Challenges of Radical Technological Transition in the Restaurant Industry Within Developing Countries

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Abstract

The advent of smart technologies, particularly those associated with the Fourth Industrial Revolution (4IR), has fundamentally restructured the delivery of services by industries, including the restaurant industry. However, radical technological transitions or innovations in restaurants enterprises has been gradual, cautious, and even timid, rather than radical in developing countries. Available studies explored the benefits of smart technologies but placed little focus on why restaurants would prefer a gradual rather than a radical transition to modern technology, particularly in developing countries. With a focus on developing countries, this article utilises a critical document review to explore the challenges of radical technological transitions in the restaurant industry. It was found that in addition to organisational culture, infrastructural barriers, and education and training, financial constraints are among the key barriers and challenges. It recommends that governments need to roll out public technological and digital infrastructure to ease the burden of technological transition by small businesses, such as restaurants which, by their nature, are low-profit enterprises and do not afford radical technological transitions.

Keywords: Fourth Industrial Revolution; hospitality; technological transition; restaurants; tourism

Introduction

Radical technology transition in restaurants in developing countries has been gradual, cautious, and even timid, rather than radical. This is despite the advent of Fourth Industrial Revolution-based (4IR) new technologies which have fundamentally restructured and revolutionised how products and services are delivered in the sector. Even though many developing countries are adding smart technology transitions to their national policy frameworks to assist small businesses such as restaurants to adopt smart technologies to boost services and profitability (United Nations Educational, Scientific and Cultural Organisation (UNESCO), 2021), practically, restaurants continue to struggle to adopt technology transition due to lack of resources (Alawamleh et al., 2022). Many developing countries, especially in Africa, Latin America, and South Asia lack the resources to extend to these businesses. As a result, instead of adopting radical technological transition to boost their attractiveness and profitability, these restaurants are compelled to follow a gradual path, with further negative consequences.

Smart technologies, particularly those associated with 4IR, have been observed to have a huge potential to improve the profitability of restaurants (Amlin et al., 2018). It is also widely accepted that 4IR technologies could be the basis of economic and social development in most developing countries (UNESCO, 2021), and therefore, the more radical technologies are adopted the better. The term 4IR refers to a system of connected devices such as sensors and communication networks that use an internet connection to transmit data and not use human

intermediation (Khan et al., 2021). The system has been accompanied by better-quality and value-added data processing aptitudes; smart intelligence (computing power, big data, image and speech recognition), connectivity (sensor technology, the Internet of Things, and mobile devices), assimilation of different platforms, and flexible automation (Maksimenko et al., 2021; Robertson, 2018; Tidd & Bessant, 2018) and has been applauded for its potential to revolutionise the restaurant industry (Lema et al., 2021; Nirere, 2022).

One of the industries that have adopted these 4IR technologies to improve operations is the hospitality industry. In this industry, new technologies have played a significant role not only in revolutionising the dining experiences of patrons, but also in reshaping ways in which menus are designed, the ways in which meals are ordered, paid for, prepared, and delivered (Amin et al., 2021; Esposito et al., 2022). The adoption of 4IR-based technologies is supported by experts in the industry who argue for the need to make major advances in the types and quality of restaurant services so as to satisfy the needs of the evolving contemporary customer base (ElShafei, 2020; Frey et al., 2019). Technology transition is targeted towards the attraction and the satisfaction of the needs of the new generation of technophile patrons traveling on a tight budget (Esposito et al., 2022) and who significantly appreciate the personalisation of experiences and digitalisation of services. A restaurant is defined as a place where patrons pay to sit and eat meals that are prepared and served on the premises (Ko, 2020). There are corporate and independent restaurants. The former category comprises restaurants owned and run by companies while the latter is not associated with any corporate chain and is run by the owner (Ishak et al., 2021). The owner of an independent restaurant has the decision-making authority over the restaurant operations.

The results from the macro literature support show that while the lag between developing and developed countries in the adoption of technology has narrowed, the gap in the intensity of use of adopted technologies has increased (Comin & Mestieri, 2018). In the restaurant sector, although the pace of technology diffusion has speeded up, diffusion is uneven, resulting in an increasing technology gap across different types of restaurants (corporate and independent) and countries. The general condition of developing countries, such as relatively low standards of living, an undeveloped industrial base, and a low Human Development Index in terms of poverty, literacy, education, education, life expectancy, and other factors for countries globally (United Nations, 2008) is widely implicated for this condition (Mun & Jang, 2018; Nkosana & Robertson, 2018; Skinner & Goodier, 2016). Available studies mostly focus on the benefits of technology innovation (Asefa et al., 2020; Kim et al., 2021; Kumaning & Godfred, 2019) while little focus is devoted to the understanding of the challenges of radical technological transition to high-risk firms such as restaurants. For instance, Alawamleh et al. (2022) explored the barriers to open innovation in the food industry in the Jordanian food industry, but did not link these identified barriers to the socio-economic challenges at the national level. Esposito et al. (2022) examined the potential, benefits of technology innovation but did not explore the factors that could hamper restaurants from adopting radical technological transitions. Other studies emphasise the internal conditions of restaurants as a major barrier towards technology transition, and fail to take into account the challenges of capital accessibility from public and private institutions to speed up technological transitions (Kansakar et al., 2019; Korede et al., 2021; Nkosana et al., 2016). Thus, available studies do not problematise the national and regional social-economic statuses when examining the challenges of restaurants to radical technological transition.

There seems to be an assumption that the challenges and opportunities of restaurants are similar across regions, and yet this is not the case. There is also an assumption that corporate and independent restaurants face similar kinds of challenges in their technological transitions. As a result, our understanding of why radical technological transition is sluggish in most

developing countries remains embryonic. To better comprehend this challenge, more studies that can better reveal how restaurants make decisions and actually use (or do not use) technology in their operations are needed. This could help answer the question of why independent restaurants particularly in developing countries, are slow in adopting and using technology that clearly could benefit them. With this comprehension, policymakers and practitioners are able to design better policies and interventions to assist restaurants to adopt better and more sophisticated technologies. With a focus on developing countries and on independent restaurants (hereinafter, restaurants), this article undertakes to resolve this gap in the existing literature by (i) exploring the challenges of radical technological transition in the restaurant industry and (ii) suggesting ways in which technological transition can be adopted more rapidly by restaurants.

The article wields much potential in stimulating scholarly research on 4IR and the restaurant industry by exposing scholarly gaps. It could also ignite an interest in hospitality experts seeking to revitalise the restaurant industry and to make it as competitive and enjoyable as other tourism businesses through the deployment of smart technologies. Lastly, the article also contributes to the existing and emerging body of literature on 4IR and on the hospitality industry. The article is organised as follows: After the introduction, the next section reviewed related literature under two sub-sections on radical technological transition and on smart technologies and their relevance or utilisation in the hospitality sector. This is followed by an outline of the research methodology. Thereafter, the findings are presented and discussed. Lastly, conclusions are drawn from the findings, and recommendations are made.

Literature review
The literature on the concept of radical technological innovation (in general) and smart technologies was reviewed in the article as detailed in the next two sub-sections.

Conceptualising radical innovation
There are diverse types of innovations. These include gradual innovation in which new technologies, products, or services that only redesign or modify existing ones are introduced (Van Lancker et al., 2016). There are technical innovations where the physical appearance of the product or service is provided (Nirere, 2022). Technical innovation may also entail changes in performance parameters or production processes (Fana & Villani, 2022). Managerial innovation involves changes in the methods of production and product delivery processes. Unlike other types of innovations described above, radical innovation entails ground-breaking solutions that transform the market by introducing absolutely new solutions, materials, and technologies that affect the price or quality of the product (Van Lancker et al., 2016). In the restaurants industry, examples of radical innovations, in terms of technology, may include the introduction of 4IR-based smart technologies, such as the Internet, computers, laptops, television, radio, WI-FI Routers, and Social Media applications.

The implementation of radical innovations has been observed to be much more difficult for enterprises for both corporate and independent restaurants in both developed and developing countries as this often requires ground-breaking changes in project management (Berger & Frey, 2016). For independent restaurants, this exerts an additional challenge since more resources are needed to implement radical innovations, such as technological transition, for instance. The nature of radical innovation, including technological transitions, is that no one knows whether the targeted innovation will actually bring about the desired results (Fana & Villani, 2022). In addition, it is also difficult to estimate the financial and social costs or difficulties that may be faced in defining the milestones (Berger & Frey, 2016).

In the restaurant industry, radical technology innovation entails the fundamental transition to more contactless technologies so as to stay relevant, attract new clients, and have a point-of-difference from competitors thus increasing opportunities for growth. Technological transition can be managed in several ways and the processes of innovation management require action on many levels simultaneously (Van Lancker et al., 2016). Innovation management also requires individualised actions, taking into account the nature and goals of each enterprise. With regard to radical technological transition, management requires each enterprise to develop its own approach based on its own circumstances and goals. Radical technology transition requires an enterprise to first have all the resources that can foreseeably be regarded as sufficient before the project can commence. An enterprise may first need to do a stock-take on its resources, including available and potential funds, as well as the available skills to utilise the adopted technologies. While restaurants in developed countries have more opportunities to access funding from public and private institutions to support their technology transition projects (Cirera et al., 2022; Comin & Mestieri, 2018), their counterparts in most developing countries do not the same privileges, and thus, their technology adoption rate lags behind (Ishak et al., 2021). In developed countries, including Canada, Singapore, and the United Kingdom, government agencies provide small subsidies in the form of vouchers and grants to small and medium enterprises, such as restaurants for basic technology upgrading and digitalisation projects, in the belief that extensive digitalisation of businesses generates positive externalities (Comin & Mestieri, 2018). In Japan, local public technology centres not only provide small local firms with various technological services, but also conduct their own research and patent inventions (Cirera et al., 2022). Thus, restaurants in some developing countries face particular challenges in adopting radical technological transition.

Smart technologies in the restaurant industry

The theoretical premise of this study is that restaurants in most developing countries, and thus, their rate of technological transition is constrained. This consequently negatively impacts of their growth and profitability (Comin & Mestieri 2018). There are several ways in which 4IR-based technologies have improved restaurant services in recent years.

Firstly, it has been observed that new technologies improve customer feedback mechanisms (Alawamleh et al., 2022; Ko, 2020). Some restaurants are able to solicit feedback from customers regarding their perception of performance using smart tracking tools which measure the needs of customers and which now replaced 'comment cards' and 'mystery shoppers' (Ko, 2020). This strategy includes the analysis of online surveys which are completed by restaurant patrons (Solnet et al., 2019). Real-time patron satisfaction reports and e-mail alerts to management when problems emerge are then utilised as damage control mechanisms (Kabadayi et al., 2019). This improves the transaction service by reducing the response time to solve customer problems (Alawamleh et al., 2022). Through technology-based solutions, restaurants can use web-based and also in-store kiosks for customer feedback (Bigliardi et al., 2021). Ko (2020) avers that restaurants that have successfully adopted these technologies have managed to generate huge volumes of responses per store, and adjusted their operational procedures much to the profitability of the business when compared with those that have not yet adopted it.

Second, through smart technologies, restaurants are also able to effectively *manage* marketing and service practices. Restaurants are able to collect and store specific data about their customers. The data mostly comes from comment cards/online surveys (Heavin & Power, 2018). The knowledge of the preferences of patrons and their consumption patterns enables restaurants to position their products or services more effectively. Smart technologies also enable restaurants to improve performance by improving the speed of service (Frey et al.,

2019). Some restaurants now use handheld gadgets that allow servers to remotely alert management of dirty tables that need to be cleaned and re-set faster for occupation by other patrons (ElShafei, 2020). The gadgets are also used to place orders in the kitchen, thus, saving time for waiters as they do not have to walk to an ordering terminal (Alawamleh et al., 2022). This reduces the time related to service functions and also provides more consistency and accuracy than people (Kabadayi et al., 2019).

Third, smart technologies improve restaurant operations management. New technologies are assisting in the development of integrated software packages that can run functions, such as payroll and inventory management, among others, on a single platform (Ko, 2020). Some restaurants use Application Service Providers to manage operations (Kumaning & Godfred, 2019). Some software companies provide solutions that support with labour, inventory, food costs, profit and loss management, and sales forecasting (Frey, 2019). Such solutions aid in menu designing and analysis, thus, enabling management to quickly rethink performance strategies.

Fourth, smart technologies help with human resources management functions. Through the support of workforce management solution software, restaurants now use technologies for workforce selection (Frey, 2019). Human Resource Management solutions are also technology-based, and they fully integrate with payroll, reporting, and analytical decision-making tools, and enable staff and management to access critical data quickly and perform routine business activities more proficiently (Ko, 2020). Furthermore, through technology-based human resources management systems, restaurants are able to manage employee behaviour and the work environment more efficiently so as to control turnover and related costs (Kabadayi et al., 2019).

Lastly, smart technologies are also important for 'Back-of-the-house' management in restaurants. Restaurants are rapidly turning to technological developments in the back-of-the-house equipment they use for daily operations. These include food preparation equipment, such as freezers, chillers, ovens, warmers, and fryers which enable restaurants to provide efficient services (Shimmura et al., 2020). If, for instance, a restaurant chooses to amend and/or add an item to the menu, instructions can be sent to a restaurant computer system, which then conveys the instruction to the oven or a deep fryer to automatically change the temperature to meet the cooking requirements. The cumulative effect is that labour, food, and operating costs are reduced (Kabadayi et al., 2019).
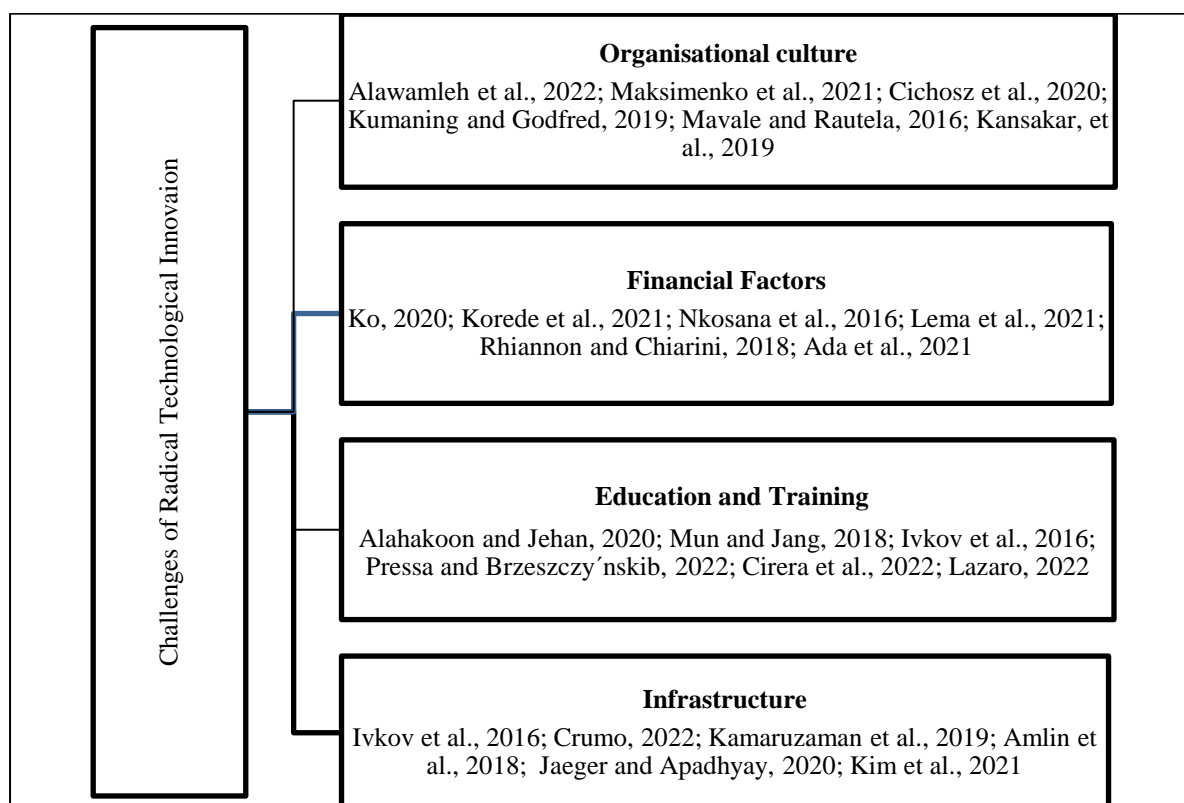
The reviewed literature shows that most developing countries, particularly in Africa, Latin America, and South Asia, lack adequate resources to extend to small businesses such as independent restaurants (Ishak et al., 2021; Nkosana et al., 2016). Most private financial institutions in developing countries were found to be much more conformist and traditional when compared to developed countries, and are only ready to assist small businesses such as restaurants with funding only in the later stages when the prospect of success is certain (Bhorat et al., 2018; Nerere, 2022). Due to a lack of funding nearly 40% of new businesses, especially independent restaurants fail in their first year, a further 60% in their second year, and 90% in their first 10 years of existence (Bhorat et al., 2018). Businesses such as restaurants in developing countries mostly rely on personal savings both in starting up their enterprises and for taking them forward (Ramukumba, 2014). In countries such as Ghana (Nkuah et al., 2013) and Malaysia (Ishak et al., 2021), restaurants are discouraged from trying to source funding from financial institutions due to the exorbitant interest rates charged by these institutions. As a result, restaurants in most developing countries are unlikely to access funding for their operations. This is not the case in developed countries where these businesses enjoy huge support from both the public and private financial institutions, and therefore, are able to rapidly

adopt evolving technologies as soon as they emerge (Cirera et al., 2022; Comin & Mestieri, 2018).

Materials and methods

This qualitative article draws on a critical review of documents obtained in the academic literature which were selected purposively in order to focus only on the challenges of radical 4IR transition in the restaurant industry using a small number of sources so as to generate an in-depth view of this phenomenon (Merriam & Grenier, 2019). The researchers first conducted a literature review search using words such as restaurants, restaurant technology challenges, restaurant industry, and smart technologies as key terms. A total of 57 papers were found and browsed through for dominant factors that were challenges to radical technological transition. Four categories, namely; organisational or institutional, financial factors, education and training, and infrastructural factors emerged as dominant in the articles. Articles that provided more details on these four categories were then reread and selected based on the amount of detail they provided on a particular theme. Articles were then grouped according to the categories which they supported most. A total of six articles per each identified theme were then selected, based on the researchers' judgment of the detail presented by each article. A summary of the articles selected for analysis and the categories which they supported are presented in Figure 1 while their complete details are provided in the list of references.

Figure 1: The dominant categories of articles
Source: Authors

Content analysis - the study of what is contained in a text - was used for the study (Merriam & Grenier, 2019). Content analysis afforded the researchers an opportunity to inspect recurrent aspects or factors considered as challenges of radical technological transition by restaurants. The researchers first coded the identified challenges into themes, namely; Organisational or institutional culture, Financial, Education and training, and Infrastructural challenges as had

been identified through latent content coding where the focus was placed on the underlying meaning of arguments. This involved the reading of entire texts and making sense of them conceptually rather than depending on the recurrence of words in the texts. This thematic type of coding is reputable for its capacity to generate an in-depth understanding of human communication, although its reliability and specificity challenges may not be denied (Merriam & Grenier, 2019; Sheppard, 2021). The selected articles are not necessarily geographically situated but rather, are rooted in the development theory, and they transcend Information Communication Technology studies to explore technology transition challenges in restaurants in developing countries. Existing literature and sectorial expertise abstraction were also tapped into so to broaden and deepen the discussion. Thus, the selected articles only served as the springboard from which the discussion of challenges and barriers of radical technological emerged.

Findings and discussion
The reviewed articles indicate that technological transition provides firms with the power to use technology to improve performance and the quality of products and services. While the challenges associated with technological transition in restaurants by some articles differed, an interpretation to the results and findings by the articles show that when technological transition is adopted in a radical manner by restaurants, several challenges emerge. In addition, even where a radical technological transition has the potential to generate positive results, prospects for a transition, particularly for independent restaurants in developing countries, could face a number of insurmountable challenges. The general argument that emerged in the articles and which is expanded in this section is that in the context of developing countries where governments and many businesses, including restaurants are operating on very tight budgets, inadequate financial resources, and limited or poor infrastructure (Mhlanga et al., 2021), radical technological transition is not only unaffordable but also not a viable option. This section presents the challenges of radical technological transition by restaurants in developing countries.

Organisational culture and technological transition
Every firm operates within a particular culture. This culture is often a result of diverse factors and experiences which include societal circumscribed conventions, socio-economic and political backgrounds of locations, as well as available capitals (physical, financial, human, natural, and social). Organisational culture is the values, beliefs, and norms within the organisation (Tidd & Bessant, 2018). These values, beliefs, and norms are accumulated over time. Transition often requires firms to change or to modify their cultures by adopting new innovations within the line of business. Experts note that understanding organisational culture is important for innovations since culture can provide the knowledge about the organisation and the existing capability. With a focus on the Jordanian restaurant industry, Alawamleh et al. (2022) found that organisational culture is very influential and extremely difficult to reform and even where the management strategies for dealing with technological transition were brilliant, culture always exerted pressure much to the slowdown of transition. Cichosz et al. (2020) recommends that in order to overcome culture as a barrier, culture needs to be observed in a manner that supports open innovation practices and strategies and not merely in the conventional way of competition. Alawamleh, et al. (2022: 105) found that many restaurant participants in Jordan considered culture to be a barrier to open technological transition and that because Jordanian culture was highly conformist by nature; Jordanian as well as the whole Middle East culture, in particular, was "unforgiving; mistakes are remembered and there is no clean slate; therefore, managers hesitate to apply OI [Open Innovation] strategies."

A focus on organisational culture can afford the management to easily identify existing capabilities and deficiencies that necessitate whether technological transition should be gradual or radical (Maksimenko et al., 2021). However, in developing countries where businesses such as restaurants face aggravated resource constraints (compared to restaurants in high-income countries), culture has been found to be a barrier to technological transition, particularly where radical trajectories are needed (Alawamleh et al., 2022; Mavale & Rautela, 2016). As a result of constrained resources and the inability to source funding from financial institutions, most firms in developing countries institute and sustain some rigid cultures as part of a survival strategy. The idea is not necessarily to resist technological transition, but rather to ensure the transition is gradual instead of being radical. In this regard, a firm defends its operational systems against new or different behaviour, structure, and cognitive systems to buttress its current situation. Even where it is necessary, radical technological transition can be resisted on the premise that it could threaten the meagre resources available (Cichosz et al., 2020). In Ghana, Kumaning and Godfred (2019) found that the restaurants did not have rigid organisational cultures were more willing to adopt smart technologies while those with very rigid preferred to keep traditional technology.

Kansakar et al. (2019) observed that the cultural rigidity of most independent restaurants in developing countries often results in a lack of standardisation and transformational transition. In Ghana (Kumaning & Godfred, 2019) and Malaysia (Ishak et al., 2021) it was found that in defence of their own individual cultures, many restaurant firms would rather develop individual proprietary solutions based on their own individual metrics and methodologies to accommodate the technological service demands of modern-day guests rather than work with other firms in a manner that can threaten existing cultures. Cultural change resistances have led to the emergence of a diverse spectrum of technological and digital transitions which are fundamentally targeted to provide a similar set of services in restaurants. While these technological transitions may work well within the scope of a single entity, they are often superficial, weak, and unattractive to patrons (Alawamleh et al., 2022), and they lack revolutionary potential. Kansakar et al. (2019) argue that such timid technological transitions by firms are unfit to be used in the sharing of pertinent information from guest profiles across different intra-organisation and inter-organisation systems, thus, constraining the capacity of a firm not only to adopt technological transition but also to improve performance needed for competitiveness and growth. Mavale and Rautela (2016) aver that in the contemporary highly globalised world, effective and efficient technological transition requires hands-on management of data. Thus, hesitancy to disrupt the existing organisational cultural status quo often translates into growth and technological transition hindrances for these restaurants.

In the contemporary world which is characterised by 4IR-based technologies, customers also now prefer to engage with innovative firms that can provide them with highly personalised services and products. The rapidity of technological transition in the world equally requires rapid changes by firms. Herbig and Dunphy (1998) found that cultures or firms that value transition, creativity, and technical ability are most likely to be successful in radical technological transitions. However, the small profit margins of restaurants in low-income countries due to inadequate financial support by private and public institutions to boost business and to diversifies services, as well as other factors create or sustain a culture of resisting radical technological transition. This resistance is seen as a risk aversion measure by the entities (Cichosz et al., 2020; Maksimenko et al., 2021).

Financial challenges and barriers

For most independent restaurants in Ghana, South Africa, Malaysia, and even the fast industrialising countries such as Brazil and Chile, technological transition is constrained by

financial challenges (Ishak et al., 2021; Khan, 2022; Nkosana, et al., 2016). This has been an ongoing challenge (Korede et al., 2021). It is argued that more of the challenges that most independent restaurants face in these countries, such as infrastructural challenges, emerge from their inability to access adequate funding to finance their operations (Khan, 2022; Khan et al., 2021; Ishak et al., 2021). For instance, in South Africa, Bhorat et al. (2018) observed that about 40% of new business ventures, including restaurants, failed within their first year, about 60% in their second year, and 90% in their first 10 years of existence due to financial challenges. A report by the Global Entrepreneurship Monitor (GEM) (2014) shows that inadequate funds and poor profitability were the major causes of failure by small businesses, including restaurants, in South Africa. Mun and Jang (2018) found that high prime costs (food and energy costs and salary expenses) were responsible for lower profitability in full-service restaurants in the broader Global South. Bhorat et al. (2018) further assert that low profitability, coupled with poor cash management, often led restaurants to dilute their initial concepts so as to meet the basic needs of survival and not of profitability. Nkosana, et al. (2016) found that some restaurants in South Africa even avoided or postponed technological transitions as a measure to save their available meagre finances. In most Asian countries Khan (2022) and in Ethiopia, Asefa, et al. (2020), most Asian countries, the financial and operational challenges which independent restaurants faced principally resulted from the nature of their business, such as low entry barriers (e.g., a small start-up capital), high operational expenses (e.g., food costs, labour costs, and rent expenses), and the existence of numerous substitutions in the market. All these challenges also readily translate into technological transition challenges (Ko, 2020; Rhiannon & Chiarini, 2018). The slow rate of technological adoption in a highly and rapidly globalised world further complicates the likelihood of these firms growing and improving their circumstances (Ada et al., 2021; Lema et al., 2021).

In countries such as India (Amlin et al., 2018), South Africa (Bhorat et al., 2018), and Malaysia (Ishak et al., 2021), restaurants had no adequate opportunities to approach financial institutions for financial support. Most of the financial institutions in these countries were found to be much conformist and traditional, and only ready to assist small businesses such as restaurants with funding only in the later stages when the prospect of success is certain (Bhorat et al., 2018; Nerere, 2022). As a result, restaurants were unlikely to access funding for technological transition needs. This has worsened in the post-COVID-19 period in which even financial institutions were also affected by the pandemic and are now likely to be stricter to whom they lend money.

The other challenge that radical technological transition faces in South Africa, for instance, was the perceived implications on lives and livelihoods. The eclectic concern is that radical technology transition could replace the human workforce with machines, thus leading to technological unemployment (Mhlanga, et al., 2021). It is argued that radical technological transition could worsen inequality in the short term, regardless of its long-term beneficial effects (Cortis et al., 2021). Robertson (2018) asserts that the technological revolution will destroy jobs, but not work. The fear of radical technological transition was also observed by the McKinsey Global Institute (2017:3) which posits that "… automation is not a new phenomenon, and fears about its transformation of the workplace and effects on employment date back centuries, even before the first Industrial Revolution in the 18th and 19th centuries." In most African countries where unemployment rates are high, some governments are very cautious about how they support transition fearing that this could leave their people unemployed. For instance, Mhlanga et al. (2021) found that most countries are battling unemployment with the unemployment rate in South Africa sitting at 34.9% in 2021; 34.1% in Angola in the same period; 34% in 2017 in Namibia; 33.4% in 2018; 33.3% in Nigeria in 2020; and 25.04% in 2017 in Mozambique while it is estimated at 85% in Zimbabwe (Mhlanga &

Ndhlovu, 2021). In this view, radical technological efforts by restaurants are unlikely to gain huge support from governments in these countries particularly as it threatens to hold back ongoing efforts to create and protect jobs.

Infrastructural challenges and barriers

Infrastructural inadequacy is another major challenge that is frustrating radical technological transition in developing countries (Kamaruzaman et al., 2019). In Brazil, although restaurant owners highly esteemed the use of smart technology, infrastructural and facility constraints were still their major challenge (Crumo, 2022). In India, Amlin, et al. (2018) found that infrastructural problems prevented restaurants from fully utilising and benefitting social media technologies. In Africa, the 2016 global manufacturing index placed only three countries, namely; South Africa, Nigeria, and Egypt in the top 40. Although these countries were in the top 40, they were also ranked in the middle and lower tiers (Kamaruzaman et al., 2019). Kamaruzaman et al., (2019) conclude that this is a direct result of inadequate infrastructure for research and design and also for the design and development of manufacturing machines.

The World Economic Forum (2018) reported that despite 4.5 billion people using smartphones, almost half of humanity had never used the internet due to a lack of infrastructure in their communities. This problem was found to be more common in developing countries (Mhlanga, et al., 2021). The main focus of restaurants in South Africa was on the acquisition and development of basic infrastructure rather than technological advancement (Bhorat et al., 2018; Nkosana et al., 2016). Rocha, et al. (2016) found that in most developing countries globally, telecommunication technological infrastructure was concentrated in urban areas while little focus was placed on rural and remote areas. In Malawi, Senegal, Kenya, India, Brazil, this has increased the 'digital gap', and is also depriving businesses such as restaurants which are located in remote areas and which might be seeking to adopt smart and digital technologies (Cirera et al., 2022). According to Kim, et al. (2021), the digital divide impact can be minimised by exploring more sustainable ways to increase technological infrastructure, including broadband technologies and digital skills across towns, but also in rural and remote areas. Bridging this divide could enable restaurant firms to be able to offer their services to their patrons in more exciting ways using personalised services. Nkosana et al. (2016) argue that focused efforts on decreasing the digital divide in South Africa could improve the profitability of the restaurant industry, and thus, enable to contribute considerably to the broader economy.

Kansakar et al. (2019) aver the successful adoption of smart technologies by restaurants requires a sound technological infrastructure base with specialised computation and communication capabilities, and yet most of them lack this critical infrastructure. In Ghana, Kumaning and Godfred (2019) suggest that the government should rather play a leading role in providing infrastructure, such as adequate fibre optic cables and other related peripherals so as to expand and encourage the adoption of e-business applications by Ghanaian food entities. Jaeger and Upadhyay (2020) and Ada, et al. (2021) aver that economic investment and financial support are also critical for developing technological infrastructure.

While other developing countries, such as South Africa (Nkosana, et al. 2016), Malawi, Senegal, India, Kenya (Cirera, et al. 2022) are struggling, there is a pocket of others, such as Brazil, Thailand, and Chile, that are making efforts to roll out infrastructure so that restaurants can benefit and rapidly adopt 4IR-based technologies. In Thailand, as part of the government's Industry 4.0 Policies, the government is providing support to electronic activities by promoting e-commerce platforms and social media applications (Kohpaiboon, 2020). In addition, Amornkitvikai, et al. (2022) found that the Thailand government also assisted restaurants by providing digital infrastructure, such as the nationwide broadband network. The government

considered this as one of the critical pillars of its Industry 4.0 policies, which aims to bridge the digital gap and promote the country's modern economic development through e-commerce (Amornkitvikai et al., 2022). Brazil and Chile provided grants to small businesses to ramp up technology adoption (Cirera, et al., 2022). This has differentiated the trends of technological adoption within and across developing countries.

Training and Education
Technological transition requires adequate technical skills and training to implement the new technologies to steer operations. In many developing countries, a wide technical skills gap has been identified (Alahakoon & Jehan, 2020). However, the restaurant industry has experienced an exodus of highly skilled and educated employees to other lucrative industries in recent years (Ishak et al., 2021). This has heightened the competition to attract new talent and retain workers within the industry (International Labour Office (ILO), 2022). In Malaysia (Ishak et al., 2021), the restaurant sector has been fast losing skilled and experienced staff. Mun and Jang (2018) report that due to labour shortages, most restaurants experienced product inconsistency and deteriorating service quality.

When an employee leaves a firm, the firm bears some labour costs in replacing the worker. Ishak et al. (2021) report that the turnover cost for a restaurant that has 30 workers is about $18 200. Thus, with considerable numbers of workers switching sectors towards the more lucrative ones, restaurants are left with inadequate skilled and trained staff to implement radical technological transition. Furthermore, in Malaysia, due to high labour costs, some restaurants ended up settling for untrained and easily available staff (Ishak et al., 2021) with little knowledge about technology. A well-trained and well-qualified workforce is likely to help them realise and successfully adopt new technologies (Pressa & Brzeszczy´nskib, 2022). Nirere (2022) found that due to the shortage of internal staff that is skilled in technology, most restaurants found system maintenance and system updating as one of their challenges which frustrated radical technological. Most of these firms used external partners for system maintenance and updating, thus, making technology adoption even more costly. Cirera et al. (2022) posits that in Africa, this is a direct result of inadequate skilful human personnel to maintain and update system tasks.

Conclusion
This article explored the challenges of radical technological transition in the restaurant industry, with a focus on developing countries. The review shows that many developing countries have socio-economic and political arrangements which differ from those observed in developed countries, and which make technological transition difficult for businesses such as restaurants. Most of these countries battle low incomes, rising unemployment rates, low financial domestic investments, low education and training levels, and corruption by officials, and thus, lack funds to extend to small businesses to adopt technology. The exception was Brazil and Chile. Inadequate support makes restaurants in these countries to find radical technological transition a 'no go area' as it is not only expensive and disruptive, but also unaffordable in terms of financial and human resources, and available infrastructure. Enterprises would rather innovate gradually rather than radically.

The results reinforce the need to first have a better understanding of the socio-economic challenges faced at national and regional levels so as to better understand the radical technological transition challenge of independent restaurants in developing countries. The results also provide the starting point upon which explanations as to why independent restaurants particularly in developing countries are slow in adopting and using technology that clearly could benefit them. This discussion could help policy makers and practitioners to design

better policies and interventions to assist independent restaurants to adopt better and more sophisticated technologies. Future studies could also focus on how contemporary challenges such as pandemics like he COVID-19, climate change, global energy crises, ad hyperinflations could force restaurants to adopt radical technological transitions in order to survive. Future studies could deploy more empirical research approaches rather than utilise literature review and abstraction which limit the generalisability of the discussion as has been the case in this article.

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