Research on enterprise's financial management
based on big data and cloud computing

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Abstract. Along with the development of information technology such as the Internet of things, big data and cloud computing era has come. Big data and cloud computing technology in the application of enterprise financial management, the enterprise financial management concept, methods and organizational structure produced a significant change. The concept of enterprise financial management reform is to abandon the explore of causality, instead, attaches great importance to the problems of the relationship between financial decisions based on the analysis of large data. The transformation of the financial data embodied in two aspects, one is to deal with all the data relating to the financial, rather than take a part of the data and the second is financial data report will provide a full range, high correlation, high accuracy of decision-making information. Financial management organization structure is a major change.

1. Introduction

Big data is another subversive technological revolution following the cloud computing and internet of things in IT industry. The earliest organization that come up with the concept "big data" was the McKinsey consultant. The agency makes judgments through a long-term research and analysis that, in the 21st century, the cast majority of business management is difficult to break away from big data, and data resources will gradually become the most important part of the enterprise production factors, through the using of big data, business managers will bring the increase of business productivity and consume profit. [1] More and more organizations such as government, business company and other institutions are start to realize the value of big data. In recent years, the U.S. government has pay high attention to the importance of big data's value, and draw up a grand plan for the development of big data from the national level. The grand plan includes the finding, talent cultivation, technological application and all other different fields, to guarantee the leading position that the Unite States will be in the big data time. The U.S. government even realizes that the future competition in the country level will be the controlling and developing of data resources, it's effect will even beyond the resource of oil, minerals, solar energy and marine resources. In the year 2012, The United Nations also released the white book on big data administration, pointing out that big data is both opportunity and challenge, all governments from different countries should learn how to make full use of big data technologies to make it become the propeller of their national economy, better service the people's livelihood, and make more contribution to business production. In another hand, IBM indicate that in the next decade, they will focus more on new business growth brought by big data analytics software. [2] The application of big data and cloud computing technology in corporate financial management will bring disruptive changes to the concept, thinking, method and organizational structure of corporate financial management.

2. Overview of Big Data and Cloud Computing

Big data refers to a collection of data that cannot be crawled, managed, and manipulated with conventional software tools over a period of time. Specifically, there are four basic characteristics of big data: First, the data capacity is quite large, it can be reached in TB, PB, EB level; Second, the data types are complex and diverse, include digital, forms, text forms, video, audio, pictures and other types of data; third, the reliability of data sources is low, so does its value density, and low proportion of the valuable data in the huge data capacity. Take the data of bank trading day as an example, during

the 100 million Trading data, eligible transaction data may be only one or two qualifications; Fourth, the handling time is not well-off, which is based on the two characteristics of the decision, huge amount of data and low value density. The strategic significance of big data technology is not to master a huge amount of data and information, but to specialize in processing, analyzing and mining these huge data. Or, if big data is likened to a resource, the key to whether or not such resource can be used is to increase the "data processing power" of data resources and "add value" to data resources through "data processing." In the data processing model based on cloud computing technology, only when big data is valuable to the enterprise, that companies can use big data to improve business decision-making ability, research and analysis capabilities and process optimization capabilities. The section headings are in boldface capital and lowercase letters. Second level headings are typed as part of the succeeding paragraph (like the subsection heading of this paragraph).

Cloud computing is a model of resources using based on Internet, when users use the computing resources, First, submit their application of resources computing service, the Internet will break up the user's computing resources service into several small programs, then through the connect of thousands of computers on the Internet, servers resources, the program processing is complete and return immediately. With this method, users can apply for calling the huge server and computer resources on the Internet to serve themselves, which means all the users will have their own fastest supercomputers on the world. Cloud computing has the following characteristics: one is the calculation of large capacity, with the help of the resources on Internet, cloud computing can have massive resources on the server, to give the users super operation ability; secondly is the convenience of service, through Internet connection, cloud computing users can easily use them in the company, home and any other places, also it's available for Wi-Fi; thirdly is the high stability, through the distributed computing, cloud computing distributed the computing mission on the Internet's computational node, to increase the stability; the fourth is the low cost, the theory of cloud computing decide the low budget of the hardware for the company, and can offer the different service based on the customer requirement; the fifth is the risk, the openness of the Internet makes the possibility of the leakage of user data higher than usual, and also increase the risk, meanwhile, cloud computing service providers are also an important factor in the risk. The relationship between big data and cloud computing is very close, they depend on each other. Big data cannot be separated from cloud computing, cloud computing is also inseparable from big data, just like the relationship between automobile engine and gasoline, big data itself is a complex problem set, and cloud computing is the most effective way to solve large data problems at present. As Fig.1: a diagram of the relationship between big data and cloud computing. Big data must rely on cloud computing technology to realize the mining and sorting of huge data resources, it make the big data like this valuable. Cloud computing provides an infrastructure platform, and big data applications run on the platform.
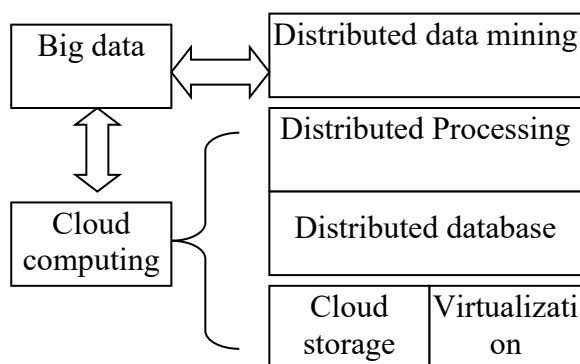
Fig.1.   Relationship between Big data and Cloud computing

3. The Evolution of Enterprise Financial Management in Big Data Era

3.1 Big data and cloud computing strategy is the fourth competitive strategy

Competitive strategy refers to the long-term planning and strategy that an enterprise has made, in order to gain a competitive advantage, be in a favorable competitive position in the market, and strive for greater market share or better economic benefits than its competitors. The basic competition strategy is put forward by the famous American strategic management expert Porter, namely: cost leadership strategy, differentiation strategy, centralization strategy, all the businesses company must choose one of them as their dominant one. [3]In the era of big data, enterprise big data and cloud computing strategy will become the fourth enterprise competitive strategy, and they will make a significant impact on the three major traditional strategy.

3.2 Transformation of Business Financial Management Decision Process Based on Big Data and Cloud Computing

Decision-making is an important function of corporate financial management, throughout all aspects of corporate financial management and functional systems, scientific decision-making is the core of financial management, and the key of it is the process and procedures. The traditional decision-making process is a four-step process: firstly, discovering the problems in the financial management; secondly, make a detailed logical analysis of the discovered problems; thirdly, finding the causal relationship of the problems again, identifying the cause of the problems and the key factors; finally, develop a solution to the problem. [4] In the era of big data and cloud computing, fundamental changes will take place in the financial management decision-making processes, the financial decision-making process based on big data and cloud computing is also a four-step process: the first step is to collect big data, and build a big financial data collection platform to realize the collection, processing and extraction of various types of financial data, and to achieve the consistency, accuracy, timeliness and systematicness of it; the second step, quantitative analysis of big data to build a financial cloud computing platform, through cloud computing technology, processing and analysis millions or even hundred millions of financial big data in real-time; the third step is to find the relevance of data Mining features, and find out the issues behind the relevance; The fourth step, make a solution to the problem. The comparison with financial decision-making processes based on big data and cloud computing to traditional financial decision-making processes are shown in Fig. 2. The biggest change of decision-making to corporate financial management in the big data era is to give up the search for causal relationship, which instead of pay attention to the correlation between various issues. In traditional decisions, managers often make direct decisions rely on personal experience but now in this era, usually they make decisions based on big data analysis.
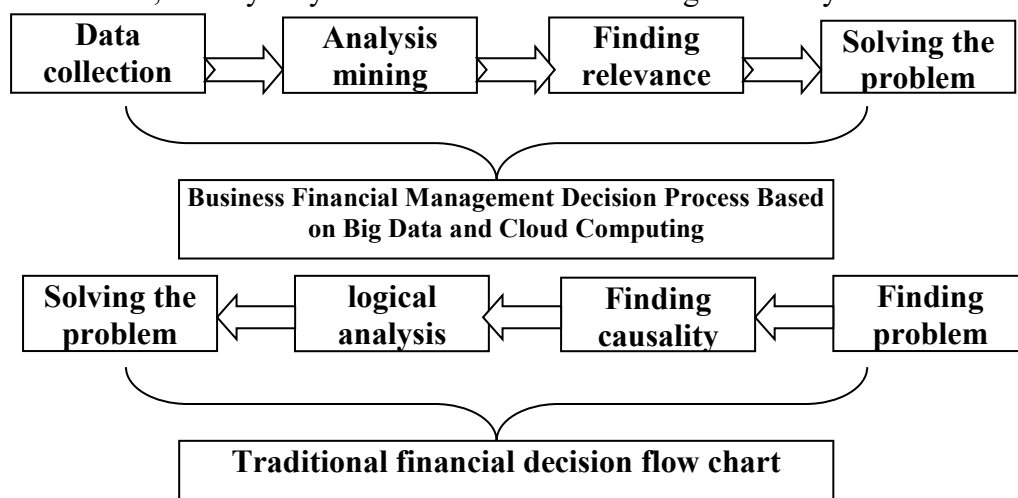

Fig. 2. Traditional financial decision flow chart and Financial decision flow chart Based on big data and cloud computing

4. Transformation of Enterprise Financial Data Processing Based on Big Data and Cloud Computing

Financial data is the core of the enterprise's financial management, it records the details of the economic activities and capital operation of the enterprise. Through the processing and analysis of the financial data, it can find the problems and risks in the operation, and then implement the targeted financial management to expand Compress the cost of income, to achieve corporate profits. Financial data is also the basic resource for the financial management of enterprises, under the background of big data and cloud computing, it need the enterprises to do a lot of change of their thought to handle financial data. [5] The changes are mainly reflected in two aspects. First, the capacity of financial data is increased, it need to deal with all the financial data rather than part of them; Second, financial data has to pay more attention to non-financial information, through the use of scalable business reporting language, accounting and other comprehensive reporting tools, financial data system will become a three-dimensional enterprise integrated Information system, to provide comprehensive, relevant and accurate decision-making information for business managers. The processing and analysis based on big data and cloud computing will take significant changes, which can bring the huge value added for the company.

The development process of financial data processing has gone through four stages: accounting data manual processing stage, accounting data mechanization processing stage, accounting data electronic computer processing stage and accounting data network processing stage. Under the era of big data and cloud computing, the financial data processing has changed more fundamentally. The financial data should deal with all the data related to finance, mainly reflected in: in the big data era, the source of financial data are becoming more abundant, the massive financial data, they break the boundaries of geographical, industrial, national, showing in the diversity and multi-level; these massive financial data are more complex, and no unitive standard or accuracy require for them, which means these numerous and complex financial data is more difficult to analyze. [6]Though the surface, it may does not have any causal relationship, but internal correlation in reality. Financial data's analysis and processing is the key, data mining techniques (neural network, decision tree, genetic algorithm, fuzzy set, etc.) widely used, the financial data analysis method is more scientific and accurate, more intelligent. In the meantime, in the era of big data and cloud computing, to realize the great changes in financial data processing above, enterprises should establish a financial big data development center, the architecture of the platform is a service-oriented system, that is, an SOA architecture. The module functions are independent of each other, combined with a protocol called loose coupling. The financial big data center development platform should have the following features: The Big Data Development Platform can collect and convert all kinds of related financial data, it's an integration platform that include foundation and adhibition; Big data development platform can achieve a series of complete semantic data processing capabilities, according to business needs to build different data processing programs (including processes, forms, application interface modules); Big data development platform can achieve the management of distributed multi-source heterogeneous data, under the same data protocol, the data of different enterprises, different structures, different formats and different locations can be unified under one system; Big Data Development Platform A well-defined functional warehouse that supports and manages the functionality provided in a variety of ways (code, controls, plug-ins, processes, databases, modules, and scripts) that can be tuned and run; Big data development platform is a completely open application integration system, it has the structure of flexible design, by a series of program modules and interfaces, according to environmental changes and business needs, the system can quickly set up to make adjustments.

5. Transformation of the Structure to Enterprise Financial Management Organizational Based on Big Data and Cloud Computing

Organizational structure is the framework formally established by the organization to decompose, combine and coordinate tasks. The design of the organizational structure of the financial management of enterprises should comprehensively consider various factors such as the nature and scale of the

operation of the enterprise, the characteristics of the industry, the type of the business and the overall organizational form of the enterprise. [7]The establishment of departmental positions should reflect the requirements of a clear division of labor, full authority and clear responsibilities, so that to enterprise the finance work smoothly. The traditional enterprise financial management organizations usually use functional departments, generally establishment of the Ministry of Finance, Accounting Department, Ministry of Finance and other departments. In the big data and cloud computing era, the organizational structure of corporate financial management will also undergo major changes, which are mainly reflected in three aspects: First, specialized departments should be established within the financial management organization to manage the development platform of the financial big data center; secondly, among those financial people, the role of data analysts is becoming more and more important. Data analysts use techniques such as statistical analysis, intelligent learning and distributed processing to extract meaningful information from a large amount of data and convey it to managers in an easy-to-understand form. Thirdly, the application of large financial data makes the financial department have closer relations with other business departments, the source of financial data is more extensive, and full participation becomes the important features of financial management under the big data era.

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