South African Journal of Information Management
ISSN: (Online) 1560-683X, (Print) 2078-1865

A digitalisation model for operational efficiency of operations in the insurance industry

Authors:
Siyabonga M. Gama[1]
Mampilo Phahlane[1]
Lario Malungana[1]

Affiliations:
[1]College of Science Engineering and Technology, School of Computing, University of South Africa, Pretoria, South Africa

Corresponding author:
Siyabonga Gama,
68176783@mylife.unisa.ac.za

Dates:
Received: 16 Sept. 2024
Accepted: 05 Nov. 2024
Published: 09 Apr. 2025

How to cite this article:
Gama, S.M., Phahlane, M. & Malungana L., 2025, 'A digitalisation model for operational efficiency of operations in the insurance industry', *South African Journal of Information Management* 27(1), a1943. https://doi.org/10.4102/sajim.v27i1.1943

Background: Digitalisation has revolutionised business strategies and processes by placing technology at the core, leading to substantial benefits including operational efficiency, increased productivity and higher revenue. This study has been influenced based on facilitating the acceleration of the digitalisation process and for enhancing the role to deliver value through innovative solutions.

Objectives: This research investigates how digitalisation can enhance business operations within the South African (SA) insurance industry by using the information technology and contingency theory as its foundational framework.

Method: We have conducted a systematic review search for articles in this study. Therefore, a total of 121 articles were included for the study based on the conducted search from academic articles sourced from the databases of EBSCO Host, Science Direct and Google Scholar using content and descriptive analysis techniques.

Results: The analysis revealed that, firstly, most studies on this topic focus on digital strategies and business models. They often miss the complex connection between digitalisation and business processes in the SA insurance industry. Firstly, there has been little research on how factors such as the environment, technology and industry impact the digitalisation process in SA insurance. Secondly, there is a clear lack of research on digitalisation in the insurance sector of developing countries, especially in SA.

Conclusion: The study aims to improve the insurance industry. One benefit is the enhancement of operational efficiency within the South African industry because of digitisation procedures. Furthermore, the advantages of the digitalisation model would enhance operational effectiveness, transforming the insurance industry by introducing innovative approaches to process and technical challenges now faced.

Contribution: The study contributes to the development of a digitalisation model specifically for SA and supplement existing research, offering a potential benchmark for similar initiatives in other emerging markets.

Keywords: digitalisation; digital technologies; operational efficiencies; insurance industry; South Africa.

Introduction

Over the last 10 years, information systems (IS) have been essential in transforming various industries by enabling the insurance industry to enhance operations, make better decisions and increase productivity (Stanković, Stanković & Tomić 2022). Information systems consists of hardware, processes, software components and people who provide information and the capability to digitalise. Digitalisation across industries is transforming company structures, products and operations, enabling a shift from traditional to digital business models. It would be most appreciated when you have defined what digitalisation entails with variance from several authors based on context of where they apply before moving further to state what they involve. Digitalisation involves leveraging technology to enhance business performance and to streamline operations and processes (Moodley 2019; Phokwane 2022). Particularly driving the restructuring of culture, business processes and strategic approaches to meet the demands of the organisation, leading to economic growth in the business landscape (Horlacher & Hess 2016).

Digitalisation has led to increased profitability, heightened sales, expanded market share and enhanced data integration capabilities. Digital solutions enable collaboration and foster the

development of a digital culture and learning within insurance industry, enabling quicker adaptation and innovation, improving the overall performance (Căpușneanu et al. 2021). Admittedly, digital innovations such as process automation and machine learning have enabled insurance companies to modernise enterprise business models, operational workflows and enhance operational proficiency (Van Dyk & Van Belle 2019). The insurance industry has adopted digital technologies and automation to boost productivity and enhance customer service standards (Mapingire, Smuts & Van der Merwe 2022). Generally, insurers have begun leveraging on automation to enable online applications and claims processing, accelerate payment procedures and deploy automated service consultants. The adoption has led to decreased turnaround times, reduced operation costs and potentially lowered premiums (Rutashobya et al. 2021). Improving performance is not the sole goal when implementing innovations. Today's insurance clientele is characterised by proficiency with technology, impatience and limited time availability (Niraula & Kautish 2019). The industry faces a global challenge with the affordability of insurance premiums, especially during tough economic times. For example, South Africa had an official unemployment rate of 32.1% in the fourth quarter of 2023 (StatsSA 2024), causing clients to prioritise essential expenses over insurance. The affordability factor, along with evolving customer expectations, is making it increasingly important for the South Africa (SA) insurance industry to embrace digitalisation.

Admittedly efforts to accelerate digitalisation in the insurance industry are made in South Africa for different companies and its subsidiaries. Aslam and Shah (2020), Bvuma and Marnewick (2020), Visagie and Turok (2021) and Severino (2023) indicate the adoption of technologies, particularly in developing nations such as SA, has been relatively slow in its adoption. On the other hand, it is clear that leading nations such as Japan, Canada, China, Great Britain and the United States have high adoption rates. This is reflected in the number of publications, with digitalisation driving both industry and social infrastructures forward (Didenko & Sidelnyk 2021). According to Sibanda (2019), prominent industries such as high tech, finance and telecommunications are investing in the digital drive. This increasing adoption of digitalisation highlights a growing belief in digital technologies such as Internet of Things (IoT), artificial intelligence (AI), machine learning, cognitive computing, blockchain and process automation, in providing added value to service delivery in insurance company. Within the insurance industry, tools are recognised for efficacy in enhancing insurance functions, as observed by KPMG (2024). A significant portion remains unexplored, showing that a lot of work still needs to be done.

Therefore, this study reviews comprehensive analyses of academic literature on digitalisation within the insurance industry, evaluating the current level of digitalisation within the industry. The objective of the study is to understand the digitalisation model and supporting digital technologies can be implemented across various contexts within the insurance industry in South Africa. The study also demonstrates how innovations are crucial in generating value within this industry. While addressing the research, the study aims to develop a model that will help in the digitalisation and improvements of service operations. The question comes to mind in this regard is 'What model could be most appropriate and used to digitalise and improve service operations in insurance company in the context of South Africa?'

Digitalisation and operational efficiency for insurance industry

The main drivers of digitalisation are improving existing models, leveraging modern information technologies and aiming to increase revenue and value (Bhardwaj 2021). In other words, digitalisation involves the transformation and reconfiguration of activities processes and products, leading to changed processes or products and models (Modiba & Kekwaletswe 2020). This view aligns with the notion of digitalisation serving as 'Fourth Industrial Revolution' primary driver, mainly facilitated by digitalisation (Nwaiwu 2018). Digitalisation has changed existing structures and fundamentally redefined the notion of customer engagement and transformed interpersonal interactions (Behar 2016).

Digitalisation converts the existing services or products into automated digital formats, thereby offering competitive advantage (Henriette, Feki & Boughzala 2016) and increased market share (Busschau 2021). It has been identified as a pivotal force reshaping both business and societal processes immediately. Achieving this goal requires implementing changes in processes. In essence, while modern technologies are crucial in driving transformation but are not solely responsible for business evolution (Tihinen et al. 2016). In the realm of insurance, effective digitalisation holds the potential to drive significant enhancements in business operations and bring about substantial changes (Mhlungu, Chen & Alkema 2019). Nevertheless, the value derived from technology for a business does not come solely from its adoption; rather, it comes from the redefined approaches to conducting business made possible by technology (Wiesböck & Hess 2020).

Benefits of digital technologies

In the insurance industry, it has been demonstrated that employing Big Data analytics (BDA) techniques can significantly enhance the ability to detect fraud, risk assessment, operational efficiency and customer experiences. The BDA is used to analyse and collect and both unstructured and structured data from diverse sources, thereby facilitating precise evaluation and services (Berthelé 2018). Machine learning applications in insurance enable insurers to review large amounts of data in 'real-time', identifying correlations and patterns traditional risk

assessment methods might overlook. This capability translates to quicker and more accurate assessment and management (Rawat et al. 2021). The insurance industry encounters several prominent challenges, including fraud, slow claims processing and payments, and concerns regarding data security. However, through the ongoing evolution of digitalisation, the industry can make substantial strides in addressing processing and safety-related issues while adding considerable value. For example, IoT technologies provide a robust communication framework has bolstered the operational safety. Additionally, adoption of blockchain yielded positive effects within insurance Deloitte Tech Trends (2019). Furthermore, cybersecurity has empowered the insurance to fulfil customer demands by ensuring technological controls safeguarding the information (Mbatha 2020).

Moyo, Watyoka and Chari (2022) indicate that the current perception is digital technologies are extremely costly and complex, but adopting digital technologies in the insurance could decrease operating costs and increase profits. In the insurance industry, the impact of digitalisation is evident across all activities in the value chain. The most notable changes include enhanced interactions between insurers and stakeholders, particularly prospective and current policyholders, improved business process efficiency and a broader array of advanced insurance products (Stanković et al. 2022). Technology advancements in within the insurance industry could potentially result in job cuts, raising concerns about job security and whether individuals' well-being will be prioritised (Nkomo & Kalisz 2023), yet automation and intelligent technologies offer added value by reducing errors, enhancing work quality and boosting productivity (Căpușneanu et al. 2021). Moreover, digital solutions not only provide benefits to businesses but also to clients and society.

The role of management in the insurance industry

Holten and Brenner (2015) indicated that sufficient evidence for the significant role played by the organisational leadership style and communication strategies exists, as well as culture and employee involvement in either facilitating or hindering digitalisation efforts (Ismail, Khater & Zaki 2017). Exclusion of operational staff from the adoption process and insufficient communication frequently emerge as significant barriers. Artemenko (2020) advocates for adaptable leadership styles from management, while Holten and Brenner (2015) further emphasise that optimal benefits from digital technology utilisation are achieved when leadership instils trust, fosters innovation, promotes transparency and prioritises employee needs to enhance operational efficiency. Successful digitalisation demands management commitment to communicating the potential advantages of digital technologies.

For instance, Rafferty, Jimmieson and Armenakis (2013) highlighted that there is a critical need for management to evaluate and prepare employees for embracing digitalisation while also providing necessary support during the transition. In addition, it is essential for companies to invest in the education and training (Kiel et al. 2017) of the workforce, particularly those directly involved with the technology, to facilitate a smoother transition process, as highlighted. Barthel and Hess (2019) suggest that by increased collaboration among stakeholders, enhancing employee participation and engagement and gaining management support while cultivating a culture of acceptance, successful transition to digitalisation can be achieved.

Impact on clients and markets

Niraula and Kautish (2019) discovered the present-day insurance clientele demonstrates proficiency with technology, a sense of urgency and limited time availability. Therefore, digital empowerment influences customer behaviour. To embrace modern technologies effectively, it becomes important for companies within the insurance industry to provide efficient online services, encompassing swift payment and claims processing, accessible online services and potentially reduced premiums. Therefore, the industry needs to assess and address customers' needs and expectations. While developing strategies focused on tackling end-users' concerns, effective customer interaction, including pricing, privacy, cybersecurity, privacy control and data security, is recommended (Bokolo 2023).

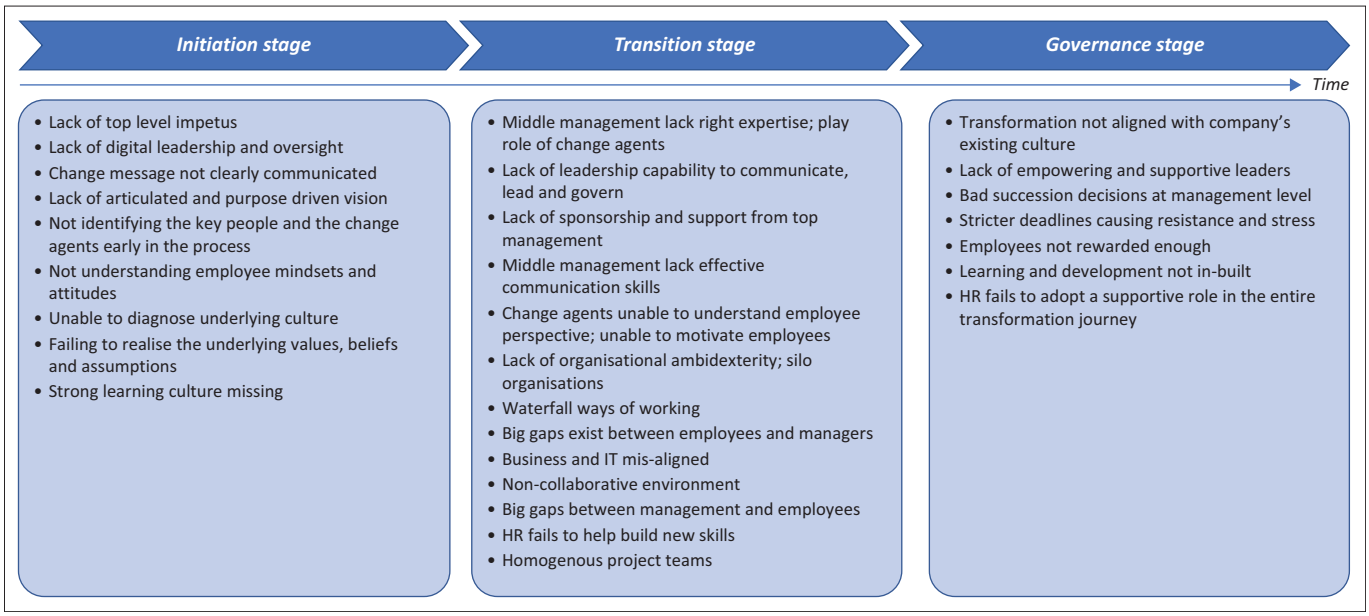
Wiesböck et al. (2017) found that in emerging markets, there is a tendency to selectively digitise certain activities of the value chain, primarily because of financial limitations and the expected complexities involved. Insurers encounter various challenges when implementing Institutional Theory (IT) solutions, such as insufficient investment in hardware and software, unsatisfactory legal structures, limited adaptability of policies and regulations to innovative technologies and cybersecurity concerns (Stanković et al. 2022). The hurdles have a lesser impact on developed economies, largely owing to more established models.

Barriers to digitalisation

Several barriers and challenges will be encountered in the drive for digitalisation (Vial 2019), including organisational culture, strategy and adoption acceptance, among others. Figure 1 highlights the potential obstacles faced during different phases of the digitalisation process, providing the research with a more practical understanding of barriers.

Digitalisation trends

Blockchain technology has firmly entered the adoption phase and moved from being overly hyped and criticised. Global expenditure on this technology is projected to reach



Source: Republished from Gupta, S., 2018, 'Degree project in industrial management, second cycle, 15 credits Stockholm, Sweden', Indek trita-itm-ex 2018:359 KTH, Master of Science Thesis, Industrial Engineering and Management Industrial Management.

IT, information technology; HR, human resource.

FIGURE 1: Challenges and barriers related to organisational change because of digitalisation.

$11.7 billion in 2022, with 41% of technology company leaders anticipating the adoption the technology to rise over the next 3 years within insurance industry (KMPG 2024). Artificial intelligence-driven fraud detection systems are emerging as critical components in ensuring the safety and integrity of the insurance industry. The systems detect patterns and irregularities signal fraudulent behaviour, enabling insurance industry to protect assets and minimise risk (Dhieb et al. 2020). Artificial intelligence for fraud detection and security is a topic requiring more extensive research for a number of reasons such as coping with the ever-changing fraud threats, creating advanced mitigation tools, integration with other technologies, cost efficiency, advancements in technology and regulatory compliance (Ryman-Tubb, Krause & Garn 2018).

Numerous industries, including finance, IS, human resources, sales and marketing, are experiencing a reduction of processes because of generative AI applications (Chui, Roberts & Yee 2022). For example, chatbots can complete customer service tasks, assist marketing in producing concepts or ideas and handle accounting and human resource duties (Siau & Wang 2020). Generative AI not only offers numerous benefits but also carries potential dangers. It can result in biased human automation because of the habitual acceptance of its recommendations and can produce inappropriate or harmful content (Ntoutsi et al. 2020) and affect problem-solving skills, creativity and critical thinking (Iskender 2023). Generative AI models, like those ChatGPT, are listed as the most innovative technological advancements (Dwivedi et al. 2023). Artificial intelligence models are considered the next milestone in achieving artificial general intelligence (Luo et al. 2023).

Summary of theoretical framework

This study intends to offer theoretical insights into digitalisation, which can be derived from theories on innovation, business management and IS. The use of IT has been used to examine how regulatory frameworks and institutions influence organisational behaviour. In the insurance industry, digitalisation is affected by digital transactions, cybersecurity and regulatory policies concerning data privacy. Therefore, IT allows insurers to navigate this complex regulatory landscape to ensure compliance while advancing digital innovation. As a result, it brings balance between priorities, which are crucial for establishing a secure and trustworthy digital insurance environment. This theory is an important area of study in sociology and organisational studies. Contingency theory is focusing on how insurance industry can adapt to institutional pressures as stated by Stechemesser, Endrikat, Grasshoff and Guenther (2015). Meyer (1970, 1980) expanded on this by exploring how institutions shape organisational behaviour, while Scott (1995) further developed the theory by categorising insurance industry into regulatory, cognitive and normative types to analyse how institutional pressures influence quest for legitimacy and support. Overall, IT offers valuable insights into how regulatory impacts of digitalisation and compliance affect both industry-wide and organisational-level dynamics. Behavioural issues in the insurance industry were measured according to Selznick institutional analysis whereby legal environment and many other institutions such as the insurance require a wider transformation. This will result into managing the organisational behaviour and its adaptation as an output.

Research methods and design

The study has applied the systematic literature review as the methodology. According to Drahota and Dewey

(2008), systematic literature review helps researchers to identify select and critically appraise research material to answer the research questions. Systematic literature review uses secondary data and Johnston (2014) suggests secondary data are still empirical and can be used for main data collection.

Selection of primary studies

The relevant primary studies for this research were selected based on keywords, titles and abstracts from the databases. The researcher examined the specified keywords, titles and abstracts based on each platform (Ruparel et al. 2023). The researcher indicated keywords were preferred for efficient and precise searching. This review used a structured methodology to compile research on digital technologies in insurance, focusing on the SA landscape. It analysed the impact of digital technology on the value chain of this industry, covering the period from January 2010 to April 2023. Following this, the subsequent section will outline the sources of information, search terms, as well as the exclusion and inclusion criteria.

The selected publications were distributed from 2010 to 2023, illustrating quantity of publications focused on digitalisation in the insurance industry (e.g. motor, business, house, etc.), and other insurance receiving increased focus over the years. It has been observed that the amount publications has fluctuated throughout the years, with a clear upward curve in the last 9 years. Of the 121 articles published over 13 years (including both local and international sources), 65 articles (54%) were published between 2016 and 2023. This trend reflects the accelerated pace of digitisation within the insurance industry.

Database and search items

Articles and journals sourced from established databases such as Science Direct, EBSCO Host and Google Scholar were accessed for this review. The databases offer a surplus of academic material, which is accessible to the academic community at large (Soykan & Uzunboylu 2015). Consequently, this review used a combination of databases to identify relevant publications, using predetermined search terms across titles, keywords and abstracts. It examines the present state of digitalisation in insurance; thus, keywords such as digital technology, digitisation, operational efficiencies and insurance were initially applied to filter relevant references. Upon identifying articles, both key terms and content were scrutinised to uncover additional related keywords and terms present in the literature.

The search query employed for articles within the databases included combinations such as 'insurance AND digital* OR technology* OR digitisation * OR "information system" AND business OR operational' whether the search term appeared in the title or efficiencies. As an example, the advanced search feature of Google Scholar, offered various search options. The options included the ability to search for articles using combinations such as all words, exact phrases, at least one word from a given set, or excluding specific words, with the flexibility to specify anywhere within the article. In addition, the standard search by author feature was utilised during the search process.

Article inclusion and exclusion criteria

Careful consideration was given to date ranges during the process of filtering articles to ensure less outdated content was considered. However, this was not the only criterion utilised. The inclusion and exclusion criteria are discussed next. The database filtering and searching was restricted in this manner: (1) articles and reviews; (2) articles within the business areas of business, management, insurance, IS; and (3) other articles published. The exclusion criteria applied was the following: Journals categorised as low relevance articles failing to emphasise digitalisation in the insurance industry were deemed as not suitable.

Results

Using the selected search terms and inclusion criteria, 35 200 articles peer reviewed were identified for the international insurance industry, and 19 200 peer-reviewed articles were retrieved for SA insurance. A series of filtering steps were then undertaken to ensure alignment with the research objectives. Initially, publications were sorted based on relevance and citation metrics, leading to the exclusion of lower-ranked journals. Furthermore, publications not relevant to the research were eliminated after a thorough review of titles and abstracts. The publications were reviewed to further refine the selection, removing research not meeting the criteria. In the final stages, 121 articles were retained for analysis (Figure 2).

The study's findings suggest focus on emerging technologies such as AI and blockchain has increased. Despite widespread examination of digitalisation in the financial services and other service industries, a scarcity remains of studies focused on its impact within the insurance industry of developing nations, particularly SA. In addition, the existing literature predominantly investigates digital strategies and business models, overlooking the intricate relationship between digitalisation and business processes, as well as how technological, environmental and organisational factors shape the digitalisation journey of the insurance industry. It primarily concentrates on early adopters such as the manufacturing and retail industries, which are also experiencing disruption and adopting digital innovations. According to Mapingire et al. (2022), all industries shift towards a service-oriented perspective during digitalisation. However, classification methods can be discussed when analysing various sources exists. The collective viewpoint across the research articles referenced herein suggests a pressing need for further exploration and advancement on digitalisation.

Figure 2 illustrates the selected search terms and inclusion criteria. Initially, 35 200 peer-reviewed articles were identified for the international insurance industry, while 19 200 peer-reviewed articles were retrieved for the SA insurance industry. A series of filtering steps were then implemented to align with the research objectives. Publications were first sorted based on relevance and citation metrics, resulting in the exclusion of lower-ranked journals. Furthermore, publications not relevant to the research were eliminated after a thorough review of titles and abstracts. The publications were reviewed to further refine the selection, and research not meeting the criteria was removed. In the final stages, 121 articles were retained for analysis.

Table 1 presents the categorisation of publishing journals. The study found that 121 articles were analysed, IS led with the highest count of 37 publications, followed by the International Conference on System Sciences (25) and lastly Computer Science (17). Surprisingly, only one article out of the 121 was published in the field of Management and five in Business. Although these articles are significant, they do not discuss the importance of digitalisation within specific journals focused on insurance. Considering digitalisation's impact on the business chain, it is advisable for relevant journals to encourage more robust findings and guidelines, which facilitate digitalisation in insurance.

Discussion

Numerous research areas requiring further insight and investigation exist. Granted research is ongoing and findings are developed, but more research and thorough knowledge is required on system integration and risk management, cyber securities, the effects of regulatory changes on digitalisation and factors affecting the adoption. Furthermore, the external and internal factors influence digitalisation, such as the impact of insufficient management support and poor communication (Ismail et al. 2017), and the perceptions digitalisation is overly complex and costly (Pauch & Bera 2022) require in-depth analysis. The process of filling in gaps is critical to understanding digitalisation and how it affects theory and practice.

The study will examine digitalisation's long-term impact on the competitiveness and performance of insurance firms, identify best practices and lessons learned, compare digitalisation strategies and outcomes across different markets and regulatory environments and explore new business models enabled by digitalisation. The benefits of digitalisation were explored through the presentation of inclusive summary of the literature in this study to assist the industry professionals, and studies in identifying the technologies have generated the greatest benefits in the

TABLE 1: Number of selected publications.

Journal	Number of publications
Economics	3
International Conference on System Sciences	25
Computer Science	17
Business	5
Management	2
Information Systems	37
Small Business and Entrepreneurship	1
International Conference on System Sciences	7
International Journal of Research in Business and Social Science	8
Journal of Industrial Policy and Technology Management	10

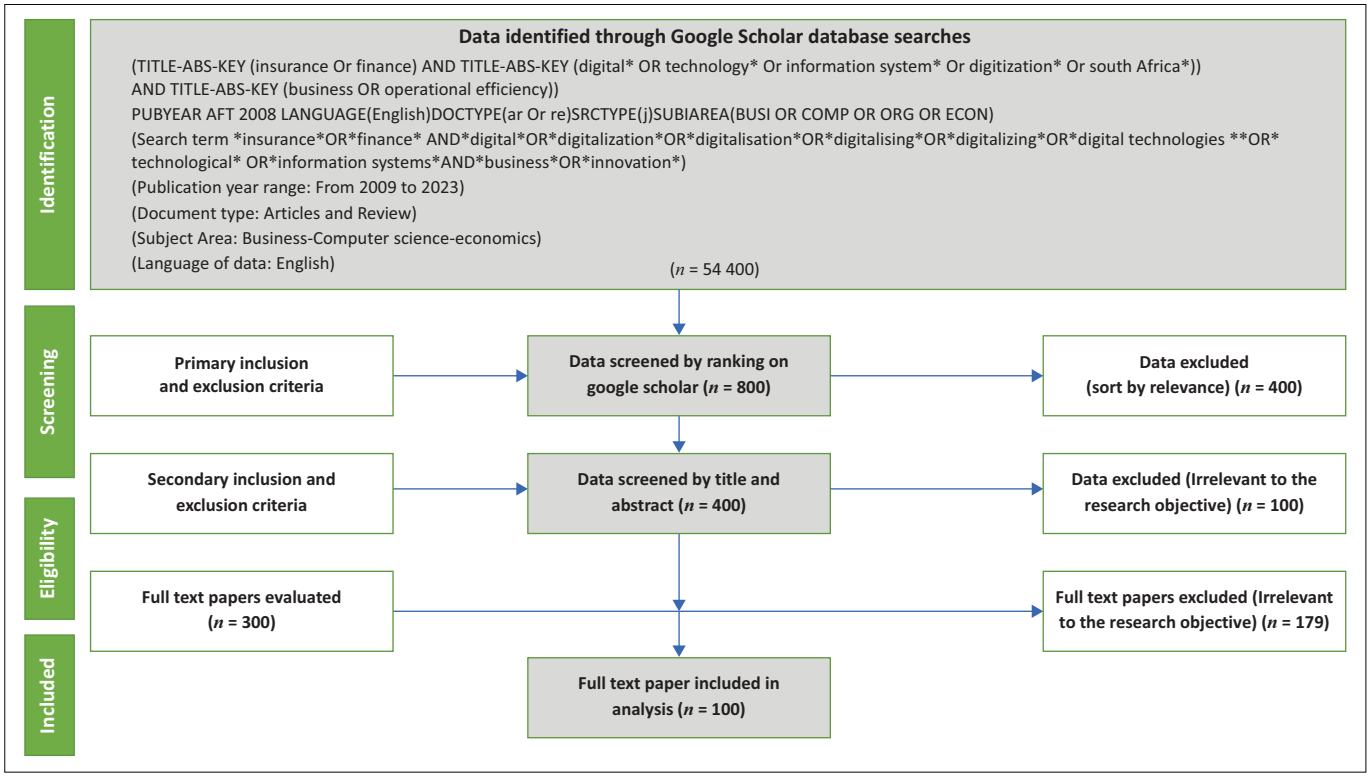


FIGURE 2: Flow diagram of the article search and selection process.

insurance industry. Furthermore, this analysis empowers practitioners with an understanding to deal with the impact of digitalisation in insurance. This study provides a consolidated overview and synthesis of the publications used in this literature review, highlighting key findings, methodologies, theories, trends and literature gaps. The process of synthesis involves selecting various assigned readings or sources from databases, organising and integrating facts to generating an original narrative (Baviskar et al. 2021).

In the past, research on the topic of digitalisation has been periodic, but because of the accelerated wave of industry transformation, a clear rise in the number of digitalisation journals and research material has been realised, reflecting a growing interest among researchers over the past decade. Stanković et al. (2021) stated that colleagues have reported a similar trend although with some differences concerning case study research. The reliance on empirical approaches suggested a lack of theoretical frameworks in the field might not validate the study. However, we support for the use of case studies and qualitative exploratory research methods in investigating digitalisation, considering it as an emerging and complex topic. Several researchers, such as Van Dyk and Van Belle (2019); Horlacher and Hess (2016), have expressed a preference for the case study approach, while others have favoured more exploratory methods. Nevertheless, it remains to be seen how academic findings on digitalisation will be applied in the future by practitioners in real-world scenarios.

The study has addressed the objectives for key digital technologies, which are used in the South African industry to enhance its operational processes. It has found that the insurance industry is divided into the following categories: life, health and non-life. Therefore, life insurance has the highest concentration (54%) of the articles. Non-life insurance has the smallest (4.0%) (four articles). Typically, a blend of technologies enhances the value chain within the insurance industry. Furthermore, although concepts such as IoT, BDA, Chatbots and robotics sometimes overlap, each study primarily focused on a specific aspect during coding. Notably, many publications detail more than one technology in analyses. Most publications tended to group interconnected technologies, which emerge as a repeated themes in discussions. The technologies gaining the most attention was AI, blockchain and robotics, as indicated by the rankings. It is noteworthy that virtual reality and social media received comparatively little attention. The IoT technology, BDA and AI have caught attention of researchers, with blockchain technologies arising at an unprecedented pace (KPMG 2024). Although benefits and minimal costs of using social networking exists, collaboration technologies and on-demand marketplace platforms, the research focus has been limited.

The research's focus in the reviewed articles in recent years emphasises the distribution of technologies. Studies concerning machine learning, AI, BDA and IoT showed significant growth since 2018 (Thayyib et al. 2023). The findings of this study indicate that technologies addressed key digital technologies used by the SA insurance industry to enhance operational processes. This research's findings discovered that blockchain and IoT only garnered attention from researchers recently, particularly since 2019. As stated in KPMG's 2019 Technology Industry Innovation Survey, 'The IoT was identified as the primary driver of digitalisation over the next few years'.

Purpose of digitalisation

To understand the potential impending shifts for the insurance industry with the integration of digital technologies, a classification system was created. This system is created on the operational transformation advantages produces. This purpose for digitalisation addressed the need to enhance business operations and increase productivity in the SA insurance industry. Among the clusters, the reduction of operational costs emerges as the most significant digital transformation advantage discussed. Of the 121 reviewed studies, the reduction of operational costs was the primary contributor for digitalisation and business enhancements and data security stand as the second and third most frequently. The reduction of capital expenses is the least addressed among the operational benefitted, respectively.

The rankings of the benefits associated with each digital technology are as follows: increasing production and profitability, reducing operational costs, improving business efficiencies, new business insights from incremental data, business process automation and increasing the market share. Enhanced business efficiency emerges as the predominant benefit across almost all digital technologies. In addition, increased profitability ranks as the second most significant benefit for technologies such as robotics, virtual reality, on-demand market platforms, cloud computing, blockchain and IoT, while cost reduction is ranked third. Lastly, beyond mere savings, advantages such as increased market share and automated business processes assume pivotal roles.

The insurance industry value chain includes primary and supporting activities, which encompass a series of actions aimed at delivering products or services. The primary activities include the following: claims assessment, customer service, underwriting, marketing, contract administration, sales and product development. The objective of this study is to influence digitalisation for operational efficiency in the SA insurance industry. On the other hand, the supporting value chain comprises the following: public relations, legal, human resources, IT and management. Further analysis was conducted for each activity to determine the segment of the value chain that received the highest attention. The researchers classified the insurance industry value chain

into three categories: (1) Application: This involves gathering basic information such as biographical details and health-related inquiries. (2) Underwriting: This stage involves assessing applications, conducting further inquiries, finalising appointments and evaluating outcomes. (3) Terms Offered: This is where decisions regarding applications are made, and the claims process may be addressed later in the process. Within the insurance industry value chain, the underwriting process emerges as the main process for potential digital technology applications.

Notably, a shortage of literature exploring technologies application exists. This gap in research highlights the ongoing justification for further research on digitalisation across various processes within the insurance industry. Within the insurance industry, IoT, BDA and AI stand out as the most extensively debated topics, with impacts covering all components of the insurance value chain. An increase in social media articles published comes as no surprise, given the significant role social media plays, particularly in the application stage. However, it is worth noting that there are other digital technologies whose potential contributions have not received thorough investigation. For example, while numerous studies have explored robotic technologies, virtual reality and the benefits of blockchain (KPMG 2024), the extent of contributions to the insurance industry remains relatively limited but is progressively gaining attention. A significant rise in research examining digitalisation's effects on insurance has been observed.

Implications of the study

This research has ramifications for both theoretical and practical applications. This research contributes to the existing body of knowledge by elucidating the influence of institutions, such as the insurance industry, which relies on social structures characterised by a significant degree of resilience. In this study we have conducted the systematic literature review from the different database such as Scopus, Science Direct and Google Scholar. This waws to bring about an opportunity to discover the gap in the body of knowledge regarding the digitalisation model for operational efficiency of operations in the insurance industry in using technologies.

Firstly, further research can aid in fully understanding how insurance companies can integrate digital technologies with current legacy systems. Secondly, cybersecurity and data privacy concerns raised by the rise in cybercrimes and variations, as well as reliance on digital platforms. Therefore, it will take more investigation to find practical approaches to controlling risks. Thirdly, more research is necessary to determine how regulatory changes have affected digital innovation in the insurance industry. Fourthly, it is important that future research should focus on how consumer trust in insurance services is impacted by digitalisation. Fifthly, further research is needed on digitalisation and the adoption factors of specific digital technologies, such as blockchain and AI, across different divisions of the insurance industry.

Future research for recommended areas

The insurance industry serves as a crucial safety net by providing financial protection against potential risks and losses, shielding individuals and businesses from unforeseen circumstances. While digital technologies offer immense potential for the insurance industry, its adoption of digitalisation has been comparatively slower than of other industries such as manufacturing and retail. Our analysis encompassed studies examining the application of digitalisation and its impact in insurance. As a result, the study will focus on the theoretical frameworks and the implementation of the digitalisation in the insurance industry. This will be performed through leveraging digital technologies that can enhance production, profitability and operational efficiency within the insurance chain.

Conclusion

It has emerged in this study that the synthesis of the is increasing the use of online platforms, such as surveys and interviews, as possible research tools. However, this rise could be attributed to changes in search strategies and the interpretation of terms rather than a genuine increase in usage. Firstly, only 54% of the articles concentrated on the life insurance industry excluding health insurance, with minimal representation from non-life insurance, this displays a further need for literature. Secondly, reduction of operational expenses was the primary objective discussed regarding digitalisation.

Through the analysis of highly regarded articles, valuable insights were obtained regarding the use of digitalisation within insurance, particularly focusing on SA. This analysis delved into trends and patterns in the adoption resulting in a thorough understanding of the digitalisation of the current state. This study highlights the transformation journey within the industry. In addition, this article outlines six key research areas stakeholders, researchers, industries and policymakers should prioritise in the future. The areas are crucial for facilitating the acceleration of the digitalisation process and enhancing its role to deliver value through innovative solutions.

Acknowledging that all investigations inherently possess methodological limitations, it is important to recognise potential weaknesses within the literature review. Firstly, to ensure the inclusion of only highly regarded journals, a filtering process was implemented. However, this approach may have led to the inadvertent exclusion of pertinent, high-quality articles published in other journals. Furthermore, it is acknowledged that significant contributions to the insurance industry that often originates from blogs, seminars and publications are 'practitioner-focused' rather than solely from literature, which was the primary focus of this survey. The alternative sources are widely esteemed within respective professional communities for offering fresh perspectives and innovative ideas. Therefore, it would be beneficial to also explore emerging trends within publications. Secondly, although thorough scrutiny was applied to the contents of articles, abstracts and titles to align with the research objectives, the selection process was inherently subjective.

Despite efforts to mitigate this subjectivity through cross-referencing, some relevant articles may still have been inadvertently excluded. Future researchers are encouraged to develop alternative search terms to enhance the range of studies identified on the topic. It is also acknowledged that unconscious biases may have influenced the chosen search terms, potentially impacting the findings. Consequently, this systematic review serves as a foundational reference for further exploration within the respective research area.

Acknowledgements

Siyabonga Michael Gama would like to acknowledge the University of South Africa's School of Computing for the master's degree study and thank Dr Mampilo Phahlane and Dr Lario Malungana for editing the manuscript and reviewing it.

This article is partially based on the author, S.M.G.'s thesis entitled, 'A digitalisation model for operational efficiency of operations in the insurance industry', towards the degree of Master's in Computing in the School of Computing, University of South Africa, South Africa, received 2024, with supervisors Dr Mampilo Phahlane and Dr Lario Malungana.

Competing interests

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

Authors' contributions

S.M.G. wrote the article and M.P. and L.M. acted as supervisors of this research article.

Ethical considerations

An application for full ethical approval was made to the University of South Africa College of Science, Engineering and Technology_School of Computing_ERC and ethics consent was received on 09 August 2024. The ethics approval number is 3827.

Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

The data that supports the findings of this study are available from the corresponding author, S.M.G. upon reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and are the product of professional research. It does not necessarily reflect the official policy or position of any affiliated institution, funder, agency or that of the publisher. The authors are responsible for this article's results, findings and content.

References

Artemenko, E., 2020, 'The roles of top management in digital transformation', *IOP Conference Series: Materials Science and Engineering* 940(1), 012014.

Aslam, A. & Shah, M.A., 2020, *Tec (h) tonic shifts: Taxing the 'digital economy',* International Monetary Fund, Washington, DC.

Barthel, P. & Hess, T., 2019, 'Are digital transformation projects special?', in *Conference: 23rd Pacific Asia Conference on Information Systems (PACIS)*, p. 30, At: Xi'an, China.

Baviskar, D., Ahirrao, S., Potdar, V. & Kotecha, K., 2021, 'Efficient automated processing of the unstructured documents using artificial intelligence: A systematic literature review and future directions', *IEEE Access* 9, 72894–72936. https://doi.org/10.1109/ACCESS.2021.3072900

Behar, A., 2016, 'The endogenous skill bias of technical change and wage inequality in developing countries', *The Journal of International Trade & Economic Development* 25(8), 1101–1121. https://doi.org/10.1080/09638199.2016.1193887

Berthelé, E., 2018, 'Using big data in insurance', in *Big data for insurance companies*, vol. 1, pp. 131–161, Wiley Publisher.

Bhardwaj, G., 2021, 'Analysis of digitization, IOT and Block chain in Bancassurance', in *2021 International conference on technological advancements and innovations (ICTAI)*, pp. 506–509, IEEE, Tashkenta.

Bokolo, Z., 2023, 'Data security in chatbots for the insurance industry: A case study of a South African insurance company', doctoral dissertation, Cape Peninsula University of Technology.

Busschau, M.C., 2021, *A study of Industry 4.0 technologies and customer perception in the insurance industry*, University of the Witwatersrand, Johannesburg.

Bvuma, S. & Marnewick, C., 2020, 'An information and communication technology adoption framework for small, medium and micro-enterprises operating in townships South Africa', *The Southern African Journal of Entrepreneurship and Small Business Management* 12(1), 12. https://doi.org/10.4102/sajesbm.v12i1.318

Căpușneanu, S., Mateș, D., Tűrkeș, M.C., Barbu, C.M., Staraș, A.I., Topor, D.I. et al., 2021, 'The impact of force factors on the benefits of digital transformation in Romania', *Applied Sciences* 11(5), 2365. https://doi.org/10.3390/app11052365

Chui, M., Roberts, R. & Yee, L., 2022, *Generative AI is here: How tools like ChatGPT could change your business*, Quantum Black AI by McKinsey, Chicago and London.

Deloitte – Market Trends 2019, viewed 05 March 2023, from https://www2.deloitte.com/content/dam/insights/us/articles/Tech-Trends2019/DI_TechTrends2019.pdf.

Dhieb, N., Ghazzai, H., Besbes, H. & Massoud, Y., 2020, 'A secure ai-driven architecture for automated insurance systems: Fraud detection and risk measurement', *IEEE Access* 8, 58546–58558. https://doi.org/10.1109/ACCESS.2020.2983300

Didenko, I. & Sidelnyk, N., 2021, 'Insurance innovations as a part of the financial inclusion', *Business Ethics and Leadership* 5(1), 127–135. https://doi.org/10.21272/fmir.5(1).116-125.2021

Drahota, A. & Dewey, A., 2008, 'The sociogram: A useful tool in the analysis of focus groups', *Nursing Research* 57(4), 293–297. https://doi.org/10.1097/01.NNR.0000313489.49165.97

Dwivedi, Y.K., Kshetri, N., Hughes, L., Slade, E.L., Jeyaraj, A., Kar, A.K. et al., 2023, 'Opinion Paper: "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy', *International Journal of Information Management* 71, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Gupta, S., 2018, 'Degree project in industrial management, second cycle, 15 credits Stockholm, Sweden', Indek trita-itm-ex 2018:359 KTH, Master of Science Thesis, Industrial Engineering and Management Industrial Management.

Henriette, E., Feki, M, & Boughzala, I., 2016, 'Digital Transformation Challenges', in *Proceedings The 10th Mediterranean Conference on Information Systems will be held in Cyprus*, MCIS, September 4–6, p. 33, viewed n.d., from https://aisel.aisnet.org/ mcis2016/33.

Holten, A.L. & Brenner, S.O., 2015, 'Leadership style and the process of organizational change', *Leadership & Organization Development Journal* 36(1), 2–16. https://doi.org/10.1108/LODJ-11-2012-0155

Horlacher, A. & Hess, T., 2016, 'What does a chief digital officer do? Managerial tasks and roles of a new C-level position in the context of digital transformation', in *2016 49th Hawaii International Conference on System Sciences (HICSS)*, IEEE, Koloa, HI, January 5-8, 2016, pp. 5126–5135.

Iskender, A., 2023, 'Holy or unholy? Interview with open AI's ChatGPT', *European Journal of Tourism Research* 34, 3414. https://doi.org/10.54055/ejtr.v34i.3169

Ismail, M.H., Khater, M. & Zaki, M., 2017, 'Digital business transformation and strategy: What do we know so far', *Cambridge Service Alliance* 10(1), 1–35.

Johnston, M.P., 2014, 'Secondary data analysis: A method of which the time has come', *Qualitative and Quantitative Methods in Libraries* 3(3), 619–626. https://www.researchgate.net/publication/294718657_Secondary_Data_Analysis_A_Method_of_Which_the_Time_has_Come.

Kiel, D., Müller, J.M., Arnold, C. & Voigt, K.I., 2017, 'Sustainable industrial value creation: Benefits and challenges of industry 4.0. *International Journal of Innovation Management* 21(08), 1740015. https://doi.org/10.1142/S1363919617400151

KPMG, 2024, *KPMG report on blockchain for technology, media and telecommunication companies*, US CEO Outlook - Pulse Survey, viewed 01 October 2024, from https://assets.kpmg.com/content/dam/kpmg/im/pdf/blockchain-for-tmt-2019-ws.pdf.

Luo, G., Zhou, Y., Ren, T., Chen, S., Sun, X. & Ji, R., 2024, 'Cheap and quick: Efficient vision-language instruction tuning for large language models', in *Advances in neural information processing systems*, vol. 36, pp. 29615–29627, Association for Computing Machinery, New York, NY.

Mapingire, K., Smuts, H. & Van der Merwe, A., 2022, 'Components of a digital transformation strategy: A South African perspective', in *Proceedings of Sixth International Congress on Information and Communication Technology: ICICT 2021, London,* vol. 2, pp. 437–447, Springer, Singapore.

Mbatha, N.S., 2020, 'Factors influencing cyber insurance adoption in South Africa industry', Master of Management, University of the Witwatersrand, Johannesburg.

Meyer, D.E., 1970, 'On the representation and retrieval of stored semantic information', *Cognitive Psychology* 1(3), 242–299.

Meyer, D.E., 1980, 'Effects of hydrogen incorporation in some deposited metallic thin films', *Journal of Vacuum Science and Technology* 17(1), 322–326.

Mhlungu, N.S., Chen, J.Y. & Alkema, P., 2019, 'The underlying factors of a successful organisational digital transformation', *South African Journal of Information Management* 21(1), 1–10.

Modiba, M.M. & Kekwaletswe, R.M., 2020, 'Technological, organizational and environmental framework for digital transformation in South African financial service providers', *International Journal of Innovative Science and Research Technology* 5(5), 180–196. https://doi.org/10.38124/IJISRT20MAY223

Moodley, A.J., 2019, 'Digital transformation in South Africa's short-term insurance sector: Traditional insurers' responses to the Internet of Things (IoT) and Insurtech', *The African Journal of Information and Communication* 24, 1–16.

Moyo, J., Watyoka, N. & Chari, F., 2022, 'Challenges in the adoption of artificial intelligence and machine learning in Zimbabwe's insurance industry', in *2022 1st Zimbabwe Conference of Information and Communication Technologies (ZCICT)*, IEEE, University of Zimbabwe, Zimbabwe, November 9–10, 2022, pp. 1–6.

Niraula, P. & Kautish, S., 2019, 'Study of the digital transformation adoption in the insurance sector of Nepal', *LBEF Research Journal of Science, Technology and Management* 1(1), 43–60.

Nkomo, L. & Kalisz, D., 2023, 'Establishing organisational resilience through developing a strategic framework for digital transformation', *Digital Transformation and Society* 2(4), 403–426. https://doi.org/10.1108/DTS-11-2022-0059

Ntoutsi, E., Fafalios, P., Gadiraju, U., Iosifidis, V., Nejdl, W., Vidal, M.E. et al., 2020, 'Bias in data-driven artificial intelligence systems – An introductory survey', *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery* 10(3), e1356.

Nwaiwu, F., 2018, 'Review and comparison of conceptual frameworks on digital business transformation', *Journal of Competitiveness* 10(3), 86–100. https://doi.org/10.7441/joc.2018.03.06

Pauch, D. & Bera, A., 2022, 'Digitization in the insurance sector–challenges in the face of the Covid-19 pandemic', *Procedia Computer Science* 207, 1677–1684. https://doi.org/10.1016/j.procs.2022.09.225

Phokwane, I., 2022, 'Optimizing and modelling business processes for a successful implementation of process automation', doctoral dissertation, University of Johannesburg.

Rafferty, A.E., Jimmieson, N.L. & Armenakis, A.A., 2013, 'Change readiness: A multilevel review', *Journal of Management* 39(1), 110–135. https://doi.org/10.1177/0149206312457417

Rawat, S., Rawat, A., Kumar, D. & Sabitha, A.S., 2021, 'Application of machine learning and data visualization techniques for decision support in the insurance industry', *International Journal of Information Management Data Insights* 1(2), 100012.

Ruparel, N., Bhardwaj, S., Seth, H. & Choubisa, R., 2023, 'Systematic literature review of professional social media platforms: Development of a behaviour adoption career development framework', *Journal of Business Research* 156, 113482. https://doi.org/10.1016/j.jbusres.2022.113482

Rutashobya, L.K., Chiwona-Karltun, L., Wilson, M., Ilomo, M. & Semkunde, M., 2021, 'Gender and rural entrepreneurship in digitizing Sub-Saharan Africa', in *Business in Africa in the era of digital technology: Essays in Honour of Professor William Darley*, Springer, pp. 63–84.

Ryman-Tubb, N.F., Krause, P. & Garn, W., 2018, 'How Artificial Intelligence and machine learning research impacts payment card fraud detection: A survey and industry benchmark', *Engineering Applications of Artificial Intelligence* 76, 130–157. https://doi.org/10.1016/j.engappai.2018.07.008

Scott, W.R., 1995, *Institutions and organizations*, Sage, Thousand Oaks, CA.

Severino, J.M., 2023, *Millions for billions: Accelerating African entrepreneurial emergence for accelerated, sustainable and job-rich growth WP325,* Université Clermont Auvergne, Clermont-Ferrand.

Siau, K. & Wang, W., 2020, 'Artificial intelligence (AI) ethics: Ethics of AI and ethical AI', *Journal of Database Management (JDM)* 31(2), 74–87. https://doi.org/10.4018/JDM.2020040105

Sibanda, G.S., 2019, *The adoption of Insurance Technology solutions by customers in South Africa*.

Soykan, E. & Uzunboylu, H., 2015, 'The review of published articles on mobile learning area in EBSCO database', *Procedia-Social and Behavioral Sciences* 182, 710–717. https://doi.org/10.1016/j.sbspro.2015.04.818

Stanković, J., Stanković, J.Z. & Tomić, Z., 2022, 'Factors affecting digital transformation of insurance in the Republic of Serbia', *Economic Themes* 60(1), 133–149. https://doi.org/10.2478/ethemes-2022-0008

Stankovic, J.J., Marjanovic, I., Drezgic, S. & Popovic, Z., 2021, 'The digital competitiveness of European countries: A multiple-criteria approach', *Journal of Competitiveness* 13(2), 117–134.

StatsSA, 2014, viewed 05 March 2024, from https://www.statssa.gov.za/?m=2024.

Stechemesser, K., Endrikat, J., Grasshoff, N. & Guenther, E., 2015, 'Insurance companies' responses to climate change: Adaptation, dynamic capabilities and competitive advantage', *The Geneva Papers on Risk and Insurance-Issues and Practice*, 40(4), 557–584.

Thayyib, P.V., Mamilla, R., Khan, M., Fatima, H., Asim, M., Anwar, I. et al., 2023, 'State-of-the-art of artificial intelligence and big data analytics reviews in five different domains: A bibliometric summary', *Sustainability* 15(5), 4026.

Tihinen, M., Iivari, M., Ailisto, H., Komi, M., Kääriäinen, J. & Peltomaa, I., 2016, 'An exploratory method to clarify business potential in the context of industrial internet–a case study', in *Collaboration in a Hyperconnected World: 17th IFIP WG 5.5 Working Conference on Virtual Enterprises, PRO-VE 2016,* Porto, Portugal, October 3–5, 2016, Proceedings 17, pp. 469–478, Springer International Publishing.

Van Dyk, R. & Van Belle, J.P., 2019, 'Factors influencing the intended adoption of digital transformation: A South African case study', in *2019 federated conference on computer science and information systems (fedcsis)*, IEEE, Leipzig, German, September 1–4, 2019, pp. 519–528.

Vial, G., 2021, 'Understanding digital transformation: A review and a research agenda', in *Managing digital transformation*, pp. 13–66, Elsevier.

Visagie, J. & Turok, I., 2021, 'The contribution of services to international trade in Southern Africa', *Development Southern Africa* 38(1), 21–38. https://doi.org/10.1080/0376835X.2020.1834351

Wiesböck, F. & Hess, T., 2020, 'Digital innovations: Embedding in organizations', *Electronic Markets* 30(1), 75–86. https://doi.org/10.1007/s12525-019-00364-9

Wiesböck, F., Li, L., Matt, C., Hess, T. & Richter, A., 2017, *How management in the German insurance industry can handle digital transformation*, LMU München.t