



# Impact of Big Data on Business Management

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## Abstract

Big data, a groundbreaking technology that has gained popularity in recent years, has been utilized in various fields. In the field of business management, big data has been considered powerful. By collecting and analyzing a large amount of data, enterprises can gain a deep understanding of market demand, customer behavior, and competitors' situations. This enables them to formulate better marketing strategies, adjust product structures, and enhance service quality. Especially in the e-commerce and Internet industries, the application of big data has become a crucial competitive strategy for enterprises. In this dissertation, two major aspects are analyzed: the nature of big data and its utilization in business management, illustrated with an actual example.

## Keywords

Big data, enterprise, manage

## 1. Introduction

The concept of big data emerged in the 1990s. After evolving for more than 30 years, this term has developed into a practical tool from merely a novel catchword. The majority of people admit the giant commercial value of big data. However, people's knowledge of the nature and the utilization of this technology remain little. Actually, by informationizing, simplifying, individually binding, socializing, and systemizing the information and data, big data technology can largely optimize the procedure of business management.

## 2. The Nature of Big Data

### 2.1 The Source of Such a Big Volume of Data

For the first point (the volume of data is large), it is a widely recognized issue that is well-known among people. Just like its name suggests, the volume of the data should be substantial enough for computers to draw comprehensive conclusions. The early emergence of the concept of Big Data raises the question of why it was not fully utilized and developed until the 2010s or even later. One thing to consider is that managing such a large volume of data is heavily reliant on the computing speeds of the hardware. However, it is argued that hardware innovation always aligns with requirements. The author suggests that the main issue arises from the lack of necessity, implying that there is not enough data for the hardware to process. We know that the data collected today is primarily from individuals using their mobile phones, which can access the internet. The first mobile phone with networking capabilities was the Nokia 7110 in 2000. It could only receive news and lacked the ability to send data. Here, "data" refers to information in various forms, including messages like notes that can be sent from one individual to another. The earliest mobile phone with an operating system (OS) is the T-Mobile G1, published by Google in 2007. This marked a milestone because, with an OS, users were allowed to use apps and upload their data. Smartphones at that time were affordable enough for everyone to own. Consequently, there was not enough data to support the development of the Big Data industry. After the 2010s, technology and the global economy have grown so rapidly that smartphones have become

popular worldwide, providing a data foundation for the development of Big Data (Li, 2015).

## 2.2 Informationlizing of The Data

### 2.2.1 Data Simplifying

For the second point informationlize, the author would start with the case of the primary trade-in in ancient times and the evolution of the currency. In primitive times without currency, people got things they needed by barter, but the time went on, people discovered the drawback of barter that there are too many kinds of tangible properties, and when people exchange their properties, one of the parties may cannot get the items he wanted. Additionally, the definition of the word “Price” is so broad, and every person wanted to make an exchange considered that their items were worthy to swap with others, therefore, when people were badly in need of something, they were forced to make an exchange, and the goods they exchanged may not be of equal value. To deal with this problem, currency in the first sense emerged: the conch. All goods or tangible properties are created through labor, in the ancient ages, how much price you could make depended on your physical, and currency like conch represented how much labor you paid, for example, making an axe, requires you to find appropriate timber and a piece of thread, and you should assemble the timbers and thread together, what you do including finding the raw material; assembling the goods, and these two processes may deserve 20 pieces of conch under the values of the time. however, if you want to make an axe, besides finding the raw material and assembling the axe, what you need to polish a stone, may require more energy and deserve 10 more pieces of conch, and at this time, a person who wants to get an axe with an arch should add 10 pieces of conch, or you can just use 30 pieces of conch to swap the axe, and this behavior called *buy* by people at the time, and due to perfection of the social system and the development of technology, the form of currency evolving step by step from pieces of conch to cash to the number written in database of the bank, we should realize that something are information. Williams. (2016).

### 2.2.2 Socializing and Binding Individual

From the evolution of the form of the currency, we easily think of informationalizing *easily as simplify*, actually they are not the same. *Simplify* is only as far as the user is concerned, the increase in face value of a currency and cashless payment means we shall not take so much cash, but the requirement of civilization level is far more complex than the ancient times. So the *simplify* is only for the form displaying externally, and there are also several other features. One of them is the *socializing*. Thanking using pieces of conch as currency, certainly solves the issue of fairness to some degree, but it causes some new problems. Producing an axe requires you to find timbers, polish the stone, and assemble parts, and the whole process may take you three days and you get 30 pieces of conch by selling it. But if you find a beach with good luck, you may pick up 100 pieces of conch just for an afternoon. There were no people or institutions to set a form or a law. But as human socialization levels grow, the countries, and institutions emerge, and the norms of using currency become more formal. Through this, socialization provides a well-aligned and positive for the infomationalizing (Zada, Ali, S., Khan, I., Hadjouni, M., Elmannai, H., Zeeshan, M., Serat, A., & Jameel, A, 2022).

With the high level of socializing, the Data takes a trend to Binding individuals. In a binding individual just as its name is implicit, all the information is binding oriented to an individual becoming tighter and tighter. This phenomenon has become visible, especially after the emergence of the computer and the internet. If you want to use a credit card or cashless pay, you need to bind your identity information first; If You want to register a social application account you need to bind your phone number which applies to your identity information. All these show that as long as you use a mobile phone, any record about you would bind you tightly. Informationalizing means the scale of information that can be recorded and indexed surge, all information binding individual satisfies the requirement of studying and serving customers well but also causes serious security issues.

### 2.2.3 Systematizing of Data

Lastly, *systematizing* is also an ingredient that should be mentioned. All the data converted into information can be related, data extracted from the same event after systematizing may feature a big difference. We still take the barter between the axe and arch as an example. Connecting the data of the way to make an axe or arch like assembling the tools or polishing the stone, we can get information about the manufacturing industry which belongs to the field of natural science, by contrast, if we focus on the process of evaluating or identifying the labor between value, we can get the information of logic or the business, which belongs to the field of the humanities. All data are extracted from the same example, and different ways to systematize data cause quite different conclusions, and this is also how the

subject information forms, people systematize these related data according to their requirements into information and organize this information together, and different subjects appear. No matter how this information is structured by related data, there must be a system (Santoro, Fiano, F., Bertoldi, B., & Ciampi, F., 2019).

### 3. Actual Utilizing of the Big Data

The author considered how Big Data influenced the field of business management prominently is to getting objective information to make decisions and formulate strategies.

#### 3.1 Data Index and Matching Abilities

For a company, choosing between selling products or providing services is the first and most important decision. However, due to obstacles posed by economies of scale and globalization, it is becoming increasingly difficult for new companies to enter the market. To address this challenge, new companies need to focus on customization and finding niche markets. Although it is widely known today that entering a niche market can help overcome obstacles, it remains a challenging task. Special and unmet needs are bound to small-scale groups of customers, prompting us to think outside the box. Let's take a popular example: the mouse. The mouse is widely used in our daily lives, but most mouse manufacturers and large brands prefer to produce right-handed mice. This preference is due to the fact that the majority of people in the world are right-handed users. For these big brands, the main profit comes from scale – the larger the scale, the lower the expenses, resulting in higher profits. Therefore, it is not financially rewarding for these brands to produce left-handed mice solely for public praise. Recognizing this gap in the market, some new and small companies have seized the opportunity, leading to the emergence of a niche market in computer peripherals. Generally speaking, it is a common trend for large brands to monopolize the market for popular products due to their strong financial foundations and long-standing history. This is a challenging situation to alter. The future for small and medium enterprises (SMEs) may involve a shift towards a business model that emphasizes customization and high-quality products, even if they come at a higher price compared to popular products. So, by learning how these companies find niche markets, someone might think that it's not such a difficult task to use logical thinking like the example above (left-handed users and right-handed users). However, there are several problems:

- 1) The concept of *niche* is compared to the general market, and it is quite objective concept. Some products or services that you think can be niches may already be found and exploited by others.
- 2) The target we find in niche markets is to make a profit, the reason why some kinds of products or services do not exist is not that these products are not thought about by people, but the power of consumption of the customers with these special needs is so weak and cannot create enough value.
- 3) By using fixed methods of logical thinking such as reverse thinking, convergent thinking truly helps a lot, but it can also limit our brain to create and innovate other kinds of niches.

Aiming at the problems above, big data may help a lot. We have discussed how big data works in chapter one: connecting large amounts of data and analyzing them into information that can be used and studied by humans. So how big data helps people to get inspiration and predict if the project would create profit, the author would illustrate gradually.

Thinking of the process we buy things online. Firstly, opening an online shopping APP and search for the things we want, then we may get hundreds of choices, and for the next steps we choose several products that attract us with their beautiful product pictures, creative titles of the product names, or the attractive advertisement, and lastly, we make a final choice and pay for it through comparing all these products, after using the products we may share the experience in the comments area. If we use the traditional method to analyze the data of customers' preferences through the whole process mainly comes from two points: survey (using experience in the comments) and price factor, somebody with advanced analysis skills may have the ability to analyze the data from the products' present condition (function and price), it can only get a relatively reasonable conclusion, no matter how comprehensively people analyze, human are not capable of completing with big data, not only because of the amount of the data, but also for the dynamic has a stronger grasp of the process than the static. The view that big data can deal with far more data than humans is easy, and the author would illustrate the strength of the *dynamics* of big data. (Zhang, 2021).

#### 3.2 Dynamic Data Analysis

Dynamics of the big data, the author identifies it as *dynamic process analysis ability*. *Dynamics* is a relative concept

compared to *statics*. We still take the example above. As the R&D manager of the company, you asked to analyze the data and develop the new product, what would you do? from the sales statistics, we may get which price people like the most, and which products' function combination; we can know which product is considered to have a better cost performance, but all these are based on the static data, and you cannot exactly understand who are truly your customers and what the true consumption ability of your customers because the value of your products limit your profit, for example, the company of manufacturing luxury car can almost determine in 80 percent that their customers are high-income groups, by this they can focus on the quality and innovation of their products, it means high profit, by contrast, the companies which provide daily necessities with high quality may would not set a quite high price, because its customers are with a wide range of income groups, and the thought of "the value and types of our product limit our ability of making money, it's a better choice to keep the present condition instead of innovating with a risk of loss" really limits the ability of innovation, the thing is many of the company's loyal users for the quality of products, and would pay more for additional function. That's the limitation of the static view of humans; by contrast, dynamic process analysis ability will help big data do a better job. In the same background, company A which manufactures daily necessities, has its popular product with function A which also has a proper price, as customers are searching for this kind of product, they know and appreciate to use of company A's product, however, when customers are just wanting to pay the company A's product, they attracted by an advertisement about the other company B's product with function A the same as company A's product but adding the function B, and the customer considers he wants the product with both A and B two functions, but the price of company B's product is too low which makes the customer thinking it's quality is poor, then customer searches the products with both A and B function. The result shows a product with both A and B functions is either too valuable or too cheap to buy trustingly, and at this time the customer still buys company A's product. So as we can see, the customer finally still chose company A's product totally experiencing steps through the whole process: paying for the product as in the past; attracting by a new product with the wrong price; searching for a new product of another company and there is still no proper-price product; at last the customer still buys the product as the past. Under the view of the big data, we can get two pieces of information: customers need the products with both A and B functions (functional aspects) and customers think the products with both A and B functions are too expensive to buy (value aspects), then the niches emerge, the company can design a new product with both A and B function. the example above shows what is the *dynamic process analysis ability*, we can notice the thing we analyzing is a dynamic process, which is the path of the heart that experiences exactly as the customers are shopping, and as this data collected more and more, we can predict what are the true needs of the customers instead of guessing or just putting managers in the position of customers. By contrast, if we use the traditional method to analyze these static data, we can only conclude that customers are loyal to our products and brand, we need not innovate this product, and it is based on steady customer loyalty, Provided customers choose the product with A and B with a high price, the company even do not understand why customers leave them (Walker, 2015).

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