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Big data analytics as a strategic enabler of business intelligence: Evidence from a mixed-method study

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Abstract
Contemporary organizations work in data-heavy environments that increasingly need data-driven frameworks to support management thinking and strategic actions. This study looked at how Big Data Analytics (BDA) helps improve Business Intelligence (BI) capabilities and influences decision-making processes in organizations. A mixed methods research design was used, combining qualitative data from semi-structured interviews with analytics practitioners and decision-makers, along with quantitative evidence from a structured survey conducted across various organizational functions. The findings show that BDA significantly improves decision accuracy, operational efficiency, and strategic responsiveness, mainly through real-time processing and predictive analysis. The study also identified barriers to effective BDA use, such as problems with data integration, lack of governance structured, unresolved ethical issues, and notable skill gaps in analytics. This research added to existing literature by confirming the strategic role of BDA within BI systems and providing practical recommendations for organizations that want to use analytics to gain a competitive edge.

Keywords: Big data analytics, business intelligence, organizational decision-making, data-driven strategy, mixed-methods research

Introduction

The ongoing digitalization of business operations has led to a rapid increase in the amount, speed, and variety of data flowing through organizational systems. This surge has significantly changed how managers think, moving away from intuition-based methods toward models, evidence from detailed data processing guides both daily operations long-term strategies. Big Data Analytics (BDA) refers to the use of advanced computing and statistical methods on large and varied datasets to uncover useful patterns, trends, and relationships that help in making informed decisions (Hariri *et al*., 2019) [11]. Similarly, Business Intelligence (BI) includes the collection of tools, processes, and practices that convert raw data into information relevant for decision-making by managers (Trieu, 2017) [28].

The rise of Web 2.0 technologies and the growing number of digital interaction channels have significantly boosted the rapid increase of both automated and human-generated data (Sun *et al*., 2018) [26]. In this environment, more organizations are relying on various, constantly changing BDA methods to improve their BI abilities and support better decision-making (Ain *et al*., 2019) [22]. Integrating BDA into BI systems allows for real-time data processing, predictive modelling, and improved visualization. Together, these elements enhance decision quality and lead to noticeable gains in organizational performance (Niu *et al*., 2021) [18]. However, many organizations still struggle to turn their analytics into real BI results. These challenges mainly come from disconnected data systems, poor data quality, ethical and regulatory issues, and a lack of analytical skills among employees (Saggi & Jain, 2018) [24].

Current BDA research has focused mainly on technical aspects, leaving a significant gap in understanding its organizational and management effects, especially regarding BI decision-making. This study fills that gap through mixed-methods investigation that explored how BDA strengthens BI capabilities, examines its impact on strategic and operational decision-making, identifies key implementation challenges, and offers practical recommendations for organizations aiming to get the most out of their analytics investments.

The study is structured around three primary research objectives:

- To examine the functional role of Big Data Analytics in augmenting organisational Business Intelligence systems
- To assess the influence of BDA-enabled BI on the quality and effectiveness of organisational decision-making
- To delineate the principal challenges confronting organizations in the practical implementation of BDA initiatives

Conclusion

This study provided mixed-methods evidence that Big data Analytics significantly improved Business Intelligence capabilities and organization decision-making quality when used in a supportive context with good governance, skilled analytical personnel, and an open organizational culture. The qualitative findings, based on detailed interviews with practitioners, support and expand the existing literature by offering practical insights into both the transformative potential and ingoing limitations of BDA-enabled BI. The quantitative survey results back up these conclusions, showing widespread acknowledgment of BDA`s ability to enhance customer service, decision-making quality, and competitive positioning. A key finding of the research is that the strategic value of BDA is not automatic or solely linked to technological sophistication. Instead, it depends on the organization`s ability to manage, interpret, and apply analytical insights within clear decision-support frameworks. Organizations that invest similarly in their

technology, governance, and human resources will be best positioned to achieve the full benefits of BDA-enabled BI and maintain the competitive advantages that these capabilities provide. As data environments become increasingly complex and the demand for analytical intelligence complex and the demand for analytical intelligence grows, the integrated perspective presented by this study which included technology, governance, people and culture provided a solid theoretical empirical basis for investing in strategic analytics.

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