

Impact of Business Analytics Practices on the Business Performance of SMEs in Hyderabad: An Empirical Study

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Abstract

Business analytics has emerged as an important mechanism through which small and medium enterprises (SMEs) can improve decision-making, operational efficiency, customer responsiveness, and overall business performance. This study examines the impact of business analytics practices on the business performance of SMEs in Hyderabad. Business analytics practices are examined through four major dimensions: data-driven decision-making, descriptive analytics, predictive analytics, and prescriptive analytics. The study adopts a descriptive, empirical, quantitative, and cross-sectional research design. Primary data are proposed to be collected from owners, managers, and key decision-makers of SMEs operating in Hyderabad using a structured questionnaire based on a five-point Likert scale. Multiple regression analysis is employed to determine the individual and collective influence of business analytics practices on SME business performance. Business performance is assessed through financial performance, operational efficiency, customer performance, and market performance. The study is expected to demonstrate that effective adoption of business analytics practices contributes significantly to improved SME performance. The findings can assist SME owners and managers in identifying analytics practices that provide the greatest contribution to business outcomes and support evidence-based managerial decision-making.

Keywords: Business Analytics, SMEs, Business Performance, Data-Driven Decision-Making, Descriptive Analytics, Predictive Analytics, Prescriptive Analytics, Hyderabad

1. Introduction

Small and medium enterprises play an important role in economic development through employment generation, entrepreneurship, innovation, regional development, and contribution to industrial growth. However, SMEs operate in an increasingly competitive environment characterized by rapid technological change, evolving customer expectations, cost pressures, intense competition, and growing volumes of business data. Under such conditions, the ability of firms to effectively collect, analyse, and utilize information has become increasingly important for sustainable business performance.

Business analytics refers to the systematic use of data, statistical techniques, analytical tools, and quantitative methods to generate meaningful insights for business decision-making. Rather than relying primarily on intuition and past experience, analytics enables organizations to identify patterns, understand existing performance, predict future outcomes, and select appropriate courses of action.

Business analytics is particularly relevant to SMEs because these firms frequently operate with limited financial, technological, and managerial resources. Effective use of available data can help SMEs improve resource allocation, understand customer behaviour, forecast demand, control costs, manage inventories, identify market opportunities, and make more informed strategic decisions.

The growing digitalization of business activities has increased the availability of data from accounting systems, customer relationship management platforms, digital payments, e-commerce, social media, enterprise software, and other digital applications. However, access to data alone does not necessarily improve performance. Business value is generated when organizations possess the ability to transform data into actionable information and integrate analytical insights into managerial decision-making.

Hyderabad provides a relevant setting for examining these relationships because of its strong entrepreneurial ecosystem and expanding adoption of digital technologies across business sectors. SMEs operating in such an environment increasingly need analytical capabilities to remain competitive. Therefore, the present study investigates the extent to which different business analytics practices influence the business performance of SMEs in Hyderabad.

Although business analytics has become increasingly accessible, SMEs differ considerably in their ability to adopt and effectively utilize analytical practices. Some SMEs primarily use historical reports and basic descriptive information, while others employ forecasting, predictive models, dashboards, and decision-support techniques.

Limited financial resources, inadequate analytical skills, insufficient technological infrastructure, poor data quality, and lack of managerial awareness can restrict the effective use of business analytics among SMEs. Consequently, there is a need to empirically determine whether the adoption of different business analytics practices actually contributes to improved business performance.

Furthermore, the relative contribution of different analytics practices may vary. Understanding which dimensions of business analytics exert the strongest influence on SME performance can assist managers in prioritizing their investments and capabilities. The present study therefore examines the influence of data-driven decision-making, descriptive analytics, predictive analytics, and prescriptive analytics on the business performance of SMEs in Hyderabad.

2. Review of Literature

Yasmin et al. (2020) examined the relationship between big data analytics capabilities and firm performance using an integrated multi-criteria decision-making approach. The study considered technological infrastructure, management capabilities, and human-resource capabilities as important components of analytics capability. The findings revealed that these capabilities are interdependent and contribute positively to organizational performance, with infrastructure capability emerging as particularly important. The study further demonstrated that big data analytics capabilities have a stronger association with operational performance than with market performance. The findings emphasize that organizations need not only analytical technologies but also appropriate managerial and human capabilities to transform data into improved business outcomes.

Wamba, Akter, and Guthrie (2020) investigated how big data analytics capability contributes to firm performance and examined organizational agility as an important mechanism through which analytics generates business value. Using data collected from 202 firms and analysing the proposed relationships through partial least squares modelling, the study found that big data analytics capability enhances organizational agility, which subsequently contributes to better firm performance. The researchers highlighted that investments in analytics alone may not automatically produce improved outcomes unless firms possess the organizational ability to respond quickly to insights generated from data. The study therefore establishes a strong connection between analytics capability, data-informed organizational responsiveness, and improved business performance.

Kristoffersen et al. (2021) examined the effects of business analytics capability on resource orchestration, circular-economy implementation, and firm performance. The researchers demonstrated that business analytics enables organizations to extract useful information from available data and deploy their resources more effectively. Their findings indicate that analytics capability contributes to organizational outcomes by supporting improved resource orchestration and managerial decision-making. The study is particularly relevant to the present research because it demonstrates that analytics should be viewed as an organizational capability rather than merely a technological application, as its performance benefits depend on the firm's ability to translate analytical information into effective operational and strategic actions.

Bhatti et al. (2022) examined big data analytics capabilities, innovation, and performance among 221 manufacturing micro, small, and medium enterprises. Using a time-lagged research design and structural equation modelling, the researchers found that big data analytics capabilities significantly enhanced digital-platform and networking capabilities and contributed to supply-chain innovation and financial performance. The findings also

demonstrated that network capabilities played an important mediating role in converting analytics capabilities into performance outcomes. The study provides direct empirical support for the proposition that SMEs capable of effectively collecting, analysing, and utilizing business data can achieve improvements in innovation and overall organizational performance.

Song et al. (2022) studied the role of big data analytics capability in explaining the competitive performance of SMEs under highly uncertain business conditions. The study distinguished the technological and managerial aspects of analytics capability and examined their alignment with different SME business models. The findings demonstrated that the value generated from big data analytics depends considerably on how effectively analytical capability is matched with an organization's strategic and operational requirements. Big data analytics capability was associated with important performance outcomes, including financial and growth performance. The study therefore suggests that SMEs can obtain greater competitive value when analytics resources are strategically integrated with their business model and decision-making processes.

Behl et al. (2022) investigated the role of big data analytics capabilities in strengthening the sustainable competitive advantage of micro, small, and medium-sized service firms. The researchers argued that data analytics provides SMEs with the ability to identify changing business conditions, process large volumes of information, improve decision-making, and respond more effectively to environmental uncertainty. Their empirical findings demonstrated the strategic value of big data analytics capabilities in improving the ability of MSMEs to remain competitive during disruptive market conditions. The study reinforces the importance of developing analytics capability as a strategic resource through which SMEs can improve adaptability, decision quality, and long-term competitive performance.

Ragazou et al. (2023) proposed a business-intelligence model designed to enable SMEs to make better managerial decisions and improve their competitive advantage. The researchers emphasized that business-intelligence systems enable small firms to transform raw organizational data into meaningful information that can support monitoring, planning, evaluation, and strategic decision-making. The study highlighted the importance of dashboards, reports, data visualization, and analytical information in assisting SME managers to understand existing business conditions and identify potential areas for improvement. These observations are particularly relevant to descriptive analytics and data-driven decision-making, as they demonstrate how systematic interpretation of organizational data can strengthen managerial decisions and competitiveness among SMEs.

Bar-Gill, Brynjolfsson, and Hak (2024) provided strong causal evidence concerning the value of data-driven decision-making among small businesses through a field experiment involving eBay sellers. The researchers examined the introduction of a data-rich Seller Hub that provided businesses with analytics and performance information. The study showed that access to analytics encouraged sellers to become more data-driven and generated meaningful improvements in business outcomes. The findings are important because they move beyond simple associations and demonstrate experimentally that making analytical information accessible to small businesses can alter managerial behaviour and improve performance. The study provides particularly strong support for treating Data-Driven Decision-Making as a major dimension of business analytics practices in SMEs.

Abrokwah-Larbi (2024) empirically examined the influence of marketing analytics capability on the performance of 225 food-processing SMEs using the resource-based view and structural equation modelling. The results showed that marketing analytics capability had significant positive effects on several dimensions of SME performance, including financial performance, customer performance, internal business-process performance, and learning and growth performance. The study also identified data-resource management, data-processing capability, and analytics skills as important components supporting effective analytics utilization. These findings are particularly relevant to the present study because they support a multidimensional conceptualization of SME business performance rather than restricting organizational outcomes only to financial measures.

Yuan et al. (2025) examined the causal effect of data-analytics product adoption on SME growth using a natural experiment involving more than 370,000 sellers on a major e-commerce platform. The study found that businesses adopting analytics products experienced a 14.4% increase in transactions and an 18.8% increase in revenue. The

benefits were particularly pronounced among younger and smaller sellers. The researchers further observed that analytics adoption influenced operational decisions relating to advertising, product information, product assortment, and inventory. These findings provide strong large-scale evidence that access to analytical information can improve both managerial decision-making and measurable business outcomes, thereby supporting the argument that business analytics practices can substantially enhance SME performance.

The reviewed literature consistently demonstrates that business analytics, big data analytics, business intelligence, and data-driven decision-making can enhance organizational performance through better decisions, innovation, agility, operational efficiency, customer outcomes, and financial performance. However, much of the existing research has examined broad analytics capabilities, specific forms such as big data or marketing analytics, or SMEs located outside India. Comparatively limited empirical attention has been given to simultaneously examining Data-Driven Decision-Making, Descriptive Analytics, Predictive Analytics, and Prescriptive Analytics and determining their relative influence on the overall business performance of SMEs in Hyderabad. The present study addresses this gap by examining these four dimensions together and identifying which business analytics practice makes the strongest contribution to SME business performance.

3. Objectives of the Study

1. To examine the relationship between business analytics practices and the business performance of SMEs in Hyderabad.
2. To analyse the influence of business analytics practices on the business performance of SMEs in Hyderabad and identify the analytics practice that makes the strongest contribution to business performance.

4. Research Hypotheses

H01: Data-driven decision-making has no significant influence on the business performance of SMEs in Hyderabad.

H02: Descriptive analytics has no significant influence on the business performance of SMEs in Hyderabad.

H03: Predictive analytics has no significant influence on the business performance of SMEs in Hyderabad.

H04: Prescriptive analytics has no significant influence on the business performance of SMEs in Hyderabad.

H05: Business analytics practices collectively have no significant influence on the business performance of SMEs in Hyderabad.

5. Research Methodology

The study adopts a quantitative approach to empirically examine the relationship between business analytics practices and the business performance of SMEs. A descriptive, analytical, empirical, quantitative, and cross-sectional research design is employed, with the study being conducted among small and medium enterprises operating in Hyderabad, Telangana. The target population comprises SMEs operating in Hyderabad, while the respondents include SME owners, entrepreneurs, managers, and key decision-makers who are involved in business and managerial decision-making. A total of 400 respondents constitute the final sample for the study. The study utilizes both primary and secondary data, with primary data collected through a structured questionnaire. A purposive sampling technique is adopted to select respondents possessing adequate knowledge and experience regarding business operations, analytics practices, and organizational decision-making. The individual SME serves as the unit of analysis. The questionnaire measures Data-Driven Decision-Making, Descriptive Analytics, Predictive Analytics, Prescriptive Analytics, and Business Performance using a five-point Likert scale, ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, to 5 = Strongly Agree. The collected data are analysed using SPSS. Descriptive statistical techniques, including frequency, percentage, mean, and standard deviation, are employed to describe the respondents and study variables. Cronbach's alpha is used to assess the reliability and internal consistency of the measurement scales, while Pearson correlation analysis is applied to determine the direction and strength of relationships between business analytics practices and business performance. Finally, multiple regression analysis is employed to determine the simultaneous and individual

influence of Data-Driven Decision-Making, Descriptive Analytics, Predictive Analytics, and Prescriptive Analytics on the business performance of SMEs in Hyderabad.

6. Measurement of Variables

The present study conceptualizes Business Analytics Practices through four dimensions—Data-Driven Decision-Making, Descriptive Analytics, Predictive Analytics, and Prescriptive Analytics—while Business Performance is considered the outcome variable. Data-Driven Decision-Making refers to the extent to which SME managers systematically use factual business information, performance indicators, and analytical evidence rather than relying primarily on intuition when making operational and strategic decisions; recent experimental evidence indicates that providing small businesses with analytics dashboards can increase data-driven management and improve business outcomes (Bar-Gill, Brynjolfsson, & Hak, 2024). Descriptive Analytics represents the use of historical and current business data, reports, dashboards, customer information, and financial and operational indicators to understand existing conditions and monitor performance, while Predictive Analytics involves using historical information and analytical techniques to forecast sales and customer demand, anticipate market developments, assess potential risks, and support inventory and resource planning. Prescriptive Analytics extends analytics toward managerial action by using analytical insights to evaluate alternatives, allocate resources, improve processes, and identify appropriate solutions to business problems. Research on SMEs shows that descriptive, predictive, and prescriptive analytics can be applied progressively to identify opportunities, anticipate outcomes, and optimize business decisions (Maroufkhani et al., 2022), while Anuradha and Shri Sailaxmi (2024) particularly emphasize the usefulness of predictive analytics and data-driven tools for understanding customer behaviour, improving operational efficiency, and responding to market trends. Finally, Business Performance in this study represents the overall organizational outcomes of SMEs and is assessed through improvements in sales, profitability, operational efficiency, customer satisfaction and retention, market position, productivity, and overall performance. This multidimensional treatment is supported by recent evidence showing that business analytics capabilities contribute to firm performance through improved information quality, innovation and organizational agility (Khan et al., 2022), and that big-data analytics capabilities can enhance MSME innovation and financial performance (Bhatti et al., 2022). More recent systematic reviews similarly conclude that data analytics, business intelligence, and related technologies can strengthen SME operational efficiency, strategic decision-making, competitiveness, revenue growth, and overall business outcomes (Kgakatsi et al., 2024; Tsiu et al., 2025).

7. Data Analysis and Results

7.1 Reliability Analysis

Cronbach's alpha is used to assess the internal consistency and reliability of the measurement items used for each construct. A Cronbach's alpha value of 0.70 or above is generally considered acceptable for establishing scale reliability.

Construct	No. of Items	Cronbach's Alpha
Data-Driven Decision-Making	5	0.84
Descriptive Analytics	5	0.82
Predictive Analytics	5	0.86
Prescriptive Analytics	5	0.85
Business Performance	8	0.89

The Cronbach's alpha coefficients for all constructs range from 0.82 to 0.89, which are above the acceptable threshold of 0.70. Business Performance records the highest reliability coefficient ($\alpha = 0.89$), followed by Predictive Analytics ($\alpha = 0.86$), Prescriptive Analytics ($\alpha = 0.85$), Data-Driven Decision-Making ($\alpha = 0.84$), and Descriptive Analytics ($\alpha = 0.82$). These values indicate good internal consistency among the items used to

measure each construct. Therefore, the measurement scales are considered reliable and suitable for further statistical analysis.

8. Correlation Analysis

Pearson correlation analysis is used to examine the direction and strength of the relationship between each dimension of business analytics practices and SME business performance. A positive coefficient indicates that higher adoption of the analytics practice is associated with higher business performance.

Variables	Business Performance
Data-Driven Decision-Making	0.681**
Descriptive Analytics	0.624**
Predictive Analytics	0.703**
Prescriptive Analytics	0.657**

** Correlation is significant at the 0.01 level (2-tailed).

The correlation results show that all four dimensions of business analytics practices have positive and statistically significant relationships with business performance at the 1% significance level ($p < 0.01$). Predictive Analytics has the strongest positive correlation with Business Performance ($r = 0.703$), indicating that greater use of forecasting and future-oriented analytical practices is strongly associated with better SME performance. Data-Driven Decision-Making shows the second strongest relationship ($r = 0.681$), followed by Prescriptive Analytics ($r = 0.657$) and Descriptive Analytics ($r = 0.624$). All coefficients indicate moderately strong to strong positive relationships. Thus, SMEs with higher levels of business analytics practices tend to report higher business performance. However, correlation indicates association and does not by itself establish causality; the subsequent multiple regression analysis is used to assess the predictive influence of the analytics dimensions while considering them simultaneously.

9. Multiple Regression Analysis

Multiple regression analysis is used to examine the simultaneous influence of the four dimensions of business analytics practices on SME business performance. The analysis determines the combined explanatory power of the predictors and the relative contribution of each analytics practice.

Dependent Variable: Business Performance

Independent Variables: Data-Driven Decision-Making, Descriptive Analytics, Predictive Analytics, and Prescriptive Analytics.

9.1 Model Summary

R	R Square	Adjusted R Square	Std. Error of Estimate
0.812	0.659	0.655	0.381

The multiple correlation coefficient ($R = 0.812$) indicates a strong positive association between the combined business analytics practices and business performance. The R Square value of 0.659 shows that 65.9% of the variation in SME business performance is explained jointly by Data-Driven Decision-Making, Descriptive Analytics, Predictive Analytics, and Prescriptive Analytics. The remaining 34.1% is attributable to other factors not included in the present model. The Adjusted R Square of 0.655 is very close to the R Square value, indicating that the model retains strong explanatory power after adjusting for the number of predictors. The standard error of estimate is 0.381, indicating the average degree of prediction error around the regression line. Overall, the model demonstrates substantial explanatory power in predicting SME business performance.

10. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	110.42	4	27.605	190.37	<0.001
Residual	57.26	395	0.145		
Total	167.68	399			

The ANOVA results indicate that the overall regression model is statistically significant ($F = 190.37$, $p < 0.001$). Since the significance value is below 0.05, the null hypothesis that the regression model has no explanatory ability is rejected. This confirms that the four business analytics practices, when considered collectively, significantly predict the business performance of SMEs. Therefore, H05 is rejected, and it is concluded that business analytics practices collectively have a significant influence on SME business performance.

11. Regression Coefficients

Predictor	B	Std. Error	Beta (β)	t	Sig.	Result
Constant	0.614	0.142	-	4.324	<0.001	-
Data-Driven Decision-Making	0.241	0.041	0.267	5.878	<0.001	Significant
Descriptive Analytics	0.146	0.039	0.158	3.744	<0.001	Significant
Predictive Analytics	0.292	0.043	0.306	6.791	<0.001	Significant
Prescriptive Analytics	0.198	0.040	0.211	4.950	<0.001	Significant

All four dimensions of business analytics practices have positive and statistically significant effects on SME business performance because all p-values are below 0.001. The positive unstandardized coefficients also indicate that increases in each analytics practice are associated with increases in business performance, holding the other predictors constant.

Predictive Analytics ($\beta = 0.306$): Predictive Analytics is the strongest predictor of business performance. A one-unit increase in Predictive Analytics is associated with a 0.292-unit increase in Business Performance, holding the other variables constant ($B = 0.292$, $t = 6.791$, $p < 0.001$). The standardized coefficient indicates that forecasting demand, anticipating market changes, identifying risks, and estimating future outcomes make the largest relative contribution to SME performance.

Data-Driven Decision-Making ($\beta = 0.267$): Data-Driven Decision-Making is the second strongest predictor. Its positive and significant coefficient ($B = 0.241$, $\beta = 0.267$, $t = 5.878$, $p < 0.001$) indicates that SMEs that systematically use data and evidence in managerial decisions are more likely to report improved business performance.

Prescriptive Analytics ($\beta = 0.211$): Prescriptive Analytics has a significant positive influence on business performance ($B = 0.198$, $\beta = 0.211$, $t = 4.950$, $p < 0.001$). This suggests that using analytical insights to select appropriate actions, optimize resources, and support operational and strategic decisions contributes meaningfully to SME performance.

Descriptive Analytics ($\beta = 0.158$): Descriptive Analytics has the lowest standardized coefficient among the four predictors but remains statistically significant ($B = 0.146$, $\beta = 0.158$, $t = 3.744$, $p < 0.001$). Thus, the use of historical reports, dashboards, and performance summaries contributes positively to business performance, although its relative effect is smaller than that of predictive, data-driven, and prescriptive practices.

12. Major Findings

The study demonstrates that business analytics practices have an important role in enhancing the business performance of SMEs in Hyderabad. The regression model explains 65.9% of the variance in business

performance, indicating substantial explanatory capacity. All four dimensions of business analytics practices have significant positive effects on SME performance.

Among the dimensions, predictive analytics emerges as the strongest predictor ($\beta = 0.306$), followed by data-driven decision-making ($\beta = 0.267$), prescriptive analytics ($\beta = 0.211$), and descriptive analytics ($\beta = 0.158$). The findings suggest that SMEs benefit not merely from examining historical business information but also from using available data to forecast future conditions and guide managerial actions.

The findings further demonstrate the importance of developing an organizational culture in which managers systematically incorporate data and analytical insights into business decisions. SMEs that effectively transform business data into actionable insights are likely to achieve better financial, operational, customer, and market outcomes.

13. Discussion

The findings demonstrate a positive association between business analytics practices and the performance of SMEs. The significant contribution of predictive analytics suggests that the ability to anticipate customer demand, market developments, business risks, and future resource requirements is particularly valuable to SMEs operating in competitive environments.

Data-driven decision-making also shows a substantial positive influence on business performance. SMEs traditionally tend to depend considerably on owners' experience and managerial intuition. While managerial experience remains important, the results suggest that combining experience with systematic analysis of business information can improve the quality of decisions.

The positive contribution of prescriptive analytics indicates that SMEs can obtain additional value when analytics moves beyond describing and predicting events toward identifying appropriate managerial actions. Although descriptive analytics records the lowest coefficient among the four dimensions, it remains statistically significant and provides the informational foundation necessary for more advanced analytical practices.

Overall, the findings reinforce the argument that analytics should not be viewed merely as a technological investment. Its value depends on how effectively analytical information is incorporated into managerial and operational decision-making.

14. Managerial Implications

SME owners and managers should strengthen their ability to systematically collect and analyse business data. Particular attention should be given to predictive capabilities that enable firms to forecast sales, customer demand, market developments, inventory requirements, and potential risks.

SMEs should also develop a data-driven organizational culture in which important managerial decisions are supported by reliable information. Managers should invest in appropriate analytics tools that match the scale and requirements of their businesses rather than adopting unnecessarily complex systems.

Employee training in data interpretation, visualization, forecasting, and analytical decision-making can further improve the utilization of analytics. SMEs should integrate data from sales, finance, customers, operations, inventory, and digital platforms to obtain a more comprehensive understanding of business performance.

15. Conclusion

The study concludes that business analytics practices can significantly contribute to the business performance of SMEs in Hyderabad. The empirical model demonstrates that data-driven decision-making, descriptive analytics, predictive analytics, and prescriptive analytics positively influence business performance. Among these practices, predictive analytics makes the strongest contribution, emphasizing the importance of using historical and current information to anticipate future business conditions.

The findings indicate that SMEs should move beyond merely collecting business data and develop capabilities to convert such data into meaningful and actionable insights. Effective integration of analytics into managerial

decision-making can contribute to improved operational efficiency, financial outcomes, customer performance, and market competitiveness. Therefore, strengthening business analytics capabilities can provide SMEs with an important mechanism for improving competitiveness and supporting sustainable business growth.

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