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Employability and Survival Strategies in Tourism and Hospitality Industry in Ever-changing Technological World: Systematic Review of the Literature

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Abstract

New technologies are becoming the backbone of production and service delivery in most industries including tourism and hospitality. In this study, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA2020) protocols were used to examine the employability and survival strategies in the tourism and hospitality industry in the ever-changing technological world. The systematic review followed the PRISMA protocol to select peer-reviewed journal articles from four databases: Scopus, Science Direct, Google Scholar, and Dimensions. The study used Vos Viewer to identify clusters and concurrency. Five major themes, employability skills, impacts, gaps, strategies, and challenges emerged from the study. The findings show that most researchers are focusing on why and how technologies are being adopted in the tourism and hospitality industry while there is little research on employability skills adaptation. The study recommends policymakers in government and tourism education, to swiftly address the labour supply and demand issues affecting employability in this dynamic environment to cope with the introduction of new technologies.

Keywords: Employability; digital skills; new technologies; artificial intelligence; robotics

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Introduction

Every day, the world is braced with new technologies forming part of the tourism and hospitality industry. Over the years, we have witnessed increasing use of service robots, artificial intelligence (AI), and automation. As a result, many jobs are being lost while other new jobs with new skill-set requirements are emerging (Bob, 2023; El Hajal & Rowson, 2020). This means that the probability of being employed or sustaining jobs in this sector is unpredictable. Among tourism professionals, there are growing fears and anxiety about the nature of jobs and employment opportunities in the industry (Chen et al., 2021). In general, this relates to the concept of employability, which refers to "the ability to gain, maintain employment and change roles within an organization, obtain new employment if required, and ideally secure suitable and sufficiently fulfilling work" (Hillage & Pollard, 1998: 2). There are growing employability concerns among stakeholders regarding the present job security and future employment prospects of tourism professionals. The question among tourism practitioners and professionals is how to survive in this volatile job market. Therefore, this paper provides a review of research papers from both the technological perspective and tourism employment research streams. In the context of tourism, employability is rather complex due to an undefined number of organizations producing the labour force and creating employment, as well as the multiplicity of laws and regulations governing the labour market. These and other factors have presented analytical concerns of the concept (Ndhlovu & Dube, 2023). Tourism provides opportunities to both skilled and unskilled labour forces, including migrant and vulnerable people. Employment options include night and shift work, seasonal, temporary, and part-time jobs, as well as a growing amount of subcontracting and outsourcing. Therefore, employability as a concept has received growing attention over the years owing to its significance to the broader issues affecting society, including the tourism industry. It addresses issues such as access to employment, job creation, and job security and how labour market policies dictate the forces of demand and supply of labour in the wider economy (McQuaid & Lindsay 2005). Employability covers both the unemployed and employed people seeking alternative jobs or promotions. According to Hillage & Pollard (1998), a person can be employable provided they possess the necessary assets (knowledge, skills, and attitudes), how they use those assets and present them to employers, and the environment in which they are looking for work (Bob, 2023; Hillage & Pollard, 1998). As a broad concept, its analysis should also take a broader approach, which is lacking in most studies as observed McQuaid & Lindsay (2005). The tourism and hospitality industry offers employment, especially for skilled, non-skilled, and migrant workers. This, in turn, promotes prosperity and has a major positive social impact, giving young people, women, and minorities opportunities to earn a living. However, the tourism industry is facing a growing trend towards greater automation. According to Manyika et al. (2017), around 400 million jobs could be lost to automation by 2030, and they predicted that 50% of jobs for which people are paid now might theoretically be mechanized.

The phenomenon of technology-driven labour displacement will continue to have a significant influence on the tourism and hospitality industry (Hyasat, 2022). It is difficult to say for sure how technology will affect employability overall and

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research points to two impacts of technology: one that is disruptive, that destroys jobs, and another one that is self-correcting and increases the demand for labour. Acemoglu & Restrepo (2019) elucidate how two sorts of technologies may affect workers differently. The first set of technologies are enabling ones; they support and boost employees' productivity in the jobs and duties they carry out. The second set relates to replacement technologies, which automate some repetitive jobs and replace labour in those areas, resulting in reduced salaries for these worker categories. The industry is still undergoing a revolution because of the usage of digitization, which includes location-based services, blockchain technology, augmented and virtual reality, artificial intelligence, and the Internet of Things. According to Ali et al. (2014), digital platforms are among the technological innovations affecting tourism jobs. For instance, online travel agencies (OTAs) and platforms allow consumers and businesses to connect and interact with each other, with ICT, big data, and AI combined in real time to provide enhanced services. According to Hadjielias et al. (2022), the success of Airbnb throughout the late 2000s and 2010s heralded the rise of the sharing economy model, which is forecast to expand more in tourism than in any other sector. Experts estimate that US$100 billion of produced value in tourism will be transferred from traditional enterprises to OTAs and sharing platforms. This in turn has reduced patronage in location-based and stationed travel agencies. Over the years, the number of traditional travel agencies has been reduced (Stipanuk, 1993) and so is the number of jobs. Online platforms have distrusted and reconstructed the travel intermediation industry. These new technologies have sparked the process known as "creative destruction". Employers are requiring new personal competencies, and the evolving nature of the workplace requires adaptable and flexible personal attributes that contribute to employability (Hyasat, 2022). Particularly for the unskilled, new technologies have eliminated jobs, but they have also created positions in different industries and called for different skill sets. When workers adapt their abilities to changing and expanding demand new industries replace old ones, and historically, this process has resulted in net job growth (Ngoepe & Wakelin-Theron, 2023). Previous studies have crystallised the impact of different technological advancements on the tourism industry (Buhalis, 1999; Stipanuk, 1993; Zelenka, 2009). These studies have hinted at the impacts of technology on the tourism and hospitality industry and identified some gaps in skills. The same has happened to the concept of employability, which is still under-researched. This paper takes a holistic approach by not only revealing the employability research gaps but also connecting the impact of technological advancement to the nature of competencies and abilities for professionals to survive in this volatile job market. Using the comprehensive framework developed by McQuaid & Lindsay (2005), this study examines the nature of employment research in the tourism and hospitality industry. The framework has three primary interconnected components: individual factors, personal factors, and external factors (McQuaid & Lindsay, 2005). Individual factors include personal competencies, transferable skills, qualifications, occupational-specific skills, health and wellbeing, work experience, adaptability, mobility, demography, job-seeking behaviour, and labour market attachment. According to McQuaid & Lindsay (2005), these individual factors are also known as human capital. While they are important in defining employability in tourism and hospitality, individual factors alone do not guarantee employability and depend on other factors. Personal factors encompass information access, work culture, and household conditions. Lastly, external influences include labour market-dependent demand factors, macro and micro economic conditions and recruitment factors, and enabling factors such as the labour market and other policies. This paper also utilizes resource view (RBV), and dynamic capability view theories to identify strategies that would enhance employability in the ever-changing technological environment. This paper argues that human resources in the tourism and hospitality industry should also be dynamic taking advantage of the available technologies.

Methodology

Approach

This study adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) which follows the underlying pre-defined steps of PRISMA 2009, which guide a systematic literature review as a sequence of four broad stages:

i. Identification of research questions and adoption of core definitions,
ii. Definition of structured search, delineation of selection criteria, and selection of source databases,
iii. Execution of exclusions based on delineated selection criteria, and
iv. Syntheses of results and analyses of findings (Liberati et al., 2009).

The research questions for the study are:

i. What are the employability gaps in the tourism and hospitality industry?
ii. How do technological innovations impact employability?
iii. What survival strategies are currently being employed in the tourism and hospitality industry?

Literature search and eligibility criteria

The first eligibility requirement was years of publication, and only papers/articles published from 2003 to 2023 were eligible. Systematic and structured literature searches were conducted in four scholarly databases, *Scopus, Google Scholar, Science Direct, and Dimensions* up to 10th December 2023. The search words included keywords separated by "AND" and "OR". These keywords include *employability in tourism and hospitality, employability skills in tourism and hospitality, technology in tourism and hospitality, impacts of technology on employment in tourism and hospitality, automation in tourism, digitalization and employment or jobs, employee survival with AI or Robotics, artificial intelligence, and future employability in tourism.* The flowchart below (Figure 1) indicates the number of articles and the PRISMA Protocol for identification and the inclusion and

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exclusion criteria. Due to the scarcity of peer-reviewed articles dealing with technology and employability skills, the researcher broadened the inclusion criteria by including articles that used literature review and conceptual frameworks.

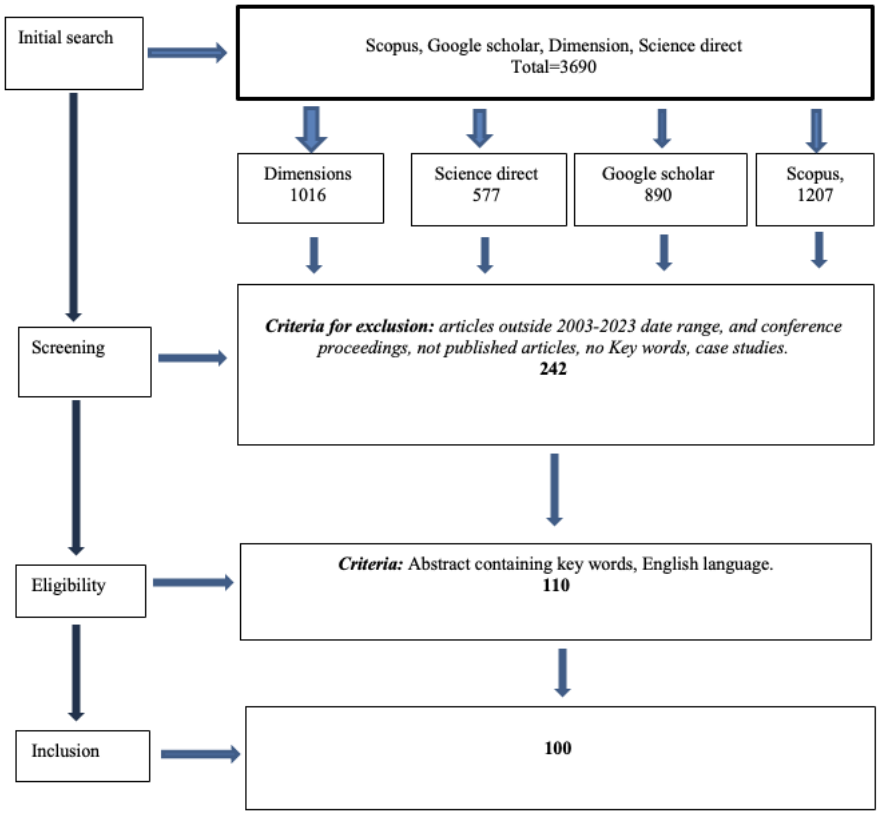

Figure 1: PRISMA Protocol

Results

Main research focus

The articles reviewed in this study were categorised into two, technological advancement and employability skills focus. The first category was further divided into five sub-categories: Service automation (SA), Artificial Intelligence (AI), Big Data and Machine Learning (BD/ML), Robotics(R), Virtual Reality/Augmented Reality (VR/AR), and Internet of Things (IoT). About 53% of the reviewed articles came from this category. The papers focused on different types of technologies and robotics (40%) and artificial intelligence (36%) were the major types of focus as shown in Figure 2.

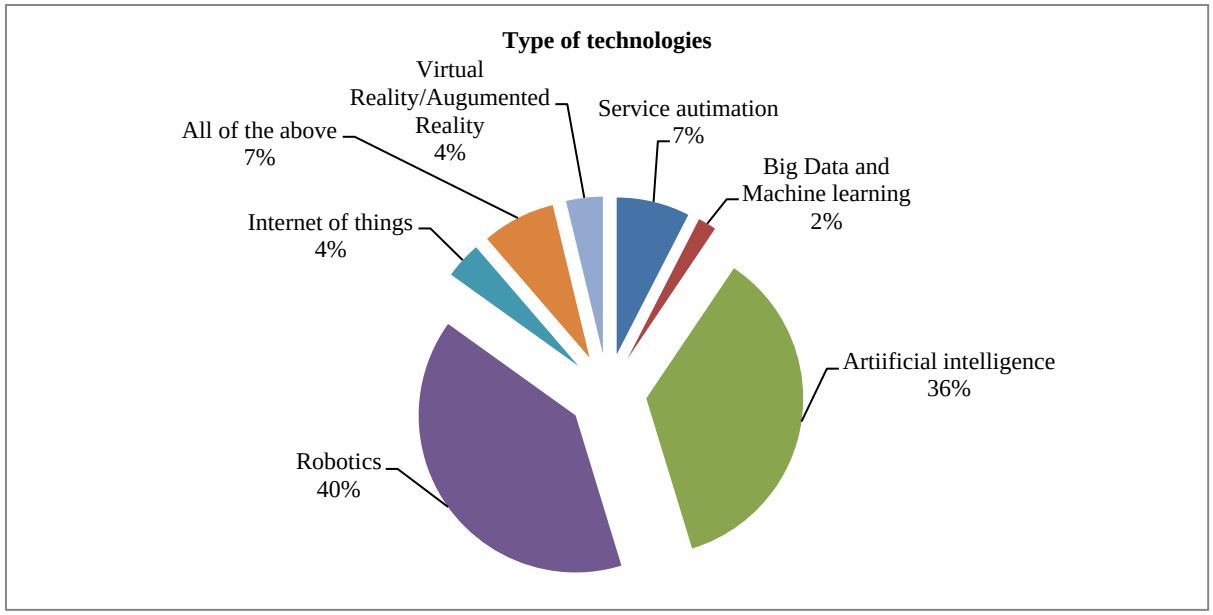

Figure 2: Type of technologies

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For employability skills research, the articles were divided into 3 main categories according to the Holistic framework of employability skills created by McQuaid & Lindsay (2005). The framework has three main interrelated components, which are individual factors, personal factors, and external factors. This category had 47% of the 100 articles reviewed in the study. Most of the articles in this category focused on individual factors (83%) as shown in Figure 3 below.

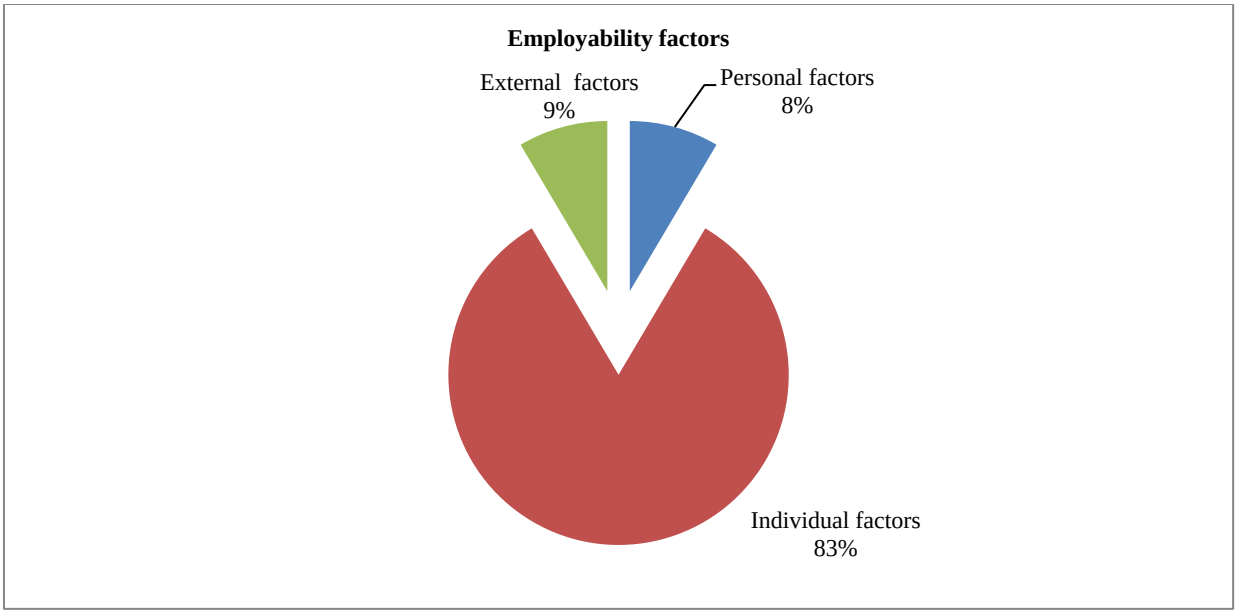

Figure 3: Employability factors

Thematic clustering

After categorization, data was further synthesised by using Vos Viewer to reveal major concurrency. The concurrency map below (Figure 4) shows that the most frequent words include industry, skill, employee, artificial intelligence, robot, customer, future, challenges, service robot, effect, perception, employability, and impact.

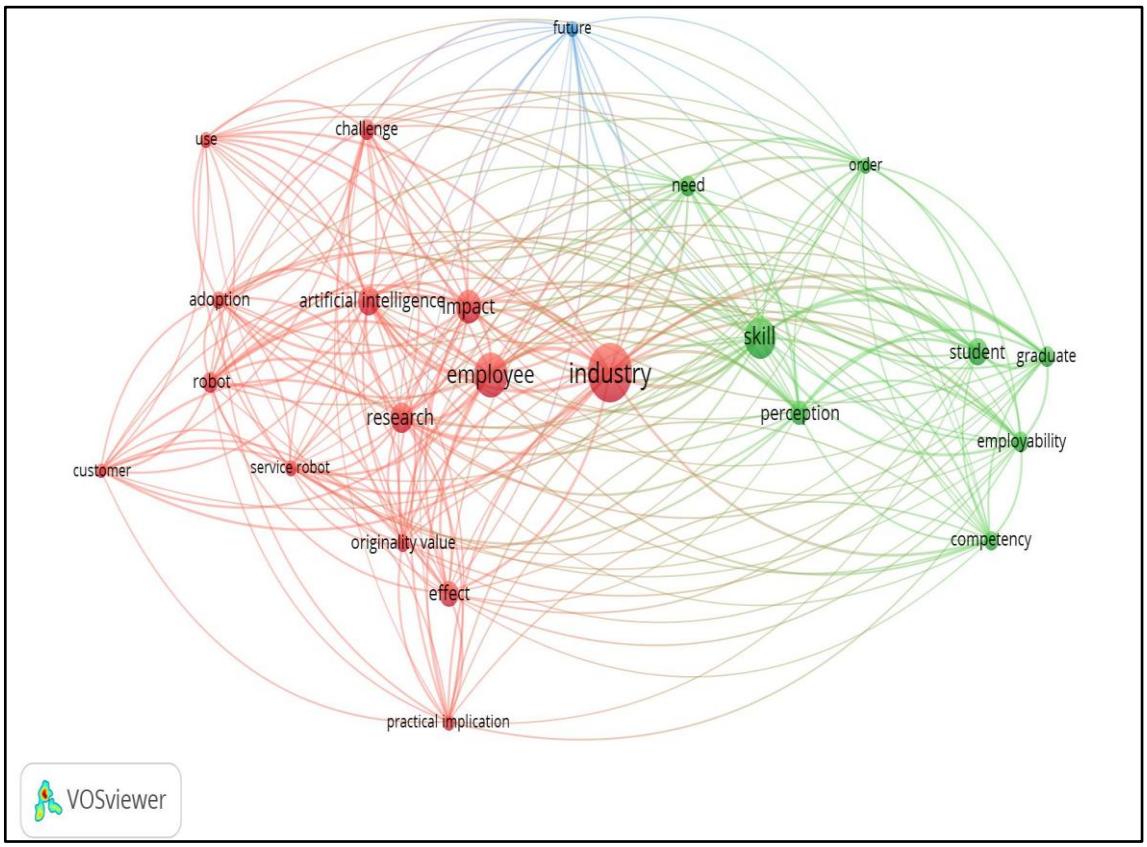

Figure 4: Concurrency map

Four key themes emerged namely, impact, employability skills, strategies, and gaps. Figure 5 below shows that about 45% of the articles analysed the impacts of technology on tourism and hospitality organisations and employment, while 24% assessed employability, 15% focused on gaps in the job market and employability skills, and those that focused on challenges and strategies contributed 8% each. These results show that many researchers have been concerned with why and how technologies are being adopted in tourism and hospitality while little effort has been put into research on employability skills adaptation.

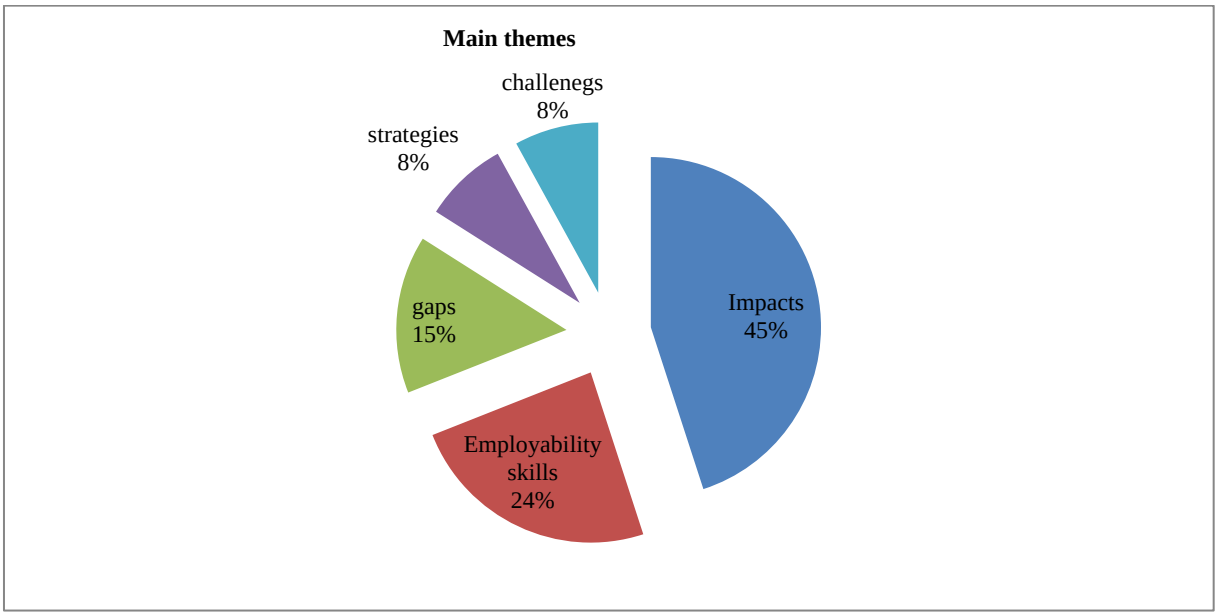

Figure 5: Main themes

Themes and key findings

Table 1 below provides a summary of the key findings based on the main themes including the contributing authors.

Table 1: Themes and Key Findings

Main theme	Findings	Author
Impacts	Improves learning experience and students' satisfaction	Bilotta et al. (2021)
	Improves profitability	Guliyev et al. (2023)
	AI positively contributes to career resilience and informal learning.	Kong et al. (2023)
	AI affects career competencies and job burnout.	Kong et al. 2021)
	The future changes in technology change the roles of service workers	Solnet et al. (2016)
	AI has analytical and empathetic capabilities that threaten human employment.	Huang & Rust (2018)
	AI increases the perception of job insecurity and turnover	Koo et al. (2021)
	Employees in low-end hotels would lose their jobs	Bin et al. (2016)
	There will be a decrease in the intensity of human labour in high-end hotels	Melián-González & Bulchand-Gidumal (2020)
	Industry 4.0 will substitute the manpower.	Kömürcü et al. (2021)
	Robotics awareness influences turnover intention	Khaliq et al. (2022)
	Causes perceptions of robot-induced unemployment.	Parvez et al. (2022)
	AI causes work withdrawal among hotel employees	Teng et al. (2023)
	Perceived risk and perceived playfulness are the key drivers of employees'	Song et al. (2022)
	Technological changes cause high levels of job insecurity	Ghani et al. (2022)
	Robots create some problems during communication with customers.	Vatan & Dogan (2021)
	Technology improves the sustainability performance of hospitality and tourism organizations	Chaudhuri et al. (2023
	Artificial intelligence affects employee performance	Sayed Abdelghany Yasin et al. (2022)
	Automation in tourism can be used to promote decent work.	Tuomi et al. (2020)
	Virtual field trip provides a technology-enhanced solution to hands-on knowledge and enhance learning outcomes.	Patiar et al. (2021)
	Technological innovation improves the employment quality of the hospitality industry	Tian (2023)
	Social media promotes employees' creativity	Sigala & Chalkiti (2015)
	Digital transformation results in digital business capabilities	Busulwa et al. (2022
	Robots give memorable entertainment and educational experiences to customers.	Wong et al. (2023)
	Social network ratings such as LinkedIn are being used for hiring decisions.	Garcia et al. (2023)
	AI and robotics affect turnover intention and future employment prospects.	Li et al. (2019)
	Sustainability knowledge gathered through digital tools for learning improves employability skills	Ali et al. (2014)
	Delivery and concierge robots replace jobs	Ivanov et al. (2018)
	AI helps increase productivity and efficiency	Hemalatha et al. (2021)
	Robots lead to positive educational experience	Ma et al. (2022
	Enterprise social media promotes innovativeness:	Rasheed et al. (2023)
	Industry 4.0 directly influences employability skills in organizations.	Sharma et al. (2022)
	Industry 4.0 influences the attitude, psychology, and job-related factors of employees	Nadeem et al. (2024)
	Customers have positive and negative attitudes toward service robots.	Akdim et al. (2021)
	Service robots cause job insecurities and technical and interactional barriers	Ali et al. (2023)
	Technology will divide hotels into high-tech and high-touch tourism companies	Ivanov (2019)
	Human resource management activities, policies, and decisions are being transformed	Vrontis et al. (2022)
Employability skills	Employees should have the ability to balance personal and professional aspirations.	Schneider & Treisch (2019)
	Hoteliers retain effective, diverse, and competent staff.	Kapiki (2012)
	Leadership and Critical Thinking, ICT skills	Marneros et al. (2021)
	Relevant work/internship experience, perceived person–organization and person-job fit, leadership/career preparedness, professionalism, interview behaviours, and student characteristics.	Kwok et al. (2012)

	Communication skills, relationship management skills; aesthetic, motivation skills	Adeyinka-Ojo (2018)
	Personal qualities and interpersonal skills	Fournier & Ineson (2010)
	Skills associated with interpersonal, problem-solving, and self-management skill domains are the most important.	Raybould & Wilkins (2006)
	Core Generic skills, Communicative Expression Skills, Practical Hands-on Skills, and MICE Professional Skills for event management	Liu et al. (2022)
	Management, analytical, digital marketing, and customer behaviour analysis	Seyitoğlu et al. (2023)
	Basic knowledge, service knowledge, product knowledge, cultural knowledge, practical knowledge, process/system knowledge, cleaning knowledge, and theoretical knowledge	Ngoepe & Wakelin-Theron (2023)
	Professional skills, personality traits, knowledge skills, and operational skills influence employability	Wakelin-Theron (2019)
	The self-image of tourism and hospitality graduates	Choudhary (2019)
	Five factors determine students' employability – management and resilience, professional and communication, teamwork and critical thinking, self-control, and achievement motive.	Pop & Khampirat (2019)
	Oral communication, customer service skills, and work ethics	Ullah et al. (2021)
	The human element, individual characteristics, and human capabilities are particularly key in a digitally transformative industry	Christou et al. (2023)
	Numerous jobs in hospitality and tourism are susceptible to automation due to advancements in artificial intelligence (AI).	Huang (2021)
	Students and graduates lack confidence in management employability	Wang & Tsai (2014)
	Programming, and cyber security skills,	Montaudon-Tomas et al. (2021)
	Sustainability knowledge	Ali et al. (2018)
Gaps	Different views on employability skills between managers and students	Raybould & Wilkins (2006)
	Difference in the relative importance of core competence	Kim et al. (2017)
	There are differences between the importance perceived and competence attained in teamwork, leadership, basic technical and ethical skills	Kenayathulla et al. (2019)
	High performance is associated with career growth	Miao et al. (2023)
	Differences in what is taught in hospitality institutions and what is needed	Luka (2015)
	Training institution applies supply-driven training instead of demand-driven training	Francis et al. (2020)
	Differences in several dimensions of IT skills acquired	Cheung & Law (2000)
	Lack of efforts and pedagogical methods to develop technological proficiency	Connolly & Lee (2006)
	Lack of practical skills, planning, and organising skills in the tourism curriculum	Shariff (2021)
	Digital skills gaps	Carlisle et al. (2021)
	Graduate attributes and skills and manager's perceptions	Wang et al. (2009)
	Robots lack service social/emotional and cognitive/analytical intelligence	Rosete et al. (2020
Challenges	Employees resistance to service robots	Fu et al. (2022)
	Lack of accessible facilities for robots to work better	Ivanov & Webster (2017)
	The cost is rather vaguely perceived as high	Menegaki (2020)
	Management, legal and ethical issues	Fusté- Forné & Jamal (2021
	Static curriculum	Sigala & Baum (2003)
	Difficult to choose between humans or robots, and up- or re-skilling transformation	Wakelin-Theron (2021)
	An experiential learning approach	Ruhanen (2006)
Strategies	The curriculum should focus on learning outcomes, building competencies, and networking with industry,	Jauhari (2013)
	A paradigm shift in curriculum development	Adeyinka-Ojo et al. (2020)
	Trade unions should safeguard workers' rights and interests in the transition to automation	Nissim & Simon (2021)
	Professional development programmes to upskill and reskill employees	Leon (2023); Ruhanen et al. (2021)
	Problem solving, decision-making, communication, collaboration, and creativity.	Mohd Yusof et al. (2020)
	Training and skills development and of service quality	Davidson et al. (2011)
	Need to develop talent management strategies	Goh & Okumus (2020)

Discussion of findings

Impacts of new technologies on tourism and hospitality employment

The study has found four main focus areas when discussing the impacts of technologies namely negative impacts, positive impacts, trends, and transformative. It has been revealed that service automation, IoT, big data, virtual realities, and artificial intelligence have positively contributed to productivity, learning, and quality of work. These are therefore called enabling technologies as explained by Acemoglu & Restrepo (2019). Digital tools make work faster, more efficient, and more inclusive. Big data and deep learning help employees to understand customer needs and expectations thereby developing products that satisfy a particular market. Digital capabilities lead to increased performance, capital accumulation, sustainability, and profitability (Busulwa et al., 2022; Chaudhuri et al., 2023; Guliyev et al., 2023; Reis et al., 2020; Ruel & Njoku, 2020). Social networks, digital platforms, and virtual learning have been reported to improve employee learning and student employability. On destructive technologies, the studies found that service robots were the most cited new technology to replace human labour. Robots outperform humans in standardised tasks such as delivery, payment, and calculation service provision. Technology has however negatively impacted the tourism and hospitality industry job market. Sixteen studies (39%) reported job losses, work burnout, turnover intention, changing work patterns, and job insecurity. Most of the studies have reported that robots will replace human labour, as they are now being designed to perform more sophisticated work previously done by human labour. The perception of losing the job and turnover intention has been reported to be very high among hospitality employees leading to mental disorder and career disruptions. New technologies are changing work patterns for service employees. Similarly, distant and flexible work in management positions is becoming normal. Managers will no longer be in the office daily but will be available 24/7 by simply connecting to the internet. Employees' negative perceptions of robots have been among one major area of research focus (Bin et al., 2016; Fu et al., 2022; Kong et al., 2021; Vatan & Dogan, 2021). Robots in general have been perceived as causing problems during communication with customers and taking over jobs and this has caused resistance among employees. The remaining studies took a balanced approach suggesting that advances in technology have a double impact and that neither good nor bad will outperform each other. Akdim et al. (2021), Ali et al. (2023), Ivanov & Webster (2019) and Nadeem et al. (2024) found that automation of tasks leads to simultaneous substitution and enhancement of human employees, deskilling of some, and upskilling of other tourism and hospitality jobs. Even customers express both positive and negative attitudes toward service robots. This means that the future of human labour cannot be ruled out in totality.

Employability skills in this technologically advancing environment

Employability is one of the hot topics in the scholarship of the tourism and hospitality labour market. This has been demonstrated here as more than 24% of papers reviewed examined this matter. Within the topic, some papers addressed hard skills, soft skills, or a combination of the two while others studied attributes that influence employability. Digital skills and operational skills were the most cited hard skills to influence employability (Huang & Baker, 2021; Liu et al., 2022; Marneros et al., 2021; Wakelin-Theron, 2019). Among others, these studies found that digital skills are important in event management, customer processing, service provision, and many aspects of the tourism and hospitality industry. Therefore, basic programming, data analytics, and cyber security skills are highly needed in the job market across the tourism and hospitality industry. The majority of soft skills for students include English language competence (other foreign languages needed depending on destination), career intention, career adaptability, professional skills, personality traits, relevant work experience, and job preparedness (Chen et al., 2021; Christou et al., 2023; Kwok et al., 2012; Liu et al., 2022; Wakelin-Theron, 2019). On the other hand, work-related employable skills that are the most important job attributes for employees to survive include leadership, critical thinking, information-seeking behaviour, career adaptability, flexible working hours, and the ability to balance personal aspirations (Kapiki, 2012; Marneros et al., 2021; Wakelin-Theron, 2019). However, four studies suggest that employability is affected by both hard and soft skills. Other studies identified factors that influence employability in the tourism and hospitality sector. At a personal level, Choudhary (2019) emphasizes the importance of the self-image of tourism and hospitality graduates. While self-image is key; Cheng et al. (2017) found that the perception of the hotel industry, self-awareness and evaluation, professional awareness, and external pressure determine employability while Pop & Khampirat (2019) consider management and resilience, professional and communication, teamwork and critical thinking, self-control, and achievement motive as five main determinants of students' employability. These studies have demonstrated that employability is a multi-faceted concept that means different things to different people.

Employability skills gaps

About 15% of the studies revealed five gaps existing in the supply and demand of labour in the tourism and hospitality industry. These gaps include skill expectations and perception gaps, skills and knowledge acquisition gaps, career growth and performance gaps, and industry-wide digital skills gaps. There is a growing difference in expectation and perception of employability skills among tourism industry players, educators, employees, students, and managers. For example, some managers expected students to have sustainable employable skills while other managers valued problem-solving skills and management skills. Kim et al. (2017) found that stakeholders attach different levels of importance to attitude, communication ability, integrated thinking ability, language ability, and a goal-orientated disposition. This has theoretical and practical implications, especially in tourism education. Similarly, at work, gaps exist between what employees expect and what they get from skills development programmes (Kenayathulla et al., 2019). In-house programmes do not meet the desired level of expectation to equip employees with the development of technical skills, leadership skills, ethical skills, and basic skills. Similarly, Miao et al., (2023) found that career growth is linked to high performance. However, in practice, there is a gap in the quality of career development programmes instituted in many hospitality organizations with what is needed. This affects employee performance. In tourism and hospitality education institutions, serious gaps exist between what employability skills are taught and what the industry needs (Cheung & Law, 2000; Miao et al., 2023). The evidence available suggests that most universities do not incorporate basic practical skills in operating point-of-sale systems, property management systems such as OPERA, and Global distribution systems such as Amadeus and Galileo. According to Connolly & Lee (2006), tourism and hospitality educators lack efforts and teaching methods of technological and digital skills owing to the costs associated with novel technologies. The industry is also showing gaps in the way technology and digital capacity are being embraced. As such, different dimensions of digital and technological skills can be seen in these institutions (Cheung & Law, 2000). Lack of uniformity in the training of tourism and hospitality graduates renders others more employable than others. There are also wide gaps in the industry. Some hotels and tourism establishments have invested a lot in technological innovations such as robots, machine learning, and artificial intelligence while others are still sceptical and reluctant creating a situation known as the digital divide (Carlisle et al., 2021).

Challenges and limitations

Three papers tackled some of the challenges and limitations of using technologies and employability subjects in the tourism and hospitality industry. About 8% of the reviewed articles focused on identifying challenges in the implementation and adoption of new technologies. High costs associated with acquisition, implementation, and maintenance gave rise to much resistance and scepticism. According to Menegaki (2020), the cost of new technologies is elusively perceived as high without performing a cost-benefit analysis. Another limitation is that robots are not yet there to handle social and cognitive tasks in high customer contact points such as the front office, massage parlour, and bar, and even respond to guest complaints. As the tourism and hospitality industry is a service industry, emotions and service touch and the way people handle and care for customers, still demand human labour (Fusté-Forné & Jamal, 2021). As the tourism industry is experiencing high competition and pressure from tech-savvy and environmentally accustomed travellers, hotels have no clear strategy for managing automation and robotisation. Apart from challenges in the application and use of innovative technologies, the supply of tourism labour is also facing challenges in incorporating technological skills such as basic programming, data analytics, and the use of service robots. According to Sigala & Baum (2003), such skills are highly in demand in the tourism and hospitality industry.

The challenge for universities is to continuously update their curriculum and teaching pedagogies to equip students with high-tech employability skills.

Surviving a technologically advancing environment

The study has identified knowledge acquisition, policy shifts, and continuous learning as key strategies in dealing with changing technologies. About 8% of the papers reviewed dealt with this theme. To begin with, the suppliers and producers of the tourism labour force should align and be proactive in the design and teaching of the curriculum. Adeyinka-Ojo et al. (2020) call for a paradigm shift in curriculum development. The author suggests that the curriculum should focus on digital literacy skills. These digital technology skills should include mobile technologies and applications, automation technologies, cloud technology, robotics and artificial intelligence, the Internet of Things, and big data. Connolly & Lee (2006) and Ruhanen (2006) share similar views but advocate for the need for deep learning and data analytics skills through experiential learning. The authors suggest that experiential learning will enable students to approach the future with an open mind and broader skill sets beyond traditional courses. Ruhanen et al. (2021) also suggest the introduction of authentic learning approaches to develop stronger employability skills, including problem-solving, decision-making, communication, collaboration, and creativity. In this digital age, teamwork, online communities of practice enterprise social networks, psychological profiles, and professional development programmes for enhancing employees are appropriate strategies to enhance employees' re-skilling and up-skilling (Leon, 2023). Acquiring skills and development is now beyond classroom work. Presenting oneself through participating in online platforms such as LinkedIn and Facebook, and company social networks expands the job market, which increases employability. The other important strategy identified in this study is career and talent management. Developing dynamic capabilities among employees through constant learning, knowledge acquisition, and talent management strategies is considered crucial for future employability (Goh & Okumus, 2020). Similarly, flesh graduates' employability depends on their ability to continuously learn and develop their capabilities beyond classroom work. Internships have been recognised to bridge employability gaps between the labour market and tourism university graduates, particularly in the area of developing positive work attitude, interpersonal skills, problem-solving skills, technical skills, teams work (Fournier & Ineson, 2010). Finally, Huang (2021) suggests that the hospitality and tourism workforce requires significantly higher levels of research support to advance the workers' skills and careers. Knowledge-based decisions through research on the latest technologies and their impacts and implications would enable the industry to make the right decisions and choices.

Conclusion

The study followed the PRISMA protocol to gather and organize data. The study utilized 100 articles from Scopus, Science Direct, Google Scholar, and Dimensions. The findings from this study revealed that there is a growing research interest in the academia to make new technologies work in the tourism industry. The majority of peer-reviewed articles used various quantitative and qualitative methods to address issues surrounding new technologies and employability skills. The most studied new technologies are artificial intelligence, robotics, big data, and service automation. The study has demonstrated that these four have positively and negatively impacted tourism and hospitality jobs and human labour. The main themes that emerged from the review include impacts, employability, gaps, challenges, and strategies. The findings have demonstrated that both employees and students have a big task to develop and acquire capability skills beyond traditional operational skills. The study has confirmed the need for continuous skilling and reskilling in digital-related skills, such as data analytics, programming, and cyber security. This can only be done if we possess what Teece (2007, 2014) calls dynamic capabilities which is the ability to sense, learn, seize, coordinate, and integrate new technological skills, tools, and work created by new technologies in the broader job markets. The study has confirmed that digital and technological competencies are rare and yet the demand is still growing. According to the resource-based view, employees, possessing digital and technological capabilities would make themselves employable and competitive in the job market, as they possess a competitive advantage different from others (Barney, 1991). The study recommends that policymakers in tourism education should consciously update their curriculum and teaching methodologies as the tourism industry is becoming a high-tech industry. Governments should institute policies that regulate the transition from humans to robots to reduce anxiety in the job market. Further research should address the measurement criteria for assessing digital employability skills in the context of tourism and hospitality as the concept is still elusively defined.

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