

The Impact of Business Intelligence in the Era of Big Data on Business Data Analysis

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ABSTRACT

With the development of information technology, business intelligence (BI), and data technology, data is not only a technology that can store a large amount of data, but also a process of processing and analyzing data. A correct understanding of the advantages of business intelligence data and business data analysis technology is conducive to the planned adjustment of enterprises, so as to achieve the goal of effective production. Through literature analysis, this paper analyzes the basic contents, research tools and characteristics of business intelligence and business data analysis, and then compares the data analysis with it. This paper finds that business intelligence and business data analysis can effectively analyze "what happened in the past, what will happen in the future, and how to handle the next best business strategy"; while business intelligence shows "what happened in the past, what will happen in the future, and what the past handling strategy was". The effective combination of the two is a key factor to enhance the competitiveness of enterprises, which provides enterprises with a tool to integrate information technology and implement efficient and automated decision-making.

Keywords: *Business intelligence, Business data analysis, Data analysis.*

1. INTRODUCTION

The development of the Internet has spawned new technologies, such as artificial intelligence, data mining and so on. The application of these emerging technologies to the management industry has become the trend of the development of modern society. In the face of the changing market, both large enterprises and small companies must make timely and efficient responses. These responses must be based on comprehensive, accurate and timely information. Enterprise managers should make continuous decisions to adapt to the market [1]. Raja (2015) summarized decision-making into a formula: "decision = information + experience + risk" [2]. No matter how to interpret the connotation of efficient response decision-making, decision-making is the main task of enterprises facing the future and the present. Since the application of computer and network, the efforts and attempts to drive decision-making by analyzing data with information technology have begun. For example, with the application of business intelligence, big data system can produce a unique business development model and service model,

which can well promote industrial innovation and rapid industrial development. Taking Muji Company in Japan as an example, the enterprise can effectively combine the advantages of big data in management and provide targeted services to users. According to the difference of users' analysis, they will receive discount coupons more in line with their needs. Therefore, it is necessary to analyze the application significance of business intelligence in data analysis.

Therefore, according to the literature analysis method, this paper discusses the effect of business intelligence (BI) on business data analysis (BA), and finds the basic contents, research tools and characteristics of business intelligence (BI) and business data analysis (BA), so as to put forward relevant suggestions on how to improve the competitiveness of enterprises through information technology.

2. ANALYSIS

2.1 *Business Intelligence*

Intelligent enterprises in the context of modern society refer to those enterprises that respond quickly, adapt to the changing needs of customers and adopt correct customer solutions [3]. Rehman and Saba (2014) explained that intelligent enterprises have the following characteristics: ① information sharing and enterprise information integration; ② Knowledge mining and management [3]. Business intelligence is an effective means to improve enterprise intelligence. According to the research of Negash (2014), business intelligence is that enterprises collect, manage and analyze relevant data and information of structured and unstructured enterprise business in combination with modern information technology area. Its purpose is to determine effective business through relevant data and information results, improve business level and accumulate business knowledge, so as to help enterprises improve competitiveness [4]. The definition of business intelligence was first motioned by Howard Dresner in 1996, an analyst of Gartner consulting company. Dresner (2002) presented that business intelligence helps enterprises design a series of concepts and methods based on relevant data and information, so as to assist business decision-making. Generally speaking, Dresner (2002) business intelligence is the scientific management of enterprise information [5]. The seminar on knowledge management and business intelligence defines BI as the application of positive, model-based and forward-looking methods for a large number of business data in order to better form the business decision-making process, so as to discover and explain the implied aspects related to business [6].

From the definition of business intelligence in these two documents, it can be seen that business intelligence is not the usual enterprise business processing. Its goal is to make better decisions faster and easier. In fact, any enterprise or company needs information for decision-making, which is inseparable from information knowledge. Knowledge is more expressed as the crystallization of experience learning. The process of learning is continuous processing of information [7]. Ng (2013) believes that the collection, processing, transmission and utilization of information run through the working process of all stages of decision-making. Information has become the second most important element in enterprise

operation, second only to talents the object explored by business intelligence is information, specifically a variety of data. Data can be records, communications and recognizable symbols. It expresses the characteristics of some entity (specific object, event, state or activity) in the real world through meaningful combination [4]. Business intelligence technology can analyze structured data, semi-structured data, unstructured data, static historical data, dynamic data flow and other types of data. Aziz (2020) explained that the tools for business intelligence research are query, report, on-line analytical processing (OLAP) and early warning [8]. This means that business intelligence can be effectively expressed "What happened in the past", "how much happened", "frequency of occurrence", "where is the problem" and "what measures should be taken in the next step".

Based on the research of Aziz (2020), this paper finds that the scope of business intelligence used to support business decisions is very broad, which extends from business operations to business decisions [8]. Raj, Wong and Beaumont (2016)'s research explained that business intelligence is the most effective when combining data from enterprise operation market (external data) with enterprise resources such as financial and operating data (internal data for business operation) [9]. Once combined in this way, external data and internal data can provide a more complete picture. In fact, this can create a "intelligence" that cannot be deduced from any single data set Therefore, from the perspective of business management decision-making, the functions or application fields of business intelligence include: ① analyzing consumer behavior, shopping mode and sales trend; ② strategy, tracking and predicting sales and financial performance; ③ formulating budget, financial planning and prediction; ④ tracking the performance of marketing activities; ⑤ optimizing process and operation performance; ⑥ network and e-commerce analysis; ⑦ consumer relationship management; ⑧ risk analysis; ⑨ strategic value driven analysis.

2.2 *Business Data Analysis*

Business data analysis refers to the skills, technologies and practical activities used to continuously explain and explore past business performance in order to obtain insight and promote fully automated decision-making. Firstly, Richards (2017) distinguished the difference between

business data analysis and business analysis. In terms of analytics, it means analysis, which focuses on the analysis of a certain method. Business analysis includes examining whether the expected sales, costs and profits meet the expected objectives of the company. Only when the objectives are completed can the product concept be further developed to the product development stage [10]. Therefore, business analysis originally means

"business analysis" or "business analysis". Therefore, in order to have a more complete and clear understanding of the research contents, objects and exploration tools of business data analysis, business intelligence, business data analysis and business analysis are compared here. In fact, there are differences between the three in terms of research content, exploration framework and means, as shown in "Table 1".

Table 1. Business intelligence (BI), Business data analysis (BA) and business analysis comparison table

Features	Business intelligence (BI)	Business data analysis (BA)	business analysis
Business performance Planning role	What happened in the past? What will happen in the future? What was the strategy to deal with it in the past?	What happened in the past? What will happen in the future? What is the best business strategy to deal with next?	What happened in the past? What will happen in the future?
Descriptive analysis is the main part of the analysis.	YES	YES	YES
Predictive analysis is the main part of the analysis.	NO (analysis only from the past)	YES	YES
Guiding analysis is the main part of the analysis.	NO (analysis only from the past)	YES	YES
Combination of the first three analysis methods.	NO	YES	NO
Commercial focus	YES	YES	Maybe
Focus storage Maintain data	YES	NO	NO
Need to focus on Improvement Business value and performance	YES	YES	NO

Based on "Table 1", this paper finds that business data analysis (BA) focuses on using data and statistical methods to develop new insights and understand business performance. In contrast, in the traditional form, business intelligence (BI) not only measures past performance, but also examines the consistency measurement content guiding business planning, which is also based on data and statistical methods. Statistical analysis is frequently operated in business analysis in order to achieve effective decision management. The general business data analysis technology includes exploratory modeling and predictive modeling [11]. Therefore, business data analysis (BA) is often applied to management science, which is used as an assistant to people's decision-making, or help people drive decision-making to be fully automated.

The research content of business intelligence (BI) is more specific, including query, report, OLAP and early warning. In other words, query, report, OLAP and alert tools can answer questions such as "what happened" and "what will happen in the future". In fact, business data analysis (BA) can answer more long-term questions than BI. It can analyze what will happen in the future, why it will

happen (i.e. predict), what we should do and why we should do so [9]. In the era of big data, data-driven decision-making will certainly occupy the leading position of enterprises. Enterprises use BA to implement data-driven decision-making, and the ultimate goal is to defeat competitors and become leaders of similar enterprises. Xia & Peng believe that business data analysis can be used to gain insight into forming business decisions and promote the automation and optimization of business decisions. Data driven companies take data as their assets and make full use of data in order to gain competitive advantage [1]. An effective business data analysis comes from information quality and successful analyst operation methods, because the combination effectively achieves the technical, business and organizational requirements of data-driven decision-making.

Fink (2010) said that the basic contents and research tools of business data analysis are roughly divided into three types: descriptive analysis, guiding analysis and predictive analysis [12]. Examples of business intelligence include: ① using data mining to explore data to find new parts and

relationships in data; ② Use statistical analysis and quantitative analysis to explain why a certain result will occur; ③ Implement experiments to test previous decisions; ④ Use predictive modeling and instructional modeling to predict future results. Generally speaking, enterprises should have several basic steps when using business data analysis. First of all, once the business objectives of business analysis are determined, the business analysis methodology must be selected, and data is needed to support this business analysis. Rehman and Saba (2014) believed that data is usually obtained from one or more commercial systems, and then the data is cleaned and integrated into a single database or data mart. This business analysis is carried out for small data sets. The scope of business analysis tools can range from spreadsheets containing statistical functions to complex data mining and prediction modeling applications. When the patterns and relationships in the data are exposed. When it is exposed, it is necessary to raise new problems, and the analysis process is repeated until the business objectives are met [3]. The research of prediction model includes scoring data record (also known as database) Then, the score is used to optimize the real-time decision-making in business processes and applications. Business data analysis also supports tactical decision-making for unforeseen events. In many cases, decision-making is an automation that supports real-time response [6].

Guiding analysis can not only process structured data, but also study unstructured data, and use the combination of advanced analysis technology and knowledge of some disciplines to predict, specify and adapt. Guiding analysis automatically integrates multiple disciplines and business rules of intelligent data, mathematical science and intelligent computer science to make predictions, and then suggests some predictions as a decision option [12].

Suenaga (2008) the tools involved in business data analysis are simple, such as reports and charts. There are also some complex tools, such as optimization, intelligent data mining and simulation. In practical application, in addition to enterprises using business data analysis, some organizations will start with relatively low-level basic analysis [13]. This is because when organizations recognize the advantages of these analysis technologies, they often use more complex technologies to obtain derivative competitive advantage. Therefore, not all enterprises will reach the degree of using such methods, but those

enterprises that use analysis as a competitive advantage often do that.

3. DISCUSSION

When using big data technology, intelligent data should use special processing methods to process relevant information, so as to meet the needs of users. When applying big data, relevant staff must have an understanding of big data technology. The application of big data technology is not only a technology that can store a large amount of data, but also a process of processing and analyzing data [14]. If big data is compared to a social industry, in order to make full use of this industry to achieve the profit goal, we need to improve the ability to process and process data, so as to achieve the effective production goal.

When using big data technology, intelligent data should use special processing methods to process relevant information, so as to meet the needs of users. When applying big data, relevant staff must have an understanding of big data technology. The application of big data technology is not only a technology that can store a large amount of data, but also a process of processing and analyzing data [14]. If big data is compared to a social industry, in order to make full use of this industry to achieve the profit goal, we need to improve the ability to process and process data, so as to achieve the effective production goal. The e-commerce industry has long been in the era of big data. Business data analysis technology is widely used in people's basic necessities of life, which has seriously affected the production and business activities of enterprises [1].

At this time, if enterprise managers want to ensure that enterprises can achieve sustainable development in the fierce market competition, they must understand the opportunities and challenges faced by enterprises due to the development of big data, and can use the advantages of business intelligence data to plan their future development and adjust the development policy of enterprises in a planned way. For example, under the background of the rapid development of intelligent technology, Microsoft can use its technical advantages to develop much data processing software.

Using intelligent data processing software can reduce the waste of resources. In terms of its goal of software development and research, Microsoft's original intention is not only to reduce the consumption and waste of resources, but also to integrate the concept of the development of the

times, implement intelligent construction. The obvious role of the development of big data technology is to increase the profitability and business value of enterprises. Taking Facebook and Google as examples, these social media software will use business data analysis technology to analyze users' behavior during specific operation, then find out the behavioral meaning hidden on the back of the data, adjust and optimize the content of advertisements pushed to users, so that users can actively consume and help enterprises increase economic benefits.

4. CONCLUSION

In the big data background, the modern science and technology has gradually become one of the key factors for enterprises to obtain advantages in market competition, in order to effectively give full play to the potential of information analysis, we need to take action from two levels. In terms of the strategic method, enterprises need to consider the importance of intelligent data to enterprise development and effectively predict the results of several rounds of future development; in addition, the implementation level, including the allocation of appropriate talents, skills and processes, and the use of correct methodologies and incentives. For modern business, business intelligence, business data analysis and analytics provide enterprises with a tool to integrate information technology and implement efficient and automatic decision-making. At present, in the era of big data, there has been an attempt to develop in the direction of data-driven decision-making. This paper summarizes and analyzes the theories and research methods of business intelligence, business data analysis and analytics, compares and puts forward the internal relations and differences between the three. Therefore, under this background, enterprises should fully understand the advantages of big data and the characteristics of business intelligence data, and combine business intelligence data with industry to promote the continuous development of industrial digital operation, update and adjust its future development direction, and improve the intelligence and digital operation of enterprises.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Du Yu.

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