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Impact Of Business Analytics On Organizational Performance: A Study Of Small Medium Enterprises

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Abstract: Business analytics (BA) have become an integral part of the business process for improving decision-making and driving organizational performance. From decision-making to enhancing the performance of an organization. It was found in this study that BA is important in SME operational efficiency, strategic planning as well as in financial growth. Through empirical analysis, the research identifies numerous critical analytical tools, challenges related to adoption, and measurable benefits within several industries. Firms whose capacity spend between $2M and $6M on analytics see profit margins varying between 300 to 600 for each and every unit sold affirming that decisions based on data make financial-sense as well. Descriptive and Predictive analytics are the most frequently used methodologies in analytics with daily at 7, monthly at 5, and weekly at 3. In terms of industry, healthcare tops the BA investment at $4.4M, followed by manufacturing ($3.4M) and construction ($3.4M), whereas the technology sector invests the least, only at $0.9M and among enterprise sizes, micro-sized enterprises deliver the highest average ROI (return on investment), indicating that smaller firms, being more agile to implement data-driven strategies through BA adoption, get more value comparatively in analytics setup. These insights highlight the growing importance of BA in driving profitability, driving organizations to allocate resources wisely for long-term growth and competitiveness.

Keywords— Business Analytics, Power BI, Tableau, SMEs, Data Visualization, Data-driven Decision-making, Competitive Advantage

I. INTRODUCTION

Businesses are simply using Business Analytics (BA) to effectively take decisions, streamline operations, and proliferate their overall performance in the data dominating world of today. BA has become an important factor in

sustainable competitive advantage in an organization, especially that of Small and Medium Enterprises (SME), because IEC statistics from 2019 (Kasiri et al., 2024) show that 98% of all businesses are SME, and SME contributes 30–60% of all activity in an economy. In contrast to large corporations with unlimited resources, it has been shown that financial, expertise, and technology infrastructure limitations make full integration of BA in SMEs business models very challenging (Deshpande, 2021).

The field of business analytics includes a variety of data analyses, such as predictive modelling, data visualization, and machine learning, that an organizations can use to obtain actionable insights about its operations. Through the systematized analysis of structured and unstructured data, BA aids SMEs in

decision-making, resource allocation, and financial performance enhancement (Chatterjee et al., 2021) However, despite the benefits, there are a larger percentage of SMEs that are lagging on the adoption of BA due to factors including high costs, data security concerns, and resistance to technological change (Kgakatsi et al., 2024).

BA is well-known to provide SMEs with the analysis of all relevant customer actions, helping them in the creation of new strategies, and discovering new trends with which to increase their value (Oukil, 2021). For example, Oukil (2021) applied Data Envelopment Analysis (DEA), a quantitative technique, to measure the efficiency of SMEs in BA adoption and demonstrate the performance benchmarking for these enterprises. An added factor is that research studies 8899322024)s in developed economies are more invested in BA due to their better infrastructure and regulatory 2024).

Fig.1. Transforming SMEs with Business Analytics

Although there is a growing body of research on BA and its relevance to large enterprises, little is known about how SMEs can leverage BA to further improve their organizational performance. Although some SMEs adopted analytics tools in the cloud and AI-based solutions, the impact of these technologies on key performance indicators like revenue growth, cost effectiveness, and market responsiveness is still needed to be explored further (Kasiri et al., 2024).

This study intends to narrow this gap by exploring the impact of Business Analytics on enhancing the organizational performance of the SMEs. This study aims to: through an analysis of the existing literature and empirical studies.

- Analyse the effects of BA on the financial and operational performance of SMEs.
- Identify the obstacles and facilitators of BA adoption in SMEs.
- Share best practices for SMEs on how to leverage analytics.

With technological advancements, there is plenty to leverage within BA that can drive efficiency and competitiveness among SMEs. This study adds to our understanding of business analytics by providing actionable insights for SMEs aiming to incorporate data-driven organizational decision-making.

II. BACKGROUND

Business Analytics (BA) is now a vital weapon in every business arsenal and facilitates making decisive intelligent analysis and improving efficiencies. Overview · Available data sources, technical expertise, organizational capabilities and fundamentals, and effective policies are critical factors in enhancing BI and BA capabilities for both large firms and Small and Medium Enterprises (SMEs), which are slower to adopt these technologies due to some restraints (Kasiri et al.,2024). The use of business analytics (BA) to improve organizational performance has been studied in several studies. Chatterjee et al. (2021), BA adds business value by facilitating data collection and analysis, results reporting, and operational efficiency. Based on a

resource-based perspective, their study finds that organizations that dedicate resources towards BA tools and capabilities (data) lead to significant improvements in business processes, strategic decision-making and competitive advantage.

According to Deshpande (2021), BA empowers managers to utilize historical and real-time data for making strategic decisions, which ultimately translates into higher profitability and flourishing organizations. According to Oukil (2024), who applied Data Envelopment Analysis (DEA) techniques to evaluate the performance of the SMEs, data-driven decision making enhances resource allocation and productivity. In short, adoption rate of BA in SMEs depends on both industry as well as geographical location. A study by Kasiri et al. (2024) studied 50 SMEs from the U.S. and discovered that the adoption of BA tools is affected by firm size, industry type, and technological awareness . The findings suggested that different groups of SMEs were likely to adopt BA solutions, with progressive SMEs being more likely to adopt BA solutions than conventional SMEs. Similarly, Kgakatsi et al. Systematic review on Big Data adoption in SMEs by (2024) showed such potential of enhancing operational efficiency through BA, however SMEs face major barriers of cost, expertise, and inertia to change. They report that the use of BA in SMEs has many advantages, but the limited financial and human resources both prevent and make widespread use of BA in SMEs very difficult. Various studies have highlighted the benefits BA gives SMEs, such as increasing competitive advantage, enhanced decision making, and improving overall financial performance. SMEs can drive their decision decisions based on data, making corporate plans clearer and more structured through BA (Deshpande, 2021) BA is also referred to as analytics allows pollen helping in refuge to optimize resource allocation and workflow (Chatterjee et al., 2021) . By using BA tools, SMEs can gain insights into customer behaviour, market trends, operational bottlenecks, etc., which enables them to get ahead of the competitors (Kgakatsi et al., 2024) .

However, despite benefits, challenges exist in the adoption of BA in SMEs. According to research, small and medium-sized organizations have financial limitations that prevent them from acquiring advanced BA solutions, which hurts their potential of employing advanced analytics (Kasiri et al., 2024). Not only do most SMEs have no measures in place to implement analytics-driven strategies (Kgakatsi et al., 2024)

, but many of them also do not have skilled personnel to manage BA tools. Moreover, this leads to reluctance to adopt data-driven decision-making practices; due to difficulties in changing organizational culture (Deshpande, 2021) Multiple conceptual perspectives have been adopted to explain the BA adoption in SMEs. Chatterjee et al. (2021), which indicates that BA aims to improve organizational performance by utilizing data as a strategic resource The Technology-Organization

Environment (TOE) framework has been extensively applied to analyze technology adoption in this context, underscoring the importance of technological capabilities, organizational readiness, and external influences in the adoption of BA (Kasiri et al., 2024)

Table 1. Summary of Literature Review on the Impact of Business Analytics on SME

References	Aspect	Key Insights
Kasiri et al. (2024)	Business Analytics (BA) & SMEs	BA is a crucial tool for data-driven decision-making and performance optimization. Large firms adopt BA faster than SMEs due to better resources.
Chatterjee et al. (2021)	Impact of BA on Organizational Performance	BA improves data acquisition, decision-making, and operational efficiency. Organizations investing in BA tools gain competitive advantage
Deshpande (2021)	Decision-Making & Profitability	BA helps managers use historical and real-time data for better decisions, increasing profitability and growth.
Oukil (2024)	Efficiency & Resource Allocation	Data Envelopment Analysis (DEA) shows BA leads to better resource allocation and productivity.
Kgakatsi et al (2024)	Challenges in BA Adoption	SMEs struggle with high costs, lack of expertise, and resistance to change, slowing adoption.
Deshpande (2021), Chatterjee et al. (2021), Kgakatsi et al. (2024)	Benefits of BA for SMEs	Improves competitiveness, decision-making, and financial performance. Helps in customer insights, market trends, and operational efficiency.

While existing studies provide valuable insights into BA adoption in SMEs, there are still gaps in the literature. Future research should focus on empirical studies assessing the real- world impact of BA in different SME sectors. Research should also explore cost-effective BA solutions tailored for SMEs to address financial barriers. Additionally, skill development programs to train SME employees on BA tools and techniques can facilitate adoption and maximize benefits. The review of literature indicates that BA has a significant impact on SME performance, enhancing decision-making, operational efficiency, and competitiveness. However, the adoption of BA in SMEs remains limited due to financial and technical constraints. Addressing these challenges through targeted policies, cost-effective solutions, and skill development programs can help SMEs fully leverage the benefits of business analytics. Overall summary of review as shown in table 1.

III. RESEARCH METHODOLOGY

This research adopts a quantitative approach and data collection using a survey followed by exploratory data analysis (EDA) method to assess BA adoption in small to medium enterprises (SME). This source is relevant to our study because previous studies suggested that their integration in analyzing organizational performance trends can promote Power BI and Tableau.

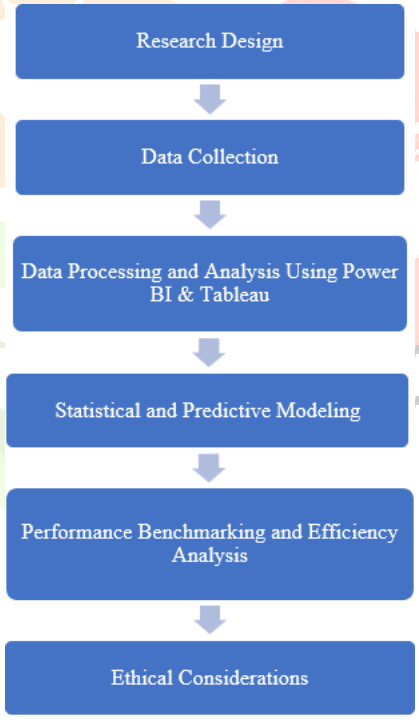

Fig.2. Proposed Flowchart

Data Collection

Primary Data: A well-structured questionnaire on BA use and performance impact will be circulated among SME managers, business analysts and decision makers. Secondary Data: The Existing industry reports in addition to performance metrics and previous research will be leveraged for comparing trends . Sample Size: At least 100 SMEs will be surveyed, encompassing various industries (finance, retail, manufacturing, IT, etc.) to ensure the dataset is diverse.

Analysing & Processing Data Using Power BI & Tableau

Data Pre-processing The raw data you collected will be cleaned to eliminate outliers and to fill in the blanks. Data Integration: Responses will be aggregated into dashboards (Power BI and Tableau) allowing for comparison of SME performance based on varying levels of BA adoption. Visualization Skills: Power BI:

KPIs indicators on Interactive Dashboards (e.g., revenue growth, operational excellence).
Tableau: BA impact comparison using heatmaps, trend analysis, and correlation charts
Visualize BA outcome: SME performance will be compared on the basis when before & after BA adoption to know statistical significance.

- **Performance Benchmarking & Efficiency Analysis** Business Intelligence-Retail metrics: Comparison of SMEs with BA and without BA.

Data Envelopment Analysis (DEA): Utilized to gauge SME efficiency enhancements following BA integration . Much of Industry: Power BI will be utilized to contrast the performance of SMEs across various industry sectors

- **Ethical Consideration**

Informed Consent: Participants will be told about the purpose of the study and their right to withdraw.
Anonymization: All answers will be anonymized to protect your privacy.
Research Compliance: The study will follow ethical guidelines for data collection and analysis.

IV. RESULTS

a) Role of Business Analytics in Organisational Performance

Operational Efficiency: Analytics-based SMEs enhances workflow processes and cuts costs.
Customer Insights: Facilitates (through data-backed strategies) engagement (and satisfaction) with customers.
Competitive Advantage: SMEs leveraging predictive analytics will be able to predict market trends and adjust strategies accordingly.

b) Barriers to Business Analytics Adoption

Financial Limitation: Restricted budget distribution for analysis tools.
Skill Gaps: Employees of the SME with not enough knowledge on data analytics.
Data Quality Issues: Decisions Made with Incorrect or Partial Data.

Fig 3 Average Of Year in Operation by Company size

They are trained until the year (October) 2023 ● line chart in figure 3 shows the average years in operation for Small, Medium, and Micro businesses. As per these statistics, small- sized companies have the longest operating tenure on average (52.87 years), followed by medium-sized companies (51.82 years). In contrast, micro-sized companies have only existed for an average of 44.92 years. This trend indicates that bigger companies are able to last longer than their smaller counterparts due to better access to funds, resources, and adaptability to changing marketplaces. On the other hand,

Micro businesses may be newer entrants or have more difficulty balancing long-term sustainability. Lower average years from small to micro businesses may suggest greater market volatility and competition impacting smaller entities. These trends can be valuable in the context of strategy or policy decisions, as providing micro businesses with access to better business analytics and possible access to financial tools can contribute to their sustainability. For more intricacy, we may include the KPIs like revenue growth or profitability or customer retention rates.

Fig.4. Market Share on the behalf of Company Size

Fig 4 Market Distribution by Company Size. This shows the various distribution to the market share: Medium, Micro and small Businesses As per the value reported, the highest market share is taken by medium business enterprises (an estimated value of 944 units corresponding to 35%) then followed by a small business (778.98 units equivalent to 29.6%). Micro have the smallest market share, near 90 units. It seems like the market is dominated by medium and small businesses perhaps due to better customer base, financial strength and operational efficiency around them. On the other hand, micro enterprises may face lower market penetration due to resource limitations, lack of brand awareness or strong competition from larger firms. The analysis adds that tools like Power BI and Tableau are essential business analytics tools for small businesses, paving the way for strategic decision-making in these companies and enabling them to detect growth opportunities. Based on data-driven insights, companies can optimize their positioning in the market based on the above factors to enable more customer retention and higher profitability. Understanding how market share is impacted by revenue trends, customer segmentation, and industry-specific performance can lead to deeper insights.

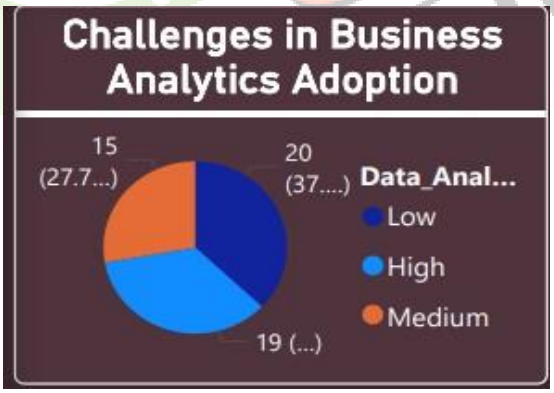

Fig.5.challenges in Business Analytics Adoption

The pie chart in figure 5 shows the challenges of business analytics adoption and classifies them into Low, Medium and High-level issues. A check for the figures shows 20 units (37%) suggests that companies with high challenges in the adoption of business analytics would seem to be the largest portion, in terms of the factors to overcome for the business achieving business analytics success, in this category include high costs, data integration issues, low-skilled personnel, and resistance to change. With the medium challenge level representing 19 units, this means quite a few companies face challenges of more medium difficulty, perhaps limited data availability or concerns for making an investment or implementing functionalities. Simultaneously, 15 units (27.7%) are at the lowest challenges, which means that these businesses have effectively used analytics within their business, possibly as a result of a strong data-driven culture (SaaS) along with proper infrastructure and competent personnel. This graph addresses the obstacles complicating the

widespread application of business analytics and highlights the importance of formal training, accessibility of tools, and strategic deployment of tools to improve the application of reporting and data analysis to business decision-making. Addressing these challenges can enhance organizational efficiency, profitability, and competitive advantage in today's agile business landscape.

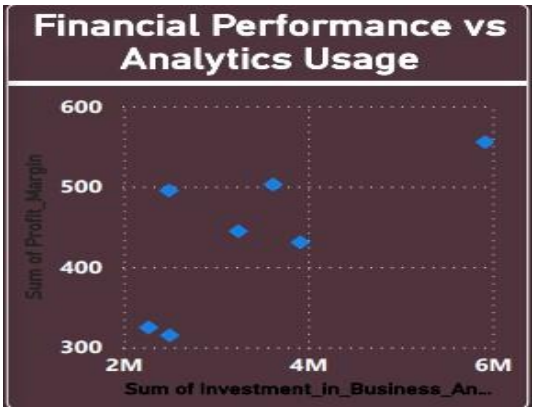

Fig.6. Financial Performance and Analytics Usage

As shown in figure 6, the scatter plot this time shows the investment in business analytics (X-axis) plotted against profit margin (Y-axis). The data seems to provide evidence of such a relationship — that increased investment in business analytics correlates positively with higher profit margins. Businesses that spend approximately $2M-$3M, exhibit profit margins of 300-500 units with slight variations. This is especially true as the investment rises to $6M with an apparent profit margin of about 600 units. This indicates that organisations that make data-driven choices would experience an increase in their bottom line due to the positive influence of data analytics on profitability. The broad distribution of the data points indicates that alongside investment, which is a critical dimension, industry type, market situation, and the efficiency at which data analytics is implemented underlie financial performance. In conclusion, such visualization lends itself to the idea that data- driven investments in business analytics lead to better financial performance, competitive advantage, as well as sustainable growth.conclusion, such visualization lends itself to the idea that data- driven investments in business analytics lead to better financial performance, competitive advantage, as well as sustainable growth.

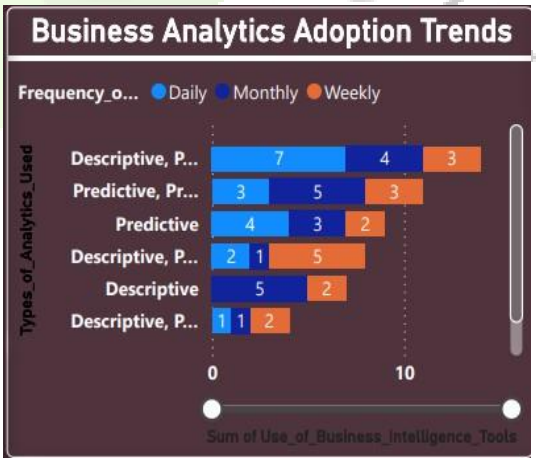

Fig.7. Adaption of Trends of the Business Analytics

We present (fig. 7) stacked bar chart for Business analytics Adoption Trends including types of analytics and the frequency of analytics usage (daily, monthly, weekly). Business Intelligence (BI) Tools from X-axis where Business Intelligence (BI) Tools has been use and Y-axis where types of analytics used by businesses. According to the chart, Descriptive and Predictive Analytics seems to be the most commonly used, averaging a high frequency of daily usage (blue bars) in comparison to monthly (orange) and weekly (red). This indicates a more strategic reliance on both descriptive and predictive analytics where businesses leverage insights from the past with analytics insights to predict the future. Compared to orgs using predictive

analytics, orgs using only descriptive analytics have a slightly higher preference of weekly or monthly usage of the BI tool, compared to daily usage. Organizations that rely on both BI and advanced analytics solutions — as shown in this visualization — have been found to use BI tools more extensively,further emphasizing the significance of advanced analytics as part of data-driven decision-making and business intelligence strategy.

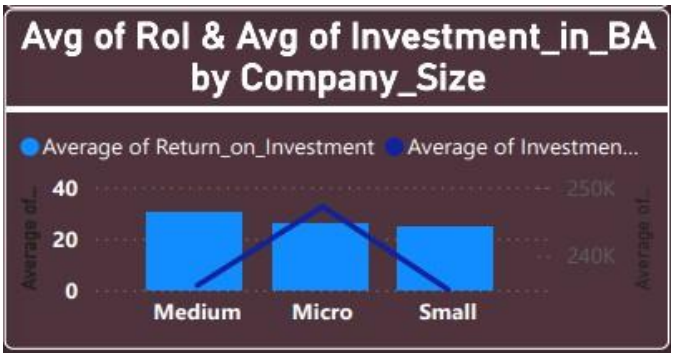

Fig.8. Avg of R.O.I & Avg of investment in BA on basic of Company size

The following is a combo chart showing average ROI and average BA investment by company size (Medium, Micro, and Small). Figure 8 is a bar chart of average ROI, and a line graph describing average investment in BA. The visualization itself also suggests that Micro-sized companies are investing the most in business analytics, due to the peak in th líne graph Nevertheless, they do not differ much from medium and small businesses when it comes to their ROI. Medium and Small organizations invest almost the same amount but see a consistent ROI. Consider that despite the data indicating that spending more on BA doesn't necessarily mean increased bang for your buck, companies of all sizes continue to invest in analytics to increase performance. Micro businesses seem to be more aggressive in investing in analytics as it may help provide a competitive advantage to them or help make up for the lack of adequate resources. This chart stresses the correlation between analytics spending and financial gain, which companies can dive into more deeply to fine-tune how they can invest resources to get more profits.

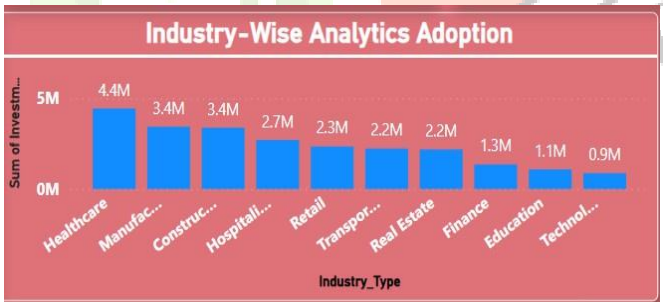

Fig.9. Industry -wise Analytics Adoption

A tree map as shown in Figure 9 depicts adoption of analytics industry-wise in terms of overall investment in analytics tools and technologies. At the top, the Healthcare industry is by far the biggest investor at 4.4M, given its high demand for analytics solutions to help improve patient care, optimize operations, and support research efforts. Close behind are Manufacturing and Construction, again with 3.4M in investment — perhaps leveraging analytics for process optimization, predictive maintenance, and supply chain efficiency. Hospitality (2.7M), Retail (2.3M), and Transportation (2.2M) have similar adoption trends; these industries are investing heavily in customer insights, demand forecasting, and logistics process improvements respectively. However, there are least amount of investment in Real Estate (2.2M), Finance (1.3M), Education (1.1M), and Technology (0.9M). Although Finance is a typically data-driven function, the lower investment indicates it might already be mature with analytics capability. Education and Technology sectors take the best opportunities for improvement on interest, perhaps a sign of the still evolving nature of these fields or budget constraints. Therefore, the chart shows that industries with high operational complexity, customer interaction and regulatory oversight lead the way in analytics

investment. That doesn't just help companies pinpoint industry trends or competing metrics for adopting analytics.

V. CONCLUSION

This study reinforces the idea that business analytics (BA) will be viewed as the essential tool to attaining financial performance, market position and operational efficiency. Medium and Large organizations are still competing due to the BA investment, planning tools and resources, while small organization are deprived of budgets, subject experts, tools inefficient use etc. Analysis of financial performance indicates a positive return on asset per BA investment, signifying a significant correlation between investment and profitability across the BA span, where companies actively allocating between $2M–$6M in BA achieved 300–500 unit profit margins. Sector-wise differences in analytics investment indicate that healthcare is ahead with $4.4M, manufacturing and construction are at $3.4M each, while technology is at the bottom at $0.9M, illustrating the differences in analytics maturity among sectors. Furthermore, micro-enterprises enjoy the best return on investment (ROI), indicating that these smaller organizations can obtain more proportional benefits from analytics given their size and nimbleness. Even with the growing investment behind descriptive and predictive analytics, organizations still tend to use historical data instead of applying forecasting and optimization models. You must switch to proactive analytics strategies, with the adoption of AI- powered insights and machine learning to keep pace with market evolution. But investment alone does not guarantee success: Implementation requires trained personnel capable of providing the right integrations with existing systems and a staged approach to adoption. Addressing issues such as technology expertise gaps, system integration, and costs can enable organizations to take significant competitive advantage. Based on these research gaps, you would need to further explore how analytics adoption impacts on the long-term, or if there are specific challenges associated with specific industries that would define analytical maturity, so that businesses can enhance their analytic strategies to enable sustainability in the future.

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