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Uptake of Internet of Things by SMEs in digital era in emerging economies: A systematic literature review

Gibson Muridzi [(a)*]

[(a)] *Dr, College of Business and Economics, University of Johannesburg, PO Box 524, Auckland Park 2006 Cnr Kingsway and University Roads, Auckland Park, Johannesburg, 2092, South Africa*

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ABSTRACT

This paper aims to establish the uptake of Internet of Things (IoT) by small and medium enterprises (SMEs) in the digital era in emerging economies. This study aims to 1) determine adoption of IoT by SMEs during digital era in emerging economies, 2) establish challenges faced by SMEs in implementing IoT in emerging economies, and 3) develop a framework for digital transformation for SMEs in digital era in emerging economies. Systematic literature review approach was used. Articles from Scopus database ranging from 2018 to 2023 was used. 57 articles were shortlisted out of 153 articles. PRISMA framework was therefore used to perform systematic review analysis. Results demonstrate that in emerging economies, SMEs do not or are slowly adopting IoT concepts, making them less competitive. The results also determine that although IoT has great promise in SMEs, the key constraint is a lack of strategic implementation frameworks for its deployment and widespread adoption. This study was therefore carried out to develop a framework that supports digital transformation for SMEs in the digital era for emerging economies. Results have significant managerial and practical implications as they offer some insights to SME managers on how they can improve on the uptake and adoption of internet of things in digital era.

Introduction

The purpose of this study is to establish the uptake of Internet of Things (IoT) by Small and Medium Enterprises (SMEs) in digital era in emerging economies. This study was motivated by the desire to 1) determine the adoption of IoT by SMEs during digital era in emerging economies, 2) establish challenges faced by SMEs in implementing IoT in emerging economies, and 3) develop a framework for digital transformation for SMEs in digital era in emerging economies. Systematic literature review approach was used to unpack issues pertaining to the uptake and usage of IoT by SMEs in emerging economies.

This study is significant as it offers some insights to SME managers when handling issues to deal with the uptake of IoT, digitalisation and digital transformation as part of fourth industrial revolution (4IR) in emerging economies. The study is also important in developing proactive leadership with capabilities of understanding digital transformation of SMEs business who can understand the need to impart knowledge on the significance of IoT and its role in value creation to industrial performance in the developing country context (Karuppiah, et al., 2023). Based on the outcome of this research, other researchers and managers can investigate further the digital transformation initiative so that small and start-up SMEs can enhance their participation opportunity in the global market. The study also is of beneficial from an academic as well as a managerial point of view. Leaders and management can be able to identify the skill gaps within their organisation which may require rearrangement of staffs who mismatched positions or cannot be reskilled or upskilled to work with the new technologies' application (Phuc Khanh Linh et al., 2019) which are brought by digital era to transform businesses, quickly seize opportunities, and mitigate risks from digital transformation.

* *Corresponding author. ORCID ID: 0000-0002-2362-8496*

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SMEs in many sectors do not or are slowly adopting IoT concepts, making them less competitive. Yet, they serve as the backbone of emerging economies, thus creating a performance gap between them and their international competitors (Peter, et al., 2023). A study by Moeuf, Pellerin, Lamouri, Tamayo and Barbaray (2017) claims that SMEs have not exploited all the resources for implementing technologies in its business and often limited themselves to the uptake and adoption of cloud computing and the IoT. Likewise, SMEs seem to have adopted those concepts only for monitoring industrial processes and there is still an absence of real applications in the field of management. A lot of SMEs actually face difficulties in achieving those plans due to the fact that most SMEs do not have financial resources to invest in new technologies and to change the range offered to the customers (Türkeș, Oncioiu, Aslam, Marin,Topor, & Căpușneanu, 2019), and is therefore leading to low usage and uptake of such technologies. The IoT ecosystem in emerging economies is still in its early stages, and since funding and budget are very limited, the IoT products are "a fixed set of features," and SMEs and start-ups cannot offer highly customized products (Saheb & Mamaghani, 2021).

SMEs also face serious challenges related to informatization and digitalization. Although SMEs are increasingly aware of the strategic value of these digital channels for conducting digital marketing activities, and particularly for enhancing their brand image, they have been unable to leverage the media fully (Malesev & Cherry, 2021). Boag (2013) added that senior management lack confidence in digital transformation, technology development and innovation because they do not really understand it, and they need a roadmap to assist them in navigating this unknown terrain. This occurs because SMEs face several barriers, including a lack of access to information about the latest technology (Kergroach, 2020), a lack of investment and necessary training to plan, monitor, and maintain the use of effective digital media (Halim, Hebrard, Hartono, Halim & Russel, 2020; Malesev & Cherry, 2021), which makes it difficult for SMEs to maximize their business operations through the use of digital media (Raharja, Kostini, Muhyi & Rivani , 2019).

This study therefore seeks to establish the adoption of IoT by SMEs in emerging economies in new and unfamiliar environment brought by digital era and to develop a framework for digital transformation for SMEs in digital era in emerging economies by answering the following research questions. 1) What is the level of adoption of IoT by SMEs during digital era in emerging economies? 2) What are the challenges faced by SMEs in implementing IoT in emerging economies? and 3) How can digital transformation framework for SMEs be implemented in emerging economies?

This study is organized as follows: following the introduction part, the second section discusses literature review with theoretical and empirical studies that shed a light on linkage between theory and practice. The third section introduces the background information on research and methodology. After analysis and findings of the study, the author provides discussions and implications. Finally, this paper concludes with key points, recommendations, future research directions and limitations.

Literature Review

The purpose of this literature review was to conceptualise Fourth Industrial Revolution (4IR) and Internet of things in order to understand how it is affecting SMEs in digital era in emerging economies**.** The approach of review was informed by the purpose of this study as well as the research questions. Theoretical underpinnings were also reviewed which helped in developing the framework for digital transformation for SMEs in digital era for emerging economies.

Conceptualising Fourth Industrial Revolution (4IR) and Internet of things (IoT)

4IR is defined as an integrated, consistent, optimized, service-oriented, and interoperable business process; in which algorithms, big data, and high technologies are embedded (Lu, 2017). 4IR refers to a new paradigm that moves from disconnected machines to ones networked via networks, data, and process models. According to a panel discussion by UNIDO (2016), Artificial intelligence, robots, the Internet of Things, self-driving cars, 3-D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing are some of the most trendy technologies. (Peter, et al., 2023). Fourth Industrial Revolution is defined as the emergence of cyber-physical systems that provide people and machines with whole new capabilities (Mpofu & Mhlanga, 2022). 4IR has been recognised as the new efficient component of an economic strategy that results in lower costs and boosts efficiency in many industries (Radanliev, Roure, Nurse, Montalvo, & Burnap, 2019). This trajectory can help SMEs in emerging economies to compete globally by taking advantage of 4IR.

The Internet of Things (IoT), as a flourishing digital technology, is one of the emerging drivers of the economy in many countries, transforming the business landscape and forms of collaboration and value creation (Selander et al., 2013). IoT refers to the network of small and intelligent devices that are widely distributed across geographic locations, are connected through the Internet, and have extended human sensing capabilities (Saheb & Izadi, 2019). IoT represents a step forward in technical innovation by connecting items and gadgets over the internet. It offers unrivalled levels of visibility, agility, and adaptability for managing a wide range of technology difficulties, such as allowing producers to track and trace the flow of raw materials and products along with the technology while also doing quality control checks and planning (Peter, et al., 2023). The digital age is fundamentally changing the way our society and businesses operate. The current study demonstrates the lack of interest among IoT SMEs and start-ups in developing meaningful interactive and engaging social communities around IoT products. As a result, the chances that SMEs and start-ups will be able to extract value have been reduced and IoT products and services are not customized based on the perspectives of the consumers (Saheb & Mamaghani, 2021). Therefore, SMEs should promote its uptake and usage by various stakeholders in the whole ecosystem of digital age.

Theoretical and Conceptual Background

Theoretical underpinnings

A key issue in digital SME's success is the development of a theoretical foundation. Technology Acceptance Model (TAM), developed by Davis (1989), is one of the most influential research models for this study as it highlights determinants of information systems and information technology acceptance by individuals and owners of SMEs. Davis (1989) explains that there are two determinants including perceived ease of use and perceived usefulness. Perceived usefulness is the degree to which an individual believes that using a particular information system or information technology would enhance his or her job or life performance.

Perceived ease of use is the degree to which a person believes that using a particular information system or information technology would be free of effort. The current study critically considered the TAM in establishing the uptake and adoption of IoT by SMEs in emerging economies. Rodgers (2002) came up with Innovation Diffusion Model (IDM) which is a process through which an innovation "is communicated through certain channels over time among the members of a social system.) Dynamic Capability Value (DCV) which is characterised by "dynamic capability" (DC) as the ability of a SMEs to frame and reframe internal and external competencies to cope with unpredictable environmental events and in this case the IoT. Steiner (1979), Hofer (1990) and Ginsberg and Venkatraman (1985) express that Strategic Contingency Theory (SCT) view a firm's resources in conjunction with environmental factors as possible avenues for strategic formulation making contingency central to the firm's operation. IoT is therefore one of the environments which affects firms' operations and performance, and SMEs should strategically think about that. This study believes that TAM, DCV and SCT are the most appropriate theories in this study in the context of SMEs for their survival and to gain the competitive advantage in the digital era.

Research and Methodology

Systematic review methodology

For this study, a systematic literature review approach was used to unpack issues pertaining to the uptake and usage of IoT by SMEs in digital era. PRISMA framework was therefore used to perform the systematic review analysis. When conducting this literature review, these keywords have been searched: TITLE-ABS-KEY ("Internet of Things" OR 4.0 OR "Fourth Industrial Revolution" OR "Digital Transformation" OR 4ir OR "Digital Era" AND SMEs OR " Small and Medium Enterprises" AND "Emerging Economies"). Figure 1 below demonstrates the process which was followed. The articles reviewed were current articles that ranged from 2018 to 2023. Scopus database was utilised to search for relevant journal sources which then was evaluated in relation to the study objectives. These articles were reviewed for relevance to the study by considering their titles, abstracts, and introductions. 57 articles were shortlisted out of 153 articles in the preliminary research however, after carefully screening the articles and applying a set of criteria of exclusion, 32 articles were finalized which formed the sample for this study. The presentation of the findings was guided by themes emanating from the three objectives that informed the study.

Findings and Discussions

A bibliographic analysis was performed on the Scopus and Google Scholar databases and provided a total of 153 corresponding articles. Next, the relevance of each paper was checked, according to its research area.This refining process resulted in the exclusion of papers from unrelated areas of research such as energy, engineering, environmental science, mathematics, and psychology. 47 papers were then retained for the next step. Retained 47 papers were exported to CSV excel, duplicate data was removed, and abstracts were screened using the coding Relevant (R) = 1, Not Relevant (NR)= 0 and Maybe Relevant (MR) = 2. Irrelevant papers were removed, and 32 papers were retained. The following are therefore the results for this systematic literature review.

Adoption of Internet of things by SMEs

In developing nations, SMEs do not or are slowly adopting IoT concepts, making them less competitive (Peter, et al., 2023). Although 4IR offers immense benefits to the industrial community, the adoption of IoT needs SMEs restructuring and improved technological capability. (Karuppiah, et al., 2023). Transformation towards 4IR is also forced by decreased product lifecycles and heterogeneous market trends (Horvath & Szabo, 2019). Hence, the adoption of IoT has become mandatory for the industrial community of both developed and emerging economies (Karuppiah, et al., 2023). The slower adoption of digital technologies could also lead to inequalities and unsustainable development within countries, for instance between different sectors or large and small firms (Birkel et al., 2019). Results established those smaller businesses, in particular, are in danger of missing out on the benefits of the industrial age. As a result, more investigation and intervention strategies are required to position SMEs to adopt and implement IoT (Sommer, 2015). Therefore, this study recommends a framework which promotes the adoption of IoT by SMEs in emerging economies. On the other hand, digitalisation is seen as an important vehicle for economic development and is supported by policies and investment (Niehoff, et al., 2022), therefore SMEs who are adopting its use are witnessing growth of their businesses.

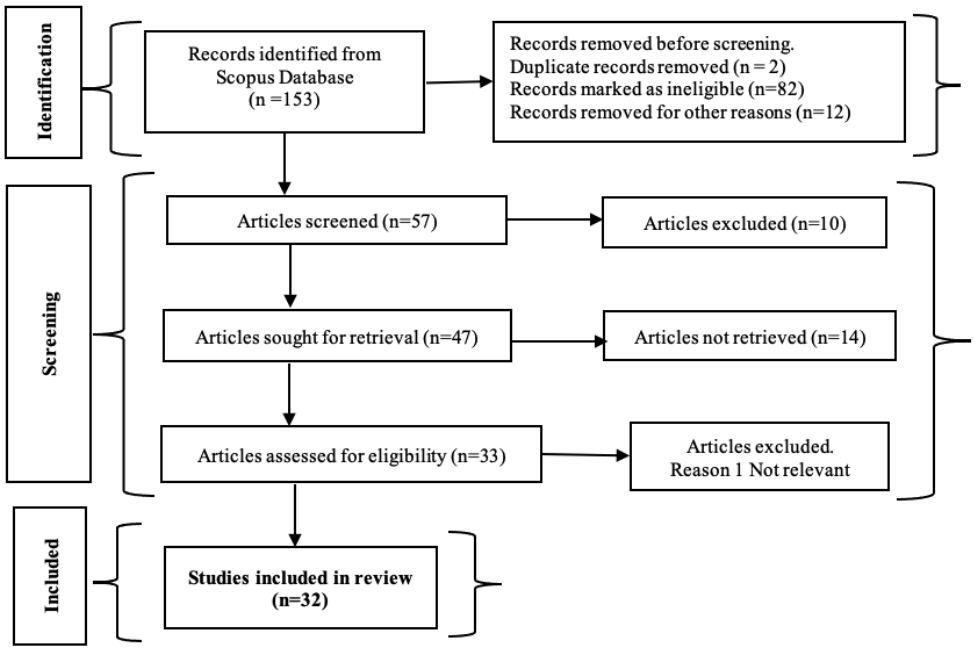

Figure 1: Systematic Review Process; Source: Authors own compilation.

The study established that some SMEs in emerging economies are adopting IoT due to the availability of real-time information from the 4IR and advanced analytical capabilities (e.g. big data analytics) as well as improved reliability (e.g. through blockchain technology) facilitate the self-organisation of production processes and promote transparency, flexibility, and efficiency (Beier et al., 2020). Results demonstrated that SMEs worldwide are embracing 4IR and its associated technologies, such as the IoT, Advanced Robotics, Big Data, and Cybersecurity. IoT technologies improve organisations' productivity, quality, cost, delivery, environmental, and safety levels (Rüßmann et al., 2015; Ardito et al., 2018). However, its implementation poses considerable risks for SMEs in emerging economies. By using cutting-edge technology, SMEs may improve their capabilities and continue to compete worldwide, enabling businesses to diversify and reach global markets. The transition from centralized to decentralized control, which allows for more flexible manufacturing of new products and services, is one of the most significant changes brought about by 4IR.

Important key factors of 4IR adoption

The evaluation of key critical key factors within a digital business ecosystem through a systematic literature review study enables us to better explain the existence of varied actors, their complex interactions, and value creation processes (Saheb & Mamaghani, 2021). The current study fills the research gap on IoT adoption by SMEs in emerging economies arguing that the key factors of 4IR ecosystem can be determined through measuring productivity, robustness, creativity, and interoperability, which provide new insights into the survival or bankruptcy of digital companies (Iansiti & Levien, 2004a).

This study found out that SMEs would need broader networks and support to adopt the new technologies as digitalisation of industries is being carried out differently in distinct nations and they cannot develop the value chain in isolation (Phuc, Kumar & Ruan, 2019). This creates opportunities for SMEs to gain access to existing knowledge and create a resilient system and processes in the future (Radanliev, Roure, Nurse, Montalvo & Burnap, 2019). Moreover, SMEs can differentiate themselves from their competitors and by adopting technologies, it allows them to be more competitive when managing the uptake and usage of IoT for their businesses.

Table 2 below indicate some of the key factors which influence 4IR adoption. The study established that there is a high adoption rate of digital technologies within large multinational corporations, with high level of sophistication in how these technologies were integrated into their business management and operations and with other information systems. On the other hand, SMEs in emerging economies seemed to lack the understanding of the importance of developing new business models or adopting already tested business models well aligned with the demands of the digital era. They had a lower adoption rate and had their adoption of digital technologies in more fragmented manner that was often restricted to certain functional areas such as moving vital assets to the cloud or use of social media in engaging with their customers. Siebel (2019) believes that “the size of a company does not affect its stability and longevity. Small agile start-ups are crowding out giants that have ceased to develop”. With this phrase, the author confirms to the advantage of SMEs to update quickly and thereby adapting to the external environment for survival.

Table 1: Key Factors For 4IR Adoption

Key factors	Description	Reference(s)
Ability to expand IT infrastructure	To ensure seamless execution of operation, high-end computer infrastructure is required	Chen & Chen (2019); D'Adamo et al., (2020); Osterrieder et al., (2020)
Competence to ensure data protection and security	Data exchanged among different departments must be protected from cyber attack	Frank et al., (2019; Kamble et al., (2018)
Ability to maintain reliable data	Consistent and reliable data on the industrial operation is required for seamless execution of the industrial operation	Chen & Chen (2019; Favaretto et al., (2020)
Facility to maintain proper data storage system	A proper data storage system will act as a database and repository of industrial processes	Kamble et al., (2018)
Capacity to provide proper training to employees	Giving formal training to employees will assist in reliable data collection	Kagermann, (2015; Raj et al., (2020)
Readiness to integrate different departments	Proper information flow among different departments will greatly enhance industrial operations	Haseeb et al., (2019; Osterrieder et al., (2020)
Willingness to change organization's culture	Industries have to change from conventional culture to clan culture	Haseeb et al., (2019); Kagermann, (2015)
Potential to reach consensus among the stakeholders	For the establishment of IT infrastructure, cooperation among the stakeholders is essential	Bydon et al., (2020; Sharma (2016)
Ability to analyse key performance indicators	Concentrate and monitor more on the key performance indicators of the industrial performance	Roblek et al., (2016; Wortmann & Flu¨chter, (2015)
Ability to construct standard and reference architecture	Constructing a standard architecture will act as a benchmark for measuring the performance	Favaretto et al., (2020; Kagermann, (2015)

Source: Authors own compilation.

Opportunities brought by IoT

Digitalization and technological leaps are expected to assist industrial sectors in creating sustainable business models (Del Giudice et al., 2021) for SMEs in emerging economies. Using IoT, it is possible to improve productivity, efficiency, flexibility, and agility. The dawn of IoT technologies has changed many SMEs processes (Stock and Seliger, 2016). Progress towards IoT gives immense opportunities for an industrial organization to realize various sustainable SMEs processes. From the operational perspective, digital technology, using cyber-physical system (CPS), is expected to reduce set-up time and production time, resulting in increased productivity (Dalenogare et al., 2018; D'Adamo *et al*., 2021). Although, IoT technologies are still in their infancy in underdeveloped nations and small and medium-sized businesses (Onu, Peter & Mbohwa, 2021), the technologies have a high degree of unpredictability and provide a wide range of performance outcomes depending on the activity or context of use. 4IR include increasing human-machine interaction, tracking, and self-recognition of components via intelligent robots and optimizing SMEs based on IoT connectivity (Qi, Qinglin & Fei Tao 2018). Previous research has addressed the opportunities of IoT technologies with a focus on the socio-economic purview of SMEs in developing economies to improve productivity (Elhusseiny, Magdy & Crispim, 2021).

Challenges in implementing IoT

Results established that there is lack of evidence-based cases of SMEs that have successfully incorporated a significant amount of 4IR technology such as IoT. Multinational enterprises (MNEs) apply robust ideas and technology that are not appropriate for SMEs (Peter, et al., 2023). Furthermore, the results review that SMEs have limited resources as per funding and qualified employees for conducting research and innovation activities. Now, just a few works of literature specify the requirements for 4IR and IoT implementation, particularly for enterprises in emerging economies (Ghadimi, Pezhman, Oisin Donnelly, Kubra Sar, Chao Wangm & Azadnia, 2022). Although 4IR has great promise in SMEs, the key constraint is a lack of strategic implementation frameworks for its deployment and widespread adoption. Furthermore, an increasing number of SMES are confronted with the problems of individualized and customized products (Peter, et al., 2023). This is especially true for SMEs, active in worldwide commerce and facing increasing product diversity constraints (Dostie and Benoit, 2014).

This study established that SMEs are characterized by their limited financial assistance, number of workers (less than 250), rigid organization structure, limited technological advancement and reluctance of industrial management, technological upgrades remain a challenge for SMEs (Yu¨ksel, 2020). Because SMEs are primarily confined to developing countries, technological updating is a major problem for industrial communities in emerging economies (Karuppiah, et al., 2023). A study by Kamble et al. (2018) indicates that a lack of clear understanding of 4IR is the major hindrance in embracing 4IR by industries in the emerging economies context.

Further, the absence of standard government regulations for industries using 4IR increases the security breach (Raj et al., 2020). Such barriers raise concerns about data ownership and cybersecurity. Regardless of the barriers, the growing level of competition and the need for reduced time-to-market requires industries to adopt 4IR (Oomen et al., 2019).

SMEs businesses are hesitant to use IoT technology due to concerns about its reliability. In today's context for SMEs, tool reliability and overall equipment efficiency are the most important components for boosting the overall quality of production systems (Peter, et al., 2023). The study found out that due to a complete lack of internationally predetermined criteria on certification, SMEs will find it more challenging to join the value creation network and get certified to run the various technologies. Firms may be hesitant to incorporate IoT technology due to this problem unless specified standards and roadmaps are in place. Conversely, emerging countries in sub-Saharan countries have an advantage over industrialized nations in that they are not burdened with meeting factory design requirements and may have little trouble adopting change (Peter, et al., 2023). Furthermore, electricity shortages are viewed as a challenge to the digital revolution toward 4IR. While installing cutting-edge IT infrastructure and advanced cyber-physical systems will be necessary for complete IoT adoption, enterprises will need to invest significant capital in implementing these technologies. As a result, SMEs in developing countries may be more vulnerable to failure implementation. The study established that implementing 4IR is not profitable if the solutions achieved have a low value.

Conclusions

The current study proposes a framework for digital transformation for SMEs in digital era in emerging economies. It aims to understand the the adoption of IoT by SMEs in digital era in emerging economies and to establish challenges faced by SMEs in implementing IoT in emerging economies. The present study addresses the important factors of 4IR adoption and opportunities brought by IoT. It can therefore be concluded that businesses which digitise will remain competitive and have a long-term future. At the same time, under the influence of new technologies, production processes will be implemented automatically, so employees have more time for creative work on the part of an entrepreneur (Martinsuo & Luomaranta, 2018.) further assert that SMEs should plan strategies to overcome the challenges in digital technology adoption which include a clear identification of the benefits of the technology investment. Consequently, a proposed framework for digital transformation for SMEs in digital era in emerging economies was developed.

Practical Managerial Implications and Recommendations

The result of this review has significant managerial and practical implications as it offers some insights to SME managers when handling issues to deal with the uptake of IoT, digitalisation and digital transformation as part of 4IR. Proactive leadership is necessary in for digital transformation of SMEs business and must understand the need for impart knowledge on the significance of 4IR and its role in value creation to industrial performance in the developing country context (Karuppiah, et al., 2023). Based on the outcome of this research, other researchers and managers can investigate further the digital transformation initiative so the small and start-up SMEs can enhance their participation opportunity in the global market. This will be beneficial from an academic as well as a managerial point of view. Leaders and management can be able to identify the skill gaps within their organisation which may require rearrangement of staffs who mismatched positions or cannot be reskilled or upskilled to work with the new technologies' application (Phuc Khanh Linh et al., 2019) which are brought by digital era to transform businesses, quickly seize opportunities, and mitigate risks from digital transformation.

Recommendations

SMEs in emerging economies should be aware of the various technologies brought by 4IR technologies as well as strategies for implementing IoT by SMEs in emerging economies and its impact and outcome thereof as demonstrated in Figure 2 below.

This study has identified technologies which are common with 4IR namely IoT, artificial intelligence, big data, block chain, interoperability, smart factory and augmented reality among others. This study therefore recommends that more efforts is required to provide adequate tools for small and medium-sized enterprises to implement 4IR, especially in emerging economies and Africa in particular. What is striking is the lack of evidence-based cases of SMEs that have successfully incorporated a significant amount of 4IR technology. The paper therefore focuses on uptake of IoT by SMEs in digital era in emerging economies. The study recommends that IoT should be embraced by SMEs in emerging economies because of the benefits associated with it such as assisting industrial sectors in creating sustainable business models (Del Giudice et al., 2021). and possibility of improving productivity, efficiency, flexibility and agility and the dawn of IoT technologies has changed many SMEs processes (Stock & Seliger, 2016).

Several developed countries have started enhancing technological capability through various programmes because they realize the potential impact of IoT in industrial performance (Karuppiah, et al., 2023). The deployment of IoT in emerging economies in the context of risk associated with implementation of IoT by SMEs in emerging economies requires some strategies to be in place to mitigate such challenges and risks. This study therefore recommends that there is need to organize some networks and have Public Private Partnerships (PPP) in implementing the uptake and adoption of IoT by SMEs at local, regional, and international level. This can be done by assessing their present digital capabilities and technical skills and assisting them when resources are in rolling out the programme.

Governments must also provide microcredit finances as well as some subsidies, and licensing processes for SMEs should be reconsidered to enable them to access IoT technologies or instead integrate their factories into the cloud. There should also be a platform which allows SMEs access to IoT demos and pilot labs to comprehend 4IR concepts better and learn more about these technologies. This study also recommends that it is important to influence people's cultural views about digitization and IoT and change their perception and attitudes through consistent educational resources.

This study also recommends that it is important to organize development programs for all levels of employees to enhance their digital literacy. As well as raise awareness of the possible benefits of implementing IoT technology. It is also of paramount importance for SMEs in emerging economies to create a sustainable network for foreign experts to guide access to funding programs to stimulate corporate investment in IoT technologies. The study also recommends the establishment of a framework for developing proactive leadership and administrative capabilities in 4IR and support businesses in upskilling their present workforce by examining the skills needed and directing them to the proper resources.

Impact and outcome of IoT

After everything has been said and done this study recommends that SMEs should adopt IoT in emerging economies for them to enjoy the benefits associated with its implementation. This comes in the form of improved reliability, transparency, flexibility, and efficiency self-organisation of production processes improved profitability as part of organization performance. This is an important vehicle for economic development which can be supported by policies and investment (Niehoff, et al., 2022), therefore SMEs who are adopting its use are witnessing growth of their businesses.

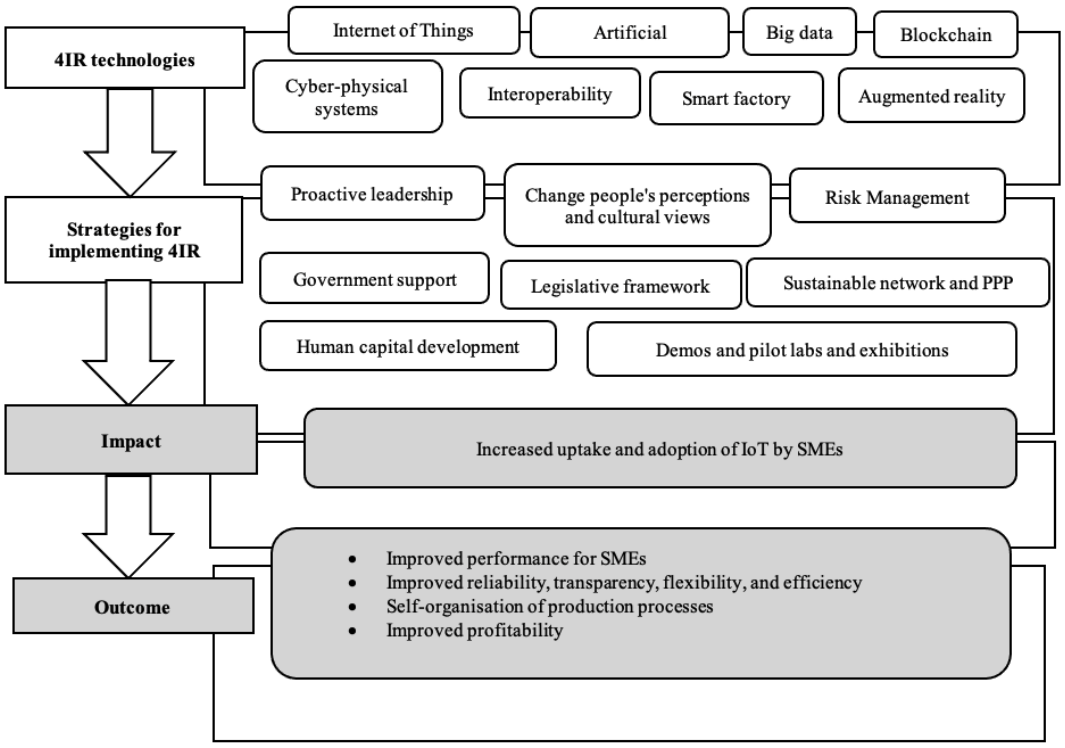

Figure 2: Framework for Digital Transformation for SMEs In Digital Era in Emerging Economies; Source: Author own compilation.

Research limitations

This study was a systematic literature review and was limited to Scopus Database and was focusing on articles only which ranging between 2018 to 2023. The study was also limited to SMEs by establishing the uptake of Internet of Things (IoT) in digital era in emerging economies.

Future research

This paper advances the study of the IoT for SMEs on the uptake of Internet of Things by SMEs in digital era in emerging. The paper has been enriched by employing by carrying out a systematic literature review by looking at relevant articles from emerging economies and developed economies. Future developments of this work can be accomplished in two main directions: (i) the qualitative approach of extracting the impacts of IoT on SMEs in emerging economies could also be complemented with other methodological approaches, such as multiple case studies. This can help to determine and examine these effects more precisely and

extract the impacts that have not been considered in this systematic literature review so far, and (ii) this research methodology could be applied in developed economies and a comparative analysis for lessons that can be learned for these two different economies.

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