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# Has generative AI become of age: Assessing its impact on the productivity of SMEs in South Africa

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ABSTRACT

*Small and Medium Enterprises (SMEs) in South Africa previously faced challenges due to limited resources, restricted access to technology, and the need to constantly adapt to a dynamic business environment. The introduction of Generative Artificial Intelligence (AI) emerged as a potential solution to these issues, promising to enhance operational efficiency and strategic decision-making. As a representative of developing economies, South Africa experienced a growing interest in AI technologies. This study was conducted to explore the impact of generative AI on SME productivity in South Africa, an area which had been underexplored. Employing a qualitative methodology, the study evaluated the current state and implications of generative AI in South African SMEs. It involved in-depth interviews to gather perceptions, experiences, challenges, and benefits from SME owners and managers regarding the adoption of generative AI technologies. The findings analysed via R Statistical Software revealed significant insights into the specific areas where generative AI substantially impacted SME productivity. It also identified the challenges and opportunities associated with the adoption of generative AI by SMEs, as well as the potential long-term implications. Key findings included notable improvements in data-driven decision-making, operational efficiencies, and market expansion strategies. However, the study also highlighted barriers such as the lack of technical expertise, initial setup costs, and concerns over data security. Overall, the impact of generative AI on SMEs in South Africa was found to be predominantly positive, paving the way for further technological advancements and adoption in the sector.*



## Introduction

Artificial Intelligence (AI) has gained significant attention in the past decade, driven by advancements in computer processing power, cloud computing, and especially deep learning (Zhou & Gumbo 2021). Chatbots, advanced demand predictions, and self-driving vehicles are just a few examples of the emerging technologies that are becoming more prevalent. As noted by Oclarino (2021), AI has the potential to boost organisational efficiency by up to 40% and is becoming a requirement for global competitiveness (Schoeman & Seymour, 2022). However, despite these promising prospects, Small and Medium Enterprises (SMEs) face persistent challenges such as limited resources, lack of access to advanced technologies, difficulties in adapting to a rapidly changing business landscape, and skills gaps that impede AI adoption (Schoeman & Seymour, 2022). These issues hamper the productivity and competitiveness of SMEs in the country.

Recently, generative AI technologies have emerged as potentially transformative tools that could address these longstanding problems for SMEs. According to Soni (2023), generative AI refers to machine learning models that can generate new content and insights without explicit programming. Its capabilities include language translation, text and image generation, predictive analytics, and customized recommendations. The strategic implementation of generative AI is significantly influencing how SMEs customise

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their customers' experiences. Mondal, Das & Vrana (2023) argue that integrating generative AI into SMEs can improve the customer experience and provide enhanced personalised services. Moreover, generative AI can help SMEs develop more efficient and tailored marketing strategies by leveraging advanced technologies such as semantic data (SD), deep learning (DL), and the Internet of Things (IoT). For example, generative AI can be used by SMEs to generate personalised recommendations for products or services that cater specifically to each individual consumer needs (Abrokwah-Larbi, 2023). This could potentially result in increased customer engagement and loyalty.

Moreover, generative AI has the potential to go beyond specific use cases and revolutionise internal knowledge management systems, (Kauppinen, 2024) providing benefits to the entire organisation. With its advanced natural-language processing capabilities, generative AI can help employees access internal knowledge through interactive conversations and question-and-answer sessions, mirroring human-like interactions (Aguero & Nelson, 2024). This enables teams to easily retrieve relevant information, leading to more informed decision-making and quicker development of effective strategies (Chui et al., 2023).

However, despite the potential benefits of generative AI for SMEs as per the preceding backdrop, its impact on SME productivity in South Africa remains largely unexplored (Department of Communications and Digital Technologies, 2023). This lack of evidence is a significant concern, considering the potential of generative AI to improve the productivity and sustainability of SMEs in South Africa. This study, therefore, seeks to address this gap by exploring the impact of generative AI on SME performance in South Africa. Specifically, the study examines the current level of awareness and understanding of generative AI technologies among SMEs and assesses its perceived impact on productivity.

Achieving this goal provided data-driven insights in exploring whether generative AI has truly come of age as a value-adding tool for boosting output, decision-making, and strategic capabilities of SMEs in a developing market context. Furthermore, the findings have implications for SME competitiveness, technological readiness in South Africa, and AI innovation tailored for African firms. Finally, the study provided policy makers with fair understanding on the SMEs' state of readiness in adopting and integrating generative AI which promises in terms of both risk and opportunities. This empowers them with requisite framework to approach the regulation of AI use within the SME sector.

## Literature Review

This section provides an overview of AI and its impact on business organisations. It highlights how AI-driven systems are automating routine tasks and transforming operational processes. The literature review explores the various applications and benefits of generative AI for SMEs. This overview is important as succinctly captures how generative AI can enhance personalisation, expedite product development, and deliver cost efficiencies in design, prototyping, and documentation for SMEs. Additionally, the section elucidates on the role of generative AI in improving online presence, identifying relevant customer content, and predicting consumer trends for targeted marketing efforts.

### Overview of artificial intelligence

At the very core of AI is the need to solve real world problems using human like intelligence. As such, the rise of AI tools has had a significant impact on business organisations, resulting in a shift from traditional processes to technology-driven approaches. Sinha & Huraimel (2020) and Soni (2023) note that AI-driven systems automate routine tasks, freeing up human resources for more strategic initiatives. Integrating AI into organisational frameworks goes beyond adopting technology; it fundamentally changes how operations are planned and executed. This integration has wide-ranging effects, including the emergence of new consumer products and business strategies. By harnessing the power of AI tools, businesses can revolutionise their products and services, giving rise to innovative solutions that were previously thought to be unattainable. Consequently, AI-powered analytics far outperform human analytical capabilities in both efficiency and accuracy, ultimately improving the way decisions are made. process (Soni, 2023). While AI demonstrates immense potential for automation and innovation, there is a subset field known as generative AI that takes this capacity even further.

### Generative artificial intelligence on SME operations

Generative artificial intelligence encompasses a range of technologies that use advanced algorithms called generative models. These models possess the capacity to create new content, including text, images, and various other forms of media. According to Shrivastava (2023), generative AI is a subset of machine learning that differs from traditional supervised learning. Unlike traditional methods, generative AI models use statistical methods and probabilistic frameworks to generate new artificial artifacts without needing much or any human supervision, resulting in significant transformations. Furthermore, generative AI examines extensive digital content, such as text, images, audio, and video. Patterns are identified, the distribution of the input data is analysed, and new outputs are generated that are reflective of the properties of the data that has been learned (Shrivastava, 2023). With their ability to generate new content and insights, these generative AI models offer invaluable solutions across a range of business functions for SMEs.

Furthermore, generative AI can enhance personalisation, expedite product development, and deliver cost efficiencies in design, prototyping, and documentation. SMEs can improve their online presence effectively and efficiently by using generative AI. This technology helps to identify relevant customer content, enabling marketers to focus on meeting real-time customer needs (Haleem et

al., 2022). Moreover, according to Dumitriu & Popescu (2020), AI helps marketers identify and predict trends, ensuring that they target consumer groups who are more likely to engage with their ads.

A key use of generative AI is the analysis of consumer data to generate personalized emails and messages. Soni (2023) suggests that this enhanced personalization has the potential to increase customer loyalty and transaction frequency, both of which are essential for SME revenue. This enables smaller corporations to achieve a higher level of customized interaction compared to larger corporations. In addition, generative AI improves the efficiency of designing and producing products. It can autonomously generate new and improved product designs by incorporating consumer feedback and keeping up with emerging trends (Lucas, 2023). This helps SMEs reduce the time it takes to bring new products to market and to respond rapidly to changes in the market (Brossard et al., 2020). Also, generative AI assists product managers in identifying product trends from various sources, such as competitive intelligence and customer feedback, which significantly streamlines the review process (Lucas, 2023).

Furthermore, incorporating generative AI into graphic design and prototyping allows SMEs to cut costs on professional design services by assisting with the creation of marketing materials and logos (Pennefather, 2023). This significantly reduces costs and saves time compared to traditional prototyping methods (Lucas, 2023). Moreover, SMEs can streamline their operations by automating routine paperwork and report preparation. This not only helps reduce administrative responsibilities but also lowers operational expenses and minimizes the risk of human error. These efficiencies enhance resource allocation and promote business growth and profit.

Above all, the impact of adopting generative AI SMEs depends heavily on their technology infrastructure. The success or failure of AI adoption relies on how well-prepared the infrastructure is (Baabdullah et al., 2021). If SMEs have outdated or inadequate IT infrastructure, it could be difficult for them to handle the computational and storage demands of generative AI (Kurup & Gupta, 2022). This can result in disruptions and higher expenses. According to Soni (2023), SMEs can effectively increase their revenue growth by integrating generative AI with their existing technology infrastructure, rather than choosing one over the other. This highlights the importance of having a robust technological environment for businesses, as it significantly enhances the efficiency and utilisation of generative AI. It is highly likely that the current state of technology frameworks facilitates the creation of favourable conditions for introducing and incorporating AI applications into operational business procedures (Kurup & Gupta, 2022). Consequently, SMEs can streamline data processing, automate complex tasks, and fully leverage AI capabilities to achieve their business objectives.

According to Chui et al., (2023), generative AI-powered chatbots can offer quick and personalised responses to complex customer queries, despite the customer's language or location. For example, generative AI models like ChatGPT analyse customer queries and generate appropriate responses by referencing the extensive training data they have (Radhakrishnan, 2024). By utilising generative AI, interactions through automated channels can be enhanced in terms of quality and efficiency. This allows a greater number of customer queries to be handled automatically, allowing customer care teams to focus on resolving inquiries that require human intervention. The study also found that approximately 50% of customer interactions in the banking, telecommunications, and utilities corporations in North America are currently managed by automated systems. Chui et al., (2023) suggests that the implementation of generative AI has the potential to reduce the number of human-assisted interactions by up to 50%, depending on the current level of automation within an organisation.

Having discussed the potential benefits of generative AI for SMEs, its impact on SME productivity in South Africa remains largely unexplored. This lack of evidence is a significant concern, considering the potential of generative AI to improve the productivity and sustainability of SMEs in South Africa. This study, therefore, seeks to address this gap by exploring the impact of generative AI on SME productivity in South Africa. The next section discusses the research methodology employed.

## Research and Methodology

This section presents the research methodology used in this study, including the research design, target population, sampling procedure, data collection methods, and data analysis techniques. These subsections provide a comprehensive understanding of how the impact of generative AI on the productivity of SMEs in South Africa was investigated.

### Research Design

A qualitative research design was employed to gain a comprehensive understanding of the impact of generative AI on SME productivity in South Africa. Qualitative methods help researchers understand the "why" behind the "what." Through interviews, this study aimed to gather perceptions, experiences, challenges, and benefits from SME owners and managers regarding the adoption of generative AI technologies. This design allowed for an in-depth understanding of the subjective experiences and perceptions of the participants, which quantitative methods might overlook.

### Target Population and Sampling Procedure

The target population for this study consisted of owners and managers of SMEs in South Africa. These individuals were chosen because of their direct involvement in strategic decision-making and operational processes within their organizations. Their insights and experiences were crucial in understanding the practical implications and challenges of integrating generative AI technologies

into SME operations. To ensure a representative sample, purposive sampling was used. Purposive sampling involves the selection of participants who are well-informed about the phenomenon of interest. The aim was to gather a sample of participants who are knowledgeable and experienced with the use of generative AI in their business operations. This ensured that the data collected would be rich and relevant to the research questions (Patton, 2015). A sample size of 15 participants was targeted as it was expected the saturation point shall be achieved, the interviewees consisted of managers and SME owners from various sectors. This sample size was considered appropriate for a qualitative study of this nature, as it allowed for in-depth exploration while still being manageable within the study's constraints (Guest et al., 2006).

**Data Collection**

Semi-structured interviews with open-ended questions were utilised. This method was chosen because it allows us to explore themes flexibly while still maintaining a consistent structure across interviews (Brinkmann & Kvale, 2015). These set of interview questions were developed based on the study's main research objectives underpinned by existing literature on generative AI and SME productivity.

The interviews were conducted virtually via MS Teams and Zoom, as participants were difficult to access for in person engagements. Each interview lasted between 30 to 50 minutes and was audio-recorded with the participant's consent. The use of common virtual platforms enabled the recording of the interviews and access to the transcript verbatim for further analysis. To protect the participants' anonymity and confidentiality, pseudonyms were used, and their companies were de-identified. Importantly, the saturation point was reached on the 11$^{th}$ respondent and the last 4 potential interviewees were thus not engaged. To enhance the validity of our qualitative research, we followed the suggestion of Creswell & Miller (2000) by implementing participant validation. This involved seeking feedback from participants during the interview process to ensure that we accurately captured their intended meanings.

**Data Analysis**

The study utilised thematic analysis as the guiding framework to inform the systematic identification and analysis of key patterns within the interview data. To achieve this, following previous studies (Zhou & Gumbo, 2021b; Fay 2018) R Statistical Software version 4.1.2 was used (R Core Team 2021). The figure below captures the main steps that were carried out as part of the data analysis process.

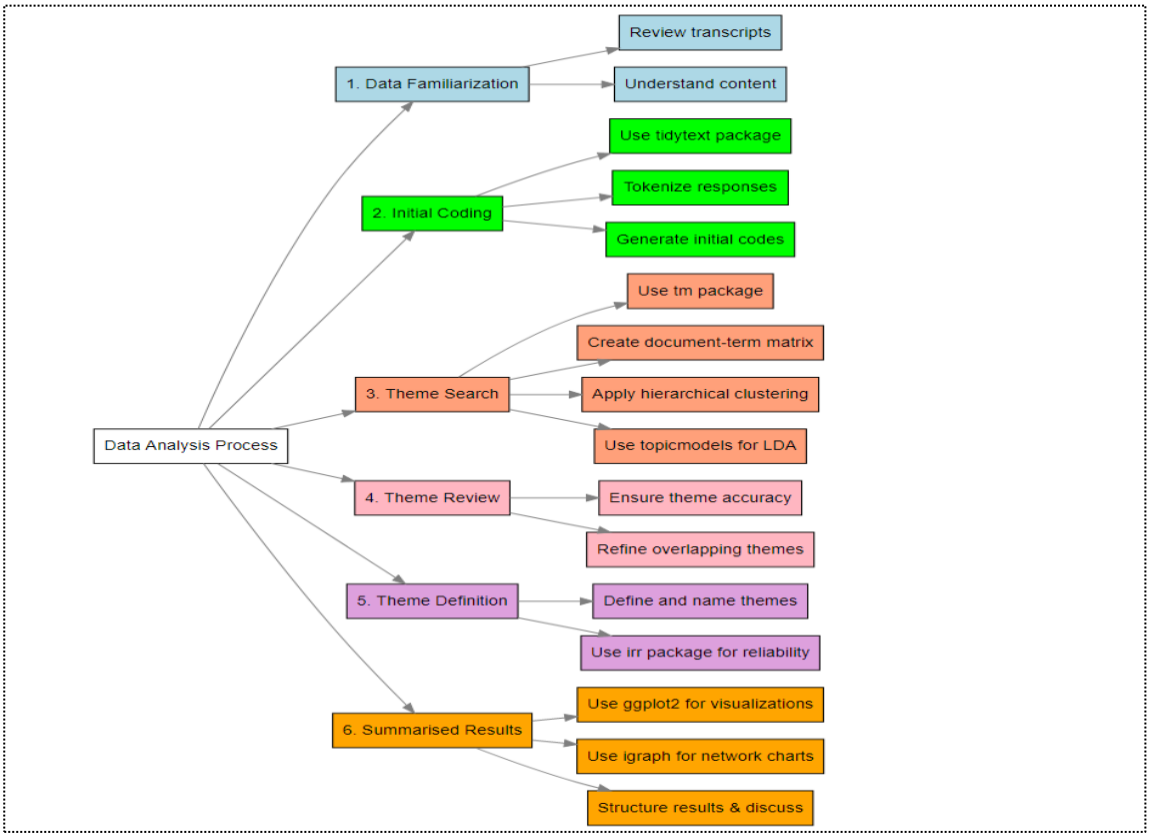


**Figure 1:** Data analysis approach; *Source:* Authors

As per the above figure the transcripts were all consolidated into a single word document and imported into R Software (R Core Team 2021). In the main several R packages were harnessed, 'tidytext' was utilised for text mining, and this included tidy data, tokenisation, text preprocessing, Term Frequency and Inverse Document Frequency (TF-IDF) and N-gram analysis. The "dplyr" package was also used for data manipulation, "ggplot" for visualising data, for network analysis, the igraph package was utilised. The "tm" package was used for document-term matrices creation and hierarchical clustering. For topic modelling, the "topicsmodel" package was used and the "irr" package for the calculation of the inter-rater reliability scores, which essentially ensured that identified themes are reliable.

In line with prior studies, (Grün & Hornik,2021; Fay, 2018; Ray, S. K., Ahmad, A., & Kumar, C. A. 2019)The analysis main steps as per the figure leveraging the R Software involved data familiarisation, through in-depth review of interview scripts to ensure appreciation of the content. The responses were then tokenised to generate codes that captured key and recurring statements. Main themes were then sought via document-matrix. Subsequently, latent themes from the transcripts were extracted by performing Latent Dirichlet Allocation (LDA). These themes were then further reviewed to ensure that they accurately reflected the participants' responses, and this necessitated the grouping of overlapping themes to ensure cross-theme heterogeneity without compromising intra-theme homogeneity. Overall, three main themes were settled upon, the first being around the participant's understanding of the Gen AI concept, the second was around the impact of Gen AI on SME operations and the third on challenges and barriers to adopting Gen AI among SMEs. The next section discusses these themes in detail as part of the results interpretation.

## Findings and Discussions

This section presented an analysis of the data collected through the interviews and analysed using the R Statistical Software system. The responses are based on the main themes that were identified via extensive analysis as per above.

**Theme 1: Understanding of gen AI concept**

Based on the results from the analysis, which is also aligned with the study's first objective, it's clear that indeed there is a significant diversity in the understanding and attitudes towards generative AI among SME owners in different sectors in South Africa. The findings, which were summarised from interviews with 11 SME owners, indicate that there is no uniform level of understanding or attitude towards generative AI among the interviewees. Figure 2 illustrates the level of understanding among the interviewees, categorized into low, medium, and high.

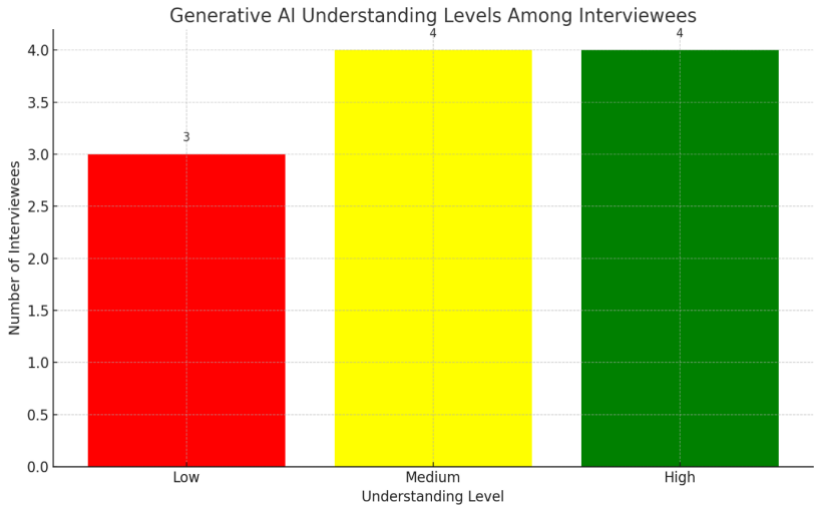


**Figure 2:** Generative AI understanding levels among interviewees; *Source:* Authors

Approximately 27% of the interviewees exhibited a low level of understanding of generative AI, while 36% demonstrated a high level of understanding of the concept. This distribution suggests that some SME owners have a low level of understanding of generative AI, while others have a medium or high level of understanding. These are some of the responses from the interviewees who initially had limited perceptions of generative AI:

*"...generative AI at first I just thought that it's just ChatGPT, but I later realised that actually AI is there to make our lives simpler because it's a tool that assist us".*

*"At first I didn't even understand what generative AI is, but through the workshop I had then I started to go deeper and understand what it is..."*

*"I probably still don't have an understanding of what I'm dealing with because it's still, you know, learning phase".*

Furthermore, findings highlight the variety in receptiveness and application of generative AI technologies within the operations of SMEs. This suggests that some SMEs are actively incorporating generative AI into their business processes, while others may be

more hesitant or have not yet fully explored its potential. These findings were consistency with the works of (Gupta, 2024; Pradhan et al., 2023; Soni, 2023).

To capture these findings, Figure 3 displays the range of understanding and utilisation of generative AI among the interviewees, showing those who are actively using generative AI tools in their businesses compared with those who are still in the learning phase or have limited or no use.

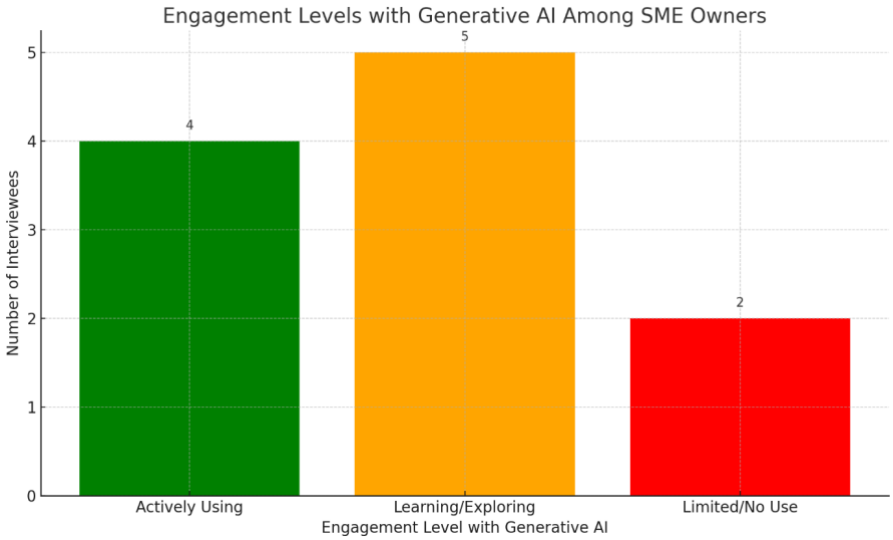


**Figure 3:** Engagement levels with Generative AI among SME Owners; *Source:* Authors

The findings indicate the varying degrees of engagement that SME owners have with generative AI, as depicted in the Figure 3. Approximately 36% of the interviewees were actively using various versions of Gen AI, and these were some of the responses *"I'm currently using Quantilytix to record my business daily operations" and* another*, "I've been using Playspace, and it helps me a lot in terms of HR management and reports for SARS".* One interviewee also highlighted the benefits of gen AI, *"I'm using the chat GPT for basically to generate information regarding my company for an example recently, I used to bake all the time without knowing exactly how much per recipe cost, so that is one of the main things that AI assisted me with".*

Meanwhile, 45% of the interviewees were still in the exploratory phase with generative AI. One interviewee expressed, "*but I haven't been using it fully, so I have not experienced the full capacity of it*," while another shared, "*I'm starting to. I have got ChatGPT and Nova on my laptop and on my phone, and I'm slowly starting to use them*". Another interviewee also highlighted that "*For now it's a work in progress. I'm just using it for financial recordings and HR".*

In contrast, 18% of the interviewees had limited or no use of generative AI. One interviewee explained, "*I like relying on my on my own thinking abilities most of the time as opposed to like finding things out on the Internet. I'm not saying it's not important……It is important is, you know, sometimes it opens up your thinking you know. But I don't rush to go to AI every time I'm faced with the task, or I need to do research on something*". Another participant admitted, *"I haven't used it a lot…I'm not going to lie to you….and I even sometimes forget about it".*

This suggests a spectrum of involvement, ranging from low to high levels of engagement, among the participants in the study. Overall, these findings indicate that SMEs in South Africa are at different stages in their journey of adaptation and learning when it comes to generative AI. Some may be actively embracing it, while others may still be in the process of understanding its implications and potential benefits for their business operations.

**Theme 2: The impact of Generative AI on SMEs**

This section presents the second theme which delved onto the specific areas within SME operations where generative AI has been implemented. Figure 4 illustrate the perceived impact of generative AI on various aspects of SMEs, including productivity, sales revenue, employee efficiency, and customer satisfaction, with each impact categorised into levels ranging from medium to high.

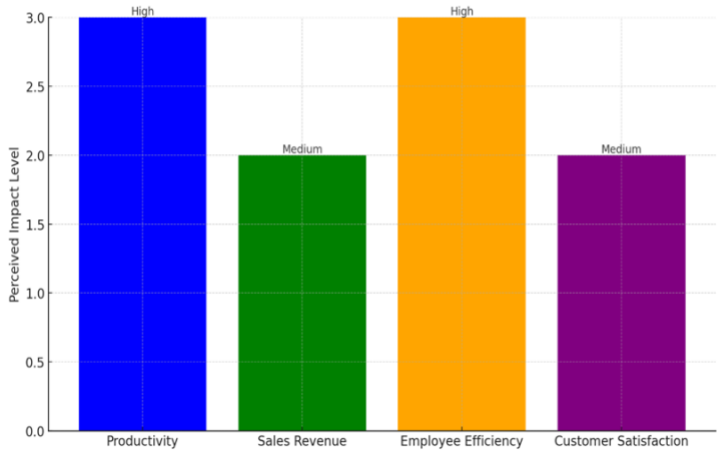


**Figure 4:** Impact of Gen AI on SMEs; Source: Authors

**Productivity**

About 30% of the interviewee noted significant improvements in productivity due to the adoption of generative AI tools. One interviewee highlighted how it streamlined daily business operations by facilitating easier recording of invoices and expenses, as well as generating necessary business *reports "There is some impact that I have seen in terms of the productivity of the business because it's easier for me to now record the generics of the daily business. You know, capturing my invoices properly and capturing whatever expense expenditure or income coming to the company and ….now I can also generate, reports, business reports that that are needed when I can.".* Another interviewee emphasised the time-saving aspect, mentioning how AI tools like ChatGPT enabled them to quickly gather information and create proposals, freeing up more time for other tasks "*actually it frees up a lot of time….if I do proposal manually I have to go from site to site to get information put it together and with ChatGPT you just give it clear instructions what it is that you need and it will give you whatever you want…You become more productive because you have more time to your ability to do other things rather than just being stuck on one thing for a long time".* Additionally, the interviewees mentioned how generative AI reduced the time spent on tasks like writing, resulting in increased productivity and efficiency, *"Gone are the days of sitting with something for like a month writing and then come back to it only to realise that you don't like it and I have to start from scratch again"* and another *"for me it is very productive and it saves time because everything is in order".* These results were consistency with studies by Sinha & Huraimel (2020) and Soni (2023) who noted that AI-driven systems automate routine tasks, freeing up human resources for more strategic initiatives. Furthermore, Lucas (2023) underscore the transformative impact of generative AI on productivity, revenue growth, and customer experience within small businesses. The study highlighted that generative AI assists product managers in identifying product trends from various sources, such as competitive intelligence and customer feedback.

**Sales Revenue**

The use of generative AI, specifically tools like quantilytics, has had a positive impact on sales revenue for 20% of the interviewees. One interviewee noted, *"sales revenue been impacted because of the use of Quantilytix…it does give me the accurate figures of what I did".* Interviewees also highlighted the ability of AI to provide insights into sales trends and expenditure, enabling better financial planning and resource allocation, thereby contributing to improved sales revenue, *"….with a AI, I was able to now understand that in a rough month this is how much I can expect and also in a very busy month…also I'm able to know how much I'm wasting and how much I'm spending to create a cake as a whole"*. This is consistent with the findings of Soni (2023) and Moyo (2024) who found that SMEs can effectively increase their revenue growth by integrating generative AI. Moyo (2024) highlighted that by integrating gen AI SMEs can expect a 6% to 10% increase in their revenue.

**Employee efficiency**

According to 30% of the interviewees, Generative AI has facilitated better task allocation and improved efficiency among employees. They mentioned how AI tools enabled them to assign tasks effectively and streamline workflow processes. As one interviewee explained, *"I'm able to assign my employees task, before that we would wait for trips to come then that's when my employees would know what to do…. But now even whether they are trips or not trips, they're able to know what to do and when to do it, and how to do it because of how I've been able to use AI in my company*". This improved clarity and efficiency in task management have contributed to enhanced overall productivity within the organization.

**Customer satisfaction**

The integration of generative AI has positively impacted customer satisfaction through various means. The interviewees at 20% of the responses highlighted how AI-enabled processes such as personalised itineraries and post-trip surveys have enhanced the overall customer experience. One interviewee mentioned, *"customer satisfaction has improved…with the assistance of AI, we can draft*

*itineraries and conduct research tailored to each trip*". Additionally, interviewees noted a reduction in complaints and improved communication with customers, leading to a more satisfactory experience, *"…our hotel it's in the rural village and it's hard to get there. You know, there are no street names…so one of the things that I did was create an info pack for our guests, it has everything in terms of how to get there, what you will see, and you know, try to make it very welcoming. So, it is impacted as a lot because I'm getting less complaints about direction from our guests*".

Literature corroborates these findings, showcasing similar outcomes of generative AI integration in SME operations. Studies by Soni (2023) and Chui et al., (2023) suggests that this enhanced personalisation has the potential to increase customer loyalty enabling smaller corporations to achieve a higher level of customised interaction compared to larger corporations.

**Theme 3: Perceived challenges for Generative AI use**

The discussion in this section as per the third and final theme offers insights into the challenges and barriers encountered by South African SMEs in adopting and integrating generative AI technologies into their business processes. The network chart in Figure 5 visually represents the challenges associated with generative AI adoption faced by SMEs and the corresponding mitigating solutions. The nodes represent individual challenges and solutions, while the weighted lines connecting them signify the relationship between specific challenges and their proposed mitigations. The thickness of these lines indicates the relative frequency or importance of each challenge-solution pairing, based on the number of SME owners mentioning them.

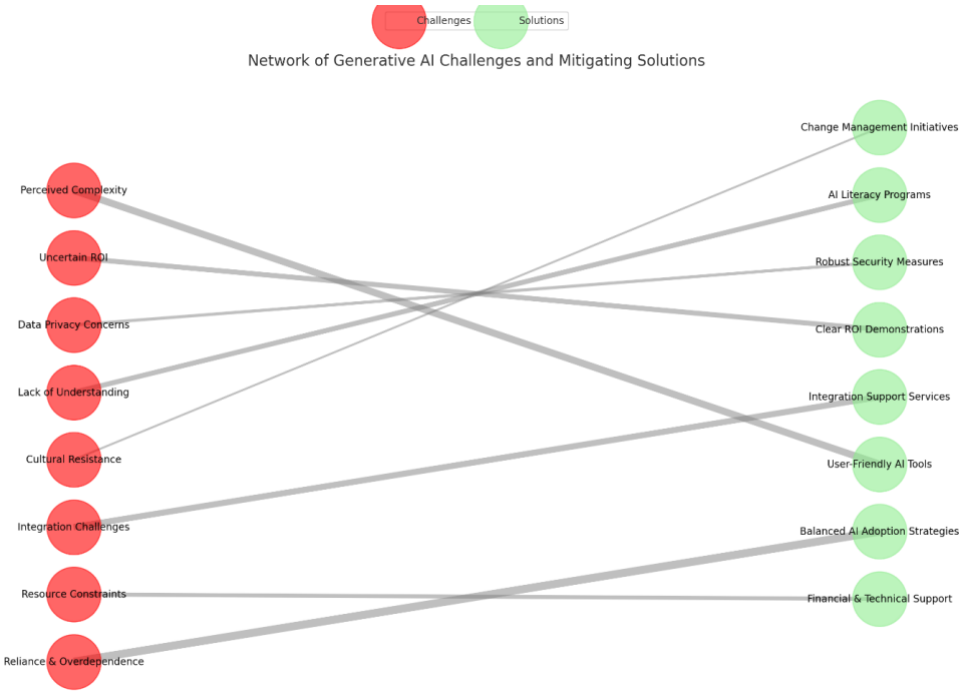


**Figure 5** : Perceived challenges for Generative AI use; Source Authors

Some of the challenges identified may include issues related to lack of technical expertise, cost, technical complexity and resistance to change.

**Lack of technical expertise:** Many SME owners at 80% of the responses, reported a lack of technical expertise as a significant barrier to adopting generative AI technologies. This challenge may stem from limited resources for training or hiring skilled personnel proficient in AI implementation and management. One interviewee highlighted that *"the biggest challenge for me…. is lack of digital skills". Another interviewee* echoed similar sentiments, expressing frustration with training sessions that were insufficient in duration and coverage, saying, *"we have encountered challenges with technical expertise because some of these trainings, they will take only 15 to 20 minutes and don't touch everything, then you yourself you have to go through it".*

**Cost Constraints:** Financial considerations were the other prominent challenge cited by SME owners. SME owners may feel overwhelmed by the initial investment required to adopt generative AI technologies. One of the interviewees highlighted the financial aspect of the challenge, explaining *"You know, one of the biggest challenges I face is that the software I currently use, which I love, requires a lot of money to upgrade".*

**Data Privacy and Security Concerns:** Concerns regarding data privacy and security emerged as significant challenges for SMEs considering the adoption of generative AI technologies. SME owners expressed apprehensions about safeguarding sensitive business data and ensuring compliance with data protection regulations. One interviewee highlighted the uncertainty surrounding security and privacy, stating, *"In terms of security and privacy, there's a lot of uncertainty… How can we be sure that the information we provide*

*is secure? What information must you give it so that you know that you know you are secured…"* Another interviewee emphasised the future challenge of data security concerns, stating, *"…and the other ones that I think would be a challenge in future that's going forward is data security concerns…"*

**Resistance to change:** Resistance to change within the organization was identified as a barrier to adopting generative AI technologies. Some SME owners and employees may be hesitant to embrace AI-driven automation due to fear of job displacement, reluctance to learn new technologies, or ingrained traditional business practices. One interviewee highlighted that, *"I've also seen that some of my staff members not comfortable to try out a new thing that is beyond their comfort zone. They can attend a workshop about AI, 2 weeks later, they still haven't tried what they have learned…and so I just feel like other people are resistant to change".*

In response to these challenges, several mitigating solutions were proposed:

i. AI literacy programmes: providing training programmes and capacity-building initiatives can address the lack of technical expertise among SME owners and employees. Investing in upskilling and reskilling programs can empower SMEs to leverage generative AI technologies effectively.

ii. Financial and technical support: offering affordable and scalable AI solutions tailored to the needs and budget constraints of SMEs can help overcome cost barriers. This can take different forms such as grants, subsidies, loans, or tax incentives. The main goal of these programs is to ease the initial financial strain of implementing AI and make it more accessible to SMEs with limited budgets. On the other hand, technical support involves providing SMEs with the expertise, guidance, and resources needed to successfully implement and manage generative AI technologies.

iii. Robust security measures: this can address concerns about data privacy and security. To alleviate these concerns, it is important for SMEs to develop robust data governance frameworks and implement stringent security measures. By adopting best practices in data management and encryption, SMEs can effectively protect sensitive information.

iv. Change management strategies: by implementing effective change management strategies and fostering a culture of innovation within the organisation, it is possible to address resistance to change. SME owners can achieve this by promoting a growth mindset, encouraging experimentation, and effectively communicating the benefits of adopting AI. These measures will help facilitate smoother transitions.

The network chart gives a complete overview of the challenges and solutions related to the adoption of generative AI by South African SMEs. By recognising and addressing these barriers, SMEs can make use of the transformative power of generative AI technologies to promote innovation and enhance competitiveness in the market.

## Conclusions

This study aimed to investigate the impact of generative AI on SME productivity in South Africa, an area that had not been extensively explored. The study achieved its objectives by conducting in-depth interviews with SME owners and managers. These interviews provided valuable insights into the current level of awareness, implementation, and challenges associated with generative AI in SME operations. The findings revealed that generative AI significantly enhances productivity, sales revenue, employee efficiency, and customer satisfaction within SMEs. The implementation of generative AI tools facilitated better task allocation, streamlined operations, and improved decision-making processes. This demonstrates the transformative potential of generative AI for SMEs. Specifically, generative AI helped automate routine tasks, generate business reports, personalize customer interactions, and efficiently manage internal knowledge systems. However, the study also highlighted several challenges faced by SMEs in adopting generative AI.

These challenges include a lack of technical expertise, high initial setup costs, data privacy concerns, and resistance to change. Addressing these barriers will require targeted interventions, such as AI literacy programs, financial and technical support, robust security measures, and effective change management strategies. In conclusion, while generative AI holds great promise for improving SME productivity and competitiveness in South Africa, its successful adoption hinges on addressing the infrastructural and human resource challenges identified in this study. The research shows that generative AI has a mainly positive impact. This is an important step towards more technological advancements and greater use of generative AI in the SME sector. Ultimately, this will contribute to economic growth and development in South Africa. For future research, it would be beneficial to conduct longitudinal studies to track the long-term effects of generative AI on SME performance. Additionally, it would be interesting to investigate the impact of specific generative AI applications in different industry sectors.

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