

# Analysis on the Application of Statistical Analysis in Enterprise Economic Management

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**Keywords:** Statistical Analysis, Enterprise Economic Management, Big Data, Application.

**Abstract:** With the rapid development of society, statistical analysis technology is gradually maturing, and its role is most obvious in the application of enterprise economic management. The related decisions of enterprises are realized according to the data obtained after statistical analysis. In this paper, by using big data technology, aiming at the problems existing in traditional enterprise economic management, the author constructs an application system of statistical analysis in enterprise economic management, which accords with the current economic development. This system not only makes up for the problems existing in enterprise economic management, but also effectively manages the data involved in enterprise economic management. Because it fully analyzes the data, the decision-making of enterprises is more efficient and accurate.

## 1 INTRODUCTION

Statistical analysis is the behavior of quantitative and qualitative research on data by using statistical methods. It is characterized by data nature, purpose nature, and timeliness. After statistical analysis of data information, it is beneficial to discover the value of enterprise data information. Therefore, now many business operators and managers pay more and more attention to statistical analysis. The author thinks that by using big data technology, the application system of statistical analysis in enterprise economic management can be constructed to solve the problems existing in traditional enterprise economic management, such as improper allocation of human resources, inaccurate control of financial risks, lack of evaluation of economic management system, so as to improve enterprise management level and statistical work quality, and then promote enterprises to quickly form an efficient management mode and achieve the goal of enterprise precise decision-making.

## 2 OVERVIEW OF RELEVANT THEORIES

### 2.1 Big Data

Big data are collection of massive data. Big data is specialized processing of data to obtain valuable data. The essence of big data is to process large quantities of data by using computer clusters. Big data is characterized by abundance, diversity, timeliness and value. Abundance is the most essential feature of data. Big data has a huge amount of data, and the data unit is at least PB, EB or ZB. Diversity is the multi-dimensional manifestation of data types, such as videos, pictures. Timeliness and value mean that big data can quickly obtain high-value data information.

#### 2.1.1 Overview of Big Data

Big data technology is realized through data collection, data storage, data cleaning, data analysis, data mining and data presentation. Its basic big data processing technology framework is shown in Figure 1.

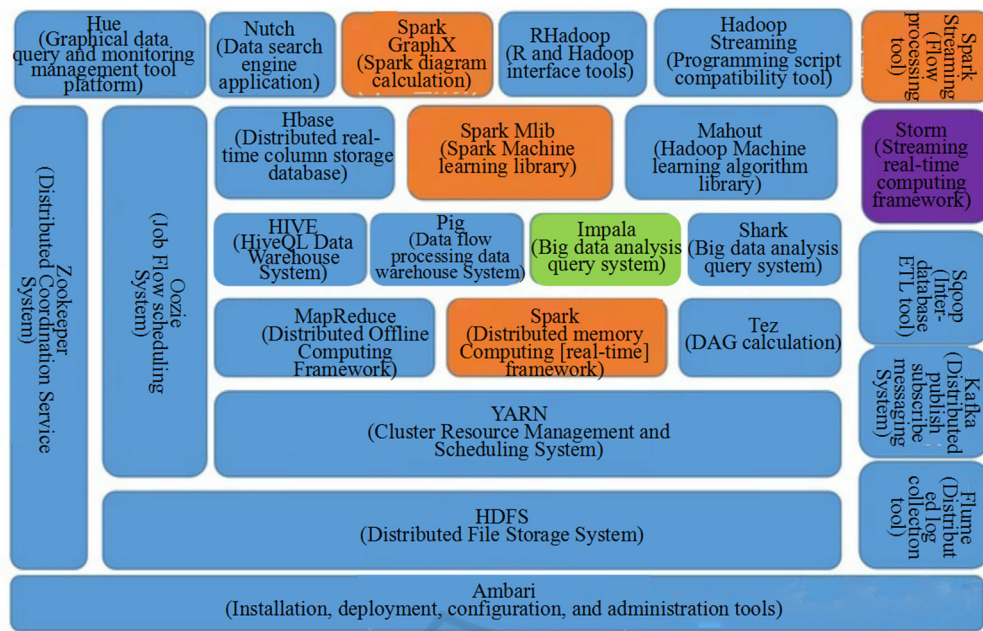


Figure 1: Basic technical framework of big data processing.

**Data collection:** Use Flume NG, NDC, Sqoop, Zookeeper and other technologies to collect the structured and unstructured scattered mass data in the network into the data warehouse. Data collection includes file logs, database logs, and access to relational databases. Data is generally presented in the form of text, graphics, images, and videos.

**Data storage:** Storage tools, such as HBase, Phoenix, Redis, and Kudu, are used to efficiently and quickly process data due to the large amount of data involved in data storage. When the data table involved is more complicated, the data can be flexibly compressed by using Parquet and ORC, so as to significantly reduce the occupation of storage space.

**Data cleaning:** Data cleaning is a process of reviewing and verifying data to ensure data consistency by adding, deleting, and modifying data. The methods used include missing data value processing and outlier processing, and technologies such as MapReduce, Oozie, and Azkaban.

**Data analysis and mining:** Use data for shallow analysis, using SPSS, SAS, etc., and then use Hive, Impala, Nutch, Elasticsearch, Mahout, machine learning algorithm, etc., for high-end analysis and application.

**Data display:** Data display is data visualization, which is to show the data results of data analysis and mining, so as to guide managers to make decisions. In the process of presentation, we need to use graphic image processing, computer vision, modeling and other methods to three-dimensional processing of

data results, such as Cufflinks, HoloViews, Pyecharts, Bokeh.

## 2.1.2 Brief Introduction of Big Data Technology

**Flume:** Flume is a tool for collecting data in big data, and performs simple processing on data, such as storage. Flume adopts a three-tier architecture, and each tier can be extended horizontally. Flume architecture collects the generated logs from the external system (Web Server). By using the Source to collect data sources into the channel, sink extracts data from the channel and stores the data into the HDFS file system. The extracted data can come from multiple external systems.

**HDFS:** HDFS is the main storage engine of Hadoop and the distributed file system of Hadoop. It can be used for offline and massive data analysis. Its characteristics are high fault tolerance, high throughput and large file storage.

**MapReduce:** MapReduce is a query engine, which is used for parallel computation of large-scale data sets. The specific operation process is divided into two steps. One is Map, which preprocesses the original data, such as filtering the required data, grouping it, and then distributing it to Reduce; the second is Reduce, which summarizes the data. For example, after receiving the distributed data, Reduce starts to execute the custom calculation function or logic, and finally gets the total data.

Hive: Hive is mainly used to map structured data into a database table, and has the function of query. Its advantage is that users can query, summarize and analyze data in HDFS without writing MapReduce program, only with standard SQL syntax.

Echarts: Echarts is the most basic tool for big data visualization. It has the advantages of making maps: first, it can be dynamic, for example, the sales of various products in various places can be displayed in one map; Second, it can not only make basic charts in Word, but also make maps, heat maps, instrument panels and so on.

## 2.2 Statistical Analysis

Statistical analysis is to prove a theory or predict the future development trend by collecting, sorting, summarizing and analyzing data. Statistical analysis can reflect not only the current situation of an enterprise at a certain point, but also the dynamic situation of a certain period, such as production and operation. (Wang, 2018) It not only provides information consulting services for decision makers, but also provides quantitative boundaries between economic phenomena for enterprises. The application of statistical analysis knowledge is reflected in the field of big data analysis. The analysis of big data needs to be supported by statistical analysis knowledge, and the two promote and develop mutually.

In the process of statistical analysis need to use statistical analysis tools, such as statistical index method, dynamic analysis, ratio analysis, comparative analysis. The function of statistical analysis method can be divided into three aspects: one is to show the law of objective things; the other is to determine the quantitative limit of qualitative change of things according to the law of quantitative change; the third is to reveal the new law that has not been discovered. It is characterized by quantity and precision.

## 3 DEMAND ANALYSIS

### 3.1 System Requirements

Economic management belongs to the most important part of enterprise management, economic management level will directly affect the enterprise profit, and then extended to the enterprise development strategy formulation, (Dong, 2015) and now exists in the economic management of enterprises human resource values, lack of financial

risk control is not comprehensive and economic management system evaluation. This will seriously affect the improvement of comprehensive strength of enterprises, and even hinder the sustainable development of enterprises. Therefore, enterprise economic management needs human resource module, financial risk control module and evaluation system as the guarantee in the process of enterprise economic management. Specific analysis is as follows:

First, the human resources department. The human resources module needs to increase the input of human resources, such as increasing the staff of the human resources department and setting up an independent human resources department; Reasonable allocation of human resources, such as the position and staff ability and technology matching; In view of employees' sense of collective achievement and superiority, measures such as performance evaluation and reward and punishment system should be set up to improve employees' enthusiasm for work. (Hou, 2015, Yang, 2015, Cao, 2015, Li, 2014) Second, finance Department. The finance department to strictly control the enterprises in the operating activities, financing activities, investing activities such as risks, such as enterprise in the process of operation, without fully considering the cash flow, capital allocation and other problems, can appear the phenomenon such as shortage of funds, unable to pay his debts, letting the phenomenon development, will affect the normal operation of the capital chain, even the results of the enterprise bankruptcy. (Chen, 2019, Wu, 2018) Third, enterprise economic management. Enterprise economic management needs to set up economic management system evaluation, in order to avoid the enterprise because of excessive pursuit of economic interests and blindly make decisions, resulting in economic losses, customer loss and other phenomena.

Now we need big data technology and statistical analysis to solve these demand problems, so as to promote the informatization process of enterprise economic management, improve the decision-making level of enterprises, and achieve the purpose of efficient management and efficient income of enterprises.

### 3.2 Overall Design

In view of the above enterprise economic management involved in the demand, now design a statistical analysis in the enterprise economic management application system, using the system to

solve the above demand problems. The application of statistical analysis in enterprise economic management is realized through the management information system, as shown in Figure 2. The management information system is built by using Web technology, statistical analysis tools and big data technology. Users enter the management information system through the website, view reports and charts, and make relevant decisions. The system consists of five parts: data source, data sorting, data analysis, application data and system evaluation. Among them, the data source is the data information of human resources department, finance department,

business department, technology development department and other departments; data sorting is to clean and convert the data source and organize it into a format that is conducive to data analysis; analysis data analyze the collated data by using statistical analysis tools and big data analysis technology; application data is to visualize the results of analysis data in the form of reports and charts. System evaluation is to evaluate the application process of statistical analysis in enterprise economic management, which is beneficial for enterprises to reflect and adjust themselves.

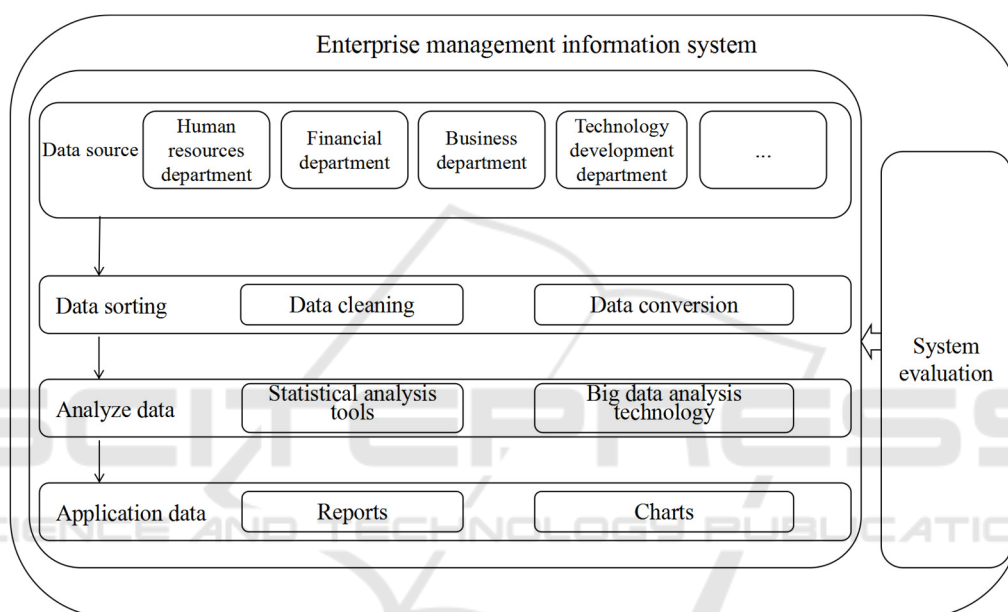


Figure 2: Management Information System.

## 4 DESIGN AND IMPLEMENTATION

This part focuses on the introduction of human resources department, finance department and system evaluation, and the specific functional modules are shown in Figure 3. The specific functional modules of Human Resources Department include employee information management, employee assessment management and employee position matching management; the specific functional modules of the financial department include financial data management, financial risk management and financial risk early warning mechanism management; the specific functional modules of the evaluation

system include enterprise data information evaluation, human resource decision evaluation and financial decision evaluation. Through the construction of the evaluation functions of human resources department, finance department and system, it makes up for the defect that the human resources department does not pay attention to it, comprehensively controls the occurrence of financial risks, and improves the evaluation system of enterprise economic management, thus making enterprise economic management more intelligent, systematic, informational and efficient, which not only improves the decision-making level of enterprises, but also makes the development direction of enterprises clear.

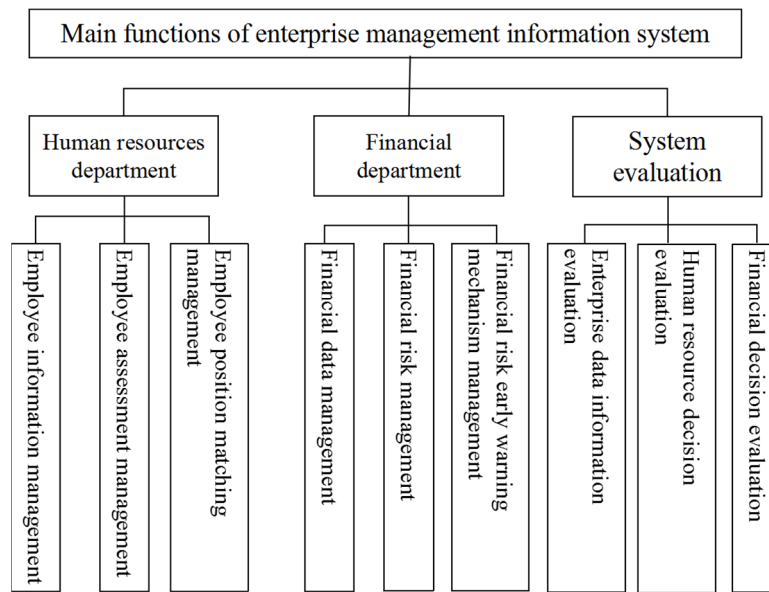


Figure 3: Specific function module.

The following is a detailed introduction to the functions.

#### 4.1 Human Resource Department

**Employee information management.** Employee information management is to use Flume to collect the data information of the data source human resources department, store it with the help of HDFS, clean and convert the data with MapReduce and spark, and send the unqualified data information such as outliers and duplicate values to the manager. The manager decides whether to filter or correct these data information. In this process, it ensures the intelligence, comprehensiveness and precision of the data information management used by the enterprises, improves the utilization rate of data and information by the department, avoids the loss of data and information, and saves human and material resources.

**Employee assessment and management.** It is necessary to establish an assessment system in employee assessment management. The system needs to analyze and query the cleaned and converted employee information by using Hive in big data technology, and then use the visualization tool Echarts to obtain reports or charts related to employee information. By viewing reports and charts, formulate a system to motivate employees to work efficiently through rewards and punishments.

**Employee position matching management.** By viewing and analyzing the report or chart of

employee information, we can transfer the employees who are not suitable for the current position or whose position is insufficient to give full play to the employees' value. It is not only conducive to the employees' efficient work, but also conducive to the employees' sense of satisfaction, accomplishment and superiority. (Jia, 2016)

#### 4.2 Financial Department

**Financial data management.** Data collection, storage, cleaning and conversion in financial data management are the same processes and tools as employee information management in human resources. Through this process, financial data can be more accurate and comprehensive, and error data caused by manual data entry, collation and review can be avoided.

**Financial risk management.** To analyze and query the processed data in the financial data management module, we need to use Hive in big data technology and statistical analysis tools, such as comparative analysis, ratio analysis and statistical index analysis. By looking at the results of data analysis, managers can not only know the source and destination of internal financial data, but also optimize the capital structure and allocate funds reasonably. It is not only conducive to the current management of enterprises, but also conducive to planning the future development of enterprises.

**Financial risk early warning mechanism management.** The financial risk early warning

mechanism is to monitor the potential risks generated in the business management activities in real time. It is based on the financial data and business plan of the enterprise, and uses statistical analysis tools and modeling methods to inform the enterprise of the crisis that the enterprise has faced and will face in advance and take corresponding preventive measures. In this way, enterprises can avoid financial crisis caused by decision-making mistakes or existing problems of enterprises themselves, and minimize financial risks.

### 4.3 System Evaluation

Enterprise data information evaluation. Enterprise data information evaluation is to evaluate the reports and charts related to human resources and financial departments. It evaluates the integrity, timeliness, legitimacy, uniqueness, consistency, accuracy and timeliness of data information. The evaluation results are graded by the frequency of data information quality problems (frequency of data information quality problems/total data stored). According to the frequency greater than equal to 1, less than 0.5 and intermediate value is divided into three levels, respectively, grade one is poor quality, need to be key monitoring; grade three is good quality, continue to maintain; grade two quality is general, need to find the source of the problem. Through data and information evaluation, we can understand the current status of the enterprise and determine the future development direction of the enterprise.

Human resource decision evaluation. According to the decision-making of human resources department, it can be judged whether it is beneficial to the development of enterprises, such as increasing investment in human resources department, making decisions to improve job matching degree, and making employee appraisal system, etc. The score reduction system needs to be used in the determination process. The score reduction system is based on the performance appraisal of the department, and the performance appraisal is aimed at employees' work efficiency, mastery of theoretical knowledge and attitude towards work, with a total of 10-point system, the work attitude is 4 points, and the other is 3 points each. When the score drops to 3 points, it is judged that there is something wrong with the decision-making and adjustment is needed. Through the evaluation of human resources decision-making, it is beneficial to timely adjust the decision-making of enterprises to departments, so as not to cause more problems.(Zhang, 2017)

Financial decision evaluation. It is to evaluate the economic decisions made by enterprises, such as meeting the daily business activities of enterprises and ensuring the normal operation of enterprises as a whole; when arranging the reasonable funds in fund-raising activities, we should consider that the enterprise has the ability to pay off debts; implement real-time tracking of investment projects, and feed back the profit and loss of investment projects in time, so as to decide whether to make additional investment or divestment. The evaluation also implements the score reduction system, aiming at the situation that the loss and profit amount of the enterprise are small, the enterprise adjusts the decision. Through this evaluation, it is conducive to timely stop loss, thus improving the profitability of enterprises. (Lei, 2020, Cui, 2020, Pan, 2020)

## 5 CONCLUSION

The application of statistical analysis in enterprise economic management is built through centralized management of enterprise human resources department and financial department, which not only shows that enterprises attach importance to human resources department, but also comprehensively controls the occurrence of financial risks. The construction of this system is conducive to promoting the information management of enterprise data and improving the efficiency of enterprise decision-making. After replacing departments and data, the system can also be applied to other departments of the enterprise, so as to realize the clarity of data in each link of the enterprise and further make the enterprise develop better. Similarly, modern enterprises also need to build this system to achieve the goal of maximizing the economic benefits of enterprises.

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