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Research Article

Business Intelligence and Analytics: Enhancing Decision-Making in Competitive Markets

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ABSTRACT

In the present era, business organizations must do market analysis to maintain stability in the face of market fluctuations and effectively manage market operations. To achieve this objective, organizations need to enhance their business processes by leveraging contemporary technologies, a practice known as business intelligence (BI). This article discusses the substantial need for innovation and creativity in market management operations in order to compete effectively in the current global trade environment. In addition, this paper discusses the various perspectives on business intelligence definitions provided by different authors, as well as the concepts and characteristics of business intelligence. Next, the proposed framework is presented, considering the many aspects and purposes of business intelligence (BI). This framework aims to provide organizations with the necessary features to adopt a BI strategy and reap the resulting benefits in the business landscape. Continual argumentation revolves around the key functions of business area development, progressive and goal-oriented presence in an international environment, and the enhancement of organizational efficiency. The purpose of this article is to introduce a practical framework that can assist firms in aligning their aims towards business intelligence (BI), enabling them to gain accurate and timely insights into market conditions.

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1. Introduction

In recent years, the significance of information in organizational management, coupled with advancements in information technology, has led to the development of business application systems. These systems empower companies and institutions to make informed decisions and enhance organizational efficiency (Adewusi et al., 2024). In the United States, there are numerous firms that have various positions in their organizational structure, such as the role of head of analysis, business strategy manager, director, or assistant director of information services. These positions are responsible for market assessment and analyzing the competitive environment, which is crucial for understanding the importance of the company's performance (Maaitah, 2023).

In the current fiercely competitive and progressively unpredictable global landscape, the caliber and promptness of an organization's "business intelligence" (BI) can determine not just the disparity between financial gain and loss but also the distinction between staying afloat and going bankrupt (Popovič et al., 2012). For instance, a firm can utilize business intelligence systems to analyze information and environmental factors in order to predict future trends in its operations. Today, business intelligence has emerged as a crucial concept in management and organizations, establishing itself as a prominent institution in the worldwide market. It plays a vital role in optimizing activities and processes (Adama & Okeke, 2024).

Business Intelligence is not a casual or amateur activity; rather, it demands specific expertise (Dabab & Weber, 2018). Consequently, prominent corporations in this domain create dedicated divisions inside their organizations known as "Business Intelligence Units." Businesses and organizations have perpetually sought to ascertain the actions and strategies of their competitors. The notion gained prominence in academic circles during the 1980s. The volume of data and information produced on a daily basis is consistently growing, compelling companies to increasingly depend on external knowledge and information to improve their innovation and performance (M Alasiri & Salameh, 2020).

Due to the rapid advancement of computer intelligence and the emergence of the "big data" idea, business intelligence

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and analytics have gained significant importance among researchers and practitioners (Božič & Dimovski, 2019). While Business Intelligence and Analytics (BI&A) were initially utilized for decision-making support, they have gained recognition for their role in organizational learning, enhancing operational efficiency, and bolstering organizational intelligence. A study done by the IBM Institute for Business Value and MIT Sloan Management Review revealed that an increasing number of companies are obtaining a competitive edge through the use of analytics. Out of the over 4500 participants, 58% reported experiencing competitive value improvements as a result of utilizing analytics (Eboigbe et al., 2023). Unsurprisingly, Gartner's poll on IT Spending revealed that Business Intelligence and Analytics (BI&A) is a high priority for the majority of the assessed organizations. Additionally, Gartner forecasted that BI&A will continue to be a primary focus for the leading firms (Sahay & Ranjan, 2008).

Various authors provide their own definitions of the concept of Business Intelligence. Intelligence in business is believed to encompass the ability to collect, process, and accumulate information that is accessible to all levels of the organization (Mohammed et al., 2024). This information can be tailored to meet individual requirements and assist in shaping future strategies while safeguarding against competitive threats.

The terms Business Intelligence, market research, and intelligence organization are frequently used interchangeably. To provide a concise and precise definition of business intelligence, we may describe it as the process of gathering data on competitors and the business environment in order to establish and maintain a competitive edge (Ibeh et al., 2024).

Intelligence in business refers to a methodical approach to obtaining accurate and relevant information about competitors. An intelligent system refers to a collection of applications and resources utilized by managers to acquire real-time marketing information (Paulino, 2022).

1.1 Fundamental of business intelligence

Business Intelligence (BI) is a comprehensive framework that encompasses several concepts, methodologies, and procedures aimed at enhancing business decision-making. It involves gathering information from diverse sources and leveraging expertise and assumptions to gain a precise comprehension of the intricacies of business operations (Jones, 2024). The system combines data analysis with a decision support system to deliver information to individuals across the enterprise, enhancing both strategic and tactical decision-making. By implementing suitable business intelligence (BI), a company can create sophisticated decision support systems that will provide them a strategic edge over their competitors in the sector (Kazemi et al., 2024).

According to a study conducted from 2001 to 2006 found that businesses that implement business intelligence (BI) achieved a return on investment (ROI) two to three times higher than those who do not. Business Intelligence (BI) allows top-level managers in organizations to make informed decisions based on their understanding of market intelligence, business investment strategies, and other relevant factors. Therefore, it is suggested that corporations implement a comprehensive program known as Business Intelligence (BI) in order to track, comprehend, and react to their competition (Babu, 2012). The presence of BI-forming domains is demonstrated in Fig. 1.

Corporate Intelligence is regarded as a strategic management tool and a rapidly expanding field in the corporate world. Competitive intelligence is a crucial approach for gaining a competitive edge. It involves closely monitoring strategic decisions made by competitors in order to effectively compete and thrive in the organization's competitive environment.

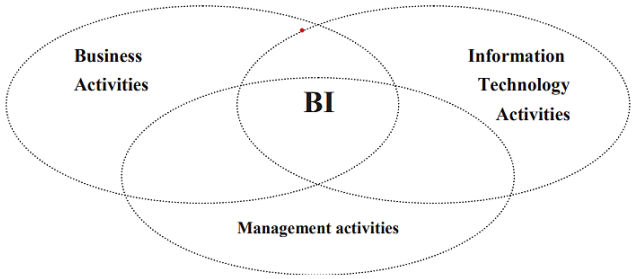

Fig. 1. Forming areas in BI (Adewusi et al., 2024).

Some authors have contended that Michael Porter (1980), the renowned researcher of strategic management, introduced the concept of Business Intelligence through his development of the competitive five forces framework and generic strategies. Porter was a pioneer in establishing the association of competitive intelligence professionals in 1986 and subsequently published the inaugural issue of competitive intelligence in 1990. Additionally, there exists a diverse array of technology that facilitates the collection of information and knowledge at an organizational level. This technology also aids in the business intelligence process by analyzing the gathered information and generating inquiries.

2. Research context and the methodology

The primary goal of the exploratory investigation was to analyze the process by which BI&A generated insights are converted into valuable knowledge, and to identify the underlying capabilities and assets involved. The exploratory methodology of the research was deemed appropriate due to the novelty, breadth, and complexity of the phenomena, making it challenging to ascertain causal relationships. The exploratory study helps to expand the current theory by providing further insights into the intricate relationship between the constructs. We utilize abductive scientific reasoning, which involves combining early inductive insights derived from empirical data with pre-existing theoretical knowledge in order to provide an explanation for the empirical conundrum at hand. We consider the semi-structured interview to be the most efficient approach for collecting information for our research due to its adaptability and ease of use.

In order to achieve a representative sample that accurately reflects the current status, we employed a theoretical, deliberate selection strategy to choose participants for the study. Nine European companies representing various industries, including high-tech, manufacturing, telecommunications, service-oriented, retail, finance, and energy, were chosen to carry out the interviews. Recognizing that larger companies have greater resources to invest in various IT systems and provide employee training, we have focused our attention on medium and large-sized organizations. The expert interviewees were required to meet the following screening criteria: (1) possessing extensive knowledge about the firm; (2) having a minimum of three years of expertise in BI&A efforts; and (3) holding a prominent position in IT or management. For this study, we carefully chose fourteen individuals who are experts in their respective fields.

Table 1. Informants data (Božič & Dimovski, 2019).

Firm	Number of informants/ Position	Country	Industry sector	Mode
A	1: CEO	Croatia	Services	On-site
B	1: Chief Information Officer	Slovenia	Software	On-site
C	2: CEO; IT manager	Austria	High-tech industry	Skype
D	1: Market Research Manager	Germany	Software, IoT	On-site
E	2: IT Manager, Head of R&D	Germany	Manufacturing	Skype
F	2: IT manager, Managing Director	Germany	Telecommunications	Skype
G	1: Chief Information Officer	Slovenia	Retail	On-site
H	2: IT manager, Managing Director	Slovenia	Financial	On-site
I	2: IT Manager, Head of R&D	Slovenia	Energy	On-site

These individuals hold roles such as Chief Executive Officer, Chief Information Officer, IT manager, Head of R&D, or Market Research Manager. From a total of fourteen individuals, five key informants were chosen using the snowball sampling approach. Each of them held and regularly utilized Business Intelligence and Analytics (BI&A) in their daily tasks. During a span of two years, specifically from February 2016 to October 2018, we conducted a total of fourteen interviews with nine different firms. Table 1 presents a detailed analysis of the individuals that were included as informants. The interviews conducted had a rather small sample size. However, this sample size was enough to achieve theoretical saturation. Subsequent interviews did not yield any new data or emergent themes, as discussed by other writers.

Furthermore, enlarging the sample size may raise concerns about the researchers' capacity to dedicate adequate attention to the examination of the dataset. All the organizations included in the research had been utilizing Business Intelligence and Analytics (BI&A) for an extended period and were suitable candidates to shed light on the process of generating value through BI&A at the time of the study.

3. BI and Proposed Framework

The objective of investing in Business Intelligence (BI) is to transition from a data-reactive environment to a data-proactive one. One of the primary objectives of Business Intelligence (BI) is to streamline and include as many processes and activities as feasible.

Another objective is to supply data for analytics that are as agnostic to certain tools as feasible.

The primary factor for achieving a successful Business Intelligence (BI) system lies in the consolidation of data from many operational systems inside a business into a centralized data warehouse. Only a small number of firms have a comprehensive enterprise data warehouse. This is because of the extensive endeavor to consolidate all the data within the organization. Fig. 2 shows various data sources.

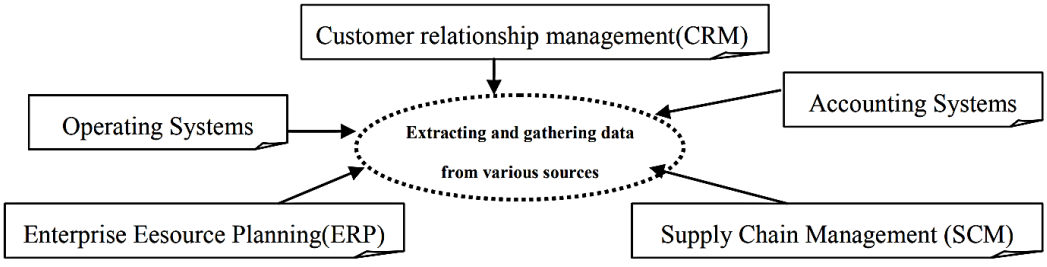

Fig. 2. Various data sources (Adewusi et al., 2024).

Organizations will differentiate themselves based on their capacity to utilize information about their market, customers, and operations in order to take advantage of commercial opportunities. BI, or Business Intelligence, is commonly defined by writers as an enterprise architecture that encompasses a cohesive set of operational and decision support applications and databases. Its purpose is to facilitate the business community's convenient access to their business data and enable them to make precise and informed business decisions.

A successful business intelligence (BI) strategy combines business and information technology to effectively manage and integrate continuing investments in BI. It involves allocating BI resources, prioritizing initiatives, and mitigating the risks associated with BI implementations. The shift towards Business Intelligence (BI) represents enterprises' aspiration to effectively control and optimize their investment in and utilization of BI tools and technologies.

Business intelligence systems enable the extraction of trends from various data types stored in repositories, facilitating strategic decision-making and future planning for managers. Additionally, the utilization of Business Intelligence (BI) systems enables the generation of intricate reports that are essential for making strategic decisions within an organization. The following is a list of the most crucial functions of business intelligence systems. Both the graphics and scenarios in question are depicted in Fig. 3.

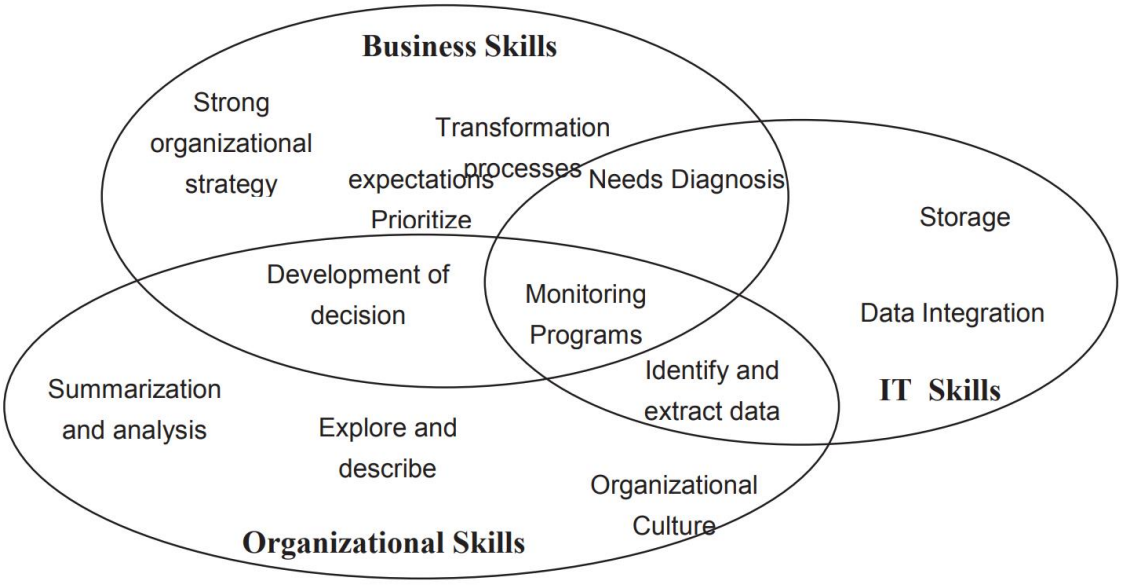

Fig. 3. Proposed framework.

Implementing business intelligence (BI) requires a substantial level of understanding of company processes, which may be lacking in remote resources. This difficulty can be addressed by allocating local workers to high-value jobs and projects that include business knowledge, while assigning remote resources to development and maintenance tasks. Another obstacle arises from the possible vulnerability of data used in business intelligence programs. Organizations must ensure that adequate security and privacy measures are implemented when sharing data outside of their premises.

Furthermore, the utilization of business intelligence application systems is on the rise across all departments. Among the employees of the Business Intelligence Unit, there is one individual who is identified as the disruptor of information flow among other candidates in the business. This disruptor plays a role in coordinating activities and enabling the organization to adapt more swiftly to changes.

Given the difficulties at hand, the recommended structure for the benefit of companies and benefits systems BI is depicted in Fig. 3. This framework efficiently utilizes the three abilities of business, organization, and IT to deploy business intelligence. Each of these abilities has a substantial influence on the implementation of Business Intelligence (BI).

4. Limitations and future recommendations

Several limitations of this study are worth mentioning. Initially, the researcher gathered empirical data from a sample of nine medium and large-sized enterprises based in European countries. While we acknowledge that the investigation has yielded useful insights regarding small-sized organizations, we cannot assert that tiny businesses, operating within the often-constrained technological knowledge market, can derive the same amount of advantage from BI&A as bigger firms. Furthermore, due to our exclusive focus on European organizations, we were unable to examine the potential variations in the value generation process of Business Intelligence and Analytics (BI&A) across diverse cultural contexts.

Limitations arise from our exclusive emphasis on a certain set of organizations belonging to eight industries known for their high knowledge and intensity, which were employed for the analysis. Further examination of industries that require less specialized knowledge may uncover further valuable

information. Hence, we strongly urge future research to examine the parallels and distinctions in context between this study and others, specifically in relation to a company's magnitude, cultural milieu, and sector. In the future, further research might be conducted to test the theory and establish causal relationships using quantitative research methods, in order to enhance and support the conclusions we have presented. Despite our diligent and comprehensive study and note-taking, we acknowledge that the notes taken do not offer a comprehensive verbal account. Hence, the act of taking notes may have influenced the precision in reconstructing the statements given by the interviewees.

5. Conclusions

BI&A has frequently been advocated for its ability to provide significant competitive advantages. The current study's findings provide insight into the process of knowledge creation resulting from insights prompted by Business Intelligence and Analytics (BI&A). Using the theoretical framework of absorptive capacity, we elucidate the interaction between the underlying capabilities of absorptive capacity and the supporting assets, offering a theoretical explanation of how value is created through knowledge generation. Therefore, we emphasize the significance of absorptive ability in the BI&A domain, taking into account the influence of BI&A assets. This serves as a crucial foundation for future study on the process of creating value in BI&A.

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