International Journal of Frontiers in
Science and Technology Research
Journal homepage: https://frontiersrj.com/journals/ijfstr/
ISSN: 2783-0446 (Online)

(REVIEW ARTICLE)

Check for updates

Integrating visual reporting, analytics, and sustainable dashboards to support decision-making and growth in small and medium enterprises (SMEs)

May Equitozia Eyeregba [1, *], Chukwunweike Mokogwu [2], Somto Emmanuel Ewim [3] and Titilayo Deborah Olorunyomi [4]

[1] *Business Analyst and Project Manager, UK.*
[2] *Independent Researcher, USA.*
[3] *Independent Researcher, Lagos, Nigeria.*
[4] *Independent Researcher, Toronto, Ontario, Canada.*

International Journal of Frontiers in Science and Technology Research, 2024, 07(02), 090–099

Publication history: Received on 15 October 2024; revised on 20 November 2024; accepted on 23 November 2024

Article DOI: https://doi.org/10.53294/ijfstr.2024.7.2.0059

Abstract

Small and Medium Enterprises (SMEs) are vital to economic growth, job creation, and innovation, yet they often face significant challenges in decision-making and resource management due to limited access to data insights. As digital transformation reshapes business landscapes, integrating visual reporting, analytics, and sustainable dashboards has become a critical strategy for enhancing SMEs' operational efficiency and growth potential. This review explores how these tools can empower SMEs by providing real-time access to actionable data, enabling more informed decision-making and promoting sustainable business practices.Visual reporting simplifies complex datasets into intuitive visual formats, helping SMEs quickly identify trends, inefficiencies, and opportunities. Analytics, spanning descriptive to prescriptive approaches, drives strategic planning by uncovering hidden patterns and optimizing processes. Sustainable dashboards further enhance this integration by incorporating environmental, social, and governance (ESG) metrics, aligning business performance with sustainability objectives and compliance requirements. The integration of these tools can deliver significant benefits, including cost reduction, improved productivity, and long-term sustainability. However, SMEs face barriers such as limited budgets, data quality issues, and resistance to adopting new technologies. This review proposes a structured methodology for implementing integrated reporting solutions, emphasizing the importance of selecting scalable technologies, customizing dashboards to specific business needs, and fostering a data-driven organizational culture. Through case studies and best practices, this review demonstrates how SMEs can leverage these integrated systems to optimize decision-making, drive growth, and build competitive advantage. As the demand for transparency and sustainable business practices continues to rise, adopting visual reporting and analytics presents a strategic opportunity for SMEs to thrive in an increasingly data-driven and environmentally conscious market.

Keywords: Visual reporting; Sustainable dashboards; Small and medium enterprises (SMEs); Review

1. Introduction

Small and medium-sized enterprises (SMEs) are the backbone of the global economy, playing a crucial role in fostering economic growth, job creation, and innovation (Anjorin *et al*., 2024). Representing over 90% of businesses worldwide, SMEs contribute significantly to Gross Domestic Product (GDP) and employment. According to data from the World Bank, SMEs are responsible for approximately 60-70% of total employment and nearly 40-50% of GDP in developing economies (Okeleke *et al*., 2023, Runsewe *et al*., 2024). These enterprises are often more agile than their larger counterparts, allowing them to innovate rapidly, respond to market shifts, and meet niche consumer needs. By driving

* Corresponding author: May Equitozia Eyeregba

innovation and competition, SMEs not only strengthen local economies but also contribute to societal advancements by developing new products and services (Ajiga *et al*., 2024). Despite their contributions, SMEs face numerous challenges that can limit their growth potential. Decision-making within SMEs is often hampered by limited access to resources, financial constraints, and a lack of access to advanced technologies. This, in turn, affects their ability to optimize operations, manage customer relationships, and expand into new markets (Ozowe *et al*., 2024). Additionally, SMEs often struggle with efficiently managing resources, such as human capital and supply chains, due to inadequate data insights and a lack of strategic planning tools (Osundare and Ige, 2024). These challenges highlight the need for SMEs to adopt more effective management practices to sustain growth and compete in an increasingly digitalized market.

In recent years, digital transformation has revolutionized business operations, placing data analytics at the forefront of strategic decision-making. The ability to collect, analyze, and interpret data has become essential for companies seeking to remain competitive (Olorunyomi *et al*., 2024). For SMEs, adopting data-driven decision-making is no longer a luxury but a necessity to navigate market uncertainties and optimize performance. Data analytics provides actionable insights that can help SMEs understand customer behavior, identify emerging market trends, and make informed decisions that drive growth. The rise of big data, artificial intelligence, and cloud computing has enabled even smaller businesses to leverage data in ways that were previously reserved for larger enterprises. By utilizing data-driven strategies, SMEs can enhance customer segmentation, improve marketing campaigns, and optimize inventory management. However, many SMEs are still lagging behind in adopting these technologies due to financial and technical barriers. Without embracing data analytics, SMEs risk being left behind in an era where data is a key driver of business success (Ahuchogu *et al*., 2023). Hence, adopting data-driven strategies is crucial for SMEs not only to enhance their competitive edge but also to ensure sustainable growth.

Given the challenges faced by SMEs and the growing importance of digital transformation, this review aims to explore how integrating visual reporting, analytics, and sustainable dashboards can empower these enterprises (Ekpobimi *et al*., 2024). Visual reporting and data analytics tools can transform raw data into meaningful insights, allowing SMEs to make more informed and strategic decisions. By using dashboards, SMEs can monitor their key performance indicators (KPIs) in real-time, identify bottlenecks, and streamline processes for greater efficiency. These tools not only enhance decision-making but also promote a culture of continuous improvement within organizations. The primary objectives of this review are to examine how data visualization and analytics can improve SMEs' operational efficiency and decision-making processes. Additionally, it explores how sustainable dashboards can support SMEs in achieving long-term growth and sustainability by aligning business objectives with environmental and social considerations. As businesses increasingly prioritize sustainability, the integration of such tools is critical for SMEs to enhance their resilience and adaptability in a rapidly changing global market (Oyeniran *et al*., 2024).

Small and Medium-sized Enterprises (SMEs) are fundamental to global economic development, yet they face substantial challenges in optimizing resources and making informed decisions. In the era of digital transformation, adopting data-driven strategies is essential for SMEs to remain competitive. This review will delve into how leveraging visual reporting, analytics, and sustainable dashboards can support SMEs in enhancing decision-making, achieving operational excellence, and fostering sustainable growth. By embracing these technologies, SMEs can overcome traditional barriers and position themselves for long-term success in the digital age.

2. Understanding Visual Reporting, Analytics, and Sustainable Dashboards

Visual reporting refers to the use of graphical tools like charts, graphs, heatmaps, and dashboards to present complex data in an easily understandable format. These tools transform raw numerical data into visual elements that help users quickly grasp insights, trends, and patterns. For instance, line charts can illustrate changes over time, while bar graphs can compare categories. Heatmaps, which use color coding to represent data density or value, can be particularly effective in highlighting areas of concern or opportunity (Ozowe *et al*., 2024). The primary role of visual reporting is to simplify complex datasets, making them more accessible to stakeholders who may lack a technical background in data analysis. By converting raw data into intuitive visuals, decision-makers can interpret information more efficiently, allowing for faster and more informed decisions. This is especially important for SMEs, which often lack the resources for detailed data analysis but still need to make strategic decisions to remain competitive. Visual reporting also facilitates communication across departments by providing a clear, unified representation of key metrics and performance indicators.

Business analytics involves using data analysis techniques to inform business strategies and improve operational outcomes. There are three main types of analytics. Descriptive analytics focuses on summarizing historical data to understand what has happened in the past. For example, sales reports, customer satisfaction scores, and financial summaries fall under this category, providing SMEs with a clear picture of past performance (Anjorin *et al*., 2024).

Predictive analytics uses statistical models and machine learning algorithms to forecast future trends and behaviors. This is particularly beneficial for SMEs aiming to predict market demands, identify potential customer churn, or anticipate supply chain disruptions. By leveraging predictive analytics, SMEs can proactively adjust their strategies to mitigate risks. Prescriptive analytics goes a step further by recommending specific courses of action based on data insights. This type of analytics uses optimization techniques to suggest solutions for improving outcomes, such as optimizing inventory levels, adjusting marketing budgets, or enhancing customer service strategies. For SMEs, incorporating analytics can transform decision-making processes by enabling a data-driven approach. This empowers them to identify trends, uncover new opportunities, and minimize risks (Ozowe *et al*., 2024). By utilizing analytics tools, SMEs can optimize resources, increase efficiency, and achieve sustainable growth, even with limited budgets.

Sustainable dashboards are specialized reporting tools designed to track and visualize metrics related to sustainability and environmental impact. Unlike traditional dashboards that focus solely on financial performance, sustainable dashboards integrate sustainability metrics, such as energy consumption, carbon footprint, water usage, and waste reduction (Runsewe *et al*., 2024). These dashboards provide organizations with real-time data on their environmental performance, helping them align business operations with sustainability goals. The significance of sustainable dashboards lies in their ability to merge financial success with environmental responsibility. In today's business landscape, where customers, investors, and regulators increasingly prioritize sustainability, these tools help organizations demonstrate their commitment to sustainable development. By integrating sustainability into their core strategy, SMEs can not only reduce their environmental impact but also build a strong reputation, attract eco-conscious customers, and gain a competitive edge in the market. Sustainable dashboards play a crucial role in helping SMEs monitor their progress toward achieving the United Nations Sustainable Development Goals (SDGs). For example, tracking energy efficiency metrics can help reduce operational costs while contributing to SDG 7 (Affordable and Clean Energy). Additionally, dashboards that focus on waste reduction align with SDG 12 (Responsible Consumption and Production), ensuring that SMEs contribute to a circular economy.

Visual reporting, business analytics, and sustainable dashboards are invaluable tools for SMEs seeking to enhance decision-making and align their operations with sustainability goals. Visual reporting simplifies complex data, making it more accessible for effective communication and rapid decision-making (Anjorin *et al*., 2024). Business analytics empowers SMEs to leverage data for optimizing strategies, identifying risks, and capitalizing on opportunities. Sustainable dashboards, meanwhile, integrate environmental metrics into business performance assessments, ensuring that SMEs can pursue growth that is not only profitable but also socially and environmentally responsible. By adopting these tools, SMEs can achieve a competitive advantage while contributing to a more sustainable future.

2.1 Benefits of Integrating Visual Reporting, Analytics, and Sustainable Dashboards in SMEs

Integrating visual reporting, analytics, and sustainable dashboards into business processes significantly enhances the decision-making capabilities of Small and Medium-sized Enterprises (SMEs). Access to real-time data allows decision-makers to promptly address challenges, optimize operations, and identify opportunities for growth. By leveraging data visualization tools, such as charts and dashboards, SMEs can gain deeper insights into their performance metrics, customer behavior, and market trends (Olorunyomi *et al*., 2024). This empowers them to make well-informed, data-driven decisions rather than relying on intuition or outdated information. In addition to providing real-time data access, visual reporting tools improve the accuracy of forecasting and strategic planning. Predictive analytics models can be used to forecast market demands, customer needs, and potential risks, enabling SMEs to proactively adapt their strategies. For instance, visual reports can reveal seasonal sales patterns or shifts in customer preferences, helping businesses allocate resources more effectively. By integrating analytics into their decision-making processes, SMEs can gain a competitive edge in responding to market changes with greater agility (Runsewe *et al*., 2024).

The use of analytics and dashboards can drive operational efficiency by streamlining processes and reducing costs. Data insights enable SMEs to identify inefficiencies in their operations, such as bottlenecks in supply chains, underperforming sales channels, or excessive resource consumption (Bakare *et al*., 2024). By pinpointing these issues, businesses can implement targeted improvements, optimize resource allocation, and reduce waste. This level of efficiency is crucial for SMEs that often operate with limited budgets and need to maximize their resources to stay competitive. Additionally, sustainable dashboards can help businesses monitor their energy consumption, waste production, and other resource-intensive activities. By visualizing these metrics, SMEs can identify areas where they are overspending or underutilizing resources, leading to cost savings. For example, an SME that uses a dashboard to monitor energy usage can quickly identify inefficient equipment or processes, allowing them to make data-driven decisions to reduce energy costs. This not only improves the bottom line but also contributes to a more sustainable business model.

Sustainable dashboards play a pivotal role in helping SMEs achieve long-term growth while meeting their sustainability goals. By integrating key sustainability metrics, these dashboards provide businesses with the tools needed to track and optimize their environmental impact. This is increasingly important as consumers and regulators demand greater accountability from companies in terms of their social and environmental responsibilities (Ozowe *et al*., 2024). For SMEs, this can mean monitoring their carbon footprint, reducing waste, and optimizing the use of natural resources, all of which contribute to a more sustainable and resilient business model. Incorporating sustainable practices through data-driven tools also helps SMEs meet regulatory requirements and align with global sustainability standards. By tracking performance against sustainability targets, such as energy efficiency or waste reduction, businesses can ensure compliance with environmental regulations and reduce the risk of fines or penalties. Moreover, demonstrating a commitment to sustainability can enhance the brand reputation of SMEs, attracting eco-conscious customers and investors. This can result in increased customer loyalty and open up new market opportunities, especially in sectors where sustainability is a critical factor in consumer decision-making.

Integrating visual reporting, analytics, and sustainable dashboards offers numerous benefits for SMEs, enabling them to enhance decision-making, streamline operations, and achieve sustainable growth. By using real-time data and predictive analytics, SMEs can improve their strategic planning and make more informed decisions that drive business success. Furthermore, the ability to visualize data through dashboards enhances transparency and accountability, making it easier to monitor performance and optimize processes (Okeke *et al*., 2023). These tools not only reduce costs by identifying inefficiencies but also help SMEs align with sustainability goals, ensuring compliance with regulations and meeting customer expectations. As the business landscape becomes more data-driven and sustainability-focused, SMEs that embrace these technologies will be better positioned to thrive in an increasingly competitive market. By leveraging the power of data analytics and visualization, SMEs can achieve a balance between profitability and sustainability, paving the way for long-term success.

2.2 Methodology for Implementing Integrated Reporting Solutions

The first step in implementing integrated reporting solutions for Small and Medium-sized Enterprises (SMEs) is to thoroughly assess their specific needs (Runsewe *et al*., 2024). This begins with conducting a data readiness assessment to evaluate the current state of data management within the organization. SMEs often face challenges with data quality, storage, and accessibility, which can impede the implementation of effective reporting systems (Ozowe *et al*., 2020). A readiness assessment involves identifying existing data sources, assessing data accuracy, and determining the gaps that need to be filled to support visual reporting and analytics. Understanding these factors helps SMEs pinpoint areas where they need to invest in data infrastructure and management. Aligning dashboard features with business objectives is another crucial aspect of the needs assessment. SMEs must identify their strategic goals whether it is enhancing customer satisfaction, reducing operational costs, or improving sustainability practices. The dashboards should be tailored to reflect these goals, ensuring that the metrics tracked are relevant and actionable. For example, if the objective is to optimize resource usage, the dashboard might focus on metrics related to inventory levels, energy consumption, or supply chain efficiency. By aligning reporting tools with business objectives, SMEs can leverage data insights to drive meaningful outcomes.

Once the needs of the SME are clearly understood, the next step is selecting the appropriate tools and technologies for visual reporting and analytics (Ajiga *et al*., 2021). The criteria for choosing these tools should include factors such as ease of use, integration capabilities, scalability, and cost-effectiveness. SMEs should prioritize tools that offer intuitive interfaces, making it easier for employees to adopt them without extensive training (Ibikunle *et al*., 2024). Additionally, the tools should be able to seamlessly integrate with existing systems such as Customer Relationship Management (CRM) software, Enterprise Resource Planning (ERP) systems, and other data sources. Leveraging cloud-based platforms is highly recommended for SMEs due to their scalability and flexibility. Cloud solutions allow businesses to scale their reporting capabilities as they grow, without the need for significant upfront investments in infrastructure (Ige *et al*., 2024). Cloud-based analytics tools also provide real-time access to data from anywhere, which is particularly advantageous for SMEs that need to stay agile in a competitive market (Adewumi *et al*., 2024). Furthermore, these platforms often come with robust security features, ensuring that sensitive business data remains protected.

The final step involves a structured approach to dashboard implementation, which includes data collection, integration, design, and training (Abass *et al*., 2024). The process begins with collecting data from various sources within the organization. This may include sales data, financial records, customer feedback, and operational metrics. It is essential to integrate this data into a centralized system where it can be accessed and analyzed holistically. Data integration ensures that all relevant information is captured, providing a comprehensive view of business performance (Ige *et al*., 2024). Designing user-friendly interfaces is critical to the successful adoption of dashboards. The dashboard should be customizable, allowing users to adjust views according to their specific needs. For instance, sales managers might focus

on revenue metrics, while operations teams may prioritize supply chain efficiency. A well-designed dashboard should also include visual elements like graphs, charts, and color-coded indicators to enhance data comprehension and enable users to quickly identify trends and anomalies (Okeke *et al*., 2024). Usability testing should be conducted to refine the interface and ensure it aligns with the workflow of its intended users. Training employees is a crucial yet often overlooked step in implementing reporting solutions. For SMEs to fully benefit from integrated dashboards, staff must be trained on how to interpret data, utilize the tools effectively, and integrate insights into their decision-making processes. This training should cover not only the technical aspects of using the tools but also the analytical skills needed to draw actionable insights from the data (Ozowe, 2018; Usuemerai *et al*., 2024). Continuous training and support can help ensure that employees remain proficient as new features are added or as business needs evolve.

Implementing integrated reporting solutions for SMEs involves a systematic approach that includes assessing business needs, selecting the right tools, and following best practices for dashboard implementation. Conducting a thorough needs assessment helps align the reporting system with strategic objectives, while selecting the right technology ensures scalability and ease of use (Anjorin *et al*., 2024). By effectively integrating data sources and designing intuitive dashboards, SMEs can leverage data analytics to enhance decision-making, streamline operations, and drive sustainable growth. Finally, investing in employee training is essential for maximizing the value derived from these systems, enabling SMEs to remain competitive in a data-driven business environment.

2.3 Challenges in Implementing Visual Reporting and Analytics

The integration of visual reporting and analytics can significantly enhance decision-making, efficiency, and growth for Small and Medium-sized Enterprises (SMEs). However, implementing these technologies is not without challenges (Ahuchogu *et al*., 2024). SMEs often face hurdles related to data quality, cost constraints, and organizational resistance, which can impede their ability to leverage the full potential of data-driven insights.

One of the primary challenges in implementing visual reporting and analytics is ensuring data quality and accessibility. For SMEs, accessing accurate and reliable data can be a significant barrier. Often, the data available is fragmented, outdated, or inconsistent, which can limit the effectiveness of reporting tools. SMEs may not have robust data management systems, leading to discrepancies that affect the accuracy of their analytics (Okeke *et al*., 2024; Ibikunle *et al*., 2024). Poor data quality can result in misleading insights, which can ultimately impact strategic decisions and business performance. Another challenge is overcoming data silos. In many SMEs, data is stored across various departments in isolated systems, making it difficult to integrate information into a unified reporting platform. For instance, sales, marketing, and operations might each have their own databases, preventing a holistic view of the company's performance. Integrating data from disparate sources requires significant effort in cleaning, standardizing, and merging datasets, which can be time-consuming and complex for organizations with limited technical expertise. To address these challenges, SMEs need to invest in data management solutions that facilitate data integration and cleansing (Osundare and Ige, 2024). Implementing cloud-based platforms or data warehouses can help centralize data storage, while automated data cleaning tools can improve data accuracy. However, these solutions require financial investments and technical skills that may be beyond the reach of many SMEs.

Cost is another significant challenge for SMEs seeking to implement visual reporting and analytics (Usuemerai *et al*., 2024). Advanced analytics tools and technologies can be expensive, requiring not only upfront investments in software but also ongoing costs for maintenance, updates, and data storage. SMEs often operate on tight budgets, making it difficult to allocate funds for sophisticated analytics systems. As a result, they may resort to using basic, less effective tools that limit their ability to derive actionable insights from their data. In addition to financial limitations, SMEs frequently lack skilled personnel to manage and interpret analytics (Ajiva *et al*., 2024). Data analytics requires expertise in areas such as data science, machine learning, and visualization, which may not be readily available in smaller organizations. Hiring specialized talent or investing in training existing employees can be costly and time-consuming (Ekpobimi *et al*., 2024). Without the necessary skills, SMEs may struggle to fully utilize the analytics tools they acquire, leading to suboptimal outcomes. To mitigate these challenges, SMEs can explore cost-effective alternatives, such as open-source analytics tools and cloud-based solutions that scale with business needs. Additionally, partnering with external consultants or leveraging training programs to upskill employees can help bridge the skills gap without significantly increasing costs.

Organizational resistance to change is a critical barrier to the successful implementation of visual reporting and analytics (Runsewe *et al*., 2024). SMEs often have established ways of doing business, and introducing new technologies can be met with skepticism and resistance from employees (Oyeniran *et al*., 2023). This resistance is typically rooted in fears of increased workload, job displacement, or discomfort with learning new tools. Without buy-in from staff, even the most advanced analytics systems are unlikely to be fully utilized. Promoting a data-driven culture within the

organization is essential to overcoming this resistance (Ajiga *et al*., 2024). This involves not only implementing new tools but also fostering an environment where data is seen as a critical asset for decision-making. Leaders in SMEs must communicate the benefits of data-driven approaches clearly, demonstrating how analytics can lead to better performance and job satisfaction. Engaging employees through training programs and workshops can help ease the transition and build confidence in using new technologies. Change management strategies can also be effective in addressing resistance. For instance, involving employees early in the decision-making process when selecting analytics tools can increase their sense of ownership and reduce resistance. SMEs should also consider phased rollouts of new systems, allowing staff to adjust gradually and providing ample support during the adoption process (Sanyaolu *et al*., 2024).

While visual reporting and analytics offer significant benefits to SMEs, including improved decision-making, operational efficiency, and growth, implementing these systems comes with challenges. Issues related to data quality and accessibility, cost constraints, and organizational resistance can hinder the successful adoption of data-driven strategies (Anjorin *et al*., 2024). Addressing these challenges requires a combination of investing in appropriate technologies, training staff, and fostering a culture that embraces data-driven decision-making. By overcoming these barriers, SMEs can unlock the potential of analytics to drive sustainable success in an increasingly competitive business landscape.

2.4 Future Trends and Opportunities

As technology evolves, Small and Medium-sized Enterprises (SMEs) are presented with numerous opportunities to enhance their reporting, analytics, and decision-making capabilities. By leveraging emerging technologies and focusing on sustainability and personalization, SMEs can gain a competitive edge and drive long-term growth (Ekpobimi *et al*., 2024). This section explores future trends in reporting and analytics, the rising importance of sustainability reporting, and the potential for personalized dashboards.

The rapid development of technology is transforming the landscape of data analytics and reporting. Artificial Intelligence (AI)-driven analytics, real-time data processing, and automation are among the most impactful trends. AI has the potential to significantly enhance the analytical capabilities of SMEs by providing deeper insights, faster decision-making, and automated reporting (Ozowe, 2021; Adewumi *et al*., 2024). For instance, AI algorithms can detect patterns in large datasets, predict future trends, and automate data visualization processes, reducing the time and effort required for manual analysis. Real-time data processing is another technological advancement that holds great promise. By leveraging cloud-based platforms and advanced data pipelines, SMEs can access up-to-the-minute data, enabling faster responses to market changes and customer behaviors (Ige *et al*., 2024). This agility is especially critical for SMEs looking to stay competitive in dynamic markets. Furthermore, the Internet of Things (IoT) and big data are becoming integral to SME dashboards. IoT devices collect vast amounts of data from various sources, such as sensors in production lines or customer interactions across digital platforms (Ozowe *et al*., 2020). Integrating IoT data with big data analytics can provide SMEs with a more comprehensive view of their operations, allowing for more informed strategic decisions (Ajiga *et al*., 2024). This convergence of technologies allows for the creation of smart dashboards that provide real-time insights, optimize operations, and identify inefficiencies.

With increasing awareness of environmental and social issues, there is growing demand for transparency in sustainability practices. SMEs that adopt sustainability reporting can not only meet regulatory requirements but also leverage these metrics for competitive advantage. Integrating sustainability metrics such as energy consumption, waste reduction, and carbon emissions into business dashboards allows organizations to monitor and optimize their environmental impact (Bakare *et al*., 2024). Sustainability reporting is becoming a powerful tool for brand differentiation. As consumers and investors become more conscious of sustainability, businesses that demonstrate a commitment to sustainable practices are likely to gain a competitive edge. By integrating sustainability into their core reporting systems, SMEs can highlight their commitment to ethical business practices, thus attracting environmentally conscious customers and investors (Ahuchogu *et al*., 2024). Additionally, sustainability dashboards can help SMEs identify areas for cost savings through resource efficiency, such as reducing energy usage or optimizing supply chains to minimize waste. The future of sustainability reporting will likely involve more sophisticated tools that integrate real-time environmental data. AI-driven analytics can predict the impact of business activities on sustainability metrics, enabling SMEs to proactively adjust their strategies to minimize their environmental footprint (Ige *et al*., 2024). This proactive approach can enhance brand reputation and build stronger relationships with stakeholders who prioritize sustainability.

The personalization of dashboards is emerging as a key trend, allowing SMEs to tailor their analytics tools to their specific needs (Ajiga *et al*., 2024). Traditional one-size-fits-all dashboards may not meet the diverse requirements of SMEs operating in different industries or regions. By customizing dashboards, businesses can ensure that they are

focusing on the most relevant metrics and KPIs for their strategic objectives. Personalized dashboards can also enhance user experience by providing insights that are directly aligned with the company's goals, enabling more effective decision-making (Osundare and Ige, 2024; Anjorin *et al*., 2024). Adaptive dashboards are designed to evolve based on user interactions, preferences, and changing business needs. For instance, machine learning algorithms can identify which metrics are most relevant to different users and automatically adjust the dashboard to prioritize those metrics. This level of customization improves the usability of analytics tools, making them more accessible to non-technical users within SMEs. Moreover, SMEs can use customized dashboards to deliver personalized experiences to their customers (Runsewe *et al*., 2024). By analyzing customer data, businesses can tailor marketing campaigns, improve customer service, and create targeted product offerings. This personalization not only enhances customer satisfaction but also fosters loyalty, leading to increased revenue and growth.

The future of reporting and analytics for SMEs is rich with opportunities driven by technological advancements, the rise of sustainability as a business imperative, and the need for personalization (Anjorin *et al*., 2024). Emerging technologies like AI, IoT, and real-time analytics are poised to revolutionize how SMEs gather, analyze, and act upon data. Additionally, the integration of sustainability metrics into business dashboards is becoming crucial for brand differentiation and operational efficiency. Lastly, the trend toward personalized and adaptive dashboards allows SMEs to leverage data in ways that align closely with their unique business needs (Ozowe *et al*., 2020; Runsewe *et al*., 2024). By embracing these trends, SMEs can position themselves for sustainable growth, enhanced decision-making, and a stronger competitive position in the marketplace.

3. Conclusion

This analysis highlights the transformative benefits of integrating visual reporting, analytics, and sustainable dashboards within Small and Medium-sized Enterprises (SMEs). By leveraging these tools, SMEs can significantly enhance decision-making capabilities, optimize resource allocation, and drive sustainable growth. Real-time access to data facilitates prompt, accurate decision-making, while analytics tools can uncover hidden insights, streamline operations, and reduce costs. Furthermore, adopting sustainable dashboards allows businesses to monitor their environmental impact, align with regulatory standards, and cater to the growing consumer demand for responsible practices.

To successfully implement these strategies, SMEs should begin with a clear assessment of their data needs and establish realistic goals for their reporting systems. Prioritizing the right tools such as cloud-based platforms for scalability can maximize return on investment. Training employees to use analytics dashboards effectively is crucial for ensuring adoption and maximizing the potential benefits. In the long term, SMEs should continue to refine their data-driven strategies, keeping abreast of new technologies and sustainability metrics to stay competitive. The landscape for data-driven SMEs is poised for continued evolution, driven by digital transformation and the increasing focus on sustainability. As technological advancements like AI and IoT become more accessible, they will further empower SMEs to optimize their operations and enhance customer experiences. The key to remaining competitive in this dynamic environment is ongoing investment in data analytics and sustainable practices, positioning SMEs to thrive in a future defined by digital innovation and sustainable growth.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Abass, L.A., Usuemerai, P.A., Ibikunle, O.E., Alemede, V., Nwankwo, E.I. and Mbata, A.O., 2024. Enhancing patient engagement through CRM systems: A pathway to improved healthcare delivery. International Medical Science Research Journal, 4(10), pp.928-960. Available at: https://doi.org/10.51594/imsrj.v4i10.1648.

[2] Adewumi, A., Ibeh, C.V., Asuzu, O.F., Adelekan, O.A., Awonnuga, K.F. and Daraojimba, O.D., 2024. Data analytics in retail banking: A review of customer insights and financial services innovation. Business, Organizations and Society (BOSOC), 2(1), pp.16-21.

[3] Adewumi, A., Oshioste, E.E., Asuzu, O.F., Ndubuisi, N.L., Awonnuga, K.F. and Daraojimba, O.H., 2024. Business intelligence tools in finance: A review of trends in the USA and Africa. World Journal of Advanced Research and Reviews, 21(3), pp.608-616.

[4] Ahuchogu Oyeniran, C.O., Adewusi, A.O., Adeleke, A.G., Akwawa, L.A. and Azubuko, C.F., 2023. Advancements in quantum computing and their implications for software development. Computer Science & IT Research Journal, 4(3), pp.577-593.

[5] Ahuchogu, M.C., Sanyaolu, T.O. and Adeleke, A.G., 2024. Enhancing employee engagement in long-haul transport: Review of best practices and innovative approaches. Global Journal of Research in Science and Technology, 2(01), pp.046-060.

[6] Ahuchogu, M.C., Sanyaolu, T.O. and Adeleke, A.G., 2024. Exploring sustainable and efficient supply chains innovative models for electric vehicle parts distribution. Global Journal of Research in Science and Technology, 2(01), pp.078-085.

[7] Ajiga, D., Okeleke, P.A., Folorunsho, S.O. and Ezeigweneme, C., 2024. The role of software automation in improving industrial operations and efficiency.

[8] Ajiga, D., Okeleke, P.A., Folorunsho, S.O. and Ezeigweneme, C., 2024. Methodologies for developing scalable software frameworks that support growing business needs.

[9] Ajiga, D., Okeleke, P.A., Folorunsho, S.O. and Ezeigweneme, C., 2024. Enhancing software development practices with AI insights in high-tech companies.

[10] Ajiga, D., Okeleke, P.A., Folorunsho, S.O. and Ezeigweneme, C., 2024. Designing Cybersecurity Measures for Enterprise Software Applications to Protect Data Integrity.

[11] Ajiga, D., Okeleke, P.A., Folorunsho, S.O. and Ezeigweneme, C., 2024. Navigating ethical considerations in software development and deployment in technological giants.

[12] Ajiva, A. O., Ejike, O. G., Abhulimen, A. O. (2024). The critical role of professional photography in digital marketing for SMEs: Strategies and best practices for success. International Journal of Management & Entrepreneurship Research, 2024, 06(08), 2626-2636. https://doi.org/ 10.51594/ijmer.v6i8.1410

[13] Anjorin, K.F., Ijomah, T.I., Toromade, A.S. and Adewale, A., 2024. Framework for developing entrepreneurial business models: Theory and practical application. Global Journal of Research in Science and Technology, 2(01), pp.013-028.

[14] Anjorin, K.F., Ijomah, T.I., Toromade, A.S. and Adewale, A., 2024. Evaluating business development services' role in enhancing SME resilience to economic shocks. Global Journal of Research in Science and Technology, 2(01), pp.029-045.

[15] Anjorin, K.F., Raji, M.A. and Olodo, H.B., 2024. A review of strategic decision-making in marketing through big data and analytics. Computer Science & IT Research Journal, 5(5), pp.1126-1144.

[16] Anjorin, K.F., Raji, M.A. and Olodo, H.B., 2024. The influence of social media marketing on consumer behavior in the retail industry: A comprehensive review. International Journal of Management & Entrepreneurship Research, 6(5), pp.1547-1580.

[17] Anjorin, K.F., Raji, M.A. and Olodo, H.B., 2024. Voice assistants and US consumer behavior: A comprehensive review: investigating the role and influence of voice-activated technologies on shopping habits and brand loyalty. International Journal of Applied Research in Social Sciences, 6(5), pp.861-890.

[18] Anjorin, K.F., Raji, M.A., Olodo, H.B. and Oyeyemi, O.P., 2024. Harnessing artificial intelligence to develop strategic marketing goals. International Journal of Management & Entrepreneurship Research, 6(5), pp.1625-1650.

[19] Anjorin, K.F., Raji, M.A., Olodo, H.B. and Oyeyemi, O.P., 2024. The influence of consumer behavior on sustainable marketing efforts. International Journal of Management & Entrepreneurship Research, 6(5), pp.1651-1676.

[20] Bakare, O.A., Aziza, O.R., Uzougbo, N.S. and Oduro, P., 2024. A human resources and legal risk management framework for labour disputes in the petroleum industry.

[21] Bakare, O.A., Aziza, O.R., Uzougbo, N.S. and Oduro, P., 2024. A legal and regulatory compliance framework for maritime operations in Nigerian oil companies.

[22] Ekpobimi, H.O., Kandekere, R.C. and Fasanmade, A.A., 2024. Front-end development and cybersecurity: A conceptual approach to building secure web applications. Computer Science & IT Research Journal, 5(9), pp.2154-2168.

[23] Ekpobimi, H.O., Kandekere, R.C. and Fasanmade, A.A., 2024. Software entrepreneurship in the digital age: Leveraging front-end innovations to drive business growth. International Journal of Engineering Research and Development, 20(09).

[24] Ekpobimi, H.O., Kandekere, R.C. and Fasanmade, A.A., 2024. The future of software development: Integrating AI and machine learning into front-end technologies. Global Journal of Advanced Research and Reviews, 2(1).

[25] Ibikunle, O.E., Usuemerai, P.A., Abass, L.A., Alemede, V., Nwankwo, E.I. and Mbata, A.O., 2024. Artificial intelligence in healthcare forecasting: Enhancing market strategy with predictive analytics. International Journal of Applied Research in Social Sciences, 6(10), pp.2409–2446. Available at: https://doi.org/10.51594/ijarss.v6i10.1640.

[26] Ibikunle, O.E., Usuemerai, P.A., Abass, L.A., Alemede, V., Nwankwo, E.I. and Mbata, A.O., 2024. AI and digital health innovation in pharmaceutical development. Computer Science & IT Research Journal, 5(10), pp.2301-2340. Available at: https://doi.org/10.51594/csitrj.v5i10.1649.

[27] Ige, A.B., Kupa, E. and Ilori, O., 2024. Aligning sustainable development goals with cybersecurity strategies: Ensuring a secure and sustainable future.

[28] Ige, A.B., Kupa, E. and Ilori, O., 2024. Analyzing defense strategies against cyber risks in the energy sector: Enhancing the security of renewable energy sources. International Journal of Science and Research Archive, 12(1), pp.2978-2995.

[29] Ige, A.B., Kupa, E. and Ilori, O., 2024. Best practices in cybersecurity for green building management systems: Protecting sustainable infrastructure from cyber threats. International Journal of Science and Research Archive, 12(1), pp.2960-2977.

[30] Ige, A.B., Kupa, E. and Ilori, O., 2024. Developing comprehensive cybersecurity frameworks for protecting green infrastructure: Conceptual models and practical applications.

[31] Okeke, I. C., Agu, E. E., Ejike, O. G., Ewim, C. P., & Komolafe, M. O. (2024). A compliance and audit model for tackling tax evasion in Nigeria. International Journal of Frontline Research and Reviews, 2(2), 57–68.

[32] Okeke, I. C., Agu, E. E., Ejike, O. G., Ewim, C. P., & Komolafe, M. O. (2024). A comparative model for financial advisory standardization in Nigeria and sub-Saharan Africa. International Journal of Frontline Research and Reviews, 2(2), 45–056.

[33] Okeke, I. C., Agu, E. E., Ejike, O. G., Ewim, C. P., & Komolafe, M. O. (2023). A theoretical model for harmonizing local and international product standards for Nigerian exports. International Journal of Frontline Research and Reviews, 1(4), 74–93.

[34] Okeleke, P.A., Ajiga, D., Folorunsho, S.O. and Ezeigweneme, C., 2023. Leveraging big data to inform strategic decision making in software development.

[35] Olorunyomi, T.D., Sanyaolu, T.O., Adeleke, A.G. and Okeke, I.C., 2024. Integrating FinOps in healthcare for optimized financial efficiency and enhanced care.

[36] Olorunyomi, T.D., Sanyaolu, T.O., Adeleke, A.G. and Okeke, I.C., 2024. Analyzing financial analysts' role in business optimization and advanced data analytics.

[37] Osundare, O.S. and Ige, A.B., 2024. Accelerating Fintech optimization and cybersecurity: The role of segment routing and MPLS in service provider networks. Engineering Science & Technology Journal, 5(8), pp.2454-2465.

[38] Osundare, O.S. and Ige, A.B., 2024. Enhancing financial security in Fintech: Advancednetwork protocols for modern inter-bank infrastructure. Finance & Accounting Research Journal, 6(8), pp.1403-1415.

[39] Osundare, O.S. and Ige, A.B., 2024. Transforming financial data centers for Fintech: Implementing Cisco ACI in modern infrastructure. Computer Science & IT Research Journal, 5(8), pp.1806-1816.

[40] Oyeniran, C.O., Adewusi, A.O., Adeleke, A.G., Akwawa, L.A. and Azubuko, C.F., 2023. 5G technology and its impact on software engineering: New opportunities for mobile applications. Computer Science & IT Research Journal, 4(3), pp.562-576.

[41] Oyeniran, C.O., Adewusi, A.O., Adeleke, A.G., Akwawa, L.A. and Azubuko, C.F., 2022. Ethical AI: Addressing bias in machine learning models and software applications. Computer Science & IT Research Journal, 3(3), pp.115-126.

[42] Ozowe, W., Daramola, G.O. and Ekemezie, I.O., 2023. Recent advances and challenges in gas injection techniques for enhanced oil recovery. Magna Scientia Advanced Research and Reviews, 9(2), pp.168-178.

[43] Ozowe, W., Daramola, G.O. and Ekemezie, I.O., 2024. Innovative approaches in enhanced oil recovery: A focus on gas injection synergies with other EOR methods. Magna Scientia Advanced Research and Reviews, 11(1), pp.311-324.

[44] Ozowe, W., Daramola, G.O. and Ekemezie, I.O., 2024. Petroleum engineering innovations: Evaluating the impact of advanced gas injection techniques on reservoir management. Magna Scientia Advanced Research and Reviews, 11(1), pp.299-310.

[45] Ozowe, W., Ogbu, A.D. and Ikevuje, A.H., 2024. Data science's pivotal role in enhancing oil recovery methods while minimizing environmental footprints: An insightful review. Computer Science & IT Research Journal, 5(7), pp.1621-1633.

[46] Ozowe, W., Quintanilla, Z., Russell, R. and Sharma, M., 2020, October. Experimental evaluation of solvents for improved oil recovery in shale oil reservoirs. In SPE Annual Technical Conference and Exhibition? (p. D021S019R007). SPE.

[47] Ozowe, W., Russell, R. and Sharma, M., 2020, July. A novel experimental approach for dynamic quantification of liquid saturation and capillary pressure in shale. In SPE/AAPG/SEG Unconventional Resources Technology Conference (p. D023S025R002). URTEC.

[48] Ozowe, W., Zheng, S. and Sharma, M., 2020. Selection of hydrocarbon gas for huff-n-puff IOR in shale oil reservoirs. Journal of Petroleum Science and Engineering, 195, p.107683.

[49] Ozowe, W.O., 2018. Capillary pressure curve and liquid permeability estimation in tight oil reservoirs using pressure decline versus time data (Doctoral dissertation).

[50] Ozowe, W.O., 2021. Evaluation of lean and rich gas injection for improved oil recovery in hydraulically fractured reservoirs (Doctoral dissertation).

[51] Runsewe, O., Akwawa, L.A., Folorunsho, S.O. and Osundare, O.S., 2024. Optimizing user interface and user experience in financial applications: A review of techniques and technologies.

[52] Runsewe, O., Osundare, O.S., et al. (2024) 'CHALLENGES AND SOLUTIONS IN MONITORING AND MANAGING CLOUD INFRASTRUCTURE: A SITE RELIABILITY PERSPECTIVE', Information Management and Computer Science, 7(1), pp. 47–55. doi:10.26480/imcs.01.2024.47.55

[53] Runsewe, O., Osundare, O.S., et al. (2024) 'Innovations in Android Mobile Computing: A review of Best Practices and Emerging Technologies', World Journal of Advanced Research and Reviews, 23(2), pp. 2687–2697. doi:10.30574/wjarr.2024.23.2.2634.

[54] Runsewe, O., Osundare, O.S., et al. (2024) 'Optimizing user interface and user experience in financial applications: A review of techniques and technologies', World Journal of Advanced Research and Reviews, 23(3), pp. 934–942. doi:10.30574/wjarr.2024.23.3.2633.

[55] Runsewe, O., Osundare, O.S., et al. (2024) 'SITE RELIABILITY ENGINEERING IN CLOUD ENVIRONMENTS: STRATEGIES FOR ENSURING HIGH AVAILABILITY AND LOW LATENCY', Acta Electronica Malaysia , 8(1), pp. 39-46. doi:10.26480/aem.01.2024.39.46

[56] Runsewe, O., Osundare, O.S., et al. (2024). 'End-to-End Systems Development in Agile Environments: Best Practices and Case Studies from the Financial Sector', International Journal of Engineering Research and Development, 20(08), pp. 522-529.

[57] Runsewe, O., Osundare, O.S., Olaoluwa, S. and Folorunsho, L.A.A., 2024. End-to-End Systems Development in Agile Environments: Best Practices and Case Studies from the Financial Sector.

[58] Sanyaolu, T.O., Adeleke, A.G., Azubuko, C.F. and Osundare, O.S., 2024. Exploring fintech innovations and their potential to transform the future of financial services and banking. International Journal of Scholarly Research in Science and Technology, 5(01), pp.054-073.

[59] Usuemerai, P.A., Ibikunle, O.E., Abass, L.A., Alemede, V., Nwankwo, E.I. and Mbata, A.O., 2024. Advanced supply chain optimization for emerging market healthcare systems. International Journal of Management & Entrepreneurship Research, 6(10), pp.3321–3356. Available at: https://doi.org/10.51594/ijmer.v6i10.1637.

[60] Usuemerai, P.A., Ibikunle, O.E., Abass, L.A., Alemede, V., Nwankwo, E.I. and Mbata, A.O., 2024. A conceptual framework for integrating digital transformation in healthcare marketing to boost patient engagement and compliance. World Journal of Advanced Pharmaceutical and Medical Research, 7(2), pp.26–50. Available at: https://doi.org/10.53346/wjapmr.2024.7.2.0045.