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Uneven digital frontiers: Adoption of digital technologies across finance, retail and manufacturing sectors in South Africa

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Background: Digitalisation could stimulate economic growth and contribute to national development. Empirically identifying sectoral similarities and disparities in digital adoption and types of technologies used in South Africa could provide a blueprint for sector-tailored digital adoption in South Africa.

Objectives: This study examines the extent of digital technology adoption across three sectors in South Africa, namely finance, retail and manufacturing.

Method: A qualitative research approach was employed, using semi-structured interviews to collect data from 45 human resource professionals, operational managers and employees from the three identified sectors. Purposive, convenience and snowball sampling methods were used. Data were analysed using thematic analysis.

Results: Two major themes emerged: (1) varied levels of digital technologies adoption and (2) commonly used types of digital technologies. The manufacturing sector is perceived as lagging in terms of digital adoption, with the retail sector being perceived as a moderate adopter of digital adoption. In contrast, the finance sector is perceived as a strong adopter of digital technologies.

Conclusion: The study offers managerial implications. Leaders and policymakers are urged to prioritise the adoption of digital strategies, foster private–public partnerships for digitalisation and empower employees with digital competencies. The government needs to ensure that infrastructure and sectoral incentives promote digitalisation for the benefit of national development.

Contribution: These results contributed to theory-building around sectoral digital adoption in emerging contexts and could be used as the foundation for the development of targeted interventions to address the uneven pace of technological adoption and to close this gap across South African sectors.

Keywords: digital technology adoption; digitalisation; finance sector; retail sector; manufacturing sector; South Africa.

Introduction

The implementation of digital technologies in workplaces increased because of the Fourth Industrial Revolution (4IR) and was further accelerated during the coronavirus disease 2019 (COVID-19) period (Chapano 2022; Paul et al. 2024). The 4IR blurs boundaries between digital, physical and biological spheres because of the fusion of digital technologies that are transforming production, management and governance ecosystems (Chapano 2022). The 4IR digital technologies are improving the effectiveness and efficiency of businesses and enabling billions of people to ubiquitously connect (Chapano 2022). Digital technologies such as social media, mobile applications, analytics, cloud computing, robotics, artificial intelligence (AI), blockchain and the Internet of Things (IoT) are among the most reported in the workplace (Chapano 2022; Gonese & Ngepah 2024).

Amid this, there is a sense that the implementation of digital technologies is varied across industries and especially in developing countries like South Africa (Sichoongwe 2023). This uneven adoption of digital technologies could exacerbate the digital divide, hamper cross-sectoral integration and data sharing, undermine the economic development of the nation, lead to disparities in skill development and limit the implementation of national policies and initiatives

(Andreoni et al. 2021; Gonese & Ngepah 2024; United Nations E-Government Survey [UNEGS] 2022; Van Dijk 2020). For instance, Van Dijk (2020) opines that on a national level, inclusive development and digital equity can be derailed if digital access is uneven across industries. Andreoni et al. (2021) mention that the uneven use of digital technology creates 'islands of excellence' benefiting specific sectors rather than the entire nation. This is a cause for concern as it could impede developing countries from fully harnessing 4IR technologies.

In South Africa, sectors such as finance, retail and manufacturing are most likely to benefit from the uptake of digital technologies and contribute more to the gross domestic product (GDP) of the country (African Development Bank Group [ADBG] 2024; Dludla 2024; PricewaterhouseCoopers [PwC] 2024). The retail sector, for instance, is considered the third largest industry (KPMG, 2024) and the second largest employer in South Africa. Retail sector companies such as Takealot are tapping into underserved rural areas and townships by leveraging digital technologies and by connecting non-tech-savvy customers with personal shoppers to help them buy commodities (Dludla 2024). In the financial sector, accessibility to efficient financial products and services via financial technologies (fintech) contributes to the expansion of the sector (ADBG 2024; Matsepe & Van der Lingen 2022). The manufacturing sector contributes 13% of the country's GDP, and the use of digital technologies in this sector is believed to support this achievement (PwC 2024). Because of potential variations in the rate of adoption, use and type of digital technologies deployed, it was deemed necessary to investigate and compare these sectors as the basis for gaining insight into the status of digital technology adoption in South Africa as a developing country. This could guide competitive business strategies and inform policies for leveraging digital technologies for the achievement of business objectives. Haryanti, Rakhmawati and Subriadi (2023) call for more research to properly address the digitalisation phenomenon, including more comparative research in developing countries. In South Africa, Gonese and Ngepah (2024) underline the need to develop policies and interventions informed by research findings on different sectors to maximise opportunities for digitalisation and to mitigate adverse effects such as inequalities and unemployment in certain sectors.

In addition, most studies focus more on the general rather than the specific adoption of technology within a specific sector and without considering cross-industry adoption of digital technologies (Paul et al. 2024; Thoukidides, Calandr & Gay 2025). According to Thoukidides et al. (2025), technology adoption must be understood from the perspectives of diverse stakeholders. This study, therefore, aims to close this gap by examining the extent of digital technology adoption and the types of digital technologies used within three sectors in South Africa, namely finance, retail and manufacturing. By placing adoption patterns within the South African context of sectoral diversity, this study adds unique empirical and theoretical insights to the body of knowledge on digital transformation.

Research objectives

The objectives of the study were to:

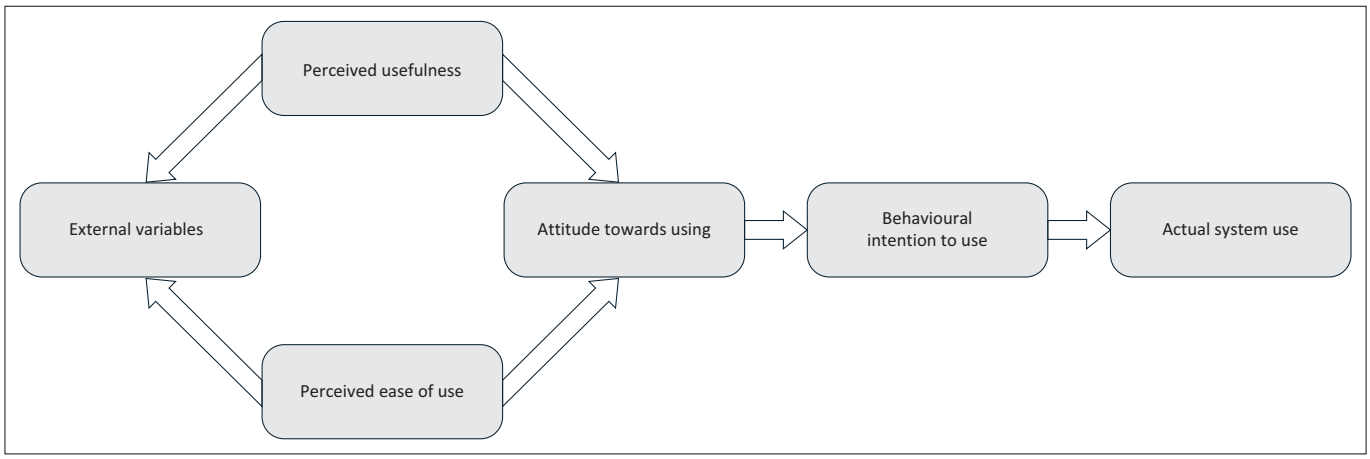
- Explore the adoption of digital technologies within the finance, retail and manufacturing sectors within South Africa from the perspective of human resources (HR) professionals, operational managers and employees.
- Identify the type of technologies adopted within the finance, retail and manufacturing sectors within South Africa.
- Propose strategies and policy recommendations that can enhance digital adoption – particularly in finance, retail and manufacturing sectors, while leveraging best practices, thereby contributing to both practical solutions and theoretical understanding of adopting digital technologies in emerging economies.

Literature review

The adoption of digital technology refers to the acceptance and use of digital technologies by either individuals or organisations (Sichoongwe 2023). It is not merely about automating business functions but about using digital technologies in the delivery of business services, in marketing the business brand and adding value to the business (Chapano 2022; Ulrich 2019). Digital applications enabling real-time monitoring and data analytics hold the promise of innovation to business operations (Sapra 2025). The extent and the type of digital technologies adopted in a sector influence the sector's digital readiness and propensity to contribute to the competitiveness of the country (Mkansi & Landman 2021). Harrison-Harvey et al. (2024) identify digitalisation as a driver of productivity as well as an enabler of economic growth, transformation and poverty reduction.

Theoretical framework

A diverse range of theories could be used to guide and underpin studies that are related to the adoption of digital technologies. The technology acceptance model (TAM) is used in this study to understand how the behavioural adoption of digital technologies in different sectors could be influenced by the interaction of managers and employees with technology. The TAM, as depicted in Figure 1, was developed by Davis (1989) and proposes that perceived usefulness and perceived ease of use are factors that influence the adoption of digital technologies. The TAM is based on the theory of reasoned action (TRA) by Fishbein and Ajzen (1975). As depicted in Figure 1, there are external variables, such as subjective norm and self-efficacy, which demonstrate that the confidence of the person (self-efficacy) and social influence (subjective norm) from people the person values, such as supervisors or peers who expect him to use the technology, will increase perceived ease of use, perceived usefulness and behavioural intention to use the technology, resulting in using the digital technology (Venkatesh & Davis 2000).



Source: Adapted from Davis, F.D., 1989, 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly* 13(3), 319–340. https://doi.org/10.2307/249008; Fishbein, M. & Ajzen, I., 1975, *Belief, attitude, intention, and behavior: An introduction to theory and research*, Addison-Wesley, Reading, MA

FIGURE 1: Technology acceptance model.

Perceived usefulness refers to a belief that performance will be enhanced if a specific digital technology is adopted, while perceived ease of use refers to a belief that using the technology will require less effort in executing a task (Davis 1989). The actual use of the digital technology is influenced by these two primary beliefs (perceived usefulness and perceived ease of use), which determine the attitude of the user towards using the digital technology, which in turn shapes behavioural intention to use. Thus, the TAM serves as a basis for understanding the rationale for adopting specific technologies. An organisation will invest in technologies if the technology is believed to improve the performance of a business and if it is believed that the technology will make the organisation more efficient. Variation in the adoption of digital technologies across different sectors could be engendered by perceived usefulness and ease of use of technologies. Based on this assumption, it could be postulated that there are technologies that are more likely to be adopted in certain sectors, and the adoption level could vary based on perceived usefulness and perceived ease of use. Harrison-Harvey et al. (2024), for example, noted that the manufacturing sector is critical in the drive for digitalisation and economic growth in South Africa. The model for the adoption of digital technology also addresses Gandhi, Khanna and Ramaswamy (2016)'s question, which is, 'which industries are the most digital (and why)?'

A range of 4IR technologies is available for adoption across businesses' value chains, and these include social and mobile applications, data analytics, Cloud (SMAC), AI, blockchain, virtual reality (VR) and robotics (Chapano 2022; Thite 2019; Ulrich 2019).

Social media applications

Social media refers to Internet technologies, such as Facebook, LinkedIn, Twitter (X), WhatsApp, Google+, Skype, Instagram, YouTube, Snapchat and Pinterest, used by people to communicate and collaborate digitally, and thus enabling the sharing of knowledge even when people are geographically dispersed (virtual teams) (Ulrich 2019). Boarah, Iqbal and Akhtar (2022) found a preference for the use of social media by small- and medium-sized enterprises (SMEs) because of these technologies requiring less investment. Ulrich (2019) perceives that social media applications are essential tools for involving internal and external stakeholders in the activities of the organisations. While companies can use insights via content generated by users to assess their brand and improve the performance of the business, it is also noted that some content generated by users on social media could be misleading and is thus not suitable for informing business decisions (Thite 2019). Organisations need people skilled in social media analytics and with marketing expertise to monitor and manage social media platforms.

Mobile applications

Mobile applications include all wireless mobile devices and applications, connected or installed via cellular, Wi-Fi or other technologies, which enable people to communicate with each other and with organisations, as well as have access to information at any time and any place (Paul et al. 2024). These mobile applications include smartphones, laptops, tablets, personal digital assistants, wearables and other mobile applications, which create a mobile ecosystem of ubiquitous connectivity and enable people to complete their tasks digitally (Albayrak et al. 2023). Google's Play Store and Apple's App Store, for example, offer around 3.5 and 2.2 million applications, respectively (Statista 2022), with these statistics continuously increasing. Mobile applications are being used by people and by businesses for communication, production, engagement, gaming, entertainment, shopping, travel and finance (Albayrak et al. 2023). It is asserted that mobile applications have been welcomed by most businesses and people because of their ease of use, efficiency, simplicity and speed (Paul et al. 2024). Retail and financial organisations are some of the notable sectors in which mobile applications are contributing to the digital economy and digital business transactions (Paul et al. 2024). For example, retail companies such as Checkers have branded mobile applications that can be downloaded by customers,

enabling direct contact and transactions between retailers and customers (Thorne 2024).

Data analytics

Data analytics gained prominence because of the advent of the big data concept. Data analytics is a product of digital businesses, using mostly mobile devices and social networks, including the IoT to generate volumes of data constituting billions of gigabytes daily (Yang & Shami 2022). Up to 2020, the amount of data managed by businesses grew exponentially to more than 44-fold, with 90% of this data having been created in the previous 2 years (Bartley 2025). 'Big data', per se, is raw information with low value and little strategic importance, unless such data are crunched, sifted, processed and analysed using the right analytics and giving meaningful inferences to solve business challenges (Sapra 2025). In the manufacturing sector, for instance, big data is applied in supply chain management and product development to identify trends (Ajeigbe & Chris 2024). In addition, using predictive analytics, the condition of machinery and equipment is monitored and adjustments are made where necessary, saving maintenance and repair costs (Ajeigbe & Chris 2024).

Cloud computing

Cloud computing is a digital technology model that provides resources, such as applications, networks, infrastructure, data storage solutions, servers and platforms accessible through the Internet worldwide for on-demand consumption and real-time delivery using Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS) or Infrastructure-as-a-Service (IaaS) type of platforms (Chapano 2022). Users of cloud computing do not manage the system directly, and interaction with the service provider is limited (Pasi, Mahajan & Rane 2020). Cloud technology offerings can be customised to the user's requirements, which is perceived as a more affordable option because of less investment required (Kumar et al. 2024). This affordability is the most likely reason for the rapid adoption of cloud computing, according to Fortune Business Insights (2024), which estimated the market value of cloud computing at $587.78bn.

Cloud applications such as the enterprise resource planning (ERP) systems are commonly used by manufacturing organisations to store data and allow managers and other users' access to these data from anywhere, for collaboration on projects and the management of production, inventory and customer relationships (Hasan 2018). In retail, enterprise retail point of sale (POS) is being transformed from basic sales transactions to also include data analysis, real-time management of inventory and tracking of sales through integrated data analytics, AI, cloud computing and personalising the customer experience (Santos & Bacalhau 2023).

Internet of Things

The IoT refers to an interconnected network of physical things or devices on the Internet that enable these devices to create and exchange data quickly (Paul et al. 2024). The IoT enables the connection of mobile phones, machines, scanners, closed-circuit televisions (CCTVs) and Bluetooth-based headsets to create a worldwide network for communication to take place between what Pasi et al. (2020) describe 'thinks to things, thinks to people, people to thinks and people to people' (Pasi et al. 2020). The output data of this dynamic network are used to make decisions and distribute goods and services in a digital transformation channel (Pasi et al. 2020). In the financial sector, IoT models aid financial transactions between the business and customers (Kumar & Gupta 2023), with privacy of information a priority (Paul et al. 2024). In the manufacturing sector, IoT provides data on equipment performance, with sensors being used to measure air pressure, oxygen levels and temperature. In the retail sector, IoT enables self-checkout systems (Chui, Collins & Patel 2021).

Artificial intelligence

Artificial intelligence involves machines, systems or computers being programmed to reflect intelligence likened to human intelligence, enabling perception, language processing, speech recognition, text generation, self-driving cars, mathematical calculation, decision-making and automated responses (Nawaz et al. 2024). It was reported that AI is expected to generate an increase of 40% in productivity because of efficiency and accuracy, with 35% of companies using AI and 42% more exploring the adoption of AI (Accenture 2023; Johnson & Nick 2023). Artificial intelligence is also utilised in (HR) for analysing resumes and identifying suitable candidates for a job (Chapano 2022; Nawaz et al. 2024).

Being embraced in sectors such as manufacturing, retail and finance, AI can monitor customer experience and employee performance, inform rewards, employment, pricing and promotion decisions (Robertson et al. 2025). In addition, AI is used in mobile applications and chatbots, providing instant customer services (Nzama et al. 2024). In the finance sector, AI assists in detecting fraudulent activities such as identity theft, phishing and card cloning (Mohamed & Vahed 2024). The adoption of AI has its challenges, such as concerns related to integrity and morality (Nawaz et al. 2024).

Robotics

Robotics refers to machines or systems programmed to automatically execute physical duties such as packaging, grinding, painting, cleaning, inspecting, assembling, disassembling and casting (Rapanyane & Sethole 2020). Being powered by AI, these machines can work smarter and be more responsive to the environment. In the finance sector, the tracking of performance and compliance reporting is sped up through robotic process automation (RPA), which

pulls data from different systems into spreadsheets (Dennis 2025). Using robots is perceived to be cheaper in the long run and a solution to scarce skills and cost challenges. In Japan and South Korea, it was estimated that there were 303 and 631 robots for every 10 000 employees, respectively, in the period before 2020 (Rapanyane & Sethole 2020). In South Africa, robotics is perceived to enhance quality, create opportunities and increase productivity, especially in the manufacturing sector, where repetitive tasks can be automated and employees can be utilised better (Calitz, Poisat & Cullen 2017).

Blockchain

Blockchain is a digital, real-time, distributed transaction ledger maintained on multiple computer systems controlled by different entities (Matsepe & Van der Lingen 2022). Blockchain technology gives multiple users digital access to recorded transactions, while the security of information is guaranteed. Thus, blockchain provides transparency through peer-to-peer networking (Dowelani, Okoro & Olaleye 2022). Blockchain overcomes weaknesses inherent in traditional databases and makes transactions more secure, transparent, anonymous and traceable, with more consensus and autonomy (Dowelani et al. 2022; Thoukidides et al. 2025). Blockchain technology is especially useful in the financial sector to decentralise finance platforms, including smart contracts and cryptocurrencies (Matsepe & Van der Lingen 2022), while in the retail sector, it enhances transparency and traceability in the distribution of goods and services (Gaur & Gaiha 2020).

Virtual reality

Virtual reality enables the experience of a real-world environment, while, in fact, the experience is virtual (Paul et al. 2024). Examples of VR technologies are Google Cardboard, Samsung Gear, VR head-mounted displays (HMDs) and VR-style websites (Rauschnabel et al. 2022). In the retail sector, VR technologies provide consumers with extraordinary experiences (Hwang 2024), for example, a virtual tour of their own home displaying furniture or decorations that they are considering for purchase. A VR-style website provides customers with a real-life experience of products and services, which could increase their purchasing intentions (Rauschnabel et al. 2022). In manufacturing organisations, VR can simulate the production line, including assembling or disassembling, and displaying the final product (Choi, Jung & Noh 2015).

Adoption level of digital technologies

In a study in the manufacturing sectors of China, Germany and South Africa, the adoption of digital technologies was rated at 47.7% and considered low (Gaffley & Pelser 2021). Low adoption in South Africa is a concern, considering that the manufacturing industry, a key contributor to the GDP of the country, is experiencing challenges such as higher tariffs imposed by the USA (Finance Monthly 2025). Having conducted a study on digitalisation in the manufacturing sector in South Africa, Avenyo, Bell and Nyamwena (2024) attributed the low level of digital readiness to a lack of knowledge of the dynamics of technology adoption (Avenyo et al. 2024). Willie and Mbongwe (2023) recommended more government assistance, greater collaboration and training to improve the digital competitiveness of the South African manufacturing industry, while the industry experienced pressure to adapt to the digital advancement experienced globally (Van der Walt 2024).

Although considered more advanced in digitalisation than the manufacturing sector, the adoption of digital technologies in the retail sector in South Africa was also perceived to be lagging (Deloitte 2022). In contrast, the financial sector was perceived as a leader in the adoption of digital technologies (Fitch Solutions 2020; Matsepe & Van der Lingen 2022). Marín-García, Gil-Saura and Ruiz-Molin (2024), who conducted a study in Spain, noted that the utilisation of advanced technologies in the retail sector improves sustainability-oriented service innovation. In South Africa, this is evident in the digital on-demand shopping services offered through Sixty60 for Checkers, 2U for SPAR, Dash for Woolies and ASAP for Pick n Pay, which have revolutionised the way retail businesses conduct business and engage with customers in South Africa. Using these technologies, customers can purchase items from these shops in a few clicks, avoiding busy aisles and checkout lines (Thorne 2024).

In the financial sector in South Africa, major banks are implementing digital strategies and changing their business models (Fitch Solutions 2020), transforming online banking, mobile banking and automated teller machines (ATMs). Simultaneously, financial institutions in South Africa are transforming in terms of digital asset management, payments, insurance, financing and advice (International Labour Organization [ILO] 2022).

Digital skills training within sector ecosystems

Generally, the demand for digital skills outweighs the supply in South Africa, and finance, manufacturing and retail are counted among sectors being affected by the digital skills gap (ILO 2023; Nkosi 2023; PwC 2024). While the finance sector has a reasonably established digital ecosystem that encourages employees to upskill with digital skills, the manufacturing sector has a weaker digital skills infrastructure (PwC 2024), and in the retail sector, there is a high demand for learning opportunities and access to digital tools to improve innovation and efficiency in the sector (Nkosi 2023). However, the digital skills gap can be bridged. According to the Department of Communications and Digital Technologies (DCDT), key initiatives to heighten the growth of the digital economy by fostering digital skills for digitalisation have been launched in collaboration with partners from the private sector (International Trade Administration [ITA] 2024). For instance, one of the initiatives, the Digital Economy Master Plan, is to ensure the integration of digital technologies

into those critical economic sectors like manufacturing, financial and retail and address the digital skills gap through education and training programmes for the sector's workforce (ITA 2024).

Research gaps

These findings from the literature confirm that while the TAM remains a dominant lens for understanding disparities in digital technology acceptance, the existing studies, in addition to be mostly theoretical and systematic review only, investigated the phenomenon in single settings, leaving a critical gap in cross-sectoral comparisons empirical studies (Paul et al. 2024; Thoukidides et al. 2025). Thus, this study aimed to address this gap by examining the extent of digital technology adoption and the types of digital technologies used within three sectors in South Africa, namely finance, retail and manufacturing.

Research methods and design

Research methodology entails methods used in the collection and analysis of empirical data in a study. In this study, an exploratory research design was adopted in conjunction with a qualitative research approach in alignment with an interpretivist paradigm (Saunders, Lewis & Thornhill 2023). This study aimed to examine the extent of digital technology adoption and the types of digital technologies used within three sectors in South Africa, namely finance, retail and manufacturing. An exploratory design and qualitative approach were deemed appropriate for engaging with participants considered knowledgeable about a phenomenon that lacked empirical evidence (Kumar 2019).

Population and sample

A population is a group of people or objects with the potential of assisting a researcher in finding answers to a problem or research questions (Saunders et al. 2023). A sample is a subset of a population, referring to the actual participants in a study (Kumar 2019). The population for this study consisted of operational managers, HR professionals and employees employed in companies listed on the Johannesburg Stock Exchange (JSE) and representing the financial, retail and manufacturing sectors in South Africa. Johannesburg Stock Exchange companies were chosen because of being known for their investment in digital technologies and for their governance and regulatory observance (Matemane, Msomi & Ngundu 2024). The finance, retail and manufacturing sectors were selected because of their potential to be impacted by digital technologies and related investment in South Africa (Dludla 2024; Matsepe & Van der Lingen 2022; PwC 2024).

Sampling refers to the process of selecting a subset (called a sample), which represents the population from a larger group or population to participate in a study (Kumar 2019). The target sample for this study was 45 participants comprising 15 operational managers (e.g. from marketing, finance or manufacturing departments), 15 HR professionals and 15 employees reporting to a manager drawn from the three selected industries. Through sustained engagement and flexible scheduling, a total of 45 participants were successfully interviewed. Thus, five operational managers, five HR professionals and five employees were drawn from each industry (manufacturing, retail and finance), ensuring the generation of diverse and rich insights. These participants were selected using a combination of purposeful, convenience and snowball non-probability sampling techniques (Saunders et al. 2023). Purposeful sampling allowed the inclusion of participants from the three selected industries, while convenience sampling allowed the inclusion of participants who were available and willing to participate in the study. Inclusion criteria were that participants had to be working in either financial, retail or manufacturing and for at least 3 years.

Data collection

Data were collected via semi-structured interviews with predetermined open-ended questions (Kumar 2019). The following open-ended interview questions were included in the interview schedule:

- To what extent do you consider your organisation to be digitalised?
- What technologies do you most often use in the workplace?

A pilot study was conducted with two operational managers, two employees and two HR professionals, with these interviews not being included in the results of this study. The final interviews for this study were conducted in March 2025 and April 2025. Two of the 45 interviews took place via Microsoft Teams, seven participants were asked to provide their answers in written form, while the remaining 36 interviews took place in-person at the participants' workplace. Potential participants were contacted via email and invited to participate in the study. They were provided with information about the study, including the objective of the study, inclusion criteria, estimated duration of the interview, procedure for the interview and that participation was voluntary. Email addresses of potential participants were obtained via invitation on social media platforms such as LinkedIn and company websites. The sample size was acceptable for a qualitative study (Creswell 2014). When additional interviews did not add novel information, data saturation had been reached.

Also, before an interview was conducted, the purpose of the study and the procedure for the interview were revisited with each interviewee. Each interviewee had to sign a consent form, indicating voluntary participation, confidentiality of personal information and the right to record and transcribe the interview. The interviews took between 10 min and 15 min. Where applicable, interviews were transcribed using the 'Transcribe function' in Microsoft Word. Following the process as described ensured trustworthiness of the study in terms of credibility, transferability, dependability and confirmability (Lemon &

Hayes 2020). Through involving participants of different organisational levels and from the three sectors, data triangulation was ensured. Credibility was further improved through inviting another qualitative researcher to review and confirm the codes and interpretations.

Data analysis

Data analysis entails converting raw data (responses of participants) into meaningful information using data analysis techniques. Inductive thematic analysis, as proposed by Creswell (2014), was used, with the researcher carefully examining the transcribed data by reading and re-reading to gain familiarity, before identifying emerging patterns and key themes. Initial codes were created by identifying common concepts and phrases (e.g. for adoption level (*larger extent digitalised, mostly manually based, on a scale 50% digitalised, a fully digital system*) and for types of digital technologies used (*MS Teams, computers, laptops, iPads, SharePoint, Instagram, POS system, PNET, ERP*). After this, broader themes were identified using the initial codes. The broader themes were reviewed, resulting in the merging of overlapping themes. To capture the essence of the findings, the themes were refined and named, and two major themes were derived: *varied levels of digital technology adoption and commonly used types of digital technologies*. Using existing literature and the objectives of this study, the final themes were interpreted and integrated into the findings section of this study.

Ethical considerations

This study formed part of a bigger mixed-method research study, with this article reporting on the qualitative component. Before the empirical study was conducted, ethical clearance to conduct this study was obtained from the Nelson Mandela University Research Ethics Committee (No. 1554). Before interviews were conducted, information sheets and signed informed consent forms were given to participants; participants' confidentiality and anonymity were assured, and the researcher obtained consent from identified participants, including for recording the interviews where applicable. Participants were informed of the topic, purpose and importance of the study, and that participation was voluntary and participants had the right to withdraw from the study at any stage with no consequence. Data collected were being stored in a secure file (password-protected devices), transcripts anonymised with only aggregated findings reported, no personally or organisational details were disclosed, and codes were used to ensure confidentiality.

Results

The inductive thematic analysis process resulted in two themes, namely (1) varied levels of digital technologies adoption and (2) commonly used types of digital technologies. These two themes, as aligned with the interview questions, are discussed, and verbatim responses are provided in support of the themes.

Theme 1: Varied levels of digital technology adoption

The theme, *varied levels of digital technology adoption*, highlights the extent (from high to low) to which digital technologies were perceived to be adopted in the retail, financial and manufacturing sectors in South Africa, using the classification by Massini, Sanchez-Barrioluengo and Yu (2022). Organisations with high digital technology adoption have the bulk of their operations digitalised, those with moderate adoption have mostly half of their operations digitalised, while low adoption entails minimal usage of digital technologies (Massini et al. 2022). The results revealed varied adoption of digital technologies across the three industries. Three participants working in the financial sector made it clear that there was high usage of digital technologies in their organisations:

> 'I feel, to a larger extent, we are digitalised. Everything that we do is digital. If you come in as a client, everything is through the system. If you want to open accounts or anything, we do not use physical papers anymore; we scan them in and give them back to you. We do not pick hard copies. It feels like you can open your account yourself at home, with nothing, no documents, basically an app. Maybe a client, their app is blocked, and they want to reset their app, then they can basically use their facial recognition.' (Financial Sector, Financial Consultant, Employee 2)

The participant provided evidence of digitalisation in the sense that hard copies of documents were not acceptable for record purposes, that hard copies were scanned in and then returned to customers and that customers could perform transactions on their devices in a remote location without any manual documents. Scanning in and returning a hard copy to the client demonstrates a preference for digitalisation being communicated to the client. Another participant declared that digitalisation was a priority and that a digital strategy was in place for the organisation to keep on improving and that this was part of a long-term plan. The participant stated:

> 'I think absolutely we are focused quite well on that, and we are constantly improving or adjusting or changing, or making more things available on the digital platforms compared to where we started years ago. They've got a specific plan and strategy built around it that's been going on for the last five years and is continuing.' (Financial Sector, HR manager, HR professional 4)

A participant noted that while they were still involved in some minimal paperwork, their organisation had largely (80% – 90%) transitioned to digital work. Referring to a transition can be considered a change. The participant stated:

> 'I have been in the bank for a very long time. So, I have seen the transition from paper-based work to digital work. So, percentage-wise, we have got eighty percent to ninety percent. There is still some paperwork involved, but not a lot.' (Financial Sector, Finance Manager, Operational manager 3)

Most participants in the retail sector indicated a moderate to high level of digitalisation in their organisation. For example, one participant noted a 50% digitalisation:

> 'The things that were done paper-based are now electronic in the sense that it's on the computer directly. So, I would say at this stage, what's paper-based is maybe about 50% of my data.' (Retail Sector, Merchandiser, Retail Employee 1)

A participant indicated that while they increased their use of digital systems, they still had challenges in making these technologies integral to their operations. In this case, the participant expressed some frustration with using various digital systems and data sources, with these systems not being integrated, which causes barriers to a seamless digital experience:

> 'We do have systems available. I mean, we use a lot of online systems, which work for us, but to integrate them all into one package, it could be more seamless. We rely on too many different sources, and to tie it into one and use one, it's too difficult.' (Retail Sector, Retail Manager, Operations Manager 5)

Another participant made it clear that in their organisation digitalisation was attempted, mostly by a community of interest (practice), and in some areas (described as 'pockets'), relative success was achieved, but mostly things were still being done manually. Thus, it was acknowledged that many operations were still done manually, which was because of a lack of capital to fund digitalisation initiatives:

> 'Although we're very active on social media and we've got a great presence on social media, and I think perhaps these pockets of digitalisation in the system, we are still very manually based. I do know that there is a community of practice in the organisation headed up by … around, you know, artificial intelligence and digitalisation, etcetera. So, I think efforts are being made in the organisation to create awareness of digitalisation and to look for opportunities where we can. But I don't think we have enough resources or the budget.' (Retail Sector, HR Manager, HR professional 2)

Most participants in the manufacturing sector indicated a low to moderate level of digitalisation in their organisations, highlighting challenges such as the lack of an integrated digital technology system and a lack of funds allocated to finance digitalisation efforts. A participant noted:

> 'The systems that we currently use we still very paper-based based and the systems that we currently use cannot be integrated with the various functions so that we can use one system.' (Manufacturing Sector, Manufacturing Manager, Operation manager 1)

The response of an HR participant indicates that the HR function was not fully digitalised and mentioned the importance of having an integrated system, with funds not yet being released for digitalisation:

> 'Well, in the process, our principles are in the process of trying, you know, to get budget approval of trying to find an HR system. You know an HR integrated system that will service the entire HR value chain. You know, so that we can offer and provide services.' (Manufacturing Sector, HR Manager, HR professional 1)

Another participant indicated moderate digitalisation, but at the same time pointed out that the use of technology was minimal ('*more of hands-on*') and was mostly used for administrative work:

> 'We do have a, let's say, an involvement with the technology to a certain extent, such as through our admin work. So, I will say moderate, on a scale, our digitalisation is 5 out of 10 because we are more hands-on than more using the technology side.' (Manufacturing Sector, General Material Handler, Manufacturing employee 3)

Theme 2: Commonly used types of digital technologies

The theme, *commonly used types of digital technologies,* explains which types of digital technologies are mostly adopted in financial, retail and manufacturing organisations in South Africa. Digital technologies can broadly be categorised into social media, mobile, analytics, cloud, AI, robotics, IoT, blockchain and VR. The most common types of technologies mentioned by participants working in organisations in the financial sector were Microsoft Teams, banking applications, Internet banking and cloud computing, while they also mentioned computers and phones, using Internet Protocol (IP) addresses. For example, a respondent mentioned technologies used to connect via voice and online:

> 'A lot of the technology that we use daily is MS Teams for meetings. We use MS Teams to call clients. We don't have a standard telephone anymore. We have phone via IP and also banking app, Internet banking, and also the different platforms.' (Financial Sector, Call Centre Agent, Employee 3)

Another participant mentioned devices used (e.g. computers), systems, as well as ATMs, and mentioned security in terms of systems used:

> 'We use computers, laptops, iPads, certain systems-the systems that we use I cannot disclose to you- it's confidential. But we do use Microsoft server, we do have the software and stuff that we develop ourselves, software that is specific to our ATMs that assist us in the deposits, make our ATMs work correctly. We have got online banking and selfie banking.' (Financial Sector, Finance Manager, Operational manager 1)

Another participant from the financial sector added that they mostly used the Microsoft Office package with SharePoint, and a dashboard, on an HR Information System, from which reports are extracted, and which is integrated with information into an Excel spreadsheet. The participant shared as follows:

> 'So, it's the Microsoft Office package. And then we also use SharePoint. We also use SharePoint, which is also a tool that the organisation uses to load data, reports, etc., that you can extract. So, in HR, we have the whole dashboard of various reports that are available on SharePoint. I would use information provided from the HRM-I system that we use and then also tie in with the Excel spreadsheets that I have to create, to be able to go into the system, having the information, and then use it.' (Financial Sector, HR manager, HR professional 1)

The most common technologies mentioned by participants in the retail sector were social media platforms such as TikTok,

Instagram, Facebook, computers, WhatsApp, tills, scanners, databases, CCTV and advertising screens. A respondent mentioned social media applications such as TikTok and Instagram in relation to customers, screens for in-store advertising, devices (computers, tills) and CCTV, typically associated with crime detection, as indicated in the following response:

> 'We are trending on all social media platforms- TikTok, Instagram, Facebook pages, websites, WhatsApp, etcetera. For example, if you assist customers in a store, they will tell you that they saw the item on TikTok. We also have our screens installed. If the store doesn't have windows [*we have many in most of the new stores that we are working on*], I don't know if you saw the one right in front. So that is also the type of advertising right in front there. And other technologies include computers, tills, scanners, databases, CCTV.' (Retail Sector, Retail Manager, Operation manager 2)

Another participant added that technologies such as POS, back-office systems and Plus More (+More), a rewards application, were used by the retail organisation:

> 'We basically use the POS system, Back office system basically operates everything that is here in the store, scanners to operate on the floor so that you do not need to actually go on the till point to get anything on the floor, it will give you all the information you need about the item, on social media [*Facebook, Instagram, WhatsApp and an application called Plus More*].' (Retail Sector, Sales Assistant, Retail Employee 5)

Another retail participant added the use of applications for financial transactions and the use of social media (WhatsApp) for inter-section communication among staff:

> 'We use POS [*Point of Sale*] systems for transactions and banking, and WhatsApp for communication among teams such as beauty, management, floor, and staff.' (Retail Sector, HR officer, HR professional 4)

In the manufacturing sector, participants indicated types of machines being used in the production line, such as corrugator machines, converting machines and TCY machines (this being a Taiwanese supplier of production, printing and corrugator machinery), machines for measuring temperature and those used in administration, HR and accounting such as Citrix, PNET, Sage technology system, as well as Microsoft Teams. As indicated by a participant:

> 'Even the machines we work on have their own computer, because everything must be captured, monitored, tracked, and backed up using corrugator machines, converting machines, and TCY machines, all of which record whatever is being done on the production.' (Manufacturing Sector, Manufacturing Manager, Operations Manager 5)

The following was shared by an HR participant working within manufacturing, indicating digital technologies associated with administration, recruitment, communication and payroll administration. The participant was not able to share information related to the actual manufacturing and production side. As indicated by this participant:

> 'From our side in terms of manufacturing and the production side, I cannot really say that we have more digitalised our systems than we use. It is more on the administrative part, whereby we use some device or software like Citrix for administrative tasks, PNET for recruitment and selection, Microsoft Teams for communication, and Georgette Times for payroll or HR systems.' (Manufacturing Sector, HR officer, HR professional 3)

Lastly, a participant from manufacturing shared about digital technologies used for temperature control, as well as for administration, and specifically invoicing:

> 'So, now we have products where we use technology to measure the temperature of our products inside, which makes it obviously important because the temperature depends on how good, how well the product is stored. We also use Sage for invoicing.' (Manufacturing Sector, Quality Control Inspector Manufacturing Employee 4)

Discussion

This study aimed to examine the extent of digital technology adoption within three sectors (finance, retail and manufacturing) in South Africa, as well as the types of digital technology used. The discussion focuses on the results obtained for levels of digital technology adoption and the types of digital technologies used across these sectors.

Theme 1: Varied levels of digital technology adoption

The results for levels of digital technology adoption suggest that the adoption of digital technologies varied across sectors within South Africa. A high level of adoption of digital was revealed for the financial sector. On a scale, this degree of digitalisation can fall between 80% and 90%. Within the financial sector, traditional paperwork is mostly digitalised, reducing the need for clients to visit financial institutions to complete transactions. The use of technologies in this sector is prioritised across most activities. These results correspond with the findings from the literature. For example, according to Fitch Solutions (2020), the financial sector in South Africa is at the forefront of digital technology adoption, with most banks focusing on changing their business models and implementing strategies aligned with digital transformation. This includes focusing on activities that improve the efficiency of business operations and providing excellent services to clients. In the same vein, Alt, Fridgen and Chang (2024) underlined that in the financial sector, the providers, digital channels, as well as clients, are positively impacted because of the deployment of technology-driven financial solutions.

On the other hand, the results showed that the retail sector in South Africa is perceived to have adopted digital technologies to a moderate extent. On a scale, this degree of digitalisation can fall between 50% and 70%. The retail sector is one of the biggest economic sectors in the country; hence, it is not surprising that such a milestone is seen as being achieved. These results indicate that digitalisation is promoted, but not fully achieved yet. The retail industry in South Africa has not yet fully capitalised on providing immersive and engaging in-store experiences or demonstrating products and their use

to customers, especially for kinds of products and services that require hands-on explanations and demonstrations. In addition, it could be difficult to digitally replicate human interaction required for some high-value products and to digitalise visual merchandising and the physical store layout, providing a virtual in-store experience (Begum et al. 2023). Most retailers use digitalisation for the tracking of stock levels, POS, marketing, online shopping and managing customer interactions. These findings are supported by the literature. According to Deloitte (2022), the pace of digitalisation in the South African retail sector is on the slow side, while there is a notable growth in the use of digital channels, including online shopping, such as that offered by Checkers Sixty60 (Thorne 2024).

In the manufacturing sector, the results revealed perceptions of low adoption of digital technologies within manufacturing organisations. All participants testified that digitalisation is low compared to the work done manually. On a scale, the degree of digitalisation can fall below 50%. The observed low adoption of digital technologies in the manufacturing sector could be attributed to cost, a lack of scale and challenges involved with integrating digital technologies because of complex production processes and the involvement of diverse stakeholders and suppliers. Irrespective, a characteristic of 4IR is the seamless integration of systems across organisational networks, and it seems that this is still to be achieved in the manufacturing sector in South Africa. Manufacturers may find it difficult and costly to replace and upgrade infrastructure and traditional systems, and this is made more difficult by stringent quality and safety standards. The literature concurs with these findings. Gaffley and Pelser (2021) also found less than 50% digital technology adoption in manufacturing organisations, and this included South Africa. Some participants in this study cited digital technology integration and lack of resources to fund digitalisation initiatives as barriers to digitalisation. Aruleba and Jere (2022) attributed the low digital adoption levels in South Africa to socioeconomic challenges and resource constraints. For example, Avenyo et al. (2024) stated that knowledge of technology implementation dynamics was required for successful integration. Sichoongwe (2023) recommended a raft of measures to improve digital technology uptake in the manufacturing sector, including supportive institutional and systemic mechanisms, and support for innovation to improve access to digital systems.

Theme 2: Commonly used types of digital technologies

The results for types of digital technologies employed suggest that a variety of digital technologies are adopted in finance, retail and manufacturing organisations in South Africa. These technologies could be classified under IoT, AI, blockchain, analytics, social media applications, mobile applications and cloud technologies while acknowledging the interrelatedness of technologies. Differences in the use of digital technologies were noted, as the financial sector focuses more on online banking applications and cloud computing, the retail sector on customer-related applications, for example, advertising, marketing and reward applications, and manufacturing on machinery such as corrugators and converting machines. However, these sectors are also part of the economic ecosystem, and there are overlaps, for example, in terms of mobile applications and social media used.

Social media technologies, such as TikTok, Instagram and Facebook, were mostly mentioned by participants from the retail industry. Corrugator machines, machines using sensors for measuring temperature and TCY machines (global corrugators and printing machines) were mentioned by participants from the manufacturing organisations. In addition, reference was made to scanners, POS, CCTVs and ATMs, which are IoT technologies that connect to a central system. The utilisation of Microsoft Teams, Citrix, Zoom and PNET could also be classified as AI technologies as they use AI features for functions such as smart scheduling and transcribing. Technologies such as Internet-enabled phones, tablets, WhatsApp, bank applications and the applications used by retailers can be classified under mobile applications and blockchain technologies (bank applications) as these involve the use of phones and applications that could be installed on smartphones. In retail, the tracking and monitoring of customers and displaying selected content on screens involve analytics. SharePoint and Sage technology systems use cloud-based computing technology.

These are the popular technologies mentioned in the literature and used in the workplace, which is an indication of the advantages they hold for organisations. For instance, it had been indicated in the literature that if organisations adopt AI technological solutions, they could realise a 40% increase in productivity (Accenture 2023), while about 35% companies were said to be using AI, and a further 42% contemplating using AI in the future (Accenture 2023; Johnson & Nick 2023). Paul et al. (2024) noted that the use of IoT contributes to innovative ideas, effective decisions, solving business problems and addressing customer queries because of the availability of real-time information.

It was also stated that in 2023 the market value of cloud computing was $587.78 billion and was projected to grow in 2025 (Business Insights 2024), courtesy of cloud computing's ability to allow the sharing of resources and thus saving time and costs, while productivity is enhanced (Kumar et al. 2024). In addition, the manufacturing industry, for example, uses data analytics in product development and supply chain management, where insights are drawn through the identification of patterns and interdependencies for decision-making (Alsolbi et al. 2023).

The use of social media platforms, as evidenced in the responses from participants from all three sectors, but especially those from retail, enables connection with customers, clients, employees and colleagues (Paul et al. 2024). Mobile applications are also used across the three sectors, albeit for different purposes (accounting, rewards

and online banking). In 2022, about 3.5 and 2.2 million applications were downloadable from Google's Play Store and Apple's App Store (Statista 2022). Increase in the adoption of mobile application technologies reflects the ease of use of these technologies in terms of speed and simplicity and perceptions of usefulness (Paul et al. 2024).

Low adoption of robotics and VR technologies could be attributed to the high costs involved in installing and implementing the software and hardware of these technologies. There are also safety concerns in the use of robots, especially in the interaction between robots and humans, and the fear that the use of robots could cause job displacement (Eurofound 2024). The procurement and use of technologies such as robotics and VR applications could be understood in terms of the investment required. Mbaraja, Moyo and Draai (2025), conducting a study in the construction sector, identified several factors that negatively influenced the adoption of VR applications, including lack of training, lack of knowledge, lack of awareness, constraints related to operations and funding issues, as well as governmental policy and support for specific industries.

Practical implications and recommendations

The results of this study have implications for scholars, organisational leaders and governmental stakeholders responsible for economic planning and development. In this study, it has been found that digital adoption is varied across the finance, retail and manufacturing sectors. The results suggest that the financial sector occupies the apex position with a high level of digital adoption, followed by the retail sector with a moderate level of digital adoption. The manufacturing sector showed a lower level of digital adoption. Perceptions of participants within these sectors were probed and thus reflect their experiences and observations. On these grounds, a digital divide is noted among sectors in South Africa where certain sectors are benefiting more than others from digital technologies, and, in this study, the financial sector is dominating over the retail and manufacturing sectors in terms of digital advancement. Digital technologies are a catalyst for economic development and change, as these technologies could optimise business operations. An imbalance in digital uptake among economic sectors of a country can negatively impact the overall development of the country because of the creation of a multiple-tiered economy, which is characterised by stagnation and decline in sectors facing challenges in adopting digital technologies, while faster growth, gains in productivity and competitiveness can be witnessed in sectors that adopt digital technologies. It entrenches income inequality among the citizens of the country and inequitable distribution of resources among the different sectors, as more resources may be channelled to successful sectors, while struggling industries could continue to be sidelined. For instance, a lack of digital skills prevents citizens from contributing to the competitiveness of the economy and achieving their career and life goals. In the same vein, companies in less digitalised sectors may outsource functions to other regions or countries where digital skills are more available. This could trigger industrial action, as a lack of digitalisation impacts organisations and employees' earning potential.

Cross-sectoral collaboration is imperative for economic growth and development (Ba, Nair & Kedia 2024). With the retail sector being the second largest industry in the country and contributing 20% to GDP and the manufacturing industry contributing 13% of GDP, digitalisation in these sectors needs prioritising (PwC 2024). The South African Presidential Commission on the Fourth Industrial Revolution (PC4IR) and the DCDT could lobby for these sectors in terms of infrastructure and incentives for implementing 4IR technologies by developing a sector-differentiated digital adoption roadmap. The results of this study should remind South African leaders responsible for steering economic development and policymaking to allocate resources effectively and assist the manufacturing and retail sectors with the capital needed to increase the level of digitalisation. The PC4IR and DCDT should guide these industries in terms of digital technologies and the implementation thereof and assist in boosting digital infrastructure, driving digitalisation, in the creation of communities or sectors of practice, and fostering digital skills development. Organisations in sectors such as finance should continue upgrading their technological infrastructure and share best practices through industry forums and cross-industry digital innovations such as digital payment systems in retail and fintech solutions for supply chain finance in manufacturing. In this way, spillover benefits from finance into lagging sectors can be built. Aruleba and Jere (2022) emphasised the importance of bridging the digital divide, pointing out that it helps to alleviate poverty and improve the well-being and education of the people. In doing so, the financial sector can become a global competitor and a good corporate citizen.

The common challenges mentioned by participants in this study, which are contributing to the low adoption of digital technologies, are difficulties in integrating different digital systems into one system and a lack of resources or budget for digitalisation. This could mean that digitalisation is seen as an expense or a non-strategic investment. The effect of this perception is that insufficient budget will be allocated for digitalisation, which could be a hindrance to adaptability, agility and successful digitalisation. These challenges, therefore, need to be considered and addressed by organisational leaders to promote digital adoption. Failure to do so could cause the organisations to continue trailing in digitalisation, and it will negatively influence their productivity and the country's competitiveness. Strategic allocation of resources and leveraging of external expertise could mitigate this problem.

Regardless of costs and challenges, investment in profitable projects is prioritised by organisational leaders (Johnson et al. 2024). It is important to prioritise investing in digital initiatives that contribute to organisational strategic goals and to supplement internal resources by outsourcing other digital systems (Johnson et al. 2024). In addition, challenges

in integrating diverse digital systems could be caused by improper digital strategy planning. It is important to conduct a detailed analysis of the existing and future digital infrastructure needs of the organisation at the onset before embarking on any digitalisation initiative.

The study also highlighted the commonly adopted digital technologies across the three sectors, namely IoT, AI, analytics, social media, mobile applications, blockchain and cloud technologies, while robotics and VR appear to be less commonly used digital technologies across the three sectors. There is a need for targeted interventions to promote the uptake of technologies such as robotics and VR. Mbaraja et al. (2025) recommend investment in VR as a medium of training. Ghobadi and Sepasgozar (2020) advocate for government support for the adoption of VR technologies and the provision of hardware and software requirements. The adoption of AI and IoT implies that organisations are leveraging a reduction in costs and agility associated with these technologies. According to Rocha and Kissimoto (2022), IoT and AI streamline the work as they enable tasks to be executed quickly and efficiently. The high adoption of SMAC technologies and the use of analytics ensure that organisations are doing well in connecting and understanding customers through social media platforms and mobile technologies. Analytics is used to study the behaviour of customers, identify business trends and make evidence-based decisions, while the cloud technology promotes cost-effective applications and storage of data. This could increase innovation as well as the experience of customers. Hence, organisations should forge ahead with adopting these technologies, considering the nature and needs of their specific sectors.

As per the TAM, the actual use of digital technologies was noted most in finance organisations, indicating that the employees in these organisations perceived the digital technologies as highly useful (perceived usefulness) in enhancing their performance and as a result of most systems being digitalised. It was therefore easier for the employees to use the digital technologies in their daily tasks (high perceived ease of use), which resulted in their behavioural intention to use the digital technologies being strongly fostered. On the contrary, because of the weaker perception of usefulness and lower ease of use by the employees in the manufacturing organisations, their level of adoption of digital technologies was low. Similarly, moderate perceived usefulness and perceived ease of use influence are noted in retail organisations where the adoption of digital technologies was at an intermediary level. The findings also indicate that organisational context (limited budget and difficulties in integrating digital technologies) moderated these beliefs, thus extending TAM in organisational settings.

Theoretically, this study contributes to the literature on TAM by extending the external validity of TAM across three diverse industries in an emerging economy (South Africa), namely finance, retail and manufacturing, offering cross-sectoral comparative insight. Because of sectoral-level structural factors' influence on perceived usefulness and perceived ease-of-use beliefs, the TAM has been embedded in an organisational-industry context, signifying new conditions for digital technology theory.

Limitations of the study and future research

While this study contributed to closing a gap in cross-sectoral research on the adoption of digital technologies in a developing country such as South Africa, it did not specifically identify digitalisation challenges experienced within the financial, retail and manufacturing sectors. Therefore, future research should be carried out to ascertain and compare the challenges these industries are facing, preventing them from optimally leveraging digital technologies. Specifically, the adoption of technologies such as robotics and VR should be investigated. This study probed perceptions of managers and employees in JSE-listed companies. Similar studies could be conducted in non-JSE-listed companies, including in terms of small- and medium-sized businesses in the finance, retail and manufacturing sectors.

Conclusion

This study aimed to examine the extent of adoption of digital technologies across three sectors, namely finance, retail and manufacturing, in South Africa, as well as the types of digital technology used. In this era of 4IR, new technologies are being introduced at an unprecedented speed. Countries and organisations are experiencing pressure to adopt digital technologies in an endeavour to optimise business processes, increase growth and ensure competitiveness and sustainability. This study provides a nuanced understanding of digitalisation across South Africa's finance, retail and manufacturing sectors, thus making a distinct scientific contribution by empirically mapping differential adoption patterns of digital technologies within these sectors. The results of this study reveal that the manufacturing sector was perceived as lagging most in terms of digitalisation. The retail sector was more described in terms of granular and selective adoption of technologies. In contrast, the finance sector was perceived as a strong adopter of digital technologies. Perceived usefulness and ease of use, as per the TAM, are factors promoting the adoption of digital technologies in sectors such as finance, where efficiency and competitiveness are seen to be aided by digital technologies. Notably, technologies such as VR and robotics were barely mentioned as being adopted across the three sectors. These disparities highlight the importance of cross-sector partnerships and digital transformation policies aimed at promoting sustainable and inclusive technological advancement in South Africa.

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The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

CRediT authorship contribution

Munodani Chapano: Writing – original draft. Amanda Werner: Writing – review & editing. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication and take responsibility for the integrity of its findings.

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Data availability

The data that support the findings of this study are available from the corresponding author, Munodani Chapano, upon reasonable request.

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