The role of data analytics in driving resilient SME performance in South Africa

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ABSTRACT

Purpose: The COVID-19 pandemic has created unprecedented challenges for businesses worldwide, especially for Small and medium-sized enterprises (SMEs). The pandemic has created new risks and uncertainties that SMEs must navigate to remain operational and competitive. To address these challenges, SMEs need to adopt innovative practices to survive and thrive. Recent studies have shown that data analytics is increasingly becoming a key factor in driving firm performance. Thus, this study aims to empirically assess the importance of data analytics in driving resilient performance. Essentially this paper elucidates the strategic role of data analytics as one of the key components of an artificial intelligence driven world, to drive sustainable firm performance.

Methodology: The research employed a distinctive dataset of 450 SMEs in South Africa. Machine learning techniques, particularly Random Forest and Support Vector Regression (SVR), were utilised to model the influence of data analytics on SME performance during the Covid-19 pandemic. This approach facilitated a detailed examination of the correlation between data analytics adoption and organisational resilience during unprecedented circumstances.

Results: Data analytics can help SMEs prioritize urgent matters, ultimately improving their performance. Thus, the study recommends analytics software. With the help of analytics software, SMEs can gain valuable insights into critical issues that require immediate attention. By embracing these data analytics solutions, SMEs can effectively leverage their data to generate valuable insights that support decision-making processes.

Originality/Relevance: In the context of a developing country during the COVID-19 pandemic, this study addresses substantial gaps in the literature by concentrating on the role of data analytics in the performance of SMEs. Although prior research has illustrated the significance of data analytics for SMEs in developed countries, this study offers new perspectives on its implementation and influence in South Africa. The use of advanced machine learning techniques to analyze a substantial dataset of SMEs adds methodological rigor to the research.

Keywords: SMEs; Data Analytics; Risk; Performance; Covid-19

Le rôle de l'analyse des données dans la performance résiliente des PME en Afrique du Sud

Résumé

Objectif : La pandémie de COVID-19 a créé des défis sans précédent pour les entreprises du monde entier, en particulier pour les petites et moyennes entreprises (PME). La pandémie a créé de nouveaux risques et incertitudes auxquels les PME doivent faire face pour rester opérationnelles et compétitives. Pour relever ces défis, les PME doivent adopter des pratiques innovantes pour survivre et prospérer. Des études récentes ont montré que l'analyse des données devient de plus en plus un facteur clé dans la performance des entreprises. Ainsi, cette étude vise à évaluer empiriquement l'importance de l'analyse des données pour générer des performances résilientes. Essentiellement, cet article élucide le rôle stratégique de l'analyse des données en tant que l'un des éléments clés d'un monde axé sur l'intelligence artificielle, pour favoriser la performance durable des entreprises.

Méthodologie : La recherche a utilisé un ensemble de données distinctif de 450 PME en Afrique du Sud. Des techniques d'apprentissage automatique, en particulier Random Forest et Support Vector Regression (SVR), ont été utilisées pour modéliser l'influence de l'analyse des données sur les performances des PME pendant la pandémie de Covid-19. Cette approche a facilité un examen détaillé de la corrélation entre l'adoption de l'analyse des données et la résilience organisationnelle dans des circonstances sans précédent.

Résultats : L'analyse des données peut aider les PME à prioriser les questions urgentes, améliorant ainsi leurs performances. Ainsi, l'étude recommande un logiciel d'analyse. Avec l'aide d'un logiciel d'analyse, les PME peuvent obtenir des informations précieuses sur les problèmes critiques qui nécessitent une attention immédiate. En adoptant ces solutions d'analyse de données, les PME peuvent exploiter efficacement leurs données pour générer des informations précieuses qui soutiennent les processus décisionnels.

Originalité/Pertinence : Dans le contexte d'un pays en développement pendant la pandémie de COVID-19, cette étude comble des lacunes importantes dans la littérature en se concentrant sur le rôle de l'analyse des données dans la performance des PME. Bien que des recherches antérieures aient illustré l'importance de l'analyse de données pour les PME des pays développés, cette étude offre de nouvelles perspectives sur sa mise en œuvre et son influence en Afrique du Sud. L'utilisation de techniques avancées d'apprentissage automatique pour analyser un ensemble de données important sur les PME ajoute de la rigueur méthodologique à la recherche.

Mots-clés: PME ; Analyse de données ; Risque ; Performance

1. Introduction

Small and medium-sized enterprises (SMEs) are widely recognised as a significant contributor to economic growth and innovation in numerous OECD countries, and they comprise over 90% of all businesses worldwide (The World Bank, 2022). They are responsible for approximately 40% of the national income in emerging nations and 50% of global employment. The expansion of SMEs has been extraordinary in recent years, and it is anticipated to triple by 2030.In contrast, over 65% of them exit the market annually due to a variety of factors, such as a lack of capability, limited funding, and a lack of strategic deployment of resources, particularly data (Tarek et al., 2016; Wang & Wang, 2020). In the majority of emerging economies, SMEs are essential (Edijala et al., 2024). Interestingly, there has been a surge in interest among academia, government, and business in the field of SMEs over the past decade (Bhardwaj, 2022). The significance of SMEs and their contributions to the contemporary economy have been emphasised in numerous research studies (Erdin & Ozkaya, 2020; Gherghina et al., 2020; Mandizha, 2020).

Nevertheless, SMEs are vulnerable and lack the requisite resilience to compete on a global scale. The competitiveness and survival of SMEs have been substantially influenced by global uncertainty and competition, changing customer demands, swiftly evolving technologies, and global events such as the conflict in Ukraine and Covid-19 (Adam & Alarifi, 2021; Ciampi et al., 2021; Dubey et al., 2023; Dubey et al., 2020). Consequently, it is suggested that in order to sustain and remain competitive, SMEs should be proactive, observe business trends, and strategically utilise data (Alsulami et al., 2024).In order to enhance the performance of SMEs, it is imperative to focus on data analytics (Bhardwaj, 2022).

The primary function of data analytics in SMEs is to analyse historical data and derive valuable conclusions through the application of statistical methodologies and technology. These results have the potential to facilitate strategic decision-making, enhance performance, and create a more promising business future (Wang & Wang, 2020). In the late 2000s, data analytics was introduced and has since been emphasised as a critical success factor for businesses operating in emerging economies (Liu et al., 2020; Oesterreich et al., 2022). In a corporate environment that is exceedingly competitive, data analytics functions as a growth catalyst (Alsulami et al., 2024). Nevertheless, small enterprises exhibit a more apprehensive viewpoint regarding the implementation of data analytics in their operations when contrasted with larger organisations (Njenga & Bakhit, 2024; Rampyapedi & Adetunji, 2024).

Interestingly, data analytics has been highly embraced by a small number of SMEs, including healthcare, manufacturing, e-commerce, and retail (Miyamoto, 2015; Gudfinnsson et al., 2019; Maroufkhani et al., 2020). Report management, financial updates, supply chain operations, and CRM services are the sole applications of data analytics in the majority of SMEs (Naeini et al., 2019; Ajibade & Mutula, 2019; Gavrila & de Lucas, 2021). Consequently, SMEs continue to experience discomfort or reluctance in employing data analytics. Consequently, a significant disparity persists between SMEs that do not invest in data analytics and those that employ extensive data analytics. In order to ascertain the causes of this disparity, it is imperative to identify the inhibitors, restraining forces, and enablers of data analytics in SMEs.

2. Literature Review

2.1. Dynamic Capability Theory

Teece, Pisano and Shuen formalised and advanced the Dynamic Capabilities Theory (DCT) in its current form in the 1990s. The seminal work that encapsulates their theories is the research study "DC and

Strategic Management," released in 1997. DCT is now widely accepted in strategic management literature as a valuable lens for assessing a company's ability to sense, build, and reconfigure both internal and external capabilities and resources in response to environmental changes (Defee & Fugate, 2010; Teece, 2007). Furthermore, Teece (2014) defines DCT development as having three main elements: (1) sensing, (2) seizing, and (3) transforming/reconfiguring.

Sensing is a higher-order capacity that helps companies gain a competitive edge by employing business resources to recognise, collect, and proactively assess market developments and consumer needs. This foundational capacity underpins the second capability, seizing, in which organisations use their resources to understand essential market insights and information to influence strategic decision-making. The third element builds on the grabbing capability by dynamically modifying and restructuring the firm's resources to adapt proactively to changing consumer needs. These three factors work together to generate value and competitive advantage (Ciampi et al., 2021; Mikalef et al., 2019; Mikalef & Pateli, 2018). The faster organisations can build these competencies and incorporate this knowledge into their strategic decision-making process, the more proactive and successful they may be in responding to dynamically changing surroundings (Dubey et al., 2020).

Teece (2014) coined the phrase "seizing capability," which Wilhelm et al. (2015) extended to relate to learning. The ability of a company to learn in a dynamic and chaotic economy is critical to overcoming problems and capitalising on opportunities. As a result of this learning power, organisations will be able to detect key changes in customer expectations and quickly translate and act on that knowledge, resulting in greater performance (Dubey et al., 2023; Mikalef & Pateli, 2018). Firms that have and use the capabilities to be proactive and agile in such markets have reported higher profits, better service, higher quality, more efficient processes, better strategic decision-making, and higher customer satisfaction (Ciampi et al., 2021; Dubey et al., 2020). A variety of studies using DCT have shown and reported that such capabilities can be created and developed over time (Mikalef et al., 2019; Wilhelm et al., 2015)), maximising both technical and human resources required for survival and thriving in the external environment (Mikalef et al., 2020). DCT is thus an appropriate theoretical lens for understanding the role of data analytics in driving resilient SME performance in South Africa.

2.2. **Resilience**

Resilience is a critical component of the dynamic capacity theory (DCT). Resilience is the term used to describe a company's capacity to adapt to changes in the environment and recover from adverse events. In recent years, numerous studies have been conducted to explore the ways in which resilience can be developed and utilised as dynamic capabilities in a variety of contexts (Putritamara et al., 2023). SMEs' proactive resilience strategies enable them to capitalise on and investigate the opportunities that result in improved organisational performance. Dynamic capability theory (DCT) offers a critical framework for understanding how businesses, including SMEs, can leverage and develop capabilities to sustain a competitive advantage over time (Putritamara et al., 2023). DCT has been implemented in order to investigate the extent to which SMEs can adjust to market fluctuations and optimise their operations.

2.3. **Organisational Performance**

SMEs contribute to economic development, job creation, wealth and income generation, and poverty reduction. Increased corporate competitiveness has raised the profile of company performance as an organisational concern (Sarfraz et al., 2021). Organisational performance, or an organization's capacity to generate outcomes in accordance with its goals, is crucial for the survival of SMEs (Rampyapedi & Adetunji, 2024). There has been a rise in entrepreneurial research focussing on the performance of SMEs, owing to their critical role in socioeconomic development, notably employment and economic growth (Mashavira et al., 2022).

Previous research has recognised that a firm's performance is a collection of complex and multidimensional characteristics that may be characterised in a variety of ways (Almatrooshi et al., 2016). It might be represented by financial results, sales or market expansion, customer happiness, or the establishment of a basis for future development (Maharaj & Doorasamy, 2024). An organization's success is driven by four essential factors: strategy, culture, leadership, and competence. The basis of the strategy is to examine the many forms of advantages that a leading firm may build and maintain over its rivals for an extended period of time.

Meanwhile, organisational culture is a cultural phenomenon that pervades the whole organisational lifecycle and serves as a means of gaining long-term competitive advantages. Next, leadership is described as the process of transforming organisations from what they are now to what the leader wants them to be, while capability refers to the ability to complete a job or activity in a coordinated way (da Silva & Borsato, 2017). Financial and non-financial variables are often used to justify an organization's performance. However, other business-related elements or indicators are much more crucial in justifying an organization's success. Examples of such indicators include innovation capabilities, market share, and other non-financial indicators, as well as other elements that may significantly impact organisational success in supply chain management (Musabayana, 2024; Rampyapedi & Adetunji, 2024). Every organisation has both short and long-term aims. These goals may assist to boost productivity, improve market share, and manage or minimise inventory and manufacturing lead times (da Silva & Borsato, 2017)

2.4. **Using data analytics to drive resilient SME performance**

Existing literature suggests a linear association between data analytics and SME success (O'Connor & Kelly, 2017). Lack of data integration, insufficient IT infrastructure, limited technology adoption, and a lack of analytics competence might lead to unsuccessful data analytics execution in SME (Ajibade & Mutula, 2020). Organisations are constantly working to improve their workflow processes. Because of their importance, these processes are examined and monitored on an ongoing basis. To optimise such processes, each step must be reviewed for potential flaws. Data analytics can help detect inefficiencies, bottlenecks, and redundancies in these processes (Trabelsi et al., 2023). Costs and expenses incurred during a process can also be examined to determine whether there is a way to cut costs without sacrificing quality (Mohamed, 2024). Data analytics can also help ensure sufficient segregation of roles by analysing user approvals throughout a workflow (Asad et al., 2020).

SMEs are becoming more interested in data analytics due to the potential benefits it provides. Some have even taken significant moves towards developing advanced data analytics skills (Justy et al., 2023). Recent research indicates that SMEs who use data analytics have greater innovative skills Liu et al. (2020) and report improved financial and marketing success (Maroufkhani et al., 2020). Interestingly, data analytics adoption remains low in SMEs (Coleman et al., 2016). SMEs appear to confront difficulties in the implementation of technology breakthroughs such as data analytics (Justy et al., 2023).

An exploratory research in the UK indicated that successful data analytics implementation requires both administrative and technical considerations (Liu et al., 2020) Despite the cost, research suggests that using data analytics and making informed decisions is beneficial (Asad et al., 2020; Liu et al., 2020). A research in Spain found that ebusiness had an impact on SMEs' performance, with organisational innovation serving as a mediator (Ruivo et al., 2014). Data analytics techniques used in e-business were driven by internal motivation rather than external pressure. Using data in unique ways can improve corporate performance (Bhardwaj, 2022; Soto-Acosta et al., 2016).

Data analytics have been identified as a game changer in the industrial environment, aiding in decision-making for maximum performance. However, it remains unclear for SMEs. According to (Maroufkhani et al., 2020), data analytics may significantly improve the performance of SMEs. To ensure successful data analytics, it's crucial to understand its drivers. Recently, scholars have focused more on data

analytics and company performance (Asad et al., 2020; Maroufkhani et al., 2020). Limited research has examined the impact of data analytics on form performance and competitive advantage. A research of 312 SMEs in China found that data analytics can provide a competitive edge and improve firm performance, particularly in dynamic markets (Asad et al., 2020).

Data analytics promotes technical innovation, leading to increased operational productivity and performance (Saleem et al., 2021). Data analytics improves customer satisfaction and profitability, as well as operational efficiency for SMEs. Accurate operational decisions require timely assessment of relevant information (Bag et al., 2020). Data analytics informs organisational learning, resulting in operational excellence and sustained supply chain performance (Asad et al., 2020; Bag et al., 2020). Most SMEs are still in the early stages of data analytics; thus staff competencies may not be fully developed, but they are increasing. SMEs use data analytics on a limited scale.

While data analytics may drive and improve an organisation's performance, its adoption may face several challenges (Mohamed, 2024). The first step in implementing data analytics is to foster a data culture among users and workers (Alsulami et al., 2024). Data should be viewed as more than merely information saved for record-keeping purposes. It must be part of the company mindset to use data to define the business so that users may make educated decisions and gain deeper insights.

3. **Data**

In this study, the researchers used secondary 3-year panel data obtained from the Department of Tourism. The dataset covered three years, from 2019 to 2021. The balanced panel data came from 450 small businesses in the tourism sector in South Africa's provinces, with Gauteng accounting for 44.6% of the total, Limpopo at 20%, KZN at 16.3%, Mpumalanga at 11.6%, and other provinces contributed 7.5%. The data set covered the following main features, annual sales, workers, use of data analytics, assets, cashflow forecasting, registration type, qualification, new products, accommodation, access to markets, risk management plan, gender and tour operator.

4. **Modelling Techniques**

In this study, marking a departure from traditional econometric modelling approaches which have yielded less reliable results on SME performance and thus poor policy interventions (Zhou, 2021), in this study machine learning techniques were employed. Specifically, Random Forest and Support Vector Regression (SVR) techniques to model the impact of data analytics on SME performance during the Covid-19 pandemic.

The Random Forest method is a powerful ensemble learning technique that uses multiple decision trees to improve prediction accuracy. It operates by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes (classification) or mean prediction (regression) of the individual trees. A fundamental equation that underpins the Random Forest algorithm is the calculation of the Gini impurity for a set of items, which is given by Equation 1 below:

$$G = 1 - \sum (p_i)^2 \qquad (1)$$

where (p_i) is the proportion of items labeled with class i in the set. One of the key advantages of the Random Forest technique is its ability to handle large data sets with higher dimensionality. It can also manage missing values and maintains accuracy even when a large proportion of the data are missing.

To ensure comparability of the findings, Support Vector Regression (SVR) was implemented. This technique, unlike the former focuses on finding the best fit line or hyperplane that has the maximum number of points. The main equation that characterizes SVR is related to its optimization problem, formulated as per Equation 2:

$$\min \frac{1}{2}\|\vec{w}\|^2 + C\sum_{i=1}^{n}\xi_i \qquad (2)$$

$$s.t\ y_i(\vec{w}.\vec{x} - b) \geq 1 - \xi_i, \forall \vec{x}_i, \xi_i \geq 0$$

where w is the weight vector, b is the bias, ξ_i is a slack variable and C is the penalty parameter. The primary advantage of SVR is its effectiveness in high-dimensional spaces and its capability to perform non-linear regression using kernel functions.

The rationale for comparing the outputs from these techniques lies in their distinct methodological approaches and strengths in handling complex and non-linear data patterns. Random Forest's ensemble method provides a robust mechanism against overfitting by aggregating predictions from multiple decision trees, thus ensuring reliability and generalizability of the model. SVR, with its emphasis on margin optimization and support vectors, offers precision in predicting continuous outcomes and is adept at identifying complex relationships within the data. By juxtaposing the results obtained from Random Forest and SVR, we aim to leverage the complementary strengths of these methodologies to gain deeper insights into the nuanced impacts of data analytics on SME performance amidst the challenges posed by the Covid-19 pandemic. This comparative analysis not only enriches key stakeholders' understanding of the predictive capabilities of each technique but also underscores the importance of adopting a multifaceted analytical approach in tackling real-world problems. These techniques as per Equations 1 and 2 were operationalised using R Software version 4.3.0 (R Core Team 2023).

5. **Results and Discussion**

Figure i provides graphical representations of the aggregate feature performance of each of the two algorithms—Random Forest and Support Vector Regression (SVR)—on the test dataset.

Random forest

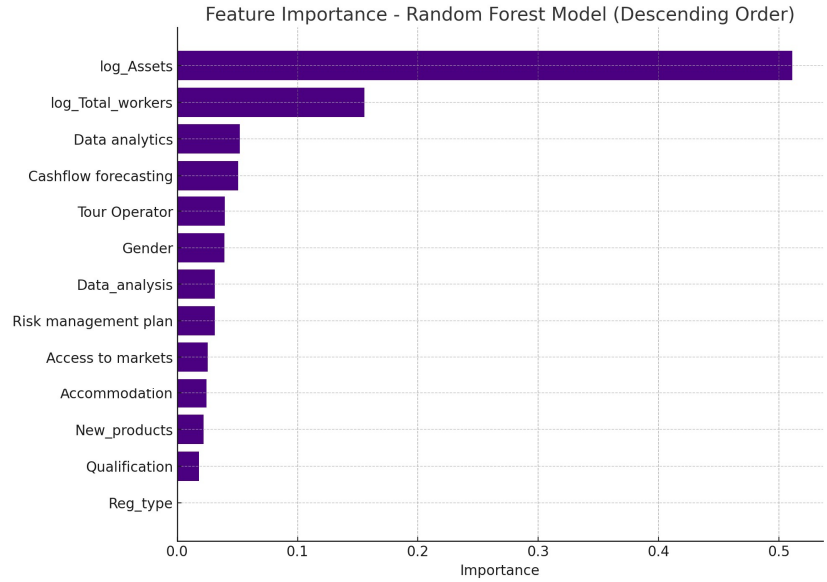

Figure i: Random Forest Model aggregate feature performance

Support Vector Regression (SVR)

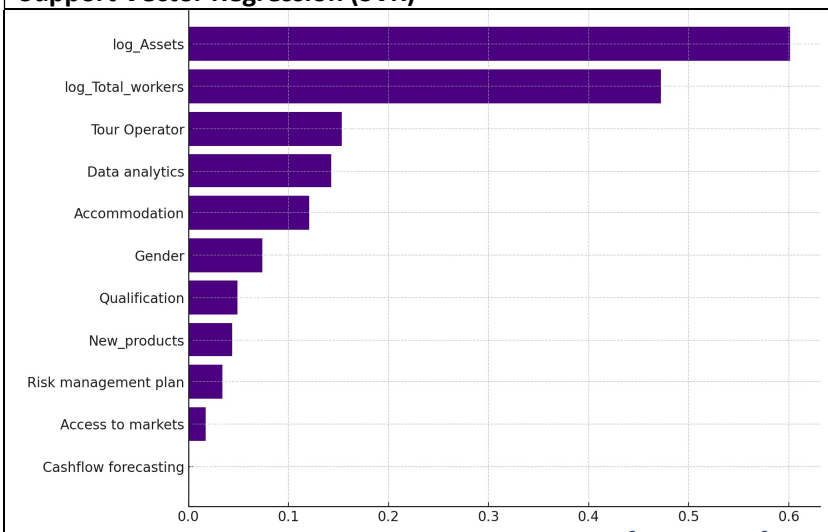

Figure ii: Support Vector Regression (SVR) Model aggregate feature performance

Figure 1: Aggregate feature importance (Source: Author's own creation)

The findings from both the random forest and support vector regression models consistently highlight the importance of data analytics as a significant factor impacting resilient SME performance in South Africa. In both models, data analytics emerges as one of the top high-impact variables, ranking third in the random forest model and fourth in the support vector regression model. This consistency underscores the critical role that data analytics plays in driving resilient SME performance. The results affirm that leveraging data analysis techniques effectively can yield valuable insights and inform strategic decisions that contribute to enhancing resilience and competitiveness within the SME sector. These findings are supported by Brandy (2023) who in their study found that SMEs can dramatically improve their decision-making processes by integrating data analytics; accurate and trustworthy data created by analytics allows businesses to make informed decisions based on real-time insights. Therefore, businesses in South Africa should prioritize investments in data analytics capabilities to unlock potential growth opportunities and navigate challenges more effectively in an increasingly dynamic business environment. The findings from both the random forest and support vector regression (SVR) models indicate that assets and total workers are among the top high-impact features affecting resilient SME performance. This underscores the significance of having sufficient assets and

a capable workforce in driving business resilience and success. To remain competitive and outperform their competitors, SMEs must recognise the importance of successfully using their data assets to drive decision-making processes (Brandy, 2023; Mashavira et al., 2022). Additionally, the SVR model specifically identifies tour operator and accommodation as features of high importance, suggesting that these sectors may have a particularly strong influence on SME performance. It's notable that tour operator and accommodation sectors outperformed other sectors in terms of importance, indicating their potential for driving growth and resilience within the SME landscape. This insight can guide SMEs in South Africa to focus on optimizing their assets, investing in workforce development, and exploring opportunities within the tour operator and accommodation sectors to enhance their overall performance and resilience.

Figure ii. provides graphical representations of the feature effects on sales performance of each of the two algorithms—Random forest and Support Vector Regression (SVR)—on the test dataset

Random forest

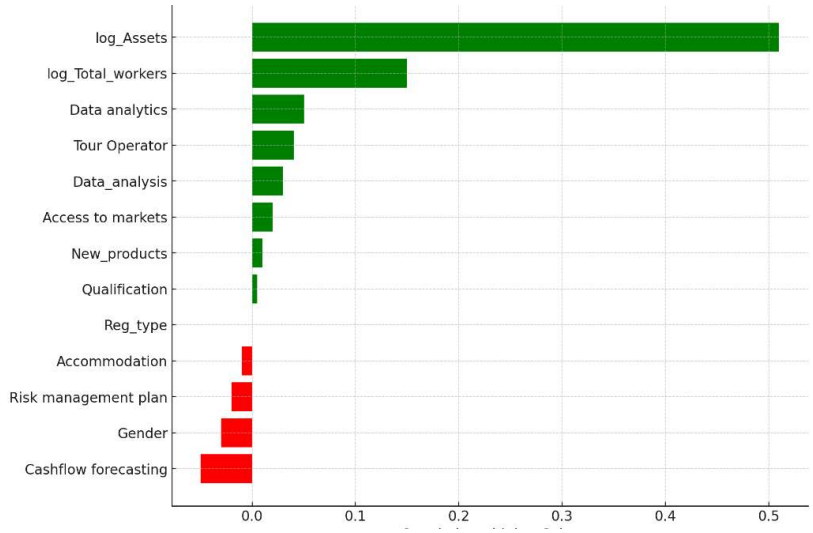

Figure i:Random Forest feature effects on sales performance

Support Vector Regression (SVR)

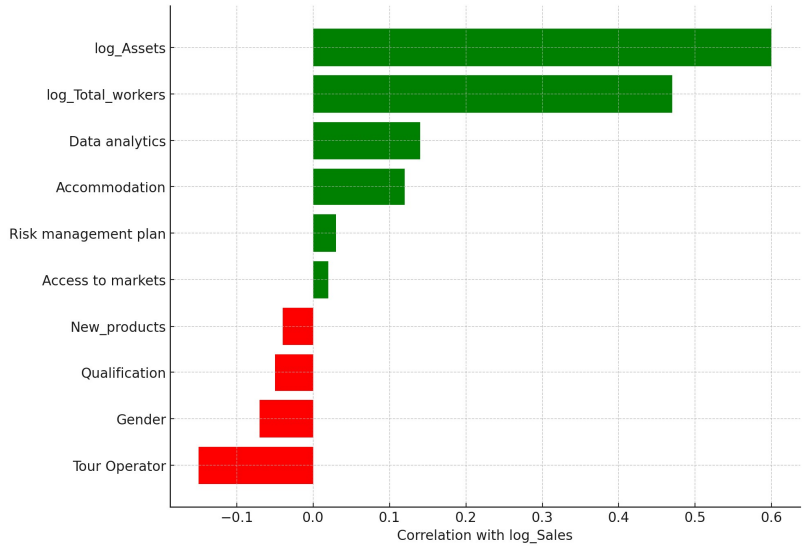

Figure ii: Support Vector Regressin (SVR) feature effects on sales performance

Figure 2: Feature effects on sales performance (Source: Author's own creation)

The consistent findings from both the random forest test and Support Vector Regression (SVR) underscore the significant impact of data analytics on sales performance within the SME sector. In both models, data analytics emerge as the third-ranked feature with high impact on sales performance. This indicates that leveraging data analytics capabilities effectively can lead to improved sales outcomes for SMEs in South Africa. Effectively leveraging data analytics capabilities can lead to improved performance by enabling more accurate decision-making through insightful data patterns, optimizing operational efficiencies (Bhardwaj, 2022; Mikalef et al., 2019). The alignment of results across both models provides strong evidence supporting the importance of incorporating data analytics into business strategies to drive sales success. By harnessing the power of data analytics, SMEs can gain valuable insights into customer preferences, market trends, and operational efficiencies, enabling them to make more informed decisions and optimize their sales strategies (Justy et al., 2023; Mikalef et al., 2019). The consistent identification of data analytics as a high-impact feature highlights its critical role in enhancing sales performance and overall business resilience for SMEs in South Africa. It underscores the importance of investing in data analytics capabilities and integrating data-driven approaches into business operations to stay competitive and thrive in today's rapidly evolving marketplace (Cadden et al., 2023).

The results from the random forest test and Support Vector Regression (SVR) consistently highlight certain features with high impact on sales performance within the SME context. In the random forest model, assets, total workers, and tour operator were identified as significant contributors to sales performance. This suggests that having substantial assets, a competent workforce, and a strong presence in the tour operator sector can positively influence sales outcomes for SMEs. On the other hand, the SVR model emphasizes the impact of assets, total workers, and accommodation on sales performance. This underscores the importance of possessing valuable assets, maintaining an effective workforce, and potentially engaging in the accommodation sector to drive sales success within the SME sector. As data analytics and technology grow and become more accessible, SMEs may successfully exploit their data assets and propel their businesses forward in an increasingly competitive environment (Asad et al., 2020; Brandy, 2023). These shared findings across both models provide robust evidence that assets and total workers are pivotal factors affecting sales performance, while the emphasis on tour operators in the random forest model and accommodation in the SVR model indicates the industry-specific nuances influencing sales outcomes. SMEs in South Africa can leverage this information to tailor their strategies, emphasizing these high-impact features to optimize their sales performance and enhance overall business resilience.

Based on the models evaluation metrics the random forest model outperforms the support vector regression (SVR) model in predicting resilient SME performance in South Africa. The random forest model has a lower mean squared error (MSE) of 10.09 compared to the SVR's MSE of 12.64, indicating that it has better accuracy in predicting outcomes. Additionally, the random forest model also has a lower root mean squared error (RMSE) of 3.18 compared to the SVR's RMSE of 3.56, further indicating its superior predictive performance. Moreover, the random forest model has a higher R-squared (R^2) value of 0.44 compared to the SVR's R^2 value of 0.30, suggesting that it explains a larger proportion of the variance in the data. Therefore, based on these metrics, it can be concluded that the random forest model is more effective in utilizing data analytics to drive resilient SME performance in South Africa.

6. **Recommendations and Conclusion**

Data analytics can help SMEs prioritize urgent matters, ultimately improving their performance. Thus, the study recommends analytics software. With the help of analytics software, SMEs can gain valuable insights into critical issues that require immediate attention. By embracing these data analytics solutions, SMEs can effectively leverage their data to generate valuable insights that support decision-making processes. It is also recommended that policymakers include comprehensive programs aimed at raising awareness about the significance of data analytics within SME policies and initiatives. These programs should not only emphasize the value of data analytics but also provide practical guidance

and resources for SMEs to integrate data-driven approaches into their operations effectively. Research on data analytics has primarily concentrated on major corporations rather than small and medium-sized businesses. Large corporations set trends, whereas SMEs follow them. SMEs rely on data analytics to understand consumer preferences and trends. SMEs lack the ability to understand consumer preferences, unlike larger organisations. Adoption of data analytics may be more significant for SMEs than large organisations. Data analytics can significantly impact a company's competitive strategy.

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