INTERNATIONAL JOURNAL OF MANAGEMENT PERSPECTIVES

https://ijmp.regent.ac.za | Open Access

An Exploration of the Nature and Status of Data Management Practices in SMEs in Limpopo Province, South Africa

I.B. Molepo[1]; Co-Author, B Ngwenya[2]

REGENT Business School

ABSTRACT

Data management presents considerable operational complexities for Small and Medium Enterprises (SMEs). Effective data handling typically requires specialised teams with expert knowledge. This research explored the influence of the characteristics and current state of data management practices within SMEs located in the Limpopo Province of South Africa. Employing a mixed-methods approach guided by pragmatism, the study distributed 500 online questionnaires for quantitative data collection, achieving an 89% response rate with 444 completed questionnaires. Additionally, in-depth qualitative data were gathered through interviews with 15 selected participants. The research indicates that addressing data management obstacles in SMEs requires harmonising data management systems with their specific strategies and objectives. The development of a data repository consistent with institutional policies is also vital for implementing effective data management. The findings offer valuable insights into effective data management practices for SMEs, underscoring the significance of aligning data management strategies with broader organisational goals. The study further informs policymakers about the unique data management needs and challenges faced by SMEs in Limpopo Province, enabling the development of focused support programs and policies.

Keywords: Organisational performance; Data management; SMEs; Data management frameworks; Data management strategies.

[1]Corresponding author: IB Molepo - ibmolepo@gmail.com | https://doi.org/10.64287/ijmp.2025.1.1.7

Introduction

Most modern organisations, including SMEs, recognise the importance of data, often relying on tailor-made software. Unifying data into centralised and standardised sources is crucial, necessitating effective data management processes (Jo & Gebru, 2020). These processes involve interdependent systems working together to organises, move, secure, and ensure data is protected, accurate, and accessible (Jadda & Idrissi, 2022). Data management systems aligned with organisational strategies significantly influence performance (Laudon & Laudon, 2019; Jadda & Idrissi, 2022). However, not all investments in data management projects are profitable, and organisations often fail to achieve desired outcomes (Jo & Gebru, 2020).

In South Africa, Small and Medium Enterprises (SMEs) contribute significantly to the economy, accounting for approximately 34% of the GDP and 66% of employment (Department of Small Business Development, 2020). Despite their importance, South African SMEs often struggle with data management due to limited resources, inadequate infrastructure, and a lack of skilled personnel. The diverse South African SME sector faces unique data management challenges across various industries, impacting their performance (Fatoki, 2018).

Furthermore, socio-economic disparities in South Africa affect SMEs' access to technology and training. These disparities, including income inequality, access to resources, and infrastructure limitations, create unique challenges for SMEs, particularly those operating in lower-income areas. This is compounded by rapid digital transformation, creating an urgent need for SMEs to adapt their data management strategies to remain competitive. Examples include the rise of e-commerce platforms like Takealot and Zulzi, which have enabled SMEs to reach wider markets. Food delivery services like Uber Eats and Mr. D have also transformed how businesses operate and connect with customers. Furthermore, digital payments and FinTech solutions are enhancing financial inclusion and streamlining transactions for SMEs. However, a Department of Small Business Development report (2020) reveals that only 20% of these SMEs utilise digital solutions for data management. This underscores the necessity to investigate the challenges SMEs face in effective data management and to explore the potential advantages of adopting digital systems.

Research Aim

This article aims to assess the nature and current state of data management practices within SMEs located in the Limpopo Province of South Africa. The focus will be anchored on big data, data management, DAMA-DMBOK Framework, methodology adopted and results.

Big Data Use in Small and Medium Enterprises

Big data refers to "the high volume, velocity, variety of information assets that require processing to provide unique insights that influence strategic decision making and business process optimization" (Beyer, 2021:67). Data has become easily accessible nowadays and several smart devices produce large quantities of data daily (Jokonya, 2019). SMEs can gather data from a variety of sources including search engines, social media posts, smartphones, and much more. The effective use of Big Data can assist SMEs in maintaining a competitive advantage over their competitors. Big Data has changed the way that enterprises compete by transforming business processes and enabling innovation (Brown, Chui & Manyika, 2022).

While there are advantages and opportunities presented by the emergence of Big Data, SMEs have lagged in adopting new technologies when compared to larger enterprises (Selamat, Prakoonwit, Sahandi & Khan, 2019). SMEs predominately use basic technologies such as emails, web, and simple accounting packages as opposed to larger enterprises that can afford to acquire advanced technologies (Sen et al, 2020). One of the obstacles to Big Data adoption is not only the lack of funding but also the lack of time and skilled resources (Selamat et al, 2019). The owners of SMEs who predominately manage the enterprises and influence the investments in technologies, often lack exposure to information on suitable big data technologies to invest in and the potential benefits associated with the technologies (Balachandran & Prasad, 2024).

Data Management-as-a-Service (DMaaS)

Data Management-as-a-Service (DMaaS) is an element of XaaS that offers centralised storage for enterprises with different data sources (Preston, 2019). XaaS, which stands for Anything as a Service or Everything as a Service, is a broad term encompassing various cloud computing and remote access services delivered over the internet. It refers to the

concept of providing everything from software and platforms to infrastructure and even specific functionalities as a service, typically on a subscription or pay-as-you-go basis (Balachandran & Prasad, 2024).

Similar to XaaS, DMaaS operates on a pay-per-use business model, which does not require enterprises to purchase or manage infrastructure for data management. DMaaS can provide SMEs with opportunities to ingest, store and process data from new sources in a cost-effective manner. With traditional data management approaches, enterprises manage their data internally, which requires investment in an on-premises data center and skilled data engineers to manage the infrastructure (Agrawal, Abbadi, Emekci & Metwally, 2021). The advent of DMaaS allows SMEs to focus on their core business and rely on industry experts to manage and protect their most valuable assets.

Theoretical Framework (The DAMA-DMBOK Framework)

The study was underpinned by the DAMA-DMBOK (Data Management Body of Knowledge) Framework presented in Figure 1 below.

Figure 1: DAMA-DMBOK Framework of Data Management

Source: Re-articulation of Framework adapted from Henderson (2017:198)

The DAMA-DMBOK (Data Management Body of Knowledge) framework outlines ten major data management practices that provide a comprehensive approach to managing data as a valuable asset. These ten practices form the core of the DAMA-DMBOK framework, providing organisations with a structured approach to effectively manage their data assets, ensuring they align with strategic goals and support decision-making processes. In summary the DMBOK serves as a structured framework that outlines the key components and practices of data management.

DMBOK provides guidance on how to implement data management strategies, ensuring that data is treated as a valuable asset and managed effectively throughout its lifecycle (Ramanathan, 2016). A valuable asset is any resource, either tangible or intangible, that holds significant worth and contributes positively to an individual's or organisation's overall value or success. It is something that provides economic benefit, either by generating revenue, reducing costs, or increasing efficiency. The framework also serves as an educational resource for data management practitioners, helping them understand the various aspects of data management and how to apply them in their organisations (Ladley, 2012). The DMBOK is a valuable resource for data management professionals, providing a structured approach to managing data effectively rather than a theoretical model (Zhang and Chen, 2015).

The Eleven (11) Data Management Knowledge Areas are:

- Data Governance – planning, oversight, and control over management of data and the use
- of data and data-related resources.
- Data Architecture – the overall structure of data and data-related resources as an integral
- part of the enterprise architecture.
- Data Modeling & Design – analysis, design, building, testing, and maintenance.
- Data Storage & Operations – structured physical data assets storage deployment and
- Management.
- Data Security – ensuring privacy, confidentiality and appropriate access.
- Data Integration & Interoperability – acquisition, extraction, transformation, movement,
- delivery, replication, federation, virtualisation and operational support.
- Documents & Content – storing, protecting, indexing, and enabling access to data found in
- unstructured sources (electronic files and physical records), and making this data available
- for integration and interoperability with structured (database) data.

- Reference & Master Data – Managing shared data to reduce redundancy and ensure better
- data quality through standardised definition and use of data values.
- Data Warehousing & Business Intelligence – managing analytical data processing and
- enabling access to decision support data for reporting and analysis.
- Metadata – collecting, categorising, maintaining, integrating, controlling, managing, and
- delivering metadata.
- Data Quality – defining, monitoring, maintaining data integrity, and improving data quality.
- The DMBOK informs the current study`s research objectives resonating with understanding of the nature and status of data management practices in SMEs in Limpopo Province, South Africa.

Methodology

The study employed the exploratory sequential mixed research design, and according to Leedy and Ormrod (2021:113) the design enables the researchers to keep their studies cohesive and allow the studies to answer the research questions in thoughtful, suitable and effective manner. Positivism and interpretivism as theoretical pillars to investigate how data management affects the organisational performance of SMEs in the Province of Limpopo through a mixed research approach were adopted. A total of 2 500 SMEs registered in the Limpopo Chamber of Commerce database constituted the target population for the quantitative study and 80 for the qualitative study.

A sample of 500 senior managers who comprised of Managing Directors, Human Resources Managers, and Senior Data Capturing personnel, Finance Managers, Marketing Managers and Information Technology Managers were randomly selected in preparation for the qualitative engagement. The researcher sampled these from the population of SMEs registered in the Limpopo Chamber of Commerce database. The Krejcie and Morgan (1970) table was used to determine the 500-sample size. From 500, the researcher then selected 15 participants for the purposes of the qualitative aspect of the study. A standardised questionnaire and an interview schedule were used to collect data both statistically and qualitatively (Bhandari, 2022:166).

Prior to starting the main study, the researcher tested the questionnaire's dependability through a pilot study. The pilot study was a condensed form of a larger study (Steward, 2019:384). The questionnaire was put through a pilot study with a small sample size of 10 participants who were selected from the study's target population after the researcher requested validation of the instrument by hiring specialists in the agrarian field and sector (Steward, 2019:384). The pilot study's

outcomes were simulated, and any necessary adjustments were then made to the previously designed data collection processes. Following their participation in the pilot project, the individuals were excluded from the main study (Saunders, Lewis, Thornhill and Bristow, 2023:231). To verify the reliability of the qualitative data collection instrument, pilot testing was performed in conjunction with validity verification for the qualitative portion of the study.

The questions were created via a 7-point Likert scale. The questionnaire included questions about the construct, nature, and status of data management practices (9 items), the challenges of data management practices (10 items), the impact of data management on organisational performance (12 items), and strategies to mitigate challenges of data management practices (11 items) (Joshi, Kale, Chandel and Pal, 2022:43). Focus groups were used to gather qualitative data with 15 participants. Qualitative data was content and thematically analysed, while quantitative data collected using a 7-Likert Scale was analysed using the Statistical Package for the Social Sciences (SPSS) software Version 29 (Nikolopoulou, 2022:335) through factor analysis.

Results

The majority (32.43%) of the executive, senior, middle and junior managers who participated in this study were aged between 31 and 35 years, followed by 23.42% aged between 26 and 30 years and 17.57% in the 36-- to 45-year category. This reflects that a significant population in the middle-aged category is participating in SME business in Limpopo Province, although 12.39% represented adults aged above 55 years. The SME business also attracted young people (10.36%) between 18 and 25 years of age. With respect to the number of years of experience in SMEs, most (29.95%) of the respondents and participants had 1 year to less than 3 years in the company, followed by 21.17% with 3 years to less than 5 years of experience in the organisation. On the other hand, 17.12% reported that they had 5 years to less than 10 years of experience in their SME organisations, and 14.41% had 10 or more years of experience in their organisation. However, a significant 17.34% of the respondents and participants had employed their organisations for less than 1 year.

Table 1 below shows the descriptive statistics of the measures of central tendencies of the mean and standard deviation performed to describe the impact of effective management of data on the performance of the SMEs. The means measure the magnitude of the indicators of the variables, whereas the standard deviation is a measure of how dispersed the data are in relation to the mean. A low or small standard deviation indicates that the data are clustered tightly around the mean, and a high or large standard deviation indicates that the data are more spread out.

Table 1: Effect of Data Management on Organisational Performance

Effect of Data Management on Organisational Performance -Descriptive Statistics			
	Mean	Std. Dev.	Analysis N
B1.Data management improves organisational performance and facilitates better business decisions which lead organisation towards success.	**6.72**	**.612**	**444**
B2. An effective data management system incorporates a multiple of goals, facilitates easy audit of organisational operations, and enables effective monitoring of organisational performance.	**6.55**	**.831**	**444**
B3. Benchmarking for best practices in the management of data improves organisational interaction with procured data, how the data should be stored for its effective use to improve organisational performance.	**6.61**	**.564**	**444**
B4. Ensuring that collection of data and how it is used complies with the regulations and laws as well as adhering to organisational standards for securing the data is critical to sustainable organisational performance.	**6.57**	**.709**	**444**
B5. Data management positively correlates with customers' retention and drives sustainable performance of organisations.	6.41	.836	444
B6. Effective data management helps organisations derive maximum benefits and performance improvements in the areas of finance, marketing, partnership networks and sustainable competitive advantage.	**6.52**	**.653**	**444**
B7. Organisational performance is determined by the organisation`s decision-making capabilities, and decision-making is based on timely access to high-quality data.	**6.45**	**.974**	**444**
B8. Creating a culture of information and data sharing in data management practices is critical to organisational performance.	6.26	.952	444
B9. Implementing data management and governance, providing data management training and developing new business ideas through data management is critical to organisational performance.	6.23	1.023	444
B10. Data management core competencies such as human skills, both tangible and intangible as well as innovation, positively correlates with organisational dynamic capabilities and hence sustainable organisational performance.	**6.48**	**.617**	**444**
B11. Data management allows organisations to effectively deliver customer satisfaction, enables collaboration among organisations, and effective response to changes in the market.	**6.47**	**.784**	**444**
B12. Organisational performance links with organisational agility, through data management, suggesting that organisations capable of being agile and adaptable tend to thrive better and overcome difficult situations.	**6.45**	**.772**	**444**

Source: SPSS statistical analysis output

The results in Table 1 above indicate that data management improves organisational performance and facilitates better business decisions, which lead organisations towards success ($\bar{x}$ = 6.72, σ = 0.612). This assertion was followed by the assertion that benchmarking for best practices in the management of data improves organisational interaction with procured data and how the data should be stored for its effective use to improve organisational performance ($\bar{x}$ = 6.61, σ = 0.564), ensuring that the collection of data and how it is used complies with the regulations and laws as well as adhering to organisational standards for securing the data are critical to sustainable organisational performance ($\bar{x}$ = 6.57, σ = 0.709). An effective data management system incorporates multiple goals, facilitates easy audit of organisational operations, and enables effective monitoring of organisational performance ($\bar{x}$ = 6.55, σ = 0.831), whereas effective data management helps organisations derive maximum benefits and performance improvements in the areas of finance, marketing, partnership networks and sustainable competitive advantage ($\bar{x}$ = 6.52, σ = 0.653).

This was followed by the assertion that data management core competencies, such as human skills, both tangible and intangible, as well as innovation, positively correlate with organisational dynamic capabilities and hence sustainable organisational performance ($\bar{x}$ = 6.48, σ = 0.617). One of the assertions is that organisational performance is determined by the organisation's decision-making capabilities, and decision-making is based on timely access to high-quality data ($\bar{x}$ = 6.45, σ = 0.974). Organisational performance links with organisational agility through data management, suggesting that organisations capable of being agile and adaptable tend to thrive better and overcome difficult situations ($\bar{x}$ = 6.45, σ = 0.772).

Table 2 below lists the themes that emerged from the qualitative focus group aspect of the study in corroboration of the quantitative results above. Notably, there were no discrepancies between the results from the quantitative aspect of the study and the qualitative findings.

Table 2: Emerged themes from focus group interviews

No.	Emerged Themes
1	Importance of data management as a practice to optimise the use of data within policy and regulations
2	Need for clear policies to govern the use of data
3	Data as a critical resource in decision-making processes
4	Protection of data as an organisational asset
5	Measures to protect data from cyber-attacks and maintain competitive advantage
6	Data security and compliance as top priorities
7	Implementation of robust encryption protocols and regular security audits

8	Employee training on data protection and privacy regulations
9	Multipronged approach to enhance data quality
10	Investment in data validation tools for error checking
11	Establishment of a Data Governance Committee (DGC) to oversee data management policies and procedures
12	Regular data audits and cleansing processes
13	Extensive training for staff on the importance of data accuracy and best practices for data entry and management

Source: Author

The themes identified in the interview transcripts are consistent with the literature on data management in SMEs. For example, the importance of data management as a practice to optimize the use of data within policy and regulations (*Theme 1*) was considered in previous research. For instance, Kaisler, Armour, Espinosa and Money (2023) noted that effective data management practices help SMEs make better decisions and improve their competitiveness in the market.

The need for clear policies to govern the use of data (*Theme 2*) was also highlighted in the literature, where Lee, Kim and Lee (2022) suggest that SMEs should establish data governance policies that clearly define roles and responsibilities for managing data.

The theme, critical role of data in decision-making processes (*Theme 3*) is in harmony with the literature underscoring the importance of data-driven decision making in organisations. According to Chen and Preston (2016) data-driven decision-making enables SMEs to identify new opportunities and help them improve their organisational performance.

Measures to protect data from cyber-attacks and maintain sustainable competitive advantage (*Theme 5*) are also in harmony with the literature. For example, Albrecht and Bachmann (2018) suggested that SMEs need to implement security measures such as encryption and regular security audits to protect their data.

The implementation of robust encryption protocols and regular security audits (*Theme 7*) was also recommended in literature by researchers such as Choo, Dhillon and Sun (2021) who suggested that SMEs should implement encryption and conduct regular security audits to protect their data from cyber threats.

The themes identified in the focus group interview transcripts are consistent with the literature on data management in SMEs. The literature suggests that effective data management practices can help SMEs make better decisions, improve their competitiveness, and protect their data from cyber threats. In corroboration of the quantitative aspect of the study, an operations director in one of the SME businesses selected for the qualitative aspect of the study, for example, had the following to say:

"While it is true that data management is a strategic issue and can be a core competence for sustainable competitive advantage, it is important that businesses have clear policies that govern the use of data. Data play[s] a very critical role in our decision-making processes in our business; as a result, it is paramount that we safeguard our data as assets and important resources."

In support of the views of the colleague above, a Senior Data Capturer and supervisor in another SME intimated as follows:

"As [a] technically oriented person, I believe that it all begins with setting up databases that should be accessed through software. The databases guarantee the protection of the data as an important organisational asset. It is therefore critical that we put measures in place to protect our data from cyber-attacks and thus protect our competitive advantage over our competitors in business."

A 51-year information technology administrator with one SME articulated his sentiments as follows:

"Data security and compliance are top priorities for us. We have implemented robust encryption protocols for all sensitive data, both at rest and in transit. We regularly conduct security audits and penetration testing to identify and address vulnerabilities. We have also invested in employee training on data protection and privacy regulations".

In corroboration of what her colleagues said, a 41-year-old manager in one of the SMEs retorted as follows:

"We have implemented a multipronged approach to enhance our data quality. First, we have invested in data validation tools that automatically check for inconsistencies and errors at the point of entry. Second, we have established a DGC that oversees our data management policies and procedures".

These results and findings are in harmony with the literature that underscores that organisational performance hinges on and depends on organisations' decision-making capabilities, which should be supported by timely access to relevant data (Makakane, 2019:157). It is critical that organisations gain their sustainable competitive advantage, and they can achieve that only through exercising proper decision-making processes in a quick manner. The broader implications of the findings are strategically relevant to the performance problem of SMEs in South Africa. The findings demonstrate that effective data management is not merely a technical requirement but a strategic imperative for SMEs aiming to achieve sustainable organisational performance (Hinton and McCaffrey, 2019:128). This insight emphasises that SMEs need to prioritise data management as a core component of their business strategy (Jansen and de Vries, 2021).

Conclusion

A well-designed data management framework can enable SMEs to collect, store, and analyse data effectively, make informed decisions, and respond to changing market conditions. Firstly, SMEs need to recognise the importance of data management in achieving sustainable organisational performance and invest in developing a robust data management framework. This requires a commitment to collecting and analysing data, investing in technology and infrastructure, and building the necessary skills and capacity. Furthermore, policymakers and stakeholders must provide support and resources to SMEs to enable them to develop and implement effective data management frameworks. This can be done by providing training and capacity-building programs, access to funding and technology, and creating an enabling environment that encourages innovation and entrepreneurship. The findings of this study can be used to inform policy and practice, and to promote the development of effective data management frameworks that support the growth and sustainability of SMEs.

REFERENCES

Adam, G. 2021. Understanding social media adoption in SMEs: Empirical evidence from the United Arab Emirates. Journal of Entrepreneurship in Emerging Economies. 10. 00-00. 10.1108/JEEE\-08-2017-0058

Beyer, T. 2021. SMEs Must Go Online—E-Commerce as an Escape Hatch for Resilience and Survivability, Journal of Theoretical and Applied Electronic Commerce Research. 16(7), 3043-3062.

Coleman, H. 2022. Dynamic capability: What are they? Strategic Management Journal, 21, 1105-1121.

DAMA International. (2019). DAMA-DMBOK: Data Management Body of Knowledge (2nd ed.).Technics Publications.

Farjami, Y., and Molanapour, R., 2022. *Business intelligence (from Idea to Practice*). 1st edition. Iran: Ati-Negar Press.

Fatoki, O. (2018). "The Impact of Business Environment on the Performance of Small and Medium Enterprises in South Africa" Journal of Economics and Behavioural Studies, 6(1), 1-10.

Gartner, H. 2019. View of Effect Of Technology, Organization, And External Environment On Business Performance Mediated By The Adoption Of Technology 4.0 In SMEs. Retrieved 23 July 2024, from http://journal.umg.ac.id/index.php/manajerial/article/view/3854/2435

Jadda, M & Idrisisi, D. 2022. Internet-based ICT Usage by South African SMEs: Are the Benefits within Their Reach?, Problems and Perspectives in Management. 13(2), 444-451

Jo, M & Gebru, T. 2020. A Technology Organization – Environment Perspective on Eco-effectiveness: A Meta-analysis". Australasian Journal of Information Systems. Vol 21, pp. 1-26.

Jones, D & Wynn, E. 2021. Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99-120

Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2022). Likert Scale: Explored and Explained. British Journal of Applied Science & Technology, 7(4), 396-403. DOI: 10.9734/BJAST/2015/14975.

Krejcie, R. V., and Morgan, D. W. 1970. Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607-610.

Ladley, J. (2012). Data Management: A Practical Guide for Managers. Morgan Kaufmann.

Laudon, K C., and Laudon, J.P., 2019. *Management information systems: Managing the digital firm.* Vol. 15. New York: Pearson Education Limited.

Makakane, M., 2019. *Do SMMEs play a role in the South African economy*? [Online]. Available from: https://www.morongwam.com/smmes-play-role-south-african-economy/ [Accessed: 27 December 2023].

Preston, M. 2019. What Helps to Make SMEs Successful in Global Markets? Procedia - Social and Behavioral Sciences. 150 (1), 192-201

Ramanathan, R. (2016). "Data Management: A Comprehensive Guide" Journal of Data Management, 2(1), 1-12.

Saunders, M., Lewis, P. and Thornhill, A., 2023. *Research methods for business students*. 7th edition. London: Pearson Education.

Small Enterprise Development Agency (SEDA). 2022. *The Small, Medium and Micro Enterprise sector of South Africa*. Research Note 2016 No 1 (Bureau for Economic Research) .Available from: www.seda.org.za/Publications[Accessed 30 December 2023].

Zhang, M & Chen, Y. 2015. Measuring competence? Exploring firm effects in pharmaceutical research. Strategic Management Journal, 15(1), 63-84.