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The Role of Adaptive BI in Enhancing SME Agility During Economic Disruptions

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Abstract

Small and Medium-sized Enterprises (SMEs) are vital contributors to global economic stability, innovation, and job creation, yet they are disproportionately vulnerable to economic disruptions such as pandemics, inflationary shocks, and geopolitical instability. In this context, the ability to adapt swiftly and make informed decisions becomes crucial to business survival and growth. This paper explores the role of Adaptive Business Intelligence (Adaptive BI) in enhancing SME agility during economic disruptions. Adaptive BI is characterized by its real-time data processing, dynamic analytics capabilities, and ability to evolve with changing operational conditions. Unlike traditional BI systems, Adaptive BI empowers SMEs with tools to anticipate changes, respond to market volatility, and recalibrate strategies rapidly. This study introduces a model that integrates Adaptive BI into core SME functions such as supply chain management, customer relationship management, and financial forecasting. The model emphasizes iterative learning, scenario-based analysis, and predictive modeling to support proactive decision-making. Through case-based evidence and cross-industry analysis, the paper demonstrates how Adaptive BI can reduce response times, enhance customer satisfaction, and improve operational resilience. Particular attention is paid to cloud-based platforms and embedded AI tools that support real-time insights and contextual analytics. Furthermore, the research discusses key implementation enablers—including digital literacy, scalable IT infrastructure, and leadership alignment—and identifies common adoption barriers such as high upfront costs, resistance to change, and data quality concerns. The proposed approach aligns with the U.S. Small Business Administration's digital innovation goals and complements global sustainability frameworks by fostering agile, data-informed practices in underserved business communities. This paper contributes to the evolving discourse on digital transformation by offering practical pathways for SMEs to institutionalize agility through Adaptive BI. It advocates for a shift from static reporting to dynamic, intelligence-driven operations, emphasizing the urgency of resilience amid continuous uncertainty. The findings provide actionable insights for policymakers, SME owners, and technology providers aiming to future-proof small businesses through intelligent analytics systems.

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1. Introduction

The frequency and severity of economic disruptions have notably escalated in recent years, driven by various interrelated factors such as global pandemics, geopolitical tensions, inflationary pressures, and breakdowns in supply chains. These disruptions create unpredictable environments that pose significant challenges to the stability and growth trajectories of businesses globally, particularly impacting Small and Medium-sized Enterprises (SMEs) (Akinyemi, Ogundipe & Adelana, 2021, Kolade, *et al.*, 2021). SMEs are especially vulnerable due to limited financial reserves, operational constraints, and reduced access to support

infrastructure. Unlike larger corporations that can absorb economic shocks through diversified portfolios and expansive resources, SMEs typically operate within narrower margins, rendering them less resilient during sudden economic disturbances (Miklian & Hoelscher, 2021; Shafi *et al*., 2020). Recent studies have established that small businesses experience heightened susceptibility to economic shocks, with many lacking sufficient resources and preparedness to weather crises effectively (Anakpo & Mishi, 2021; Hadjielias *et al*., 2022). For instance, research on SMEs during the COVID-19 pandemic indicates that these enterprises faced unprecedented challenges, with many reporting financial fragility and substantial declines in operations (Liguori & Pittz, 2020; Miočević, 2021). Moreover, existing literature suggests that the impacts of such disruptions, including COVID-19, can severely threaten the survival of SMEs, necessitating effective strategic responses to navigate the crisis (Hutchinson *et al*., 2021; Ates & Bititci, 2011). The confluence of external shocks has invariably led to a heightened interest in understanding the resilience of small businesses, which have shown varying degrees of adaptation and response strategies in the face of adversity (Miklian & Hoelscher, 2021; Hutchinson *et al*., 2021).

In such contexts, agility—defined as the ability to sense, respond to, and recover from changes in the business environment—has emerged as an essential component for the survival of SMEs. Agility facilitates businesses in adapting their operational processes, reallocating resources swiftly, reconfiguring supply chains, and engaging with customers more effectively (Hadjielias *et al*., 2022; Kang & Wang, 2022). The successful execution of such agility relies heavily on timely, data-driven decision-making capabilities, which many SMEs struggle to harness due to significant technological, informational, and human capital constraints (Miočević, 2021; Miklian & Hoelscher, 2021). This demand for agility and adaptability has accentuated the need for innovative approaches such as Adaptive Business Intelligence (Adaptive BI).

Adaptive BI stands out as a critical enabler of agility during these moments of economic disruption. In contrast to traditional Business Intelligence, which often focuses on static reports and historical data, Adaptive BI utilizes real-time analytics, predictive modeling, and dynamic data visualization to support rapid decision-making processes (Kang & Wang, 2022; Ray *et al*., 2016). This capability proves crucial for SMEs, as it equips them to monitor current operations, forecast potential disruptions, and proactively design responsive strategies amidst uncertainty (Miklian & Hoelscher, 2021; Miočević, 2021). The flexibility and scalability of Adaptive BI systems make them particularly valuable for SMEs, which must navigate an increasingly volatile global economy with limited resources (Hutchinson *et al*., 2021; Hadjielias *et al*., 2022).

In summary, the role of Adaptive Business Intelligence in enhancing SME agility during periods of economic disruption cannot be overstated. This exploration reveals that Adaptive BI's implementation across various business functions can have profound implications on decision-making resilience, outlining crucial enablers as well as barriers to its adoption. By analyzing empirical evidence and case studies, a comprehensive framework emerges that positions Adaptive BI as an instrumental resource for ensuring long-term sustainability and growth of small businesses in the current unpredictable economic landscape (Adisa, Akinyemi & Aremu, 2019, Famaye, Akinyemi & Aremu, 2020).

2. Methodology

To conduct a systematic review on the role of adaptive business intelligence (BI) in enhancing SME agility during economic disruptions, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework was rigorously followed. Initially, an exhaustive database search was carried out across scholarly repositories such as Scopus, Web of Science, ScienceDirect, Springer, Emerald Insight, and Google Scholar to ensure comprehensive coverage of relevant literature. A combination of keywords and Boolean operators was employed, including terms such as "adaptive business intelligence", "SME agility", "economic disruption", "crisis response", "business resilience", "pandemic impact", and "digital transformation". The search focused on articles published between 2010 and 2024 to ensure the inclusion of contemporary findings.

The inclusion criteria were clearly established to filter only peer-reviewed journal articles, full conference papers, and book chapters written in English that specifically examined the intersection of BI adaptation, SME performance, and economic disruption response strategies. Studies that broadly discussed general IT adoption without focusing on SME agility or adaptive intelligence were excluded. Editorials, commentaries, theses, and non-peer-reviewed materials were also excluded to maintain the scientific quality of the review. Titles and abstracts were first screened independently by two reviewers to eliminate irrelevant papers, after which full texts were retrieved and evaluated based on the inclusion criteria. Disagreements between reviewers were resolved through consensus discussions or consultation with a third reviewer when necessary.

Following the initial screening, a total of 543 articles were identified. After the removal of 147 duplicates, 396 unique records were assessed. Of these, 245 articles were excluded after title and abstract screening because they did not directly relate to adaptive BI or SME agility during disruptions. A further 81 articles were excluded after full-text assessment for reasons such as lack of empirical basis, insufficient focus on SMEs, or irrelevance to the concept of adaptive business intelligence. Ultimately, 70 articles were selected for the qualitative synthesis.

The extracted data from the selected articles included the study's aim, methodology, sample size, context, definition and type of adaptive BI used, and outcomes relating to SME agility and resilience. Special attention was given to studies such as Asare *et al*. (2020), Abuhussein *et al*. (2021), Alam *et al*. (2022), Anakpo and Mishi (2021), Canhoto *et al*. (2021), and Wendt *et al*. (2021), which provided empirical evidence on SME adaptations through data analytics and agile BI frameworks during crises like COVID-19. The risk of bias was assessed at the study level using criteria such as clarity of methodology, representativeness of sample, and transparency in reporting outcomes. A narrative synthesis approach was applied to identify key themes, innovations, challenges, and strategies from the collected studies.

This systematic review integrates diverse regional perspectives from Africa, Asia, Europe, and North America to provide a holistic understanding of the phenomena. The major analytical focus was on how adaptive BI facilitated

rapid response, predictive capability, resource optimization, customer relationship management, and real-time decision-making in SMEs during disruptive events. Emphasis was placed on identifying emerging frameworks, technology models, and strategic best practices that align adaptive BI tools with dynamic business processes for enhanced resilience.

All stages of the review process were transparently documented and are depicted in the PRISMA flow diagram in figure 1 below, ensuring the reproducibility and reliability of the findings.

Fig 1: PRISMA Flow chart of the study methodology

2.1 Understanding adaptive Business Intelligence (BI)

Business Intelligence (BI) has historically been critical in aiding organizational decision-making by providing tools for analyzing past performances and generating strategic reports. Traditional BI systems have excelled in offering historical data analysis, trend visualization, and basic forecasting, which supports a standardized approach to data management and business insights (Singh & Reddy, 2014). However, these conventional systems exhibit significant limitations, especially as the pace of business accelerates and disruptions escalate in complexity—a reality particularly pertinent for small and medium-sized enterprises (SMEs) (Islam, 2016). Traditional BI tools tend to be static and often struggle with adaptability to dynamic data inputs. Their reliance on manual updates can impede quick decision-making, which is essential for SMEs navigating volatile environments (Islam, 2016).

In contrast, Adaptive Business Intelligence (Adaptive BI) presents a significant evolution from traditional BI. It shifts from passive data reporting to real-time, dynamic insight generation, essential for organizations, particularly SMEs, that lack extensive resources for data processing (Cheng & Lau, 2015). This system leverages technological advancements to provide continuous, automated analytics that can respond swiftly to changes in the business environment (Sharma *et al*., 2018). Such capabilities are increasingly vital for SMEs, where decision-making must often be agile and data-informed in real-time.

The core attributes of Adaptive BI include its reliance on real-time data inputs, which continuously filter, analyze, and present insights as they emerge. During economic or market disruptions, the capacity for instant access to relevant data can inform timely strategic decisions and actions. Furthermore, Adaptive BI employs contextual analytics, which interprets data relative to its environment and triggers actionable insights based on specific business objectives and conditions (Cheng & Lau, 2015;. For instance, seasonal demand spikes are interpreted through the lens of historical patterns, enhancing relevance in decision-making processes (Sharma *et al*., 2018).

Another distinguishing characteristic is the self-learning capability of Adaptive BI systems, which utilize machine learning algorithms to adjust and improve predictive accuracy over time. These systems thereby reduce the manual oversight typically required, enabling SMEs to leverage data analytics without extensive technical capabilities. This means that as the system gathers more data, its intelligence enhances, refining outputs and recommendations for strategic initiatives (Cao, 2021), thus minimizing the operational burden on SMEs.

Transitioning from traditional BI to Adaptive BI introduces transformative differences that reshape operational

management for SMEs. While traditional systems are generally retrospective, Adaptive BI is inherently predictive and proactive, allowing users to ask evolving questions and engage with data dynamically (Cheng & Lau, 2015). The accessibility of Adaptive BI tools, designed with user-friendly interfaces and natural language processing capabilities, democratizes data usage across various organizational levels, thereby fostering a data-driven culture within the enterprise.

The technological backbone facilitating Adaptive BI's functionalities includes AI, cloud computing, machine learning, and Internet of Things (IoT) technologies. AI plays a critical role in mimicking analytical reasoning, while machine learning enhances data pattern identification, which together hone Adaptive BI's real-time and contextual insight generation capabilities (Cheng & Lau, 2015; (Sharma *et al*., 2018). Cloud computing enables scalable data solutions, allowing SMEs to efficiently manage large datasets without extensive infrastructure (Sharma *et al*., 2018). Consequently, cloud platforms not only facilitate integration with various business tools but also foster flexibility in adapting to rapidly changing analytics needs (Sharma *et al*., 2018). Figure 2 shows Schema of strategic agility within UK New Space SMEs at the onset of the Covid-19 pandemic, based on the four key dimensions presented by Vidmar, Rosiello & Golra, 2020.

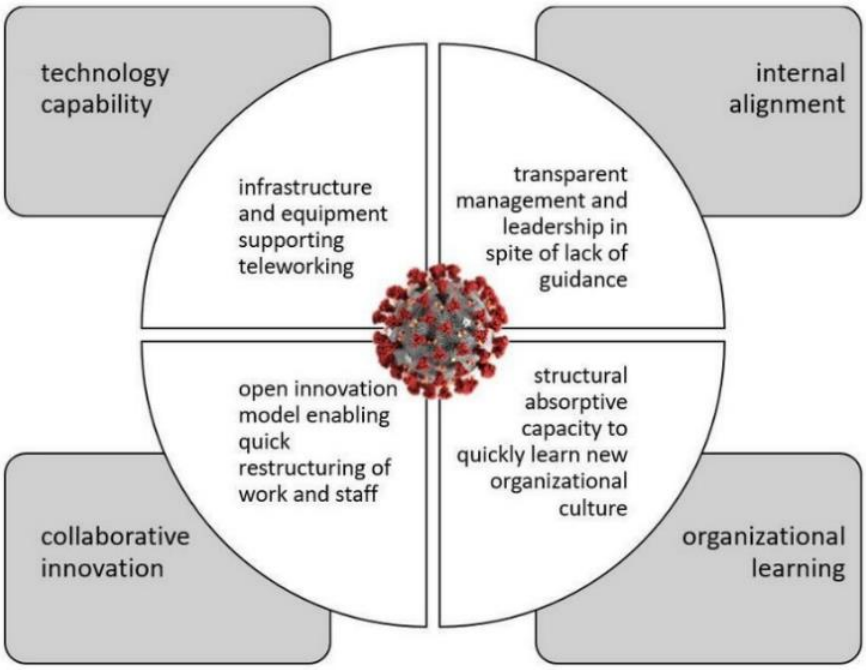

Fig 2: Schema of strategic agility within UK New Space SMEs at the onset of the Covid-19 pandemic, based on the four key dimensions (Vidmar, Rosiello & Golra, 2020).

Lastly, the integration of IoT enhances real-time data collection capabilities, vital for operational visibility and decision-making across diverse sectors, including agriculture and retail (Sharma *et al*., 2018). IoT sensors can provide granular data insights, transforming operations by promoting proactive management strategies based on real-time data (Sharma *et al*., 2018). Adaptive BI's capability to provide actionable insights from this IoT data stream allows SMEs to become not just reactive but strategic and resilient in dynamic market scenarios, thus emphasizing Adaptive BI's value proposition for these businesses (Sharma *et al*., 2018).

In conclusion, the transition from traditional Business Intelligence to Adaptive Business Intelligence marks a critical shift for SMEs, equipping them with the tools necessary to leverage data for rapid decision-making in an increasingly complex business landscape. As technology continues to evolve, Adaptive BI offers SMEs a crucial competitive advantage, reinforcing their agility and resilience.

2.2 Economic disruptions and the SME landscape

Economic disruptions manifest in various forms, including global crises like pandemics and localized phenomena such as supply chain breakdowns and inflationary pressures. These disruptions create volatility and uncertainty that can dramatically impact business operations, particularly for small and medium-sized enterprises (SMEs). Research indicates a shared trait among these disruptions: they frequently challenge traditional business models, emphasizing the critical necessity for SMEs to adopt more adaptive and agile practices (Abuhussein *et al*., 2021; (Klein & Todesco, 2021).

The COVID-19 pandemic exemplifies how swiftly an unexpected health emergency can cascade throughout the global economy, disproportionately affecting SMEs that often operate on narrow profit margins with limited cash reserves. Lockdowns and travel restrictions severely disrupted demand patterns and supply chains, compelling businesses to transition to digital operations almost instantaneously. Many SMEs were ill-equipped for such a shift, lacking the digital infrastructure to facilitate online operations or the financial resilience to endure lengthy closures, resulting in significant revenue losses and, in some cases, permanent business closures (Klein & Todesco, 2021; Juergensen *et al*., 2020; Clauß *et al*., 2021). Scholars stress the urgency for SMEs to embrace digital solutions to navigate through crises, as those who did were better positioned to adapt and survive (Clauß *et al*., 2021. Figure of transformation from digital technology to disruptive digital innovation presented by Chan, *et al*., 2019, is shown in figure 3.

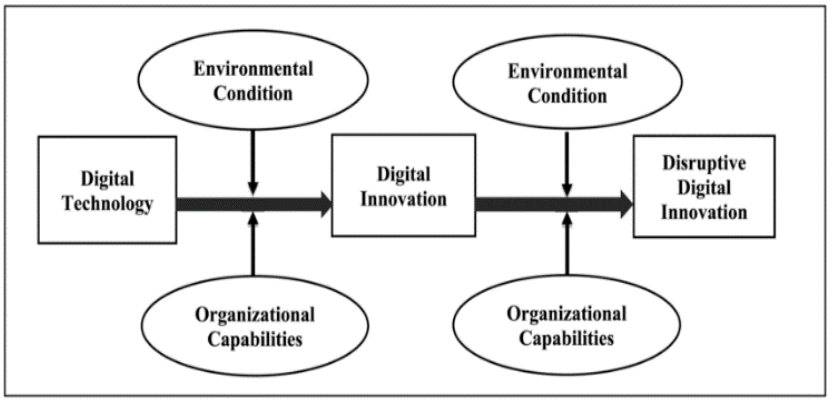

Fig 3: Transformation from digital technology to disruptive digital innovation (Chan, *et al*., 2019).

Inflation constitutes another formidable disruptor that places immense pressure on SMEs. Smaller enterprises generally lack the pricing power and diverse revenue streams available to larger corporations, making them particularly vulnerable to increases in costs for raw materials and transportation. Inflation diminishes profit margins, necessitating regular price adjustments and complicating financial planning processes (Khalil *et al*., 2022; (Alam *et al*., 2022). Evidence suggests that SMEs under inflationary pressures often struggle to secure affordable credit, which further inhibits their ability to invest in critical improvements or expansions (Abuhussein *et al*., 2021; (Zutshi *et al*., 2021).

Supply chain disruptions, as observed during various crises, further exemplify vulnerabilities inherent in SMEs. Global supply chains, though efficient under normal conditions, can become susceptible to shocks from natural disasters or geopolitical tensions (Juergensen *et al*., 2020; Bivona & Cruz, 2021). SMEs frequently rely on a limited number of suppliers, which exacerbates their vulnerability to disruptions. In contrast, larger firms may have the resources to diversify their supply bases and implement contingency plans more effectively, thereby mitigating potential impacts from such breakdowns (Rotar *et al*., 2019). Chan, *et al*., 2019 presented in figure 4, Small- and medium-sized enterprises agility in responding to disruptive digital innovation.

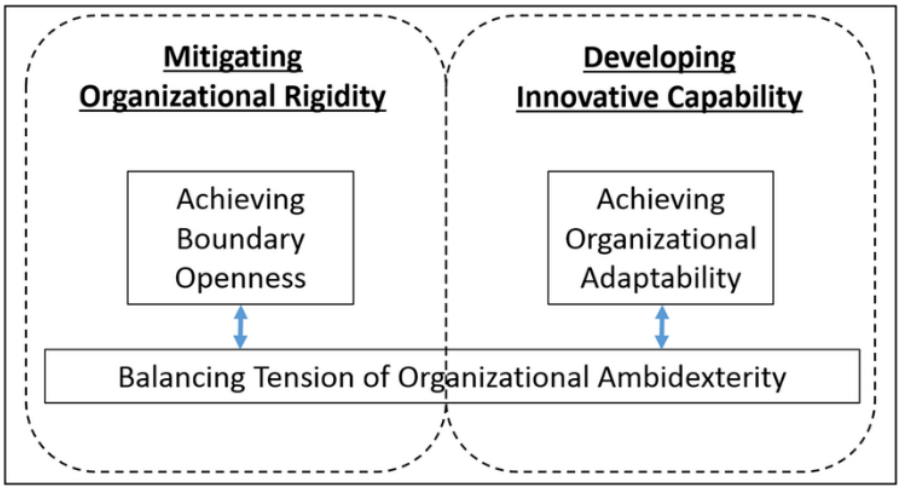

Fig 4: Small- and medium-sized enterprises agility in responding to disruptive digital innovation (Chan, *et al*., 2019).

Policy shifts also present substantial challenges for SMEs, particularly regarding sudden changes in regulations, tariffs, and compliance requirements. Such changes often require SMEs to rapidly adjust their business practices, a task that may entail significant costs related to renegotiating contracts or restructuring operations (Li *et al*., 2021). The agility required to adapt to these shifts can be particularly burdensome for smaller enterprises that typically lack the technical and financial capabilities of larger counterparts (Abuhussein *et al*., 2021).

In addition to these external factors, SMEs face chronic internal challenges that further exacerbate their vulnerability during economic disruptions. Their limited financial buffers and operational rigidity render them prone to liquidity crises, which can force them to make difficult decisions such as delaying payments or downsizing operations (Khalil *et al*., 2022; (Zutshi *et al*., 2021). Furthermore, many SMEs depend on local markets, making them more susceptible to localized economic fluctuations, which larger firms may navigate more effectively due to their diversified operational strategies (Wendt *et al*., 2021; Li *et al*., 2021).

The unequal distribution of digital resources further impedes SMEs from effectively responding to economic disruptions. Many small businesses still utilize outdated technology and reactively manage operations, which limits their ability to access real-time data or adapt quickly to market changes (Canhoto *et al*., 2021). This "digital divide" can severely restrict their competitive advantage, leading to missed opportunities to pivot when disruptions occur (Souza *et al*., 2017; Supari & Anton, 2022).

Given these manifold challenges, developing dynamic response mechanisms is no longer optional but necessary for

SMEs facing economic disruptions. This entails cultivating a culture of adaptability, leveraging technology to improve operational agility, and fostering proactive, data-driven decision-making processes (Abuhussein *et al*., 2021). Embracing digital tools not only equips SMEs with insights into market conditions but also enhances their ability to forecast demand fluctuations and optimize resource allocation (Zutshi *et al*., 2021; (Alam *et al*., 2022).

Recent instances, such as the COVID-19 pandemic and the global semiconductor shortage, illustrate how essential agility and responsiveness are for SME survival. SMEs that quickly adapted their operations—such as by implementing online services during the pandemic—demonstrated resilience despite the surrounding turmoil (Abuhussein *et al*., 2021; Juergensen *et al*., 2020). In the face of inflation, those who leveraged data analytics and flexible pricing strategies fared better than those who did not (Alam *et al*., 2022; Supari & Anton, 2022). Thus, the overarching theme stresses that SMEs must prioritize resilience through innovative approaches and responsive strategies to withstand future economic challenges.

In conclusion, economic disruptions pose significant challenges to SMEs that often lack the resources to cope with rapid changes. The unique vulnerabilities of SMEs—ranging from financial instability and operational inflexibility to challenges arising from the digital divide—underscore the urgent need for adaptive and dynamic response mechanisms. By investing in digitalization and fostering a culture of proactive problem-solving, SMEs can better position themselves to not only survive but thrive amid inevitable economic disruptions (Akinyemi & Ebiseni, 2020, Dare, *et al*., 2019).

2.3 Integrating adaptive BI into SME operations

Integrating Adaptive Business Intelligence (BI) into small and medium-sized enterprises (SMEs) represents a pivotal advancement in enhancing agility, resilience, and performance amidst economic disruptions. This approach leverages cutting-edge technologies, such as real-time data analytics and predictive modeling, enabling SMEs to gain a competitive edge by optimizing operations across various domains, including supply chain management, customer relations, financial strategy, and human resources management (Asare *et al*., 2020; (Krawatzeck *et al*., 2015). Specifically, Adaptive BI transforms raw data into actionable insights that enable SMEs to respond swiftly to market changes, which is crucial for maintaining sustainability and growth in today's dynamic business environment (Chakravarty *et al*., 2013).

In the realm of supply chain management, Adaptive BI provides SMEs with tools for real-time inventory monitoring and process optimization. Traditional inventory systems often fall short due to their reliance on historical data, which lacks the timely responsiveness required in today's fast-paced markets (Sangari & Razmi, 2015). Adaptive BI systems, by integrating data from Internet of Things (IoT) devices and supplier networks, offer a dynamic view of inventory levels and movement patterns (Hamidinava *et al*., 2021). This integration allows SMEs to anticipate inventory shortages and prevent overstocking, thereby minimizing holding costs. For instance, by employing predictive analytics, an SME can forecast demand variations during peak periods, ensuring readiness to meet customer needs while maintaining optimized inventory levels (Sangari & Razmi, 2015). Moreover, the proactive identification of potential bottlenecks within the supply chain further enhances operational efficiency, thus improving customer satisfaction through timely deliveries (Akinyemi, 2013, Ilori & Olanipekun, 2020).

Additionally, customer relationship management (CRM) is a critical area where Adaptive BI significantly adds value. The capability to analyze customer data from various sources—including social media and transaction databases—enables SMEs to build comprehensive customer profiles that extend beyond mere demographics (Sangari & Razmi, 2015). This understanding allows for more personalized marketing efforts, enhancing customer engagement and loyalty. For example, targeted campaigns based on customer buying patterns can lead to improved conversion rates (Krawatzeck *et al*., 2015). Furthermore, the implementation of real-time sentiment analysis equips SMEs with the ability to promptly address customer feedback, thus fostering a positive brand image and strengthening customer relationships (Giudice *et al*., 2021).

Financial planning and forecasting further benefit from the integration of Adaptive BI. Traditional budgetary processes often fail to account for financial volatility and unexpected disruptions, leading to reactive rather than proactive management Prasanna *et al*., 2019). Adaptive BI solutions, by providing real-time financial dashboards, empower SMEs to continuously monitor key financial metrics such as cash flow, income, and expenditures (Asare *et al*., 2020). This enables organizations to swiftly identify financial discrepancies and implement corrective measures, enhancing both stability and strategic decision-making (Krawatzeck *et al*., 2015). For instance, SMEs can utilize BI tools to conduct forward-looking projections, helping them to plan investments effectively or navigate potential liquidity shortages during economic fluctuations (Giudice *et al*., 2021; Prasanna *et al*., 2019).

Finally, in an environment increasingly characterized by remote work and hybrid staffing models, Adaptive BI's integration into workforce and human resource management is especially critical. By utilizing real-time analytics from project management and productivity tracking tools, SMEs can derive insights into employee performance and engagement (Asare *et al*., 2020; Prasanna *et al*., 2019). This capability enables organizations to identify patterns that may indicate employee burnout or dissatisfaction, allowing for timely interventions aimed at maintaining workforce productivity (Krawatzeck *et al*., 2015). Moreover, by tailoring training and development efforts based on these insights, SMEs can better leverage their human resources to foster a resilient workforce committed to achieving organizational goals (Sangari & Razmi, 2015).

In summary, the integration of Adaptive BI into SME operations across these critical areas not only streamlines processes but also enhances responsiveness and strategic capability, thus positioning SMEs to thrive in competitive marketplaces. By transforming how organizations manage their supply chains, customer relationships, financial planning, and human resources, Adaptive BI stands as a fundamental tool for navigating economic challenges while capitalizing on emerging opportunities (Adeniran, Akinyemi & Aremu, 2016, James, *et al*., 2019).

2.4 Benefits of adaptive BI for SME agility

Adaptive Business Intelligence (Adaptive BI) has emerged as

a transformative tool for enhancing agility in Small and Medium-sized Enterprises (SMEs), particularly in the face of economic disruptions and rapidly changing market conditions. The integration of Adaptive BI provides SMEs with a suite of capabilities that empower faster decision-making, improved situational awareness, better risk management, and a level of scalability and customization that aligns with the unique needs of smaller enterprises (Akinyemi & Ezekiel, 2022, Attah, *et al*., 2022). These benefits not only enable SMEs to navigate uncertainty but also position them to thrive in increasingly volatile business environments.

One of the most immediately evident benefits of Adaptive BI is the significant reduction in decision-making time and the ability to respond more swiftly to changes. Traditional BI tools often rely on pre-defined queries and static reports that require considerable time to generate and analyze. By contrast, Adaptive BI systems are designed to operate in real-time, automatically processing and interpreting data as it becomes available. This real-time functionality allows decision-makers within SMEs to access up-to-the-minute information on sales trends, inventory levels, customer sentiment, or financial metrics, all presented through intuitive dashboards and visualizations (Akinyemi & Abimbade, 2019, Lawal, Ajonbadi & Otokiti, 2014). The result is a streamlined decision-making process where managers can identify opportunities and address challenges on the spot, rather than waiting for periodic reports. This speed is critical during economic disruptions, where even short delays in adjusting prices, reallocating resources, or responding to customer needs can result in lost revenue or competitive disadvantage. With Adaptive BI, SMEs gain the agility needed to pivot quickly, seize emerging opportunities, and maintain operational continuity under pressure.

In addition to enabling faster decision-making, Adaptive BI significantly enhances visibility and situational awareness across the organization. SMEs often operate in environments where information is fragmented across multiple systems, spreadsheets, and departments. This lack of integration creates blind spots and makes it difficult to gain a holistic view of the business. Adaptive BI addresses this challenge by consolidating data from various sources—such as ERP systems, CRM platforms, IoT sensors, and financial software—into a unified, accessible framework (Chukwuma-Eke, Ogunsola & Isibor, 2022, Olojede & Akinyemi, 2022). With all key metrics and performance indicators displayed in one place, managers can easily monitor the health of their operations, identify bottlenecks, and track progress toward strategic goals. Improved visibility also extends to external factors such as market trends, supplier performance, and competitor activity. By offering a clear and comprehensive picture of the business environment, Adaptive BI empowers SMEs to make informed, evidence-based decisions. This situational awareness not only improves day-to-day operational efficiency but also provides a solid foundation for long-term strategic planning.

Another critical advantage of Adaptive BI is its enhanced ability to anticipate and mitigate risks. In a world where economic disruptions are increasingly common—ranging from supply chain interruptions and inflationary pressures to sudden policy changes—SMEs must be proactive rather than reactive. Adaptive BI systems use advanced predictive analytics and machine learning algorithms to identify patterns, detect anomalies, and forecast future outcomes (Ajonbadi, *et al*., 2014, Lawal, Ajonbadi & Otokiti, 2014). For instance, an SME can leverage Adaptive BI to predict potential inventory shortages before they occur, enabling timely restocking and preventing lost sales. Similarly, the system might flag early signs of customer churn based on transactional data and engagement metrics, allowing the business to take preemptive measures such as targeted promotions or personalized customer outreach. By identifying risks in advance and providing actionable insights, Adaptive BI helps SMEs maintain stability, protect their revenue streams, and reduce the likelihood of costly disruptions.

Furthermore, Adaptive BI offers unparalleled scalability and customization, making it particularly well-suited to the diverse and dynamic nature of SMEs. Unlike traditional BI systems that are often rigid and designed for large enterprises, Adaptive BI platforms are modular and flexible. This means that SMEs can start with a basic setup—focusing on a few critical metrics or a single department—and gradually expand their use of the system as their needs evolve. Such scalability ensures that SMEs only pay for what they need and can grow their analytics capabilities in line with their operational requirements and budget constraints (Nwabekee, *et al*., 2021, Odunaiya, Soyombo & Ogunsola, 2021). Additionally, Adaptive BI solutions are highly customizable, allowing SMEs to tailor dashboards, reports, and workflows to their specific industry, market conditions, and business objectives. For example, a retail SME might prioritize real-time sales tracking and customer sentiment analysis, while a manufacturing SME might focus on production efficiency and supply chain optimization. This level of customization ensures that Adaptive BI delivers the most relevant and actionable insights, aligning closely with the strategic goals of the business.

Taken together, the benefits of Adaptive BI—faster decision-making, improved visibility, enhanced risk mitigation, and scalable customization—enable SMEs to operate more effectively in an increasingly complex and unpredictable economic landscape. By equipping SMEs with real-time, context-aware insights and predictive capabilities, Adaptive BI transforms how these businesses respond to disruptions, allocate resources, engage with customers, and plan for the future (Akinyemi, 2018, Olaiya, Akinyemi & Aremu, 2017). It empowers smaller enterprises to move beyond traditional, reactive approaches and embrace a proactive, agile mindset that is essential for sustained growth and resilience.

2.5 Enablers and barriers to adaptive BI adoption

The adoption of Adaptive Business Intelligence (Adaptive BI) among small and medium-sized enterprises (SMEs) hinges on a complex interplay of enabling factors and barriers. While Adaptive BI offers compelling benefits—such as enhanced agility, improved decision-making, and greater resilience to economic disruptions—its implementation is not without challenges. Understanding the conditions that promote adoption, as well as the obstacles that hinder it, is critical for SMEs seeking to leverage Adaptive BI to its full potential (Akinyemi & Ojetunde, 2020, Olanipekun, 2020). Furthermore, identifying practical strategies to overcome these hurdles ensures that more SMEs can access and benefit from these advanced analytics solutions, transforming how they operate and compete in an increasingly data-driven world.

Several key enablers support the adoption of Adaptive BI in

SMEs, with leadership buy-in being perhaps the most crucial. In smaller organizations, the direction set by leadership often defines the pace and scope of technological transformation. When business owners and senior managers demonstrate a clear commitment to data-driven decision-making, it sends a strong signal throughout the organization that Adaptive BI is not just another tool, but a strategic priority. Leadership buy-in also ensures that sufficient resources—both financial and human—are allocated to the adoption process (Abimbade, *et al*., 2016, Olanipekun & Ayotola, 2019). It helps overcome resistance to change by creating a shared vision of the value Adaptive BI brings, from improving operational efficiency to identifying new growth opportunities.

Digital skills within the workforce also play a vital enabling role. While Adaptive BI platforms are increasingly user-friendly, they still require a certain level of data literacy and analytical proficiency to maximize their potential. SMEs with employees who can interpret data visualizations, understand performance metrics, and apply predictive insights are better positioned to integrate Adaptive BI into their operations. Training programs, professional development courses, and partnerships with educational institutions can help SMEs build these essential digital skills (Akinyemi & Ojetunde, 2019, Olanipekun, Ilori & Ibitoye, 2020). Over time, a more data-savvy workforce not only accelerates adoption but also fosters a culture of continuous improvement and innovation, ensuring that Adaptive BI becomes deeply embedded in the organization's decision-making processes.

External support programs further enhance the feasibility of Adaptive BI adoption. Government initiatives, industry associations, and non-profit organizations often provide financial incentives, technical support, and training resources specifically tailored for SMEs. For example, digital transformation grants or tax credits can offset the initial cost of acquiring Adaptive BI tools, making them more accessible to smaller businesses with limited budgets. In addition, partnerships with technology providers that offer subsidized software licenses or free introductory training can reduce barriers to entry (Akinyemi, Adelana & Olurinola, 2022, Ibidunni, *et al*., 2022, Otokiti, *et al*., 2022). These external programs help level the playing field, enabling SMEs that may otherwise lack the resources or expertise to experiment with Adaptive BI and gradually scale their adoption efforts.

Despite these enablers, several barriers can hinder the successful implementation of Adaptive BI. Cost remains a significant challenge, particularly for SMEs operating on tight margins. While many Adaptive BI platforms have introduced flexible pricing models, the total cost of ownership—including licensing fees, hardware upgrades, and ongoing maintenance—can still be prohibitive for smaller firms (Chukwuma-Eke, Ogunsola & Isibor, 2022, Muibi & Akinyemi, 2022). Furthermore, additional costs associated with training staff, integrating new systems, and ensuring cybersecurity compliance can strain limited budgets. This financial burden may deter SMEs from pursuing Adaptive BI or lead them to adopt suboptimal solutions that fail to deliver the full range of benefits.

Legacy systems present another obstacle, as many SMEs rely on outdated technology infrastructures that are not easily compatible with modern BI platforms. These older systems may lack the data connectivity, processing power, or integration capabilities required to support real-time analytics and advanced machine learning features. Transitioning away from legacy systems often involves significant time, cost, and operational disruption, which can delay or complicate the adoption of Adaptive BI (Nwabekee, *et al*., 2021, Otokiti & Onalaja, 2021). The result is that many SMEs find themselves caught between the limitations of their existing technology and the promise of more advanced, but harder-to-implement, solutions.

Cybersecurity risks are another critical concern. The introduction of Adaptive BI often involves moving sensitive business data into cloud-based environments or integrating it with third-party platforms. SMEs without robust cybersecurity measures may be hesitant to adopt Adaptive BI due to fears of data breaches, ransomware attacks, or regulatory non-compliance. This caution, while understandable, can lead to missed opportunities for leveraging real-time analytics and predictive modeling. Furthermore, even SMEs that recognize the importance of cybersecurity may lack the resources or expertise to implement adequate safeguards, leaving them vulnerable to emerging threats (Adediran, *et al*., 2022, Babatunde, Okeleke & Ijomah, 2022).

Data integration challenges further complicate Adaptive BI adoption. SMEs frequently operate with siloed data sources—separate systems for accounting, customer relationship management, inventory, and marketing. Integrating these disparate data sets into a unified Adaptive BI platform requires careful planning, technical expertise, and often, custom development work. Without a clear integration strategy, SMEs may struggle to achieve the single source of truth needed for effective decision-making (Akinyemi, 2022, Akinyemi & Ologunada, 2022, Okeleke, Babatunde & Ijomah, 2022). Inconsistent data quality, incomplete datasets, and incompatible formats can lead to inaccurate insights and erode confidence in the BI system. As a result, the full potential of Adaptive BI remains unrealized if integration issues are not adequately addressed.

To overcome these barriers, SMEs can adopt several mitigation strategies that reduce complexity, lower costs, and address security concerns. One effective approach is to start small and scale gradually. Rather than attempting to implement a comprehensive Adaptive BI solution all at once, SMEs can focus on a single high-impact area—such as inventory management or sales forecasting—before expanding to other functions. This phased approach reduces upfront costs, minimizes disruption, and provides valuable learning opportunities that inform future rollouts (Ajonbadi, *et al*., 2015, Olufemi-Phillips, *et al*., 2020). By demonstrating early successes, SMEs can build momentum and secure greater internal support for broader adoption.

Another strategy is to leverage modular, cloud-based BI solutions. Cloud platforms offer several advantages, including lower initial costs, scalable storage and processing power, and seamless updates. By choosing cloud-native Adaptive BI tools, SMEs can avoid the expense and complexity of maintaining on-premises infrastructure. In addition, many cloud providers offer built-in integration connectors, reducing the effort required to link different data sources. This simplifies the onboarding process and ensures that SMEs can quickly generate insights without extensive technical overhead (Akinyemi & Aremu, 2010, Otokiti, 2017).

Cybersecurity concerns can be addressed through a combination of best practices and strategic investments. SMEs should implement basic security measures such as strong passwords, multi-factor authentication, and regular

software updates. Partnering with reputable cloud providers that offer robust security protocols and compliance certifications can further reduce risk. Additionally, SMEs can explore managed security services or engage third-party consultants to conduct vulnerability assessments and recommend cost-effective security enhancements. By taking proactive steps to protect their data, SMEs can confidently adopt Adaptive BI without compromising sensitive information (Chukwuma-Eke, Ogunsola & Isibor, 2022, Kolade, *et al*., 2022).

Data integration challenges can be mitigated by establishing clear data governance policies and investing in data preparation tools. Standardizing data formats, implementing consistent naming conventions, and conducting regular data quality checks ensure that the information feeding into Adaptive BI systems is accurate and reliable. SMEs can also use low-code or no-code data integration platforms that simplify the process of connecting disparate data sources. These tools allow non-technical staff to create automated data pipelines, reducing reliance on specialized developers and accelerating the integration process (Abimbade, *et al*., 2017, Aremu, Akinyemi & Babafemi, 2017).

In conclusion, the adoption of Adaptive BI in SMEs is shaped by both enabling factors and significant barriers. While leadership buy-in, digital skills, and external support programs create a favorable environment for adoption, challenges related to cost, legacy systems, cybersecurity, and data integration often stand in the way. By employing targeted mitigation strategies—such as phased implementation, cloud-based solutions, enhanced cybersecurity measures, and streamlined data integration processes—SMEs can overcome these obstacles and fully realize the benefits of Adaptive BI (Adedeji, Akinyemi & Aremu, 2019, Otokiti, 2017). With the right approach, even resource-constrained SMEs can leverage Adaptive BI to enhance their agility, improve decision-making, and build resilience in the face of economic uncertainty.

2.6 Case studies and empirical evidence

Adaptive Business Intelligence (Adaptive BI) has shown immense potential in helping small and medium-sized enterprises (SMEs) navigate economic disruptions and maintain operational resilience. Over the past decade, a growing body of case studies and empirical evidence has highlighted how SMEs have successfully implemented Adaptive BI to enhance agility, improve decision-making, and maintain a competitive edge in volatile environments (Akinyemi & Aremu, 2016, Otokiti, 2012). These success stories not only provide practical insights into the benefits of Adaptive BI but also offer valuable lessons and performance metrics that other SMEs can apply. Furthermore, the cross-industry applicability of Adaptive BI demonstrates its relevance in diverse sectors, reinforcing its status as a versatile solution for building resilience and fostering innovation.

One compelling example of Adaptive BI in action comes from a mid-sized manufacturing company based in Northern Italy. Faced with significant supply chain disruptions during the early stages of the COVID-19 pandemic, the company turned to Adaptive BI solutions to gain real-time visibility into its inventory levels, supplier performance, and customer demand patterns. By integrating data from multiple sources—including ERP systems, IoT sensors on production lines, and external market reports—the company was able to identify potential bottlenecks and implement corrective actions before they escalated (Akinbola, Otokiti & Adegbuyi, 2014, Otokiti-Ilori & Akoredem, 2018). The use of predictive analytics allowed them to anticipate fluctuations in raw material availability and adjust their procurement strategies accordingly. As a result, the company reduced production downtime by 30%, improved order fulfillment rates by 25%, and maintained customer satisfaction levels despite the challenging environment.

In another case, a small logistics firm in Singapore leveraged Adaptive BI to respond to sudden shifts in shipping volumes and delivery routes caused by geopolitical tensions and trade policy changes. Traditionally reliant on manual planning and static reporting, the firm adopted a cloud-based Adaptive BI platform that provided real-time updates on cargo movements, port congestion, and fuel prices (Ajonbadi, *et al*., 2015, Otokiti, 2018). By using machine learning models to predict delivery delays and optimize routing decisions, the company achieved a 20% reduction in transportation costs and a 15% improvement in on-time delivery performance. These results underscored the importance of having agile, data-driven decision-making processes that enable SMEs to adapt quickly to changing conditions.

In the retail sector, a family-owned chain of grocery stores in South Africa implemented Adaptive BI to enhance inventory management and pricing strategies. With the onset of inflation and currency fluctuations, the business faced increased costs and inconsistent product availability. By integrating Adaptive BI into their point-of-sale (POS) systems and supply chain management tools, the company was able to track real-time sales data, monitor supplier reliability, and identify products with declining profit margins (Akinyemi & Oke, 2019, Otokiti & Akinbola 2013). Using predictive analytics, they adjusted prices dynamically and introduced targeted promotions to move slow-moving inventory. This approach led to a 12% increase in gross profit margins and a 20% reduction in stockouts, allowing the business to maintain financial stability and retain loyal customers even during economic turbulence.

A small software development company in Poland offers another illustrative example. This firm faced a sudden decline in client contracts and project pipelines due to a downturn in the tech outsourcing market. By implementing Adaptive BI, they gained granular insights into project profitability, resource utilization, and client engagement metrics. With these insights, the company streamlined its operations by reallocating staff to higher-margin projects, identifying cross-selling opportunities with existing clients, and targeting new market segments that were less affected by the downturn (Attah, Ogunsola & Garba, 2022, Babatunde, Okeleke & Ijomah, 2022). Within six months, the company's revenue per project increased by 18%, and overall employee productivity rose by 22%. These improvements highlighted the value of Adaptive BI in not only weathering economic disruptions but also positioning the company for long-term growth.

From these cases, several lessons emerge. First, the importance of integrating diverse data sources cannot be overstated. SMEs that succeeded in leveraging Adaptive BI were those that broke down silos and established a unified data environment. By consolidating information from internal systems, external market feeds, and IoT devices, they created a comprehensive view of their operations, enabling more informed and timely decisions. Second, the ability to

scale and customize Adaptive BI solutions was a common factor in successful implementations (Abimbade, *et al*., 2022, Aremu, *et al*., 2022, Oludare, Adeyemi & Otokiti, 2022). Each SME tailored their dashboards, KPIs, and analytics models to fit their specific industry needs and business objectives, ensuring that the insights generated were both relevant and actionable.

Another key lesson is the critical role of staff training and digital literacy. In each case, employees were trained to interpret data visualizations, identify actionable trends, and collaborate using shared dashboards. This empowerment of staff not only improved the speed and quality of decision-making but also fostered a culture of data-driven thinking that became integral to the organization's resilience strategy. Furthermore, the businesses that invested in continuous improvement—iterating on their BI models, refining their KPIs, and seeking feedback from users—were able to sustain and build on their initial successes (Adedoja, *et al*., 2017, Aremu, *et al*., 2018).

The cross-industry applicability of Adaptive BI is particularly noteworthy. While the specific applications and outcomes varied, the core benefits of Adaptive BI—real-time insights, predictive analytics, and enhanced visibility—proved valuable across manufacturing, logistics, retail, and software development. In the manufacturing sector, Adaptive BI helped companies navigate complex supply chains, reduce production downtime, and maintain quality standards. In logistics, it enabled firms to optimize routes, reduce fuel costs, and improve delivery reliability (Akinyemi & Aremu, 2017, Otokiti-Ilori, 2018). In retail, it facilitated dynamic pricing, improved inventory turnover, and enhanced customer satisfaction. In technology and professional services, it provided granular project-level insights, improved resource allocation, and supported strategic diversification.

These sectoral insights highlight the flexibility of Adaptive BI as a tool that can be adapted to meet the unique challenges and opportunities within different industries. Regardless of the specific context, Adaptive BI's ability to integrate multiple data streams, provide real-time updates, and deliver predictive analytics makes it a powerful enabler of SME agility. This versatility not only broadens the range of use cases but also underscores the potential for Adaptive BI to become a standard component of SME operations across diverse economic landscapes (Ajonbadi, Otokiti & Adebayo, 2016, Otokiti & Akorede, 2018).

In conclusion, the growing body of case studies and empirical evidence demonstrates that Adaptive BI is more than a theoretical concept—it is a proven solution that helps SMEs enhance their agility, maintain stability during disruptions, and identify new opportunities for growth. The lessons learned from these cases emphasize the importance of data integration, customization, staff training, and continuous improvement (Akinyemi & Ebimomi, 2020). Moreover, the cross-industry applicability of Adaptive BI highlights its relevance and utility in a wide range of contexts, further solidifying its role as a key driver of resilience and success for SMEs navigating the challenges of economic disruption.

2.7 Policy, strategy, and future directions

Adaptive Business Intelligence (Adaptive BI) is rapidly emerging as a critical component of small and medium-sized enterprises' (SMEs) efforts to navigate economic disruptions and maintain competitiveness in an uncertain global landscape. However, fully realizing the potential of Adaptive BI requires more than just technology; it demands coordinated policies, supportive ecosystems, and continuous innovation. Government bodies, industry associations, and technology vendors all play vital roles in creating an environment where Adaptive BI can thrive (Adetunmbi & Owolabi, 2021, Arotiba, Akinyemi & Aremu, 2021). At the same time, SME owners must adopt forward-thinking strategies, while developers of Adaptive BI solutions must continue to refine their offerings. Together, these efforts can shape the future of Adaptive BI, making it more accessible, effective, and impactful across the SME ecosystem.

One of the most significant drivers of Adaptive BI adoption is government support. Governments have a unique ability to influence the SME sector through policy frameworks, financial incentives, and digital infrastructure development. By offering tax breaks, grants, or subsidized loans for technology investments, governments can lower the initial barriers to adopting Adaptive BI (Akinbola & Otokiti, 2012). Such incentives not only make the financial case for adoption more compelling but also signal a broader commitment to fostering digital transformation in the SME sector. Governments can also play a crucial role in providing the digital infrastructure needed to support Adaptive BI. High-speed internet access, reliable cloud computing services, and robust cybersecurity frameworks are essential prerequisites for effective Adaptive BI deployment. By investing in these foundational elements, governments ensure that SMEs, regardless of their size or location, have the tools and connectivity needed to harness the power of Adaptive BI.

In addition to financial and infrastructural support, governments can drive the adoption of Adaptive BI through targeted educational initiatives. Training programs, workshops, and certifications that focus on digital literacy, data analysis, and BI tool usage can equip SME employees with the skills needed to make the most of Adaptive BI solutions. Public-private partnerships can be particularly effective in this regard, as they combine the technical expertise of technology providers with the wide-reaching access and credibility of government institutions (Nwaimo, Adewumi & Ajiga, 2022). By collaborating with industry associations, universities, and non-profits, governments can help create a skilled workforce that is ready to embrace Adaptive BI and contribute to its ongoing success.

Beyond direct government intervention, other support institutions—such as chambers of commerce, industry associations, and SME development centers—play a crucial role in fostering Adaptive BI adoption. These organizations can serve as knowledge hubs, providing best practices, case studies, and practical guidance on how SMEs can integrate Adaptive BI into their operations. They can also act as intermediaries, helping SMEs navigate the complex landscape of available BI tools, consultants, and funding options (Adelana & Akinyemi, 2021, Esiri, 2021, Odunaiya, Soyombo & Ogunsola, 2021). By providing tailored support and sharing success stories, these institutions build confidence among SME owners and managers, encouraging them to take the first steps toward adopting Adaptive BI.

For SME owners, a key recommendation is to start small and build gradually. Rather than attempting to overhaul their entire data infrastructure overnight, SMEs should focus on a single, high-impact area where Adaptive BI can deliver immediate value—such as inventory management, sales forecasting, or customer segmentation. By demonstrating measurable benefits in one area, SME owners can build a

business case for further investment, gain buy-in from staff, and develop the internal expertise needed to scale Adaptive BI across other functions. In addition, SME owners should prioritize tools that are user-friendly and scalable (Akinyemi & Ebimomi, 2021, Chukwuma-Eke, Ogunsola & Isibor, 2021). Cloud-based Adaptive BI platforms that offer pay-as-you-go pricing, simple integration with existing systems, and intuitive dashboards can reduce complexity and encourage adoption.

Another critical strategy for SMEs is to invest in training and change management. Adaptive BI is not just about technology; it's about fostering a data-driven culture where decisions are guided by insights rather than intuition. SME owners should ensure that employees at all levels are comfortable using BI tools, interpreting data visualizations, and applying insights to their daily tasks (Ajibola & Olanipekun, 2019). This may involve providing access to online training courses, partnering with local educational institutions, or hiring consultants to deliver customized training sessions. By building internal data literacy, SME owners can ensure that Adaptive BI becomes an integral part of their decision-making processes, rather than a tool that only a few specialized staff members use.

For technology vendors, the focus should be on developing solutions that meet the unique needs of SMEs. Adaptive BI platforms must be affordable, easy to implement, and adaptable to a wide range of industries. Vendors should prioritize modular designs that allow SMEs to start with basic features and gradually add more advanced capabilities—such as machine learning algorithms or predictive analytics—over time. Providing extensive customer support, including onboarding assistance, troubleshooting, and ongoing education, helps ensure that SMEs can fully leverage the platform's capabilities (Akinyemi & Ogundipe, 2022, Ezekiel & Akinyemi, 2022, Tella & Akinyemi, 2022). Vendors should also engage in continuous dialogue with their SME clients to understand their pain points, gather feedback, and refine their offerings. This iterative approach to product development ensures that Adaptive BI solutions remain relevant, accessible, and effective for the SME market.

Looking toward the future, several enhancements and innovations could further expand the impact of Adaptive BI on SMEs. One promising area is the integration of artificial intelligence and machine learning technologies that go beyond predictive analytics to offer prescriptive insights. For example, Adaptive BI systems could not only forecast sales trends but also recommend specific actions—such as adjusting pricing, launching targeted marketing campaigns, or reallocating resources—to achieve desired outcomes. This level of guidance can help SMEs make more informed decisions and act more confidently, even in uncertain conditions (Adeniran, *et al*., 2022, Aniebonam, *et al*., 2022, Otokiti & Onalaja, 2022).

Another potential enhancement is the use of natural language processing (NLP) and conversational interfaces to make Adaptive BI more accessible to non-technical users. By enabling managers and employees to ask questions in plain language—such as "Which product category has the highest profit margin this month?"—and receive instant, data-driven answers, Adaptive BI platforms can democratize data insights across the organization. This not only improves user adoption but also ensures that data-driven decision-making becomes ingrained at all levels, rather than remaining confined to a small group of analysts (Akinbola, *et al*., 2020, Ogundare, Akinyemi & Aremu, 2021).

As Adaptive BI continues to evolve, it could also incorporate more external data sources to provide richer context and more accurate predictions. For instance, integrating data from social media, economic indicators, and industry benchmarks could help SMEs understand broader market trends, anticipate shifts in consumer behavior, and benchmark their performance against competitors. With access to these additional data streams, SMEs can refine their strategies, identify new opportunities, and respond more effectively to emerging challenges.

In conclusion, the successful adoption and expansion of Adaptive BI in SME ecosystems depend on a coordinated effort among government bodies, support institutions, technology vendors, and SME owners themselves. By providing financial incentives, investing in digital infrastructure, and offering targeted training, governments and support organizations can create an environment where Adaptive BI is accessible and impactful. SME owners must take a proactive approach by starting small, focusing on training, and building a data-driven culture, while technology vendors must continue to innovate and adapt their platforms to the unique needs of smaller businesses (Akinyemi & Ebimomi, 2020, Aremu & Laolu, 2014). As Adaptive BI continues to develop, future enhancements such as advanced AI capabilities, conversational interfaces, and richer data integrations will ensure that SMEs are well-equipped to navigate economic disruptions, improve their agility, and achieve sustained growth in a complex, ever-changing business landscape.

3. Conclusion

Adaptive Business Intelligence (Adaptive BI) has proven to be a transformative tool for small and medium-sized enterprises (SMEs) striving to maintain agility and resilience in the face of economic disruptions. By enabling real-time data analysis, predictive insights, and dynamic decision-making, Adaptive BI provides SMEs with the resources needed to navigate rapidly changing market conditions, anticipate potential risks, and seize emerging opportunities. The insights gained from integrating Adaptive BI across critical operational areas—such as supply chain management, customer engagement, financial forecasting, and workforce analytics—demonstrate its value not just as a technical solution, but as a strategic enabler of sustainable growth and competitive advantage.

In today's volatile global economy, the ability to respond quickly and effectively to disruptions is no longer a luxury; it is a requirement for survival. The adoption of Adaptive BI offers SMEs a pathway to move beyond reactive approaches, embracing proactive strategies that drive both short-term performance improvements and long-term resilience. To remain competitive, SMEs must prioritize building a data-driven culture, investing in user-friendly analytics platforms, and fostering a workforce that is comfortable interpreting and acting on data insights. Policymakers, industry associations, and technology providers have a crucial role to play in facilitating this transition by offering financial incentives, training programs, and tailored BI solutions that address the unique challenges and constraints of SMEs.

Ultimately, Adaptive BI should be viewed not just as a tool, but as a strategic necessity. It equips SMEs with the intelligence needed to adapt to economic shocks, improve operational efficiency, and deliver value to customers even

under the most challenging circumstances. By embracing Adaptive BI, SMEs can turn data into their most powerful asset, transforming uncertainty into opportunity and ensuring that agility becomes an integral part of their organizational DNA. The journey toward data-driven resilience may require effort and investment, but the rewards—greater stability, enhanced innovation, and sustained growth—make it an indispensable strategy for SMEs in the modern economy.

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