The Changing Research on Decisions of Enterprise Management in Big Data Era

Yao Zou[1]

[1] Management of School, Shanghai University of Engineering Science, China

Correspondence: Yao Zou, Management of School, Shanghai University of Engineering Science, Shanghai 201600, China

Received: May 25, 2014 Accepted: June 18, 2014 Online Published: June 28, 2014

doi:10.5430/sass.v1n2p107 URL: http://dx.doi.org/10.5430/sass.v1n2p107

Abstract

With the popularity of innovation and application of cloud computing, mobile Internet and a new generation of information technology, highly fusion of human, machine, and thing led to the explosive growth and highly complex of data scale. The world steps into big data era. The various subjects were involved, such as Cross reengineering of physics, biology and other disciplines, at the same time it has brought revolutionary change in the management, and influences communication, energy, healthcare, media and other traditional disciplines profoundly. Unstructured data was produced followed, such as Documents, photos, video and so on, and the proportion has reached more than seventy-five percent of the volume of the whole data on Internet, great wisdom often arises from the unstructured data. On the basis of this, mining accurate data required in large amount of data to make the correct choice of the enterprise management is becoming an important problem puzzling the enterprise managers. Based on the concept of big data and decision-making, we summary the importance role of the large data in the decision-making process.we expect our little endeavor can make a large contribution to the development of the scientific decision.

Keywords: Big data, Decision, enterprise management

1. Introduction

The twenty-first Century is the era of knowledge economy and information economy, the world today is in the explosion era of information. With the rapid development of Internet, mobile Internet and Internet of things technology, the information technology breaks though human's limitation, Linkage is extended to people to people, people to objects, and object to object. As Google has to deal with more than 24 petabytes of data every day, twitter's information almost double every year.It will be released more than 400 million daily, and more than 800 million visitors will visit You Tube per month, about 4 billion messages are posted daily on Facebook. Various enterprises have realized the importance of these data. It increasingly becomes a hot topic in the media, an attractive picture scroll is showed by his new idea and the application of technology for enterprises: Data mining, correlation analysis, accurate decision and so on. What's more, the data is viewed as an important advantage in today's business competition. Many enterprises are itch for a try, preparing to implement data item. However , the saying goes , "dilettante watch the scene of bustle, adept the contents", how to make good use of data to develop the right marketing strategy for the enterprise so as to win the competitive advantage for the enterprise, becomes the most concerned in the modern enterprises.

2. The Implication of Decision

As one of the basic function of enterprise management, Decision makes the difference in running a company, and it also produced a special school of management in the jungle of the management. Simon one of the most important representative proposed that the management is decision-making, "Satisfied with the standard" substitutes the traditional "the best standard", decision making is a complex process Instead of "green" of the moment, decision-making can be decomposed into programmed decision and non-programmed decision and so on. And because his contribution to theoretic research of decision, he won the 1978 Nobel prize. He believes that the decision is mainly affected by the internal and external environmental as the picture below.

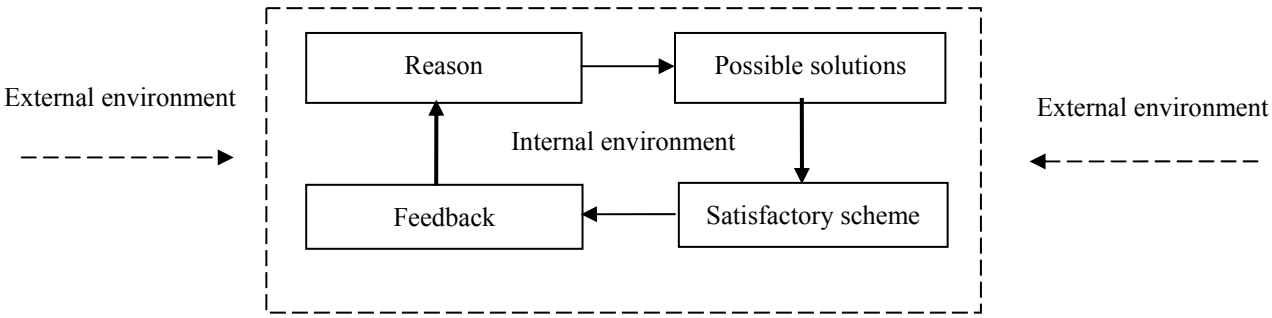

Figure 1. The flowcharts of decision

However, in the sense of Robbins, another famous master of management, each person in any organization in any field is making decision or has to choose between two or more programs.He thinks the process of decision-making includes identification of problem of decision, confirmation of the variables of decision, the distribution of decision's weight, development of alternatives, alternative's analysis, selecting an alternative, etc.

Since then, various of theories about decision making arises, for example, behavioral decision theory, uncertain decision theory, asymptotic decision theory, etc.

2.1 The Behavioral Decision Theory

Allais paradox proposed in 1953 and Ellsberg paradox proposed in 1961 attract researcher's attention to "decision-making process". With the development of cognitive psychology, the cooperation of some psychologists and economic management experts, the results of research effectively explain many strange economic phenomenon, provide a series of new management strategy, greatly promote the formation and development of the behavioral decision theory. In 1961, Professor Edwards known as "the father of behavioral decision theory" published an essay named 'behavioral decision theory', summed up the research of experiment since 1954, proposed "weight decision", which had a major impact on the follow-up study. Kahneman and his partner Tversky's research in twentieth Century made the behavioral decision theory recognized by academe widely. They conducted the research on judgment and decision behavior under uncertainty, noticed people's decision-making shortcuts or intuitive thinking is very useful sometimes.

2.2 Uncertainty Decision

Based on a series of strict rational preference assumption, Von Neumann established the expected utility function theory though the use of logic and mathematical tools. Based on the Expected utility theory, Markowitz created portfolio theory. Arrow introduced it into the general equilibrium framework, made it a paradigm for dealing with uncertainty decision problems. The theory of individual decision making under uncertainty has become the cornerstone of modern economics and financial theory. "Uncertainty" mostly refers to a probable measure in Economy, finance. But the definition of probability is not clear. Von Neumann thinks that the probability is inherent objective in nature, and can be obtained by frequency experiment. If the system is a simple and ergodic, we can get the objective probability through the frequency test. But in most cases, due to restrictions of time or the subjective and objective conditions, we could not get the probability by frequency experiment method, even not the objective probability. In fact, Knight has put forward the issue. He put the uncertainty into two kinds of situations: (1) the uncertainty of probability distribution, it is risk. (2) the uncertainty of no objective probability distribution. He thinks the latter is the real uncertainty, it Called Knightian uncertainty or fuzzy uncertainty. Frank believes that, although sometimes a probability distribution of a random event can't be calculated, but we can use subjective probability in Bias's theorem, and specify a prior belief of random events, so it doesn't matter that technology selection of establishment of mathematical model, Nate's classification of uncertainty has no meaning. Daniel's tests show that people would violate the principle of subjective probability in most cases, so it cannot be described with a subjective probability proposed by Savage et al, subjective expected utility theory cannot describe the behavior of decision makers in the face of Knightian uncertainty.

2.3 Gradual Decision Theory

Rational model of decision making is a leading model in the research field of western administration on decision

making before the twentieth Century 60's, the framework of finite rational model Simon proposed doesn't jump out of rational decision-making model, there are some new decision model to make up for lack of rational decision-making model in this case. Lindblom put forward the progressive decision making theory through criticizing of comprehensive rational decision-making and the traditional theory. The so-called progressive decision-making, refers to the decision makers make decision based on the existing legal policy, take the gradual approach to modify the existing policy, it can achieve decision goal gradually through a series of small changes in the context of social stability.

3. Promotion of Big Data to the Development of Scientific Decision-making

The competition of market is becoming increasingly fierce, relying on the traditional means of enterprise management decision, It becomes more difficult for enterprise to gain a competitive advantage in the market. However, the appearance of big data has changed this situation, it not only changes the way of information's transmission, but overturns the habit of the traditional data's usage, and even changes the human's understanding of the world law. Based on big data, the enterprise turns data mining, processing and analysis capabilities into commercial value. Big data changes people's life, a full range of changes from the way of thinking, management philosophy and management decision-making method happen, so decisions based big data will become an inevitable trend in the development of scientific decision in the future.

3.1 Effects of Big Data to the Decision-making

Table 1. The progress of effect of big data to the decision-making

Management of massive data	Process of marketing management			
	Analysis of market opportunities	Selection of target market	To make the right decision	implementation of management decision
Data acquisition (various,rich)	The importance of secondary data;diversity of competitor's information	Measurement of market demand Market prediction Consumer behavior information	Competitor's information Information of the target market The information of new products	Change of the external market information internal and external information
Storage of data	Improvement of hardware and software of enterprise management information system	Support of Processing technology of large data	Support of enterprise management information system	Reporting system of internal management
Data processing and analysis (data mining ,analysis of real time)	Analysis of product and market matrix,retrieval technology,data mining technology	Analysis of strategic business and market potential	Analysis of various factors of enterprise management decision	Retrieval technology, mining technology The Internet of things
Application of data (Decision Support System)	Discovery of market opportunities Market segmentation	Determination of the target market	Determination of the strategic decision	Planning, organization, execution

We can see from the table above that management of massive data affects the whole process of enterprise management and decision-making directly. The combination of the two ways of decision-making is latest application of scientific decision. This is because scientific decision is based on the acquisition, storage, processing of data sharing and application, it is the base of database of the enterprise management decision-making.We can the establish

database and analysis accurate information of user, identify segments of market,can make accurate decision of production, marketing strategies. It is also the corn of the scientific decision. Therefore, the management decision-making based on the big data become the unique scientific way in modern information society, and it is used widely with the rapid development of information technology.

3.2 Big Data and Process of Decision-making

In general, decision based on database can be divided into seven basic parts: data acquisition, data storage, data processing and sharing, searching for the ideal consumer, the use of consumer data, analysis of the data and evaluation and improvement of data etc. the process and the management of massive data is consistent. Therefore, the decision based on database is the mainstream of scientific management in the era of mass data as the picture following.

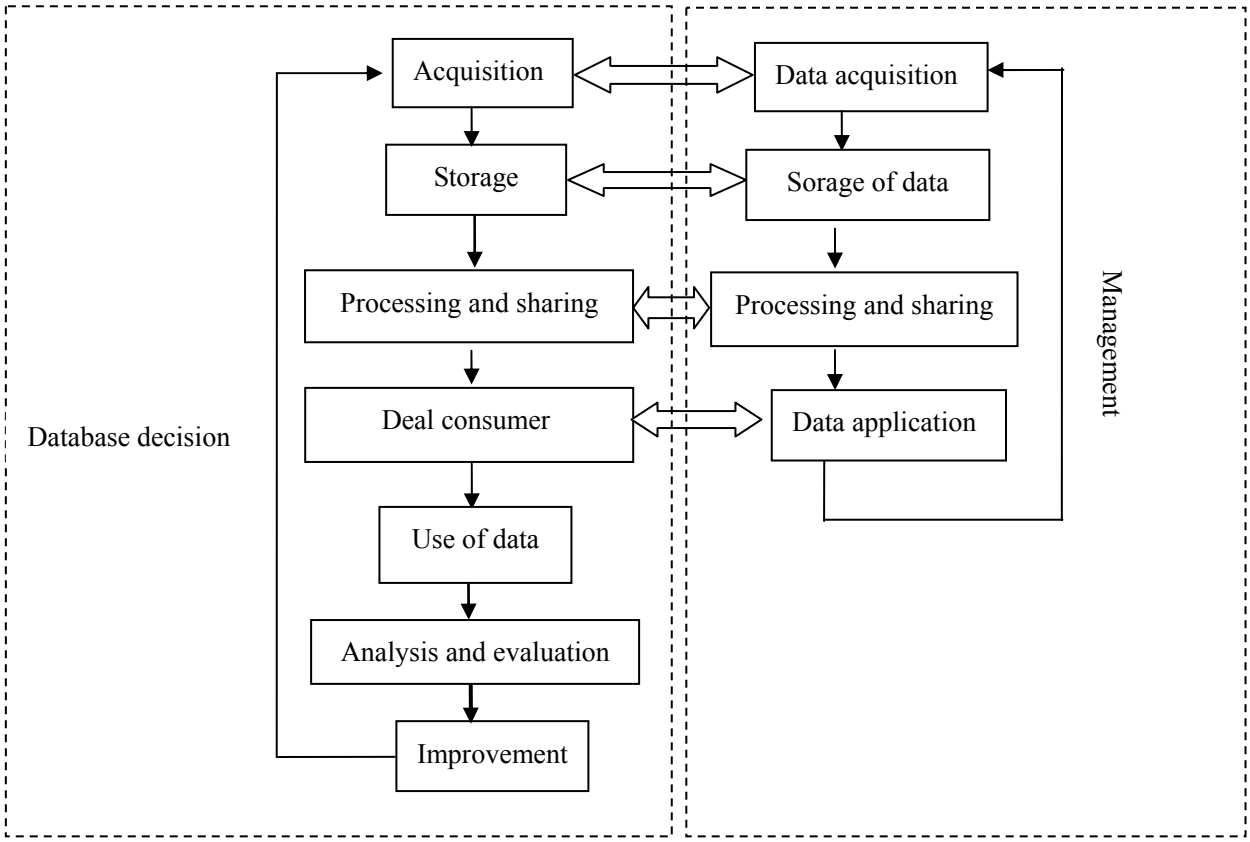

Figure 2. Module of database decision and data management flow chart

In the process of decision-making based on database, the three core issues are the collection of decision data , the establishment and maintenance of the database, the analysis and modeling of database.However, there still are some disadvantages in our enterprise's decisions based on database decision at present: (1) The database is too single and the source of data is too narrow; The database is not perfect; (2) The database is not perfect; (3) It is difficult to provide some valuable data; (4) The lack of effective information of customer.These problems were solved properly with the arrival of the era of mass data,the diversification of sources of data, the richness of data type and the improvement of data mining and processing technology. However, at the same time, as an important part of the data and database decision of management decision, we needs to have the new ability to change the organization and culture of enterprises. However, most of the enterprises did not make full use of all available data.Some enterprises even have no ability and technology to acquire and analyze them to obtain valuable information. More often, they are not the right talent and process to design experiments so as to get business value from the massive data. Therefore, enterprises also need to continue to improve and perfect the enterprise's talent, process, organization in the massive data era.Only in this way can enterprises meet the requirements of database decision in the era of massive data.

3. The Meaning of Big Data on Decision

Based on the big data, we can get several helpful meanings from decision of purchase, decision of production and decision of marketing as following:

3.1 It Can Achieve Precise Positioning, Accurate Decision, Precision Marketing

For example, the enterprise's customers are classified. The important groups of customers were split into small groups of customers, we can find some similarity in this little groups. This process can be achieved through the implementation of data mining and clustering analysis.Precision positioning of different customer like this, we can make successful decision, and bring rich and generous profit for the enterprise.

3.2 It Can Improve Enterprise Management Decision and Promote Cross Decision

Massive data was generated by enterprise every day, we should profoundly analyse data accumulated though data mining technology, get different kinds of information and make the whole decision-making strategy of enterprises. For example, the decision of management plan for each commodity category, the implementation of product configuration plan.At the time, based on sale management decision, we can find the association rules though data mining, analyse the correlation of consumer's goods in the basket,the correlation when the goods have been bought, mine hidden rules so as to help businessman make the correct decision.

3.3 It Can Assist Enterprises with the Management Decision

Using data mining technology to mine important information, we can make correct decision at the right time in the right people through cluster analysis,it can greatly improve validity of the decision.We can identify those commodities that may be purchased together with the discount goods through the correlation analysis. At the same time, we can compare sales before and after promotion period with the help of data mining, and analyse it in different angles, we can use the related data to find customers who can bring the maximum return for us in the future investment.At last,we can make the participate decision for a particular customer and enhance corporate's profitability.

3.4 In Order to Make the Correct Existing Resource Allocation Decisions

We should build the core competitiveness of enterprises.Information technology continues to be improved and enhanced in the big data age.On the one hand, it brought massive data for the enterprise management decision. On the other hand, it is also possible for the enterprise to process the data rapidly and make the correct decision. With the increasingly complex and intense of competition in the market environment, local enterprises's competitive pressures increase. It is not obvious for the enterprise to gain the differentiated advantage reliable only on the traditional product strategy, price strategy, distribution strategy and promotion strategy. Therefore, the companies must find another way and change the past the traditional decision-making model into scientific decision model in the current market environment, apply the data mining technology to the management decision-making. We should mine the useful knowledge of the market, allocate the enterprise's resource rationally to improve the efficiency of the decision with the help of existing massive data.In the last, we can build the core competitiveness though scientific decision based on big data.

4. Conclusion

With the arrival of the era of big data,the decision-making of enterprise management is also faced with revolutionary. If it only depend on the traditional data mining technology in the past. It is difficult to fully grasp the real needs of all customers, because it can not deal with some non -structured data and semi-structured data. However, the emergence of big data technology has changed this situation. The large-scale open source data distributed processing technology represented by Hadoop, which can analyze the unstructured and semi-structured data fully. Dig out the precise information based on needs of customers from the massive data and lay a good foundation for accurate decision of enterprises. This technique also has the performance and cost advantages in those aspects.At the same time,it is also very easy for enterprises to expanse in the horizon.

Through the analysis of customer consumption habits, consumer evaluation data, we can select the appropriate data mining technology to find the enterprise management decision mode. Understand what management decisions can meet customer demand better, in addition, we can create more value for the enterprises. This is one of the most important research directions in this article.In the process of this research,we rely on network technology and other technology to verify that use of enterprise management decision model based on big data is effective.The technology we use are as following:

Structural equation analysis: we use clustering analysis method, hierarchical analysis method to determine the key factor and the index of age of big data that can bring profits for enterprise and promote the improvement of decision-making of the enterprise management.

Interview deeply: Through customer-orientation based on the use of large data, we can make the right decision based on interview of enterprise users.In the end, we discuss precision and reliability of the data about the enterprise management and decision making in the age of big data.

References

CERN experiments observe particle consistent with long-sought Higgs boson. CERN press release, July 4, 2012.

David Lazer, Alex Pentland, Lada Adamic et al. (2009). Computational Social Science. *Science*, *323*(5915), 721-723.

Edwards W. (1961). Behavioral Decision Theory. *Annual Review of Psychology*, (12), 473-498.

Huo Yuhong. (2008). briefly discussion on Scientific decision in enterprise management. *Sci tech information development and economic, 18*(15).

James Manyika, Michael Chui, Brad Brown et al. (2011). Big data: The next frontier for innovation, competition, and productivity. McKinsey Global Institute, May 2011.

Liu Lili, & Yan Yongxin. (2013). A review of the theory of the Simon decision. *Business Times*, (17).

Pattern-Based Strategy: Getting Value from Big Data. Gartner Group press release, July 2011. [21] Codd E F. A Relational Model of Data for Large Shared Data Banks. *Communications of the ACM*, 1970, *13*(6), 377-387.

Song Qi. A review of the theory of behavioral decision making. (2010). *Journal of Capital University of Economics and Business*, *12*(4).

The 2011 Digital Universe Study: Extracting Value from Chaos. International Data Corporation and EMC, June 2011.

Wu Cheng zi. (2013). The construction and evolution of enterprise ecosystem in the era of big data. *Social science, 12*.

Xu Yuandong, Huang Dengshi, & Liu Sifeng. (2008). Review of research on behavioral decision theory under Knightian uncertainty. *Journal of systems management*, (17).

Xu Yueming. (2013). See the gate way of data application. *Enterprise management*, (8).