
The role of business intelligence in enhancing the quality of decision-making

Boudraa Oumnia

Smart City Geomatics and Governance Lab, university of Msila (Algeria)

Oumnia.boudraa@univ-msila.dz

Received: 26/01/2026

Accepted: 24/03/2026

Published: 31/05/2026

Abstract:

Business Intelligence (BI) plays a pivotal role in enabling timely, accurate, and fact-based decisions that enhance organizational efficiency and competitive advantage. Yet, BI tools alone are not enough; their effectiveness depends on qualified experts who can translate analytical insights into actionable guidance for decision-makers. When organizations successfully balance analytical rigor with managerial needs, decision quality improves significantly. Moreover, motivating managers to read, create, and share BI reports is essential for fostering a data-driven culture and moving away from intuition-based decisions. Ultimately, BI becomes valuable only when actively used across all decision-making levels

Keywords Business Intelligence; decision-making; analytics.

Jel Classification Codes: 033, D01.

*Corresponding author.

Introduction :

Business Intelligence (BI) has become a strategic cornerstone for modern organizations seeking to enhance the quality of their decision-making processes. provides accurate, timely, and actionable insights that support informed judgments and strengthen competitive advantage. By transforming raw data into meaningful indicators, BI enables decision makers to anticipate future trends, understand economic conditions, and evaluate their institution's position relative to competitors.

At the same time, the growing reliance on analytical tools reinforces the importance of user-friendly BI systems that motivate managers to actively read, create, and share analytical reports. When trust in data quality is established and BI tools are well-integrated, decision makers become more engaged in evidence-based analysis driven not only by the pursuit of accuracy but also by intrinsic and extrinsic rewards linked to improved performance outcomes. Consequently, BI does not merely provide information; it fosters a data-driven culture in which motivated decision makers leverage insights to enhance effectiveness, collaboration, and overall organizational success.

The Research Problem Statement:

Despite significant technological advancements and increased investment in Business Intelligence (BI) systems across modern organizations, many of these organizations continue to face ongoing challenges in:

- Translating Big Data into high-quality decisions with clear, measurable impact.
- Ensuring that decisions made are fully reliant on objective analysis and insights extracted from BI systems, rather than heavily depending on personal experience or intuition.
- The lack of a clear framework that precisely and measurably illustrates how the effective utilization of Business Intelligence tools (such as dashboards, predictive analytics, and reporting) affects decision quality indicators (such as decision accuracy, speed, and success rate).

Thus, the core Research Problem crystallizes into the following main question:

"What is the actual, tangible role of Business Intelligence systems in enhancing the quality and effectiveness of decisions made within organizations, and how can these systems bridge the gap between data availability and the ability to optimally utilize it in the strategic and operational decision-making process?"

Sub-Questions :

- What is Business Intelligence (BI)?

- What are the key components of a Business Intelligence (BI) system that directly impact the quality of the information provided to decision-makers?

Research Hypotheses Research

Major Hypothesis:

There is a statistically significant and positive impact of Business Intelligence (BI) systems on enhancing the quality and effectiveness of decisions made within organizations.

Sub-Hypotheses:

Sub-Hypothesis 1:

There is a statistically significant relationship between the effectiveness of the key components of a Business Intelligence system (especially Data Warehouses and ETL/ELT processes) and the quality of the information provided to the decision-maker (in terms of accuracy, completeness, and timeliness).

Sub-Hypothesis 2:

The increase in the quality of information extracted from Business Intelligence systems directly contributes to the improvement of decision quality indicators, specifically in decision-making speed and the reduction of the error rate.

Aim of study:

This article aims to clarify and analyze the pivotal role of Business Intelligence (BI) as a strategic tool within organizations. It primarily seeks to demonstrate how BI systems can enhance the quality and effectiveness of decisions made by providing accurate, processed, and analyzed data in a timely manner, enabling managers and decision-makers to transform raw data into actionable insights that support both strategic and operational planning.

Significance of the study:

The article's significance lies in highlighting the crucial role of Business Intelligence (BI) in shifting the decision-making process from intuition to data-driven accuracy. It demonstrates how BI not only improves the quality of strategic decisions and mitigates risks, but also grants the organization a competitive advantage by providing fast and deep insights, ultimately leading to enhanced operational efficiency and increased profitability.

Reasons for Choosing the Topic

The motivations for selecting this vital topic stem from the following points:

- **Strategic Importance of Business Intelligence (BI):** In the current era, Business Intelligence (BI) is an essential, indispensable pillar for growth. Therefore, the study aims to affirm its status as a strategic tool rather than merely a technical system, justifying the necessity of researching how this tool transforms administrative processes.
- **Responding to the Complexities of the Current Business Environment:** The business environment is characterized by volatility, complexity, and the flow of Big Data. This massive influx makes the decision-making process challenging for management. Consequently, the research seeks to clarify how BI can simplify this complexity and provide organized information to support critical decisions.
- **The Need to Improve Decision Quality:** A large number of organizations suffer from poor or delayed decisions, which cost them significant resources. This research focuses on addressing this problem by analyzing the BI mechanisms that reduce bias, enhance transparency, and improve the success rate of decisions made.

2. Business intelligence

Business intelligence involves gathering large volumes of data, analyzing them, and delivering high-quality reports that distill the core insights tied to business activities. This process equips management with the information needed to make informed day-to-day decisions (Abusweilem & Abualoush, S., 2019). Stackowiak describes Business Intelligence as the practice of collecting extensive data, examining it, and producing concise, high-level reports that capture its essential insights. These reports form a foundation for business actions and support management in making key day-to-day decisions (Stackowiak, 2007.).

Some management scholars (Martin R.L. & Smith T.G., 2017) contend that management should be treated as a science, insisting that rigorous data analysis must underpin business decisions. In a survey conducted by EY, 81% of senior executives agreed that “data should lie at the heart of all decision-making,” prompting EY to assert that big data has the potential to eliminate reliance on intuition-based choices (Martin & Smith, T. G., 2017). According to (Alzghoul & others, 2022), BI is the process of collecting, processing, and distributing information in order to minimize uncertainty during decision-making. BI is a technique used to improve business performance by providing strong support for decision-making and ensuring access to actionable information. In essence, BI tools are technologies that enhance operational efficiency by increasing the value and usability of information (Alyan, 2022). Today, BI is no longer viewed as an emerging technology; instead, it is regarded as a comprehensive solution for organizations that prioritize their needs as a driving force for technological innovation. Consequently, identifying and addressing critical business issues has become one of the main challenges for BI systems in delivering meaningful business value. BI is described as incorporating a well-designed data warehouse and a

responsive component that monitors time-sensitive operations, allowing tactical and operational decision-makers to adjust their actions in alignment with the company's overall strategy (Božič & Dimovski, V. , 2019.)(

2.1 Tools for Business Intelligence:

The main tools used in Business Intelligence include:

2.1.1. OLAP (Online Analytical Processing)

OLAP allows business users to explore data with advanced tools that support multidimensional navigation, such as time and hierarchical views (G., 2007). It provides summarized, multidimensional business information used for reporting, analysis, business modeling, and planning optimization. OLAP techniques work efficiently with data warehouses and data marts designed for modern enterprise intelligence systems (Gratton, 2012). These systems handle queries related to trend identification and critical-factor analysis. Reporting software, in turn, generates aggregated data views that help management stay informed about organizational performance.

2.1.2..Additional BI Tools:

BI also relies on a range of tools for data storage and analysis, including data mining, data warehouses, decision support systems, forecasting tools, document warehouses and document management systems, mapping and visualization technologies, and knowledge management solutions (Hoque & all, 2020). This category further includes dashboards, geographic information systems, trend analysis tools, SaaS-based BI platforms, advanced analytics, and predictive/forecasting analytics that use statistical methods to generate accurate predictions (Ranjan, 2009.)(

2.1.3. Corporate Performance Management (Portals, Scorecards, Dashboards:)

This category consists of frameworks that integrate various BI components to create a unified performance overview (Turban, Ramesh Sharda, Jay E. Aronson, & David King, 2008). For example, a balanced scorecard presents portlets that combine financial indicators with organizational learning and growth measures (Chen & Lin, Z., 2021). Real-time BI enhances this process by enabling immediate delivery of metrics through email, messaging tools, or interactive displays (Abimannan, 2020.)(

2.1.4. Data Warehouses and Data Marts:

These are critical parts of BI systems. They are subject-oriented, integrated, and support the movement and refinement of data across the enterprise through integration, cleaning, aggregation, and querying tasks (Alzghoul & others, 2022). They often store operational data—an updatable collection of integrated information—used for

broad tactical decision-making (Gratton, 2012). This type of data is "live" and continuously updated, with only limited historical content maintained (G., 2007).

2.1.5.Data Sources:

Data feeding BI systems can originate from historical records, operational systems, external databases, market research firms, or online platforms, including data warehouses already in place (Chong, 2019). These data sources may exist in relational databases or other structures supporting business applications (Yeung, 2021). They can also be stored across different platforms and include both structured formats (such as tables and spreadsheets) and unstructured formats (such as text files, images, and multimedia content).

3. FUTURE OF BUSINESS INTELLIGENCE

In today's fast-changing business environment, consumers expect services that are both fast and efficient (Kubinaa, Komana, G., & Kubinovab, I. , 2015). To stay competitive, companies must meet or even surpass these expectations. As a result, organizations are increasingly relying on BI systems to anticipate trends and future developments (Alzghoul & others, 2022).

Users of BI tools are pushing for real-time capabilities—or technologies that come very close—especially for use in frontline operations, where access to the most current information is essential, much like tracking stock prices online (Chong, 2019). In other words, weekly or monthly analyses are no longer adequate (Turban, Ramesh Sharda, Jay E. Aronson, & David King, 2008). In the near future, businesses will depend on real-time data just as easily as they access information on the internet with a single click (Alyan, 2022).

The coming era will also feature more democratized information, allowing individual users to view performance data relevant to their specific areas. To meet rising consumer expectations, BI tools will need to advance accordingly (Abimannan, 2020). Ultimately, businesses must accelerate their service delivery to remain competitive and maintain relevance in the market.

3.1.REASONS FOR ADOPTING BUSINESS INTELLIGENCE

Within universities, BI supports precise and well-informed decision-making, making it a potential tool for gaining competitive advantage (Božič & Dimovski, V. , 2019). This is especially true for institutions that draw insights from environmental indicators, enabling them to accurately forecast future trends and economic conditions (Ranjan, 2009). When BI is collected, analyzed, and applied effectively, it guides decisions that ultimately enhance the timeliness and quality of the information produced (G., 2007).

This advantage is comparable to leading a race with a clear path ahead. BI provides visibility into an institution's standing relative to competitors, shifts in customer behavior and spending patterns, organizational capabilities,

market dynamics, emerging trends, demographic and economic data, as well as the broader social, regulatory, and political landscape.

3.2.Rational Decision-Making

Herbert A. Simon's decision model (Simon, 1960) describes decision-making as a process driven by information and rational analysis (Kahneman, 2002). His model is composed of three main stages:

3.3.Intelligence Stage (Kielstra, 2007):

This phase involves recognizing that a problem exists. Gathering sufficient information is essential here, as it enables the identification and clear definition of the issue.

3.4.Design Stage (Pranjic, 2011):

During this stage, possible solutions are developed and additional information is often required. A model of the problem is constructed, alternative courses of action are identified, and potential outcomes are anticipated.

3.5.Choice Stage (Alzghoul & others, 2022):

The best alternative is selected, and a plan of action is created. At this point, a Group Decision Support System (GDSS) may be used to ensure broad participation and collaboration in choosing the most suitable option. This stage is closely linked to the Design stage and should follow smoothly from it.

Following these three stages, a final implementation and testing phase is carried out.

Another decision-making approach developed after extensive research (Vugec, Bach, M. P., & Jaklič, J., 2018) emphasizes the value of using a structured checklist to improve decision quality and outcomes. According to this research, managers who consistently use such checklists save an average of 10 hours of discussion time, make decisions ten days faster, and improve the quality of their outcomes by 20%. As with other rational models, having sufficient information remains a critical requirement in this decision-making process (Alzghoul & others, 2022).

Decision-making has undergone substantial transformation over time (Gauzelin & Bentz, H., 2017), largely due to rapid and dramatic shifts in the business environment. To manage these evolving conditions, managers who rely on objective and quantitative analysis must also incorporate qualitative factors and exercise subjective judgment (Chong, 2019).

All employees make avoidable errors—not because they lack intelligence, but because of the inherent limitations of human cognition. Instead of attempting to change how the brain functions, managers should act as “architects,” shaping the decision-making environment to encourage better choices (Gauzelin & Bentz, H., 2017).

Mintzberg (1973) identifies ten managerial roles grouped into three categories: interpersonal, informational, and decisional (Vugec, Bach, M. P., & Jaklič, J., 2018). To perform effectively across all these roles, a manager must be well-informed and capable of quickly leveraging available data (Božič & Dimovski, V. , 2019). Reliable information can be used with confidence to guide managerial actions. Within the informational category, the monitor role is essential, as it involves collecting information from internal operations and external events, observing trends, analyzing ideas, and understanding pressures (Kielstra, 2007) . The disseminator and spokesperson roles further emphasize the importance of gathering and sharing information.

Obtaining, processing, and distributing the information required to achieve organizational goals are among a manager's most critical responsibilities (Chong, 2019). Dependence on high-quality information is especially vital in the "data gathering" stage, the second step of the decision-making process (Yeung, 2021). If the data collected is flawed, the entire decision-making process becomes compromised, leading to decisions based on inaccurate inputs (Turban, Ramesh Sharda, Jay E. Aronson, & David King, 2008).

Behavioral scientists, decision researchers, and psychologists note that two systems of information processing shape decision-making (Kahneman, 2002):

System 1: fast, automatic, intuitive, and emotionally driven; oriented toward immediate and concrete outcomes.

System 2: slow, analytical, and deliberate; focused on long-term strategic goals.

Each system has its strengths and limitations, and both can be applied—independently or together—to achieve desired results.

4.Data – Information – Intelligence – Decision Quality

The modern business environment is characterized by the high speed, great variety, and enormous volume of data being generated (Savita, 2022). With new methods and sources for measuring data, organizations and decision-makers must handle increasingly large quantities of information produced through routine operations (Mohamad, 2018). The usefulness of data grows when both the amount of available data and the capacity to process it increase (Božič & Dimovski, V. , 2019). However, when processing resources are insufficient to handle this data efficiently, its value declines (Abusweilem & Abualoush, S., 2019).

As data continues to accumulate without corresponding improvements in processing capabilities, its usefulness diminishes even further (Chong, 2019). Decision-makers must devote more time to examining the data, slowing down the organization's ability to act promptly (Turban, Ramesh Sharda, Jay E. Aronson, & David King, 2008). A lack of data control develops, leading to gradual disconnection from the information (Yeung, 2021). Consequently, data integrity and value erode. When the marginal value of new data reaches zero, data shifts from

being a valuable asset to becoming a burden, raising the risk of poor decisions and lengthening both decision-making and reaction times (Stackowiak, 2007). Introducing BI solutions can enhance employee performance, improve access to decision-oriented reports, and elevate the overall quality of managerial decisions through clear and intuitive visual outputs (Abimannan, 2020).

The formerly dominant reliance on intuition and post hoc information in decision-making has now been replaced by informed choices supported by near–real-time or real-time data. As organizational decisions grow increasingly data-driven, many companies have recognized data governance as a strategic priority (Savita, 2022). Decision-makers face constant pressure to choose correctly, making the steady flow of timely and relevant data essential (Martin & Smith, T. G., 2017).

5. Decision Makers and BI Experts Interaction

The range of outputs that decision-makers can derive from a BI system is extensive. A key factor in ensuring the success of any BI initiative is strong collaboration between decision-makers and BI analysts (Chong, 2019). One of the primary goals of BI is to support managers in improving the quality of their decisions by combining technological capabilities with rich data and analytical insight (Kielstra, 2007).

A crucial step in the decision-making process is accurately defining the decision problem or question that needs to be addressed. Analysts must possess strong analytical knowledge in order to deliver the insights required. However, highly technical analytical outputs are often difficult for decision-makers to interpret, which reduces their usefulness and applicability (Martin & Smith, T. G., 2017). Because decision-makers are not expected to be analytics experts, complex or unclear analytical products may be undervalued or ignored, leading managers to fall back on intuition rather than data-driven insights (Pranjic, 2011).

Therefore, analysts must produce insights and decision-support materials that are easy for decision-makers to understand and aligned with their expectations (Ranjan, 2009). Analysts must remain transparent, maintain alignment with managerial objectives, and apply rigorous analytical procedures to ensure consistency, traceability, and reliability in their work (Abusweilem & Abualoush, S., 2019).

At the same time, decision-makers need a basic level of analytical literacy (Alzghoul & others, 2022). They must be able to read and interpret analytical reports and understand the requirements for high-quality analytical work (Chong, 2019). Without these skills, analytical insights may be overlooked, and decisions may revert to intuition instead of data and evidence (Alzghoul & others, 2022).

To improve results, decision-makers should define their requirements as precisely as possible ideally in close cooperation with analysts (Chong, 2019). Such collaboration influences the choice of information sources, level

of detail, and timeliness of insights (G., 2007). A strong partnership between decision-makers and analytical support teams is essential for achieving a synergistic improvement in decision quality (Abimannan, 2020).

Kowalczyk and Buxmann (2015) examined ambidexterity in the interaction between analysts and decision-makers across various dimensions of the decision-making process (Božič & Dimovski, V. , 2019). Since organizational ambidexterity refers to the ability to manage conflicting demands, several tensions naturally emerge in these interactions (Turban, Ramesh Sharda, Jay E. Aronson, & David King, 2008).

6. Decision Making Based on BI – Motivational Aspects

Decision-makers increasingly rely on analytical outputs in their daily decision processes (Kubinaa, Komana, G., & Kubinovab, I. , 2015). It is essential that they read and engage with analytical reports, though producing such reports can often be complex and time-consuming (Gauzelin & Bentz, H., 2017). BI solutions help address this challenge by offering user-friendly interfaces that make reports easier for end users to access and understand (Kubinaa, Komana, G., & Kubinovab, I. , 2015).

When an organization has established strong measures to ensure trust, consistency, and data quality—and when the capabilities of BI tools are well understood—decision-makers can generate their own analytical reports to support informed, data-driven decisions (Abimannan, 2020). Moreover, sharing information and knowledge is a crucial element of effective decision-making (Kielstra, 2007). Therefore, beyond providing BI tools, companies must also create an environment that encourages decision-makers to use, create, and share BI products (Gauzelin & Bentz, H., 2017).

Motivation plays a significant role in how decision-makers engage with BI tools (Mohamad, 2018). Rewards are one of the most common motivational factors (Alyan, 2022). These can be extrinsic (tangible or intangible) or intrinsic (G., 2007). Tangible rewards involve material or financial incentives, while intangible rewards provide psychological value such as recognition, a sense of belonging, or improved reputation (Pranjic, 2011).

Research by Chang, Hsu, and Wu (2015) shows a direct link between rewards and decision-makers' willingness to read BI reports, create their own analyses, share insights within the organization, and strive for better decision outcomes (Chong, 2019). This connection aligns with expectancy theory, which states that individuals are motivated to exert effort when they believe it will lead to strong performance and desirable rewards (Stackowiak, 2007).

As managers grow accustomed to making decisions based on accurate data—and to demonstrating that their decisions are grounded in solid evidence (Kubinaa, Komana, G., & Kubinovab, I. , 2015), they become more motivated not only to consume analytical outputs but also to generate their own BI-based reports. This motivation

is strengthened by the tangible rewards associated with achieving better decision results.

4. Results and discussion

- The theoretical literature indicates that Business Intelligence (BI) systems play a central role in improving the quality of decisions within organizations due to their ability to transform large and complex datasets into accurate, usable information. The reviewed concepts show that the modern business environment—characterized by rapid change and massive data volumes—requires organizations to rely on advanced analytical tools to enhance the quality and speed of decision-making.
- Most studies emphasize that the success of BI does not depend solely on technical tools and systems, but also on human factors and the interaction between decision-makers and analytical experts. The literature highlights the importance of data quality, effective data processing (ETL/ELT), and strong data warehouse structures as essential components for improving the quality of information provided to decision-makers.
- Furthermore, shifting from intuition-based decisions to data-driven decision-making enhances efficiency, reduces errors, and strengthens an organization's competitive advantage.

Discussion and Confirmation of the Hypotheses

Main Hypothesis

There is a statistically significant and positive impact of Business Intelligence (BI) systems on enhancing the quality and effectiveness of decisions within organizations.

Theoretical Discussion:

The literature clearly emphasizes that BI systems—through reports, dashboards, and deep analytics—provide decision-makers with better insights into organizational operations and the environment. This directly improves decision quality and increases decision-making efficiency. Therefore, the theoretical framework strongly supports the validity of the main hypothesis.

Sub-Hypothesis 1

There is a significant relationship between the effectiveness of BI system components (particularly data warehouses and ETL/ELT processes) and the quality of information provided to decision-makers (accuracy, completeness, timeliness).

Theoretical Discussion:

information quality is directly dependent on the effectiveness of data collection, cleaning, transformation, and storage. Any weakness in these components results in poor-quality information. Thus, theory strongly supports the existence of a relationship between the effectiveness of BI components and information quality, confirming this hypothesis.

Sub-Hypothesis 2

Improved quality of information extracted from BI systems directly contributes to enhancing decision-making speed and reducing error rates.

Theoretical Discussion:

accurate, timely information reduces uncertainty and enables decision-makers to act more quickly without extensive verification or reanalysis. It also reduces the errors associated with incomplete or inaccurate data. Therefore, the theoretical framework supports and confirms the validity of this hypothesis.

5. Conclusion:

In modern organizations, making strategic decisions without relying on real-time data and analytical insights has become nearly impossible. Advances in technology and BI platforms now allow companies to uncover hidden patterns and transform accumulated data into meaningful knowledge that supports better decisions. For this potential to be fully realized, decision-makers must have the awareness, skills, and willingness to engage with analytical outputs, while maintaining close collaboration with BI specialists to establish a solid framework for informed decision-making.

Because high-quality decisions are a core driver of competitive advantage, BI professionals must remain closely aligned with decision-makers for several reasons. First, they need to understand their needs, preferences, and decision-making styles to deliver relevant insights. Second, leadership must actively promote a BI-driven culture that ensures consistent data flow, unified information sources, and the use of BI tools at all organizational levels. Third, only a strong partnership between BI experts who generate analytical value and decision-makers who apply it can create the synergy required to improve decision quality and strengthen the organization's competitive position

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First marginalization, followed by second marginalization, etc. (marginalization will be in the last article)