conducted by Mingotto *et al.* (2021), which emphasised the strong interest of travel companies in advancing AI and robotics due to their potential advantages. Firstly, to enhance effectiveness and efficiency, these technologies can operate longer than humans and perform their tasks more accurately and punctually. Furthermore, the aim is to decrease labour

expenses by substituting or complementing personnel, freeing them from repetitive and monotonous duties and enabling them to dedicate their time to more demanding and innovative endeavours (Pillai *et al.*, 2021; Tussyadiah *et al.*, 2022; Seyitoğlu *et al.*, 2023). Nonetheless, this contradicts Pizam *et al.* (2022), who asserted that cost was not a determinant of technology adoption, observing that the study sample lacked knowledge or perspectives regarding costs in hotels.

### 5.2.3 Trust as an Essential Determinant

Our research findings within the Technology Acceptance Model (TAM) demonstrated the impact of trust on managers' intentions to adopt advanced technologies in the restaurant industry. Restaurant managers considering the adoption of advanced technology assess the technology's trustworthiness, which refers to their confidence in its security, reliability, and ability to meet operational goals. In addition, managers need assurance that the technology will safeguard sensitive data while seamlessly integrating with current systems. This highlights the significance of trust as a construct that directly impacts behavioural intention (BI) in the technology acceptance model (TAM). This finding is consistent with the study conducted by Wu *et al.* (2011), which emphasised the significance of trust in the adoption of new technologies. Their meta-analysis of the impact of trust on the Technology Acceptance Model (TAM) revealed that trust plays a crucial role in influencing behavioural intention (BI). Furthermore, the research conducted by Shaker *et al.* (2023) demonstrated that trust is crucial in determining the likelihood of individuals adopting online restaurant community recommendations.

The study's findings identified three anticipated scenarios for the restaurants' labour force, as a logical consequence of the manager's intentions to implement advanced technologies. The scenarios are structured according to the participants' estimations of their probability of occurrence. In addition, the findings unveiled suggestions for conserving labour force resources in each given scenario. Each scenario will be individually discussed in sections 5.3 to 5.5.

## 5.3 Human-Tech Interplay in Hospitality

### 5.3.1 Unveiling the Reasons Behind the Scenario

The study's findings revealed that the interaction between humans and technology is the most anticipated scenario, as emerging technologies can effectively collaborate with human workers at all employment levels, from entry-level to managerial positions. An illustrative instance involves cutting-edge technologies such as kiosks, which can enhance the focus of front-line employees on

customer service by simplifying their tasks. Due to the importance of the human element in service, participants highlighted the likelihood of this scenario more than others. This implies that there will be no layoffs of employees, and technological advancements will only serve to improve and assist human workers in their specific positions. This finding aligns with field notes in which the researcher disclosed that a dining establishment had adopted robots to enhance its standing, support marketing initiatives through word of mouth, and aid human employees. In addition, this finding is consistent with the research conducted by Lu *et al.* (2019) and Kim and Cha (2024), which concluded that the collaboration between humans and advanced technology robots is more effective than replacing humans entirely.

Additionally, the nature of the hotel industry requires the presence of human staff. This viewpoint is predicated on the notion that robots will assist managers in addressing human resources challenges such as recruiting temporary employees, managing work schedules during the offseason, and providing visual support. Conversely, robots will never achieve complete substitution of humans in the labour force, and occupations will continue to necessitate human involvement in the foreseeable future.

In this scenario, the study's findings highlighted advanced technologies can effectively collaborate with humans on any task. The tasks that garner the highest focus are repetitive, involving physical effort, requiring prompt completion, and demanding cognitive abilities. This aligns with the findings of Gibbs (2022), who stated that advanced technologies enable the automation of repetitive tasks. Nevertheless, our study expanded upon this comprehension by applying it to the hospitality sector, proposing that sophisticated technologies can supplement human efforts in physical, cognitive, and time-sensitive tasks. Furthermore, advanced technologies cannot complement humans in non-routine tasks and multitasking.

### 5.3.2 Strategies for Human-tech Interplay Success

#### *5.3.2.1 Listing Areas Where Human Workers Add Value*

The study's findings offer recommendations to manage human-technology interactions and preserve the labour force in restaurants. Participants emphasised the need for managers to prioritise areas where human employees contribute substantially. The participants highlighted the significance of customer engagement and hospitality, wherein human personnel excel in providing warmth, empathy, and a personalised experience that technology may lack. This may involve

assigning human personnel to greet and assist customers, handle specific inquiries, and ensure a seamless dining experience. Moreover, it is essential to prioritise human involvement in domains that require complex decision-making, creativity, and adaptability, such as handling diverse customer preferences or addressing unexpected issues. This finding is consistent with Huang and Rust's (2018) research in the service context and de Kervenoael *et al.* (2020) in the tourism context, which emphasised that these technologies are envisioned to handle routine and hazardous tasks, allowing humans to focus on tasks that add value. Our study expanded on this knowledge by demonstrating how it can be effectively implemented in the hospitality industry, using examples from a managerial point of view.

#### *5.3.2.2 Investing in Training Initiatives*

The findings highlighted the importance of investing resources in training programmes in the context of human-technology interaction. The participants emphasised the importance of enhancing soft skills and technical proficiency in these programs. Training staff in the operation and use of the technology ensures they are skilled in its application, allowing them to integrate it into their daily work routines seamlessly. Promoting soft skills training, which involves developing qualities such as empathy, communication, and adaptability, is equally important. These programmes need to provide staff with the ability to use technology to enhance human interaction rather than replace it. This is consistent with Seyitoğlu *et al.*'s (2023) research, which highlighted the importance of technology skills and training for restaurant employees in the current era. However, our study highlighted specific aspects to consider when creating employee training programs from a managerial perspective.

#### *5.3.2.3 Promoting Transparency and Collaboration*

The findings showed that managers need to encourage collaboration and transparency to enhance human-technology interaction by promoting shared learning and open communication. Encouraging discussions on how technology can enhance operational efficiency and customer service is crucial. To foster ownership and understanding, it is essential for staff to actively participate in decision-making processes related to the adoption and use of technology. Cheung and Vogel (2013) conducted a study on the factors influencing the acceptance of collaborative technologies for online education, highlighting the importance of collaboration in accepting technology. Furthermore, Ratna *et al.* (2023) underscored the importance of cultivating a culture that promotes open communication, collaboration, and knowledge sharing among teams in the

tourism and hospitality sectors. Our study expanded on this knowledge by proposing methods to promote collaboration and transparency in human-technology interaction within the hospitality industry.

#### *5.3.2.4 Monitor and Adjust the Human-technology Interaction Ratio*

The findings emphasised the importance of continuously evaluating and adjusting the ratio of human-technology interaction as a recommendation in the context of human-technology interaction. The participants noted that this can occur through monitoring the balance between human-technology interaction, which requires the consistent use of assessments and feedback systems. Defining key performance indicators (KPIs) for customer satisfaction and operational efficiency enables a measurable assessment of technology's influence on human interaction. Consistent monitoring of these metrics offers immediate insights into the efficiency of the current structure. Obtaining direct feedback from customers and staff about their experiences with technology helps to gain a more detailed understanding of its impact on service delivery. Adaptability is crucial, and businesses must be ready to adjust and refine their strategies in response to feedback. This iterative method enables improving technology integration to ensure it enhances human interaction rather than replacing it. This in-depth understanding of managing the ongoing evaluation and adjustment of the ratio of human-technology interactions guarantees a long-term commitment to making it easier for humans to interact with technology meaningfully. Although previous studies have discussed the interaction between humans and technology, including works by Choi *et al.* (2020), Sadangharn (2021), and Kim and Cha (2024), there is a paucity of research highlighting this strategy as a method for workforce management in contemporary times.

#### *5.3.2.5 Establish Incentives*

The findings showed that implementing rewards is essential in human-technology interactions. The participants ensured that one strategy involves utilising performance metrics to gauge the effective incorporation of technology into customer service, including higher customer satisfaction ratings, reduced response times, and tailored customer interactions. Employees who excel in combining technological tools with human interaction may be acknowledged through incentive programs, award ceremonies, or bonuses. Our findings emphasised the significance of implementing rewards to improve human-technology interaction. The lack of specific references

may hinder our ability to place this finding in the context of current literature, but its significance for the hospitality industry is evident.

## 5.4 Tech Disruption: Job Losses in Hospitality's Wake

### 5.4.1 Unveiling the Reasons Behind the Scenario

In this scenario, new technologies could completely replace human workers in basic job positions (entry-level) like waitstaff, bartenders, and hosts. This is especially pertinent because these positions usually necessitate little to no previous experience. Supervisory-level positions can become completely obsolete, unlike managerial-level roles. This finding is consistent with observations that a single shift involves assigning three core personnel to the kitchen. Furthermore, they supervise customers as they get their food from the robot tray if they are unaccustomed to the procedure. They also perform cleaning duties and prepare the food for service. The absence of waiters is due to the multitasking of the kitchen staff and service robots in the dining area. This is consistent Ivanov (2020) and Ghosh *et al.* (2024), who suggested that entry-level positions such as sales agents, receptionists, waiters, cooks, room service delivery staff, and food order delivery staff for restaurants, cashiers, drivers, accountants, gardeners, cleaners, etc., will not disappear completely, but will diminish due to automation, unlike Tussyadiah and Park's (2018) research, which concluded that there are no obstacles to substituting humans with advanced technology in hotels. Robots can manage front desk tasks, provide room service, and engage socially with guests. Our study further explored managers' perspectives regarding supervisory and managerial-level positions.

In case of this scenario, advanced technologies can replace human involvement in routine, physical, and time-sensitive tasks. Some respondents proposed that advanced technologies could potentially supplant humans in cognitive tasks and multitasking. This aligns with Nissim and Simon's (2021) findings in technology, sociology, and labour studies, which showed that advanced technology threatened many jobs by automating routine and non-routine tasks. Until now, routine tasks performed by workers have been replaced, whether physical or cognitive. Although there were concerns about automating non-routine tasks, workers performing non-routine tasks were replaced with automated systems to complete tasks with minimal human involvement. Our study further developed this understanding by suggesting that advanced technologies can take over the

hospitality industry's routine, physical, and time-sensitive tasks. At the same time, advanced technologies could eventually replace humans in cognitive tasks and multitasking.

### 5.4.2 Proactive Strategies for Job Losses Scenario Avoidance

The study offers recommendations for effectively managing job losses in the hospitality industry and retaining the workforce in restaurants. Highlighting the areas where human employees add substantial value, investing resources in training programmes, and promoting a collaborative culture are commonly shared in this scenario and the scenario of human-technology interaction. The participants offered further suggestions for addressing the situation of job losses in the hospitality industry, as outlined below:

#### *5.4.2.1 Establishing an Innovative and Creative Environment*

The finding underscored the importance of cultivating a conducive environment that encourages innovation and creativity, as emphasised by the participants. Encouraging creativity and innovation in restaurants is a strategic method to prevent job loss when introducing advanced technology. This can be accomplished by encouraging employees to share ideas, organising frequent brainstorming sessions for staff to propose innovative solutions to operational issues and ways to utilise technology efficiently, and encouraging and compensating creative ideas to stimulate innovation. Furthermore, using customer feedback and preferences as a source of inspiration to adjust menus and services according to data-driven insights, creating a forward-thinking environment by staying updated on the latest restaurant technology trends and consistently evaluating the technology stack to ensure it meets the restaurant's objectives and customer expectations. Our research highlighted the importance of creating a supportive environment that fosters innovation and creativity to mitigate job displacement while implementing cutting-edge technology. Although prior research indicates that technological advances foster innovation in hospitality services (Elkhwesky *et al.*, 2024), there is insufficient emphasis on this strategy as a method for labour force management in the current context.

#### *5.4.2.2 Offering Opportunities for Reskilling and Upskilling*

The findings underscored the value of enhancing and acquiring new skills. The participants emphasised the importance of creating pathways for skill development and retraining to provide the labour force with the necessary skills. Training modules may include technical and soft skills relevant to the new technology. Soft skills such as software proficiency and adaptability are examples of this. Encourage employees to participate in these programs voluntarily by highlighting

the benefits of acquiring new skills. Incentivise employees to participate in upskilling and reskilling by offering extra rewards, like salary raises or promotions. Create a supportive learning environment for self-improvement through online courses, workshops, and mentorship programs. Ensure the workforce remains agile and adaptable by regularly assessing and updating the training program to align with new technological advancements. This is in line with the research by Chi *et al.* (2020) and George *et al.* (2023), which recommended reskilling and upskilling employees, providing support during job transitions, and implementing policies to tackle the challenges of AI adoption. Our study expands on this understanding by proposing strategies for reskilling and upskilling.

#### *5.4.2.3 Incorporate and Actively Solicit Feedback from Employees.*

The findings highlighted the importance of seeking employees' feedback to prevent this scenario. The participants stressed that this practice ensures that employees' viewpoints are valued, considered and successfully incorporated into the workplace to help them feel valued and listened to. Feedback can offer insights into areas requiring retraining and reskilling, helping employees adapt to changing technological needs, enhancing job security, and reducing the risk of layoffs. Although previous research underscores the importance of employee feedback (Abdelmotaleb, 2024; Arun Kumar *et al.*, 2024), there is a notable deficiency in attention to this method as a strategy for workforce management in the era of technological progress.

#### *5.4.2.4 The Execution of a Clear Technology Plan*

The findings highlighted the importance of having a technology plan with clear objectives to prevent job loss. Participants stressed the need to set specific goals and key performance indicators (KPIs) demonstrating how technology can enhance efficiency, streamline workflows, and improve organisational outcomes. The participants emphasised essential tips for the technology implementation plan, such as developing a strategic plan with specific dates and milestones for technology integration, implementing a gradual rollout to reduce disruptions, focusing on enhancing employee skills and providing training programmes customised to technology needs. Consistently assess progress and adjust as needed to ensure alignment with the strategy's goals. Continual efforts are being made to communicate effectively with the workforce to address concerns and ensure alignment with the technology's objectives. This aligns with Baum's (2015) research advocating for hotel managers to plan on employee retention and Cobos *et al.*'s (2016) findings that effective technological advancements in the hospitality sector result from a carefully

planned and implemented innovation adoption procedure. Our study enhances this suggestion by providing tips for an effective implementation plan for advanced technology.

## 5.5 Simultaneous Job Creation and Unemployment

### 5.5.1 Participants' Viewpoints in that Scenario

According to the findings, this is the weakest scenario in which unemployment and job creation can occur concurrently. In this scenario, integrating advanced technologies improves efficiency in current roles and creates employment opportunities, significantly contributing to the growth and advancement of the restaurant industry. The participants stated that skilled individuals are required to supervise, maintain, and improve automated order processing systems, digital marketing platforms, and data analytics tools, all of which have been introduced due to technological progress. IT specialists, data analysts, and tech support teams are essential for successfully integrating and operating of these advanced solutions. Furthermore, the implementation of digital payment systems, user experience design, and app development by restaurants is driving the need for professionals in these areas. In addition, introducing robotics and automation in the restaurant industry could create new specialised professional positions responsible for overseeing and maintaining these technological advancements. Furthermore, with dining establishments incorporating technological advancements to enhance their services and reach a wider audience, there is a growing need for professionals skilled in menu engineering, digital marketing strategy, and social media management. However, participants noted that integrating advanced technologies in the restaurant industry could eliminate specific job roles. Implementing self-service kiosks, mobile applications, and online ordering systems could replace traditional roles like order takers and cashiers. The combination of robotics and smart kitchen appliances can improve cooking processes and impact the traditional responsibilities of kitchen staff. This contradicted the findings obtained from observations, which indicated that the researcher had not detected any additional staff positions being created in the dining area due to the two existing kitchen employees' expertise in operating the robots. On the other hand, this is consistent with Nissim and Simon's (2021) and Law *et al.* (2021) findings that advanced technologies can generate new job prospects and lead to the displacement of human workers, resulting in increased technological unemployment. Our study emphasised certain tasks as examples in the event of this scenario happening.

The findings in this scenario also demonstrated that job creation or unemployment is influenced by the job level. Participants noted that basic tasks such as order taking and payment processing can be automated at the entry-level, which may decrease the cashier and order clerk roles. Technology generates new possibilities in positions such as IT support, focusing on the upkeep and resolution of issues with automated systems. Implementing self-service kiosks and automated cooking processes in fast-food chains and quick-service establishments could reduce the need for kitchen and counter staff responsible for basic duties. Yet, these progressions also lead to job opportunities in software development, system maintenance, and digital marketing, indicating a transition towards technology-centric positions. Upscale or fine-dining restaurants prioritise personalisation and specialised skills, where technology can enhance human roles instead of replacing them. Customer service and experience-oriented positions like sommeliers and concierge services remain crucial. This is consistent with the viewpoints of Ivanov (2020) and Ghosh *et al.* (2024), who noted that digitalisation would substantially transform the service sector, encompassing both front-of-house and back-of-house operations. These changes would involve the creation of new positions, and the elimination of existing ones based on job level.

### 5.5.2 Strategies for Handling this Scenario

The study provided recommendations for efficiently handling job creation and unemployment scenario. This and previous scenarios consistently emphasise allocating resources to training programs and fostering a collaborative culture. The participants provided additional recommendations for dealing with the concern of job creation and unemployment in the hospitality sector, as listed below:

#### *5.5.2.1 Supporting Affected Workers*

The findings indicated that managers play a crucial role in supporting staff affected by implementing advanced technology. This can be accomplished by fostering a culture that prioritising empathy, transparency, and proactive assistance. Managers should clearly explain the reasons for technological advancements, highlighting the organisation's commitment to helping employees during the transition. Organisations can ensure that employees affected by the changing environment acquire the required skills by providing support mechanisms like tailored training programs and workshops. Fostering a mindset of continuous learning helps individuals develop resilience and adapt effectively to new tasks. Managers can create mentorship programs that match employees with advanced technological skills with those who need help. Showing a commitment

to employee well-being can be accomplished by fostering open communication, addressing issues, and offering emotional assistance. Managers demonstrate dedication to affected staff's future success and professional development by providing internal job opportunities and assisting in finding external job placements. This is consistent with a study by Chatterjee *et al.* (2021), which found that leadership support plays a significant role in moderating the adoption of such technologies. This aligns with George *et al.* (2023) who proposed assistance during job transitions and implementing policies to tackle the obstacles related to AI integration. Our study further develops this suggestion by offering tips for effective support.

#### *5.5.2.2 Exploring Opportunities and New Roles*

The findings revealed that managers can reduce unemployment and improve job opportunities by taking a strategic and forward-thinking approach to discovering new roles. First, conducting a comprehensive assessment of the restaurant's operational procedures to identify precise areas where incorporating technology can enhance efficiency and create new job prospects. This could involve positions related to technology management, data analysis, digital marketing strategy implementation, and enhancing customer experience. Implementing training programs and upskilling initiatives to properly equip the current workforce with the required skills for emerging roles. This method will foster a culture of ongoing learning. For the restaurant to stay at the forefront of technological innovation, it is crucial to collaborate with technology vendors and industry experts. This proactive approach allows the establishment to remain informed about the latest advancements and trends in the field. Considering pilot programs to evaluate the feasibility and operational effects of newly introduced positions is recommended. Encourage employees to actively participate in the process by creating an environment that promotes generating and sharing ideas related to potential areas for expanding employment. Exploring different ways to diversify is important, such as expanding online services, using new technologies in food preparation, and incorporating sustainability initiatives that require specialised roles. This is consistent with the findings of Davenport and Kirby (2015) and Chi *et al.* (2020), who emphasised the importance of developing new tasks to replace those that have been completely automated. This is crucial to prevent potential psychological and social issues due to unemployment rates.

#### *5.5.2.3 Facilitating Advanced Technology Integration Incrementally*

The findings showed that gradual adoption enables a step-by-step integration, minimising the effect on current roles and allowing staff to improve their skill sets. This approach ensures a smooth

transition, allowing employees to adapt to the changing technological landscape without undue stress or risk of job loss. Gradual implementation enables managers to assess the impact of technology on operations and workforce dynamics, helping them identify potential areas for creating new positions. Managers can engage employees in learning by integrating technology systematically, which fosters an environment that values flexibility and inventive thinking. Managers can use this systematic approach to adjust their strategies, address obstacles, and strategically integrate technological advancements with the organisation's objectives. While earlier studies have addressed technology integration within the hospitality sector (Tlili *et al.*, 2021), there remains a lack of focus on gradual implementation strategies for managing the workforce in the light of technological progress.

## 5.6 The Contemporary Skills and Job Stability

### 5.6.1 Abilities in Technical and Technological Domains

#### *5.6.1.1 Technological Skills*

The findings indicated that employees must have advanced technological skills, including proficiency in point-of-sale (POS) systems, to process transactions smoothly. They should also thoroughly understand reservation and table management software to improve seating arrangements and navigate online ordering interfaces and delivery systems. Proficiency in customer relationship management (CRM) software is crucial for facilitating personalised interactions with customers and implementing loyalty programs. Furthermore, personnel must possess considerable expertise in utilising digital communication tools to facilitate efficient internal communication, foster collaboration, and enhance customer service. The comprehension and operation of automation in cooking equipment and inventory management systems are becoming increasingly crucial in the restaurant field. It is essential to have a basic understanding of cybersecurity protocols to maintain the reliability of digital systems and safeguard customer data. These findings are consistent with the research conducted by Erebak and Turgut (2021), which suggested that organisations may endeavour to incorporate contemporary technologies into their operational processes. Hence, proficiency in utilising these technologies may be necessary. This observation underscored the necessity for continuous enhancement of technological competencies among personnel. This study contributes to the existing body of knowledge by examining the specific restaurant domains in which this skill is crucial.

#### *5.6.1.2 Data Analytics Skills*

The findings suggested that individuals must possess considerable expertise in utilising data analytics tools to derive significant insights from customer behaviour, sales patterns, and operational metrics. Data analytics involves the capacity to derive significant patterns from extensive datasets produced by technological platforms and convert these findings into practical strategies. For instance, to effectively understand customers' preferences by engaging with AI-driven chatbots or enhancing menu offerings through data-driven insights, it is important to possess a strong analytical mindset. Moreover, individuals must possess the proficiency to effectively utilise data to inform decision-making, enhance customer satisfaction, and optimise restaurant operations. In addition, employees must possess proficient communication and data visualisation skills to communicate intricate findings to diverse stakeholders. This finding is consistent with the research conducted by Seyitoğlu *et al.* (2023), which suggested that possessing a diverse set of skills, commonly called being multi-skilled, is an essential prerequisite to sustain in the restaurant industry as an employee. This includes the possession of analytical skills. According to Carlisle *et al.* (2023), there is a greater demand for analytical skills and the ability to interpret big data at managerial levels compared to operational levels. However, our study aims to investigate further the complexities associated with the importance of this specific skill.

#### *5.6.1.3 Problem Solving Skills*

The findings emphasised the importance of workers' ability to identify, comprehend, and resolve issues that arise during technical interactions. This includes resolving technical problems, addressing consumer grievances regarding automated services, and ensuring the seamless operation of technology-dependent processes. It is crucial to have the ability to quickly adapt and create innovative solutions when faced with challenges in using digital tools or automated systems. In addition, employees must exhibit a proactive thinking approach, wherein they can anticipate potential challenges and take proactive steps to implement preventive measures to minimise disruptions within the workflow. This is consistent with the findings of Fitsilis *et al.* (2018) and Carlisle *et al.* (2023), who noted that employees are expected to possess problem-solving abilities. Nevertheless, our research expands upon this proposition by delving into the intricacies surrounding the significance of this skill.

#### *5.6.1.4 Language Skills*

The findings suggested that individuals must have strong language skills to communicate with customers and work with technologically advanced systems effectively. Highly skilled individuals fluent in multiple languages improve customer service by efficiently communicating in diverse languages and addressing the requirements of different customers. Furthermore, employees must possess proficient language abilities to handle and analyse data generated by technological platforms effectively. This proficiency empowers them to extract meaningful insights and make informed decisions. This aligns with the conclusions drawn by Fitsilis *et al.* (2018), who observed that the modifications introduced to the market will significantly alter the skills necessary for the job and may even impact the approach to recruiting. Employees are expected to have language proficiency (Carlisle *et al.*, 2023). Nevertheless, our research shed light on the context surrounding this skill in this era.

### 5.6.2 Soft and Interpersonal Abilities

#### *5.6.2.1 Emotional Intelligence Skills*

The study findings indicated that employees need to have improved interpersonal and empathetic skills to understand and address customer concerns, especially in technology-related situations. It is essential to comprehend when it is beneficial to employ technology to enhance efficiency and when it is more appropriate to utilise human interaction, such as in scenarios involving personalised recommendations or resolving complex problems. Managing situations where customers experience frustration or confusion due to technology necessitates employees to exhibit qualities such as patience, active listening, and effective communication. These attributes underscore the significance of emotional intelligence in such circumstances. Furthermore, within developing collaborative work environments enabled by advanced technologies, individuals with strong emotional intelligence play a valuable role in enhancing team dynamics and fostering a culture characterised by support and adaptability. This is consistent with the findings of Ivanov *et al.* (2020) and Cheong *et al.* (2023), who emphasised the importance of emotional intelligence and social skills in human personnel.

#### *5.6.2.2 Communication Skills*

The study's findings indicated that effectively communicating with customers and technology is of utmost importance. Proficiency in guiding and instructing customers is essential to ensuring a positive experience when using technology-driven services. When communicating intricate details

about menu choices influenced by AI-powered suggestions or addressing customer inquiries regarding chatbot engagements, it is imperative to employ language that is both lucid and succinct. Moreover, in restaurant settings, where cooperative teamwork remains crucial, employees must articulate their thoughts and ideas when working with automated systems or coordinating tasks that involve technology-dependent procedures. Adaptable communication is essential as it allows staff to tailor their interactions based on the situation, whether direct customer engagement or collaborative work with colleagues in a technologically advanced workplace. This finding is consistent with Seyitoğlu *et al.* (2023) and Carlisle *et al.* (2023), who emphasised that perseverance and effective communication abilities are crucial in the current era.

#### *5.6.2.3 Creative Skills*

The findings underscored employees' need to exhibit creativity in devising innovative strategies to enhance customer experiences and adapt to the dynamic technological landscape. Using technology for marketing and customer engagement necessitates the creation of persuasive digital content, such as visually attractive menus or captivating social media campaigns, which emphasises the importance of creative skills. An enhanced dining experience is achieved through the integration of innovative technologies and ingenuity by personnel, resulting in a dynamic and memorable dining experience. Moreover, in collaborative environments where technological progress intersects with the culinary arts, the capacity to create inventive recipes or enhance kitchen operations through automation becomes crucial. Although the absence of specific references may impede our capacity to situate this finding within the current body of literature, its relevance to the hospitality industry is apparent.

### 5.6.3 Advanced Technologies and Wages

The findings revealed that a notable percentage of participants indicated that individuals who possess pertinent technical and technological competencies and robust interpersonal and soft skills are more inclined to secure higher remuneration. On the other hand, individuals who did not possess these skills were not found to undergo proportional salary increments. A subset of participants indicated that implementing advanced technologies has a detrimental impact on employee remuneration, as it diminishes pay. This perception stems from the notion that technologies relieve employees of repetitive, tedious responsibilities. Other minority groups perceive that this alleviation will enable employees to focus on more complex and value-adding duties, thus enhancing their overall performance. Increased productivity can result in employees

taking on more specialised roles, leading to greater recognition and appreciation of their skills and contributions, justifying salary raises. While the lack of explicit citations may hinder our ability to contextualise this finding within the existing scholarly literature, its significance to the hospitality sector is evident.

## 5.7 Chapter Summary

The purpose of this chapter is to discuss and contemplate the findings presented in chapter four in connection with the current body of knowledge. Through the TAM model lens (Davis, 1989), this research aimed to explore hospitality managers' intentions to adopt new technologies, the factors that influence their choices, potential outcomes, consequences for the future of the workforce, and new labour management tactics in this era. Initial data analysis indicated that the implementation of cutting-edge technology in restaurants is influenced by multiple factors from a managerial perspective. One of the primary factors to consider is the technology's perceived usefulness (PU). Perceived usefulness (PU) is influenced by various factors, including the perception of the brand, competitive advantage, innovation and experimentation, labour market conditions, and cost-effectiveness. Perceived ease of use (PEOU) is the subsequent factor, preceded by employee engagement and satisfaction. Trust is identified as the final determinant that impacts managers' intentions to adopt advanced technologies.

The research findings revealed three projected scenarios for the workforce in the hospitality sector, particularly within the restaurant industry, as a logical outcome of the managers' plans to adopt advanced technologies. The scenarios are organised based on the participants' assessments of their likelihood of happening, namely human technology interaction (HTI), tech-related Joblessness and the unemployment and job creation. Furthermore, the findings revealed recommendations for preserving workforce resources in each specific scenario.

The findings of the study revealed the in-demand skills possessed by workers in the era of technological advancement. The skills include technical and technology-related competencies (such as technological skills, data analytics skills, problem-solving skills, and language proficiency) and interpersonal and soft skills (including emotional intelligence, communication, and creativity). According to most of the participants, individuals who demonstrated relevant technical and technological proficiency, and strong interpersonal and soft skills, are more likely to

be rewarded with higher wages. Conversely, individuals lacking these skills are less likely to receive commensurate wage increases. A minority of participants posited that the implementation of advanced technologies has a negative effect on worker wages, as it reduces remuneration due to the alleviation of task-related burdens. A small proportion of respondents believed that the implementation of advanced technologies has a favourable impact on employee remuneration by augmenting wages, as it enhances their overall productivity, leading to heightened acknowledgement and gratitude for their expertise and contributions.

# Chapter Six: Conclusion

## 6.1 Introduction

The primary objective of this concluding chapter is to present the definitive findings and conclusions of the thesis. This study aimed to explore the intentions of hospitality managers to adopt new technologies, the factors that influence their intentions, potential outcomes, consequences for the future of the workforce, and new labour management tactics in the current era, using the Technology Acceptance Model (TAM) as a framework. To effectively address this issue, the chapter begins by providing an overview of the overarching research aims and objectives formulated in Chapter One. The subsequent section succinctly outlines the thesis by discussing key themes and emphasising the study's significant theoretical, practical, and methodological contributions. The chapter concludes by considering the study limitations and delineating potential avenues for future investigation.

## 6.2 Revisiting the Research Aim, Objectives

The research aim, objectives, and questions underwent refinement throughout the process of developing this thesis. The main emphasis was on the intentions of hospitality managers to adopt new technologies, the factors that influence their intentions, potential outcomes, consequences for the future of the workforce, and new labour management tactics in the current era, using the Technology Acceptance Model (TAM) as a framework. Consequently, the main aim of the study was as follows:

> **To develop an understanding of how managers' intentions to adopt advanced technologies will impact the future of the hospitality workforce.**

Four research objectives were devised to address this overarching aim. These addressed recurrent issues and unresolved enquiries previously identified in the literature. Thus, the subsequent section outlines the main findings and contributions to the existing body of knowledge per specified areas of emphasis and the underlying objectives of the study.

## 6.3 Research Findings and Overview

The present section of the conclusion offers a concise overview of the core themes and contributions derived from the research. These gaps and unresolved areas of enquiry in the literature encompassed several aspects. Firstly, there is a dearth of advanced technology research, specifically in hospitality. Secondly, there is a lack of examination regarding the prospects of hospitality managers in the recent technological epoch, particularly in terms of their acceptance. Thirdly, most Technology Acceptance Model (TAM) studies have focused on the individual acceptability of technology within the consumer and guest contexts only. Fourthly, there is a lack of clarity regarding the ultimate impact of advanced technologies on the labour force of the hospitality industry, and the existing studies are quantitative. Fifthly, there is a dearth of knowledge regarding the new strategies for managing the labour force. Lastly, there is a lack of understanding regarding the skills required from employees in the era of technological breakthroughs. The gaps identified in the existing literature have underscored this research agenda and offered opportunities for future investigation.

**RO1: Use the TAM model as a lens through which to examine hospitality managers' intentions for the adoption of new technologies, including the factors that influence their decisions.**

The literature review revealed a noticeable absence of analysis regarding the prospects of hospitality managers in the context of the recent technological era, specifically in terms of their acceptance. Furthermore, it is worth noting that a significant portion of research on the Technology Acceptance Model (TAM) has predominantly concentrated on examining the individual acceptability of technology solely within consumer and guest contexts. In light of this objective, the literature review analysed the existing body of knowledge pertaining to the factors that managers must consider when implementing new technologies. In Section 2.6, the literature chapter analysed and revealed that Lin *et al.* (2020), Lin and Mattila (2021), Nam *et al.* (2021), Sony *et al.* (2021), and Ghosh *et al.* (2024) have identified several key factors to consider when implementing advanced technologies. These factors include the advantages of technology, the level of technical complexity involved, a comprehensive understanding of information technology, financial incentives or return on investment (ROI), employee resistance, guest acceptance,

competitive dynamics, legal considerations, the value of recency (people's inclination to acquire knowledge about new technologies), and rapport (treatment with warmth and kindness). Furthermore, the study conducted by Tussyadiah *et al.* (2022) revealed that the primary factor in adopting automation is the significant and enduring labour scarcity. Ivanov *et al.* (2018) incorporated demographic factors into these factors, while Sun *et al.* (2020) reviewed cultural values.

The findings show that the adoption of advanced technologies in restaurants is impacted by various factors from a managerial standpoint through TAM model lens (Davis, 1985). The perceived usefulness (PU) of the technology is a crucial factor to be considered. The perception of usefulness (PU) is subject to the influence of several antecedents, such as the perception of the brand, competitive advantage, innovation and experimentation, labour market conditions, and cost-effectiveness. The subsequent factor is the perceived ease of use (PEOU). The perception of the (PEOU) is subject to the influence of employee engagement and satisfaction as an antecedent of the (PEOU). In the present study, trust is recognised as a main determinant or construct within the Technology Acceptance Model (TAM) that influences managers' intentions to adopt advanced technologies. This finding serves as an extension of the TAM model in the context of this research.

**RO2: Acquiring comprehensive and analytical understanding of how managers' intentions to embrace advanced technologies affect the future of the workforce in the hospitality industry.**

**RO3: Gain an understanding of the most recent strategies for managing hospitality workers in the age of technological advancement.**

The literature has identified a dearth of clarity concerning the ultimate ramifications of advanced technologies on the workforce within the hospitality industry. Furthermore, the current body of research predominantly consists of quantitative studies. In addition, there is a dearth of knowledge regarding the new strategies for managing the labour force. Given the stated RO2 and RO3, the literature debate has been reviewed and categorised into three anticipated scenarios for the future of the labour force in the hospitality industry (Chapter 2, Section 2.9), to be thoroughly examined in this qualitative study.

The study's findings deeply unveiled three anticipated scenarios for the labour force in the hospitality sector, specifically within the restaurant industry, as a rational consequence of the managers' intentions to embrace cutting-edge technologies. The scenarios are structured according to the participants' evaluations of their probability of occurrence, namely human technology interaction (HTI), tech-related joblessness, and unemployment and job creation. Moreover, the findings unveiled suggestions for safeguarding workforce resources in every scenario.

In the first scenario (HTI), the study's findings indicated a high level of anticipation for the interaction between humans and technology. This is due to the potential of emerging technologies to effectively engage with human workers across various employment levels, ranging from entry-level to managerial positions. An exemplification can be observed in the utilisation of advanced technologies like kiosks, which can potentially augment the concentration of frontline personnel on customer service by streamlining their responsibilities. Participants emphasised the significance of the human factor in service, with some highlighting the likelihood of this scenario more than others. This suggests that there will be no workforce reductions, and technological progress will solely contribute to enhancing and supporting human workers in their specific positions.

The study revealed that most participants believe advanced technologies can effectively collaborate with humans across various tasks. Advanced technologies can enhance human efforts in physical, cognitive, and time-critical tasks. Moreover, it has been noted that it cannot effectively assist humans in non-routine tasks and multitasking. The findings underscored the need for various actions to be taken in the event of this scenario, including prioritising areas where human employees contribute significant value, allocating resources towards training programs, fostering a collaborative culture and transparency, maintaining an ongoing assessment and modification of the human-technology interaction ratio, and establishing rewards.

In the second scenario (Tech- related Joblessness), emerging technologies could fully substitute human workers in entry-level positions such as waitstaff, bartenders, and hosts. These positions typically require minimal or no prior experience, making this particularly relevant. Supervisory-level positions have the potential to become entirely outdated, in contrast to managerial-level roles.

The majority of participants believe that advanced technologies have the potential to supplant human involvement in routine, physical, and time-sensitive tasks. Some respondents proposed that advanced technologies could potentially supplant humans in cognitive tasks and multitasking. The significance of the human element in service, with varying ratios of human-technology balance, led the participants to assess it as a second scenario and emphasise that this scenario will partially happen. This suggests that substitution will occur to some extent, reaching up to 75% while still retaining a weak presence of the human element.

The findings revealed that the current and previous scenarios take similar actions to address the human replacement issue, such as emphasising areas where human employees add significant value, allocating resources to training programs, and fostering a collaborative culture. Additional actions that can be taken in the event of this scenario, include fostering an environment that promotes innovation and creativity, providing opportunities for upskilling and reskilling, including and soliciting employee feedback, and implementing a technology plan with clear goals.

In the third scenario (unemployment and job creation), the study's findings revealed that the respondents believed that the restaurant industry's adoption of cutting-edge technologies had created new job opportunities. However, this scenario contended that although the incorporation of cutting-edge technologies might result in job creation, it might also cause the elimination of some jobs. A small percentage of respondents proposed that the impact of new technologies on employment differs depending on the job level. Although the percentage of human-to-technology balance varied, some participants emphasised the possibility that this scenario could happen because of how important humans are to service. This suggests that substitution could occur to some extent—up to fifty percent—with the human component still partly existing. The participants proposed the following actions to prevent unemployment and assist the workforce if this scenario comes to pass; allocating resources to training programs, fostering a transparent and collaborative culture, offering support to affected employees, exploring new opportunities and roles, and facilitating the integration of advanced technologies incrementally.

**RO4: To explore the new skills required in the technological advancement era and how employees' earnings affected in this era.**

The literature review unveiled a conspicuous dearth of comprehension of the skills demanded of employees in the epoch of technological advancements. The findings emphasised that the skills encompass a range of technical and technology-related proficiencies, including technological skills, data analytics skills, problem-solving skills, and language skills. The skills include interpersonal and soft skills, such as emotional intelligence, communication skills, and creativity. According to the majority of participants, individuals who demonstrated relevant technical and technological proficiency and strong interpersonal and soft skills were more likely to be rewarded with higher salaries. Conversely, individuals lacking these skills were not observed to receive commensurate salary increases. A minority of participants posited that the implementation of advanced technologies has a negative effect on employee salaries, as it reduces remuneration due to the alleviation of task-related burdens. A small proportion of respondents believed that implementing advanced technologies has an optimistic impact on employee remuneration by augmenting wages, as it enhances their overall productivity, leading to heightened acknowledgement and gratitude for their skills and contributions. This study addressed the existing gaps in knowledge, as demonstrated in chapters four and five.

## 6.4 Contribution to knowledge

This section examines the ways in which the findings have enhanced theoretical, practical, and methodological understanding.

### *Theoretical*

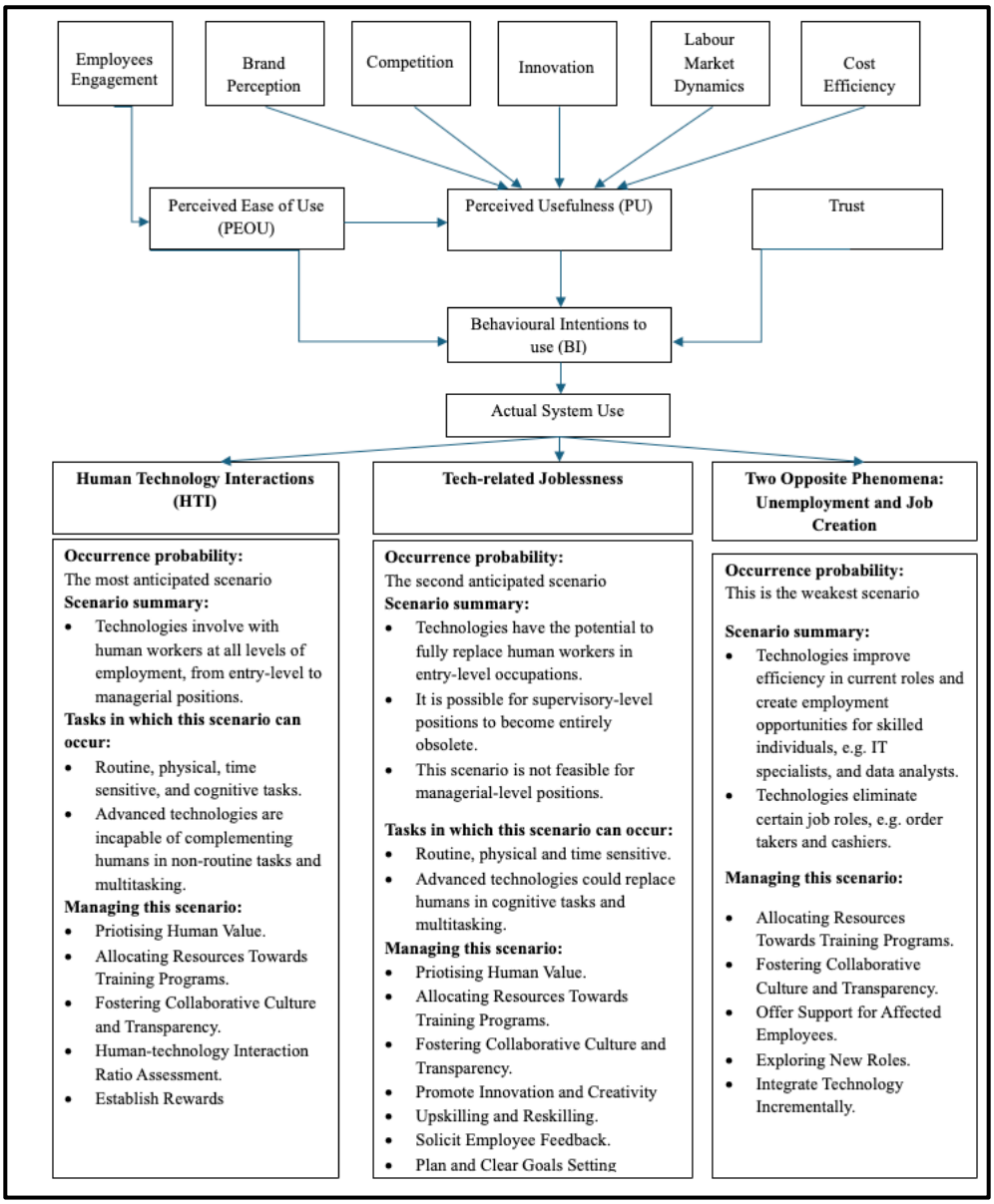
This study highlighted numerous theoretical contributions. Previous studies have identified gaps in knowledge on the insufficient research on advanced technology in the hospitality industry (Park, 2020; Shin & Jeong, 2020; Cheong *et al.*, 2023). Additionally, there is a lack of examination regarding the prospects of hospitality managers in the recent technological era, specifically in terms of their acceptance (Ivanov *et al.*, 2018; Pizam *et al.*, 2022; Tussyadiah *et al.*, 2022). Furthermore, concerns regarding the labour force were identified in previous studies (Drexler & Lapre, 2019; Seyitoālu *et al.*, 2023). There exists a dearth of lucidity regarding the ultimate ramifications of advanced technologies on the workforce within the hospitality industry (Erebak & Turgut, 2021; Nam *et al.*, 2021; Pillai *et al*., 2022; Vatan & Dogan, 2021; Cheong *et al.*, 2023), new labour force management strategies are needed (Shin & Kang, 2019; Choi *et al.*, 2020; Tuomi

*et al.*, 2021), and a dearth of understanding regarding the skills needed of employees in the era of advanced technologies (Murphy *et al.*, 2017). This study addressed the existing gaps in knowledge, as demonstrated in the themes in chapters four and five, and the findings have been summarised in Section 6.3 of this chapter.

Although the Technology Acceptance Model (TAM) was initially developed as a framework for forecasting users' acceptance and utilisation of technology in workplaces (Davis *et al.*, 1989; Slade *et al.*, 2015), the majority of research using TAM has focused on examining the individual acceptability of technology in consumer and guest contexts, as demonstrated in studies conducted by Nizar and Rahmat (2018), Pillai and Sivathanu (2020), and Yang *et al.* (2021). This study is among the initial ones employed Technology Acceptance Model (TAM) to examine the managerial viewpoints regarding the intentions of hospitality managers to embrace new technologies. It also explored the factors that impact their decision-making, potential outcomes, implications for the future of the workforce, and novel labour management strategies in the present era.

Trust has been identified as an additional and main construct or determinant in the TAM model, indicating an extension of the TAM model. Moreover, the perception of usefulness (PU) in the TAM model is influenced by various factors, including the perception of the brand, competitive advantage, innovation and experimentation, labour market conditions, and cost-effectiveness from a managerial standpoint. The perception of the Perceived Ease of Use (PEOU) is contingent upon the impact of employee engagement and satisfaction as an antecedent to the PEOU. These findings also suggested that the antecedents influencing the constructs of the TAM model, as viewed from a managerial standpoint (See Figure 6.1), differ from those observed from the perspectives of customers or guests in previous research (Kim, 2016; Han *et al.*, 2021).

**Figure 6.1:** A Framework for Understanding Technology Adoption and Labour Force Future (TALFF)




### *Methodological*

Additionally, this study made a methodological contribution. This qualitative study represented a unique departure from the prevailing quantitative research in hospitality, as it utilised a comprehensive qualitative methodology. This study facilitated an in-depth examination of the intentions of hospitality managers to adopt new technologies, the factors that influence their intentions, potential outcomes, consequences for the future of the workforce, and new labour

management tactics in the current era. The utilisation of a methodological perspective was crucial in effectively communicating various interpretations and revealing intricate details that may have been overlooked by quantitative methodologies such as the study of Pizam *et al.* (2022).

There has been a recurring demand for additional qualitative research investigating issues related to advanced technologies. Insufficient research has been conducted on the prospects of hospitality managers in the recent technological era, specifically in terms of their acceptance (Ivanov *et al.*, 2018; Pizam *et al.*, 2022; Tussyadiah *et al.*, 2022), labour-related issues (Drexler & Lapre, 2019; Seyitoğlu *et al.*, 2023), and new strategies for managing the workforce (Shin & Kang, 2019; Choi *et al.*, 2020; Tuomi *et al.*, 2021). Furthermore, Cobos *et al.* (2016), Ivanov & Webster (2020), Reis *et al.* (2020), and Mingotto *et al.* (2021) have emphasised the need for further empirical research to thoroughly examine the future of the workforce in the hospitality industry. These aspects collectively demonstrated that qualitative inquiry was an appropriate and indispensable research strategy.

The majority of prior research is based on data obtained from a single source, as evidenced by Shin *et al.* (2019) and Mingotto *et al.* (2021). The present investigation collected data from multiple sources. Two data collection methods were utilised in the present study: semi-structured interviews and observations. Undertaking this action presented a chance to mitigate common method bias and underscored the importance of trustworthiness

***Practical Contribution***

The findings provided evidence-based insights to assist stakeholders in the restaurant industry in making informed decisions regarding technology investments. The study provided a comprehensive guide for restaurant managers on the factors to consider when thinking about adopting new service technologies. The study, while consistent with existing understanding of the significance of usability, utility, and trust in securing managerial acceptance of advanced technologies, uncovered the factors influencing perceived ease of use, namely employee engagement and satisfaction. Furthermore, it highlighted the factors influencing perceived usefulness, including cost efficiency, innovation, brand perception, competition, and labour market dynamics from a managerial standpoint. It is crucial for designers, developers, and vendors

to reveal these factors to fully understand the challenges encountered by restaurants and to showcase how their products provide effective solutions and are continuously improved.

The research findings have brought attention to three potential scenarios for the future of the labour force in the restaurant industry. These scenarios were thoroughly examined, each elucidated individually, considering the various job levels and natures. Furthermore, an analysis was conducted on the strategies that can be considered for each scenario, thereby aiding managers in effectively navigating the future of the labour force and identifying when technology functions as an aid for human tasks and when it acts as a replacement. Gaining insight into the concrete effects on the labour force facilitates the formulation of decisions that drive business progress and safeguard the personnel's well-being.

Analysing strategies for each scenario offers vital guidance for industry professionals and policymakers to develop a resilient and sustainable workforce for the future of the restaurant industry. Restaurant managers can assist human resources (HR) in achieving a balance between the personal touch appreciated by diners and the efficiency provided by emerging technologies. Human resources should incentivise employees who effectively integrate technological tools with interpersonal communication. Moreover, impacted employees should receive both psychological and practical support. Human Resources should develop training programs beyond simple task instruction; they must also emphasise reskilling and upskilling employees to improve adaptability and digital literacy. Employees must be ready to multitask, engage in cognitive activities, and acquire new competencies, particularly AI, to cope with the evolving technological landscape and adeptly prevent obsolescence.

Based on the research findings, managers can enhance workforce management by prioritising human value in areas where they possess considerable influence. Managers must prioritise reskilling and upskilling, seek feedback from workers, and formulate clearly defined plans to address potential unemployment concerns. Managers must pinpoint areas where technological integration can improve efficiency and offer job opportunities. We encourage for a phased integration of new technologies to determine potential opportunities for the establishment of new roles. This research should prompt policymakers to establish regulations that protect employees'

rights and promote equitable labour practices. This may include collaboration with restaurateurs and educational institutions to create programs that correspond with workforce development in this changing landscape.

This research is crucial in emphasising the skills employees need to develop to succeed in the face of technological progress. For managers, identifying the skills needed in this era highlights that employee development is of utmost importance and facilitates the creation of training programs that are in line with the changing requirements of the hospitality industry. Additionally, it guides managers regarding the essential skills they should prioritise when selecting job candidates.

This study was among the first to emphasise the impact of acquiring new skills in the era of technological advancements on employee salaries. Based on the majority of participants' perspectives, it was observed that individuals who exhibited pertinent technical and technological skills, along with robust interpersonal and soft skills, were more likely to receive higher remuneration. This guide gives managers insights into the importance of retaining skilled employees in the latest technologies to sustain a competitive advantage within the hospitality industry. Employers may provide competitive salaries and training programs to incentivise employee retention, acknowledging the significance of these workers to the business's success. This holds particularly true in a highly competitive labour market where proficient individuals have numerous employment opportunities.

A subset of participants argued that integrating advanced technologies hurts employee salaries and diminishes compensation by relieving task-related burdens. The adverse effect on salaries could result in more extensive modifications to the labour market. With the devaluation of specific jobs caused by technology, the workforce may transition towards emerging roles created or improved by technology. This transition has the potential to generate a surge in demand for novel skill sets, ultimately resulting in salary modifications that accurately align with the significance of these emerging positions. This perspective directs policymakers and managers to continuously discuss modifications to the minimum wage, benefits, and working conditions to guarantee equitable remuneration and treatment of employees in the present era.

## 6.5 Study Limitations and Future Research Directions

The study has primarily concentrated on particular technologies identified in the interpretation chapter as the prevalent technologies in restaurants, as perceived by the participants, while potentially neglecting other technologies and emerging ones. Subsequent investigations may expand the range to encompass nascent technologies, thereby enhancing the comprehensiveness of the research matter.

The primary objective of this study was to examine the motives behind hospitality managers' adoption of novel technologies and their potential implications for the future of the employment workforce. However, this study did not thoroughly investigate the societal and psychological consequences of technological advances on the workforce, including factors such as job satisfaction and work-life balance. Additional qualitative research has the potential to explore these dimensions further, providing a more comprehensive understanding of the overall influence of technology on the labour force.

This study applied the TAM model lens because previous research highlighted that TAM is widely popular and simple for numerous reasons, such as this model being IT-specific and concise. It can investigate and forecast the acceptability of various technologies (Cheong *et al.*, 2023; Li *et al.*, 2024). However, future research can apply another model and theories to explore the research issue, such as the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.*, 2003).

This study explored the intentions of hospitality managers to adopt new technologies, the factors that influence their choices, potential outcomes, consequences for the future of the workforce, and new labour management tactics in the current era in United Kingdom restaurants. Due to the study's qualitative nature, which emphasised interviews and observations, the sample size is probably limited (Crawford, 2013). This can restrict the generalizability of the findings to the broader hospitality sector in the UK. Future research endeavours may consider mitigating this constraint by incorporating a more extensive and diverse sample encompassing a wide range of geographical regions and diverse categories of hospitality establishments such as hotels.

Using interviews and observations in research gives rise to the potential for biases and subjective interpretations stemming from both the researchers and the participants involved. Personal experiences or attitudes towards technology can influence managers' perceptions of the factors that influence their choices, potential outcomes, and consequences for the future of the workforce. Future research endeavours may consider the triangulation of data with quantitative methods to address these biases.

The study's findings are limited to the specific period during which the data were gathered over four months. The swift rate of technological advancement implies that the significance and practicality of the findings may decrease as time passes. Understanding manager's intentions to adopt new technologies, the factors influencing their choices, potential outcomes, consequences for the future of the workforce, and new labour management tactics in the current era would be facilitated by implementing longitudinal studies or follow-up research. The researcher could not employ a longitudinal study due to constraints in time and financial resources.

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# Publications related to the process of obtaining a Ph.D. degree

## Publications List

Elmohandes, N., & Marghany, M. (2025). From Slavery to Fair Work in Hospitality: How New Technologies Affect. *Economica* (Accepted).

Elmohandes, N., & Marghany, M. (2024). Effective or ineffective? Using ChatGPT for staffing in the hospitality industry. *European Journal of Tourism Research*, *36*, 3617-3617.

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Elmohandes, N., & Csobán, K. (2022). Industrial 4.0 revolution: Can it positively step into a sustainable hospitality?. *Applied Studies in Agribusiness and Commerce*, *16*(2).

## Conference proceedings

Elmohandes, N. and Marghany, M. (2024, June 5-7). *The future of hospitality publications in the era of ChatGPT: Insights from academics*. Technology Enabled Competitiveness and Experiences in Tourism, Hospitality and Events. Hotelschool The Hague, Netherlands.

Marghany, M., Elmohandes, N., Saleh, M, Helal, M., Elshawarbi, N and Ghazy, K. (2023, July 5-7). *How Do Hotel Robot Aesthetics Affect Guests' Acceptance Intentions? A TAM Model Perspective.* Surrey 2023 Conference. University of Surrey, the UK.

Elmohandes, N. and Csobán, K. (2022, 31st March- 1st April). *Industrial 4.0 Revolution: Can it Positively Step into a Sustainable Hospitality?*. New Trends and Challenges in Management– Special Focus on Industry 4.0. International Scientific Conference, Faculty of Engineering, University of Debrecen, Hungary.

Elmohandes, N. and Osman, H. (2022, June 22-24). *Conflicting cultural values and the female tourist experience*. THE INC 2022 3rd Tourism, Hospitality and Events International Conference. University of Technology, Limassol, Cyprus.

Csobán, K., Elmohandes, N., Serra, G. and Károly, P. (2022, June 22-24). *The Impacts Of Technological Advancements On Sports Events Tourism*. THE INC 2022 3rd Tourism, Hospitality and Events International Conference, University of Technology, Limassol, Cyprus.

Elmohandes, N and Csobán, K. (2022, November 18). *Advanced Technology's Role In The Hospitality Industry's Hiring Process*. New Tourism, Opportunities and Challenges Conference The Department of Tourism and Hospitality at the Széchenyi István University, Hungary.

# Appendices

**Appendix 3.1: Initial Contact Emails**

**From one of the UK academic networking**

**To one of the restaurants' managers**

Dear...,

I trust that this email finds you in good health. I am anticipating your ability to offer assistance. The effects of technological advancements on the labour force within the hospitality sector are of interest to a doctoral candidate. Without a doubt, the outcomes will be extraordinarily beneficial. Could she interview you regarding research-related matters?

Warmest regards,

**Following-up email from the researcher**

Dear...,

I hope that you are doing well. I appreciate your busy schedule, and I am following up on Dr XX's email from earlier this week. Dr XX, a senior lecturer at XX University, provided me with your contact information in order to conduct an interview. I am aware that you are the manager of the British restaurant XX.

My research aims to gain an understanding of the intentions of hospitality managers to adopt new technologies, the factors that influence their decisions, the potential outcomes, the implications for the future of the hospitality workforce, and new labour management strategies. As this restaurant has such an excellent reputation, I believe your knowledge and experiences would be invaluable to enhancing this study.

The interview is expected to last approximately 45 minutes and will be conducted either online via your preferred platform, such as Zoom or Microsoft Teams or face to face based on your personal preference and the ease of your schedule. The interview will be audio recorded for accurate

transcription and analysis. Please rest assured that all information shared during the interview will be treated with strict confidentiality, and both your identity and the name of the restaurant will be anonymised in the final research report.

If you are willing to participate, please suggest a convenient way, time and date for the interview. Please include the email address and any other contact information for your assistant and supervisor who will also be participating.

Please do not hesitate to contact me if you have any questions or require additional clarification regarding the research study or interview procedure. I would be delighted to provide any additional information you may require.

Thank you for considering this request; I eagerly await your favourable response.

Best wishes,

Nirmeen Elmohandes
Doctorate researcher,
University of Debrecen
Elmohandes.nirmeen@econ.unideb.hu

**Appendix 3.2: Interview and Observations Scheduling**

| Participants | Methods | Date and time |
|---|---|---|
| **Semi Structured Interviews Stage** | | |
| P1, P2 | Semi-structured interview | Thursday, December 1st, 2022. |
| P3, P4, P5 | Semi-structured interview | Wednesday, January 4th, 2023 |
| P6, P7, P8, P9 | Semi-structured interview | Friday, January 6th, 2023 |
| P10 | Semi-structured interview | Tuesday, January 10th, 2023 |
| P11, P12, P13 | Semi-structured interview | Wednesday, January 18th, 2023 |
| P14, P15 | Semi-structured interview | Friday, February 3rd ,2023 |
| P16 | Semi-structured interview | Tuesday, February 14th, 2023 |
| P17 | Semi-structured interview | Thursday, February 23rd, 2023 |
| P18, P19, P20 | Semi-structured interview | Wednesday, March 1st, 2023 |
| P21, P22 | Semi-structured interview | Thursday, March 16th, 2023 |
| P23 | Semi-structured interview | Monday, March 27th, 2023 |
| P24, P25 | Semi-structured interview | Tuesday, April 4th, 2023 |
| P26 | Semi-structured interview | Thursday, April 6th, 2023 |

| | | |
|---|---|---|
| P27 | Semi-structured interview | Wednesday, April 12th, 2023 |
| **Observations Stage (After the Complex Exam, 2023)** | | |
| First Location | Non-participant observation | Wednesday, June 28th, 2023 |
| Second Location | Non-participant observation | Friday, June 30th, 2023 |
| Third Location | Non-participant observation | Monday, July 3rd, 2023 |
| Fourth Location | Non-participant observation | Wednesday, July 5th, 2023 |
| Fifth Location | Non-participant observation | Friday, July 7th, 2023 |
| Sixth Location | Non-participant observation | Monday, July 10th, 2023 |

**Appendix 3.3: Interview Themes and Questions**

| | |
|---|---|
| **Interview date:** | |
| **Interview code:** | |
| **Position:** | **Year of Experience:** |
| **Main study question:** | How will managers' intentions to adopt advanced technologies impact the future of the hospitality workforce? |
| **Theme one** | **Managers' intentions towards technological advancements adoption** |
| 1. Do you have any technological advancements in your restaurant? if so, can you explain them?<br>2. To what extent do you accept advanced technologies implementation in restaurants? and why?<br>3. What technological factors influence your intention to adopt advanced technologies?<br>4. To what extent do these factors impact your decision to substitute human employees?<br>5. To what extent do you think that customers have openness (agree) to be served by advanced technologies? | |
| **Theme two** | **First Scenario: Tech- related Joblessness in the hospitality industry** |
| 6. Which tasks can new technologies substitute for human employees in your restaurant?<br>7. What nature of tasks can be entirely completed by new technologies?<br>8. What is the technological substitution ratio between human employees and new technologies (e.g., robots, chatbots, self-service kiosks) for specific tasks in your restaurant?<br>9. What employee management recommendations do you have in case of the occurrence of this scenario? | |
| **Theme three** | **Second scenario: Human technology interaction (HTI)** |
| 10. Which tasks can be performed and enhanced by integrating human and technological elements?<br>11. Which nature of tasks can be completed with the cooperation of new technologies and human employees?<br>12. What is the optimal "human–technology interaction" ratio for service delivery? | |

| | |
|---|---|
| 13. What employee management recommendations do you have in case of the occurrence of this scenario? | |
| **Theme four** | **Third scenario: Two opposite phenomena; unemployment and job creation** |
| 14. Do new technologies create new jobs in your restaurant? if so, give an example. If no, explain why?<br>15. Do new technologies eliminate jobs in your restaurant? if so, give example and why?<br>16. What is the ratio of new jobs created to jobs lost in your restaurant due to new technology?<br>17. What employee management recommendations do you have in case of the occurrence of this scenario? | |
| **Theme five** | **New skills and strategies** |
| 18. What skills do new technologies require from human employees in your restaurant?<br>19. What are technological advancements' impacts on the salary of human employees in restaurants? | |

## Appendix 3.4: Photographic Evidence from Fieldwork

Food delivered to tables by 8-metre track:

Robots assist as waiter:

**Appendix 3.5: Thematic Content Analysis Example**

| Interview response participants | |
|---|---|
| **I** | Q3. What technological factors influence restaurant managers' intention to adopt advanced technologies? |
| **P7**<br><br>Reliability and accuracy<br><br>Usability,<br><br>Implementation utility<br><br>Competition<br><br>Employees engagement and satisfaction<br><br>Solving labour issues | We have had to trust that the advanced technologies used at the restaurant would perform their intended functions reliably and accurately. This could include trust in the robots' ability to take orders, prepare and serve food, and interact with guests. The usability, including the robots and any associated software or systems. The technologies would need to be intuitive and user-friendly enough for human staff members to operate and for guests to interact with. The ability to improve efficiency, reduce costs, and enhance the overall dining experience. The effectiveness of adopting advanced technologies, including the cost of acquiring and maintaining the technologies, as well as any potential savings or revenue increases that could be generated through their use.<br><br>How adopting advanced technologies could enhance the restaurant's image and reputation by positioning it as a leader in innovation and technology and attracting media attention and positive reviews is crucial. We may view the advanced technologies as a way to engage and motivate employees, by providing them with new and exciting opportunities to learn and use cutting-edge technologies.<br><br>Finally, I see the shortage of qualified workers or rising labour costs have made the adoption of advanced technologies more attractive as a way to reduce labour costs and improve operational efficiency. |
| **P14**<br><br>Cost saving<br><br>Reliability and accuracy<br><br>Usability<br><br>Data analysis features<br><br>Reputation enhancement | The most important thing is to find out how much money our business can really save. What is also important to me is how much I believe that these technologies will keep the operation running smoothly and without any issues. You see what I mean? We implement and use these technologies if they are simple and quick to use. The data analysis feature helps us better understand and meet the wants and needs of our customers by looking at information about their spending and preference patterns. I also usually use a certain technology if it will help people talk about our business. Another benefits its ability to support employees performance and ideas and get staff motivated. |

| | |
|---|---|
| Employees engagement and satisfaction | |

| Step | Thematic Content analysis Application in this Study | |
|---|---|---|
| **1- Familiarisation** | The researcher meticulously examined all the data aiming to gain a profound understanding of its content. | |
| **2- Conceptualisation and coding** | Reliability and accuracy, Usability, Implementation utility, Competition, Employees engagement and satisfaction, Solving labour issues, Cost saving, Data analysis features, Reputation enhancement. | |
| **3- Refining codes and categorising of themes** | **Refining codes** ⟶ | **Subthemes** |
| | Reliability and accuracy. | **Perceived Trust** |
| | Implementation utility (Usefulness), Competition, Solving labour issues, Cost saving, Data analysis features. | **Perceived Usefulness** |
| | Usability (Ease of use), Employees engagement and satisfaction. | **Perceived Ease of Use** |
| **4- Re-coding** | The researcher examined the functionality of the subthemes with respect to both the coded phrases and the complete dataset. | |
| **5- Theme extraction and data Linking** | The theme of **Drivers of cutting age technologies adoption** extracted from the subthemes (Perceived trust, Perceived usefulness, and Perceived ease of use) | |
| **6- Interpretation and conclusion-drawing** | In the data analysis chapter, direct quotations from participants were incorporated to substantiate the evidence pertaining to each theme. | |

**Appendix 3.6: Consent Form**

**Participant Consent Form**

You have been invited to take part in a semi-structured interview for a doctoral research study. The purpose of this study is to understand the intentions of hospitality managers to adopt new technologies and how these intentions will impact the future of the hospitality workforce. Your involvement in this interview will provide valuable insights to further enhance understanding in the realm of business and management.

The aim of this study is to investigate and comprehend the motivations of hospitality managers in adopting novel technologies, the determinants that impact their choices, the potential consequences, the implications for the future of the hospitality workforce, and new strategies for labour management.

**Interview procedures:**

- The duration of the interview will be approximately 45 minutes.
- The interview will be conducted in a semi-structured format, providing flexibility in discussion while addressing key topics concerning managers' intentions to embrace cutting-edge technologies in restaurants and the resulting impact on the hospitality workforce.
- The user's responses will be recorded in audio format to ensure accuracy and to serve as a reference during the analysis process.
- We will ensure that your identity and privacy are rigorously upheld throughout the entirety of the research procedure.

Your involvement in this research is completely optional. You possess the entitlement to decline engagement or retract from the interview at any given moment without incurring any punishment or repercussions.

The information obtained during the interview will be treated as confidential and will only be accessible to the researcher and authorised personnel directly involved in the study. To ensure your anonymity, we will assign a pseudonym to your responses and will not disclose any identifiable information without your explicit consent.

Your perspectives have the potential to enhance the progress of knowledge in the realm of hospitality management. The risks associated with participating in this interview are minimal, and we will make every effort to ensure your comfort and confidentiality throughout the process.

If you have any inquiries, apprehensions, or need additional elucidation regarding the study, kindly feel free to reach out to: Elmohandes.nirmeen@econ.unideb.hu.

**Consent:**

By consenting to partake in the semi-structured interview, you acknowledge that you have comprehended and assimilated the information presented in this consent form. By voluntarily participating, you are indicating your agreement to be part of the study according to the terms described here.

Kindly sign the following to signify your consent to partake:

Signature _____ Date _____

We appreciate your willingness to participate in this research study.

Sincerely,

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Subject: PhD Publication List

Candidate: Nirmeen Mohamed Abdelaziz Ameen Elmohandes
Doctoral School: Doctoral School of Management and Business
MTMT ID: 10081127

## List of publications related to the dissertation

Articles, studies (3)

1. **Elmohandes, N. M. A. A.**, Marghany, M.: Effective or ineffective?: Using ChatGPT for staffing in the hospitality industry.
   *European Journal of Tourism Research. 36*, 1-22, 2024. ISSN: 1994-7658.
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Conference presentations (2)

8. Osman, H., **Elmohandes, N. M. A. A.**: Conflicting cultural values and the female tourist experience.
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MTMT azonosító: 10081127

## A PhD értekezés alapjául szolgáló közlemények

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