Research on the Impact of Hadoop Application on Financial Performance

Xieyong Wang *, Xiuchun Wang
Email: 844140415@qq.com, Email: 1603422502@qq.com

School of Economics and Management, Dalian University, Dalian University

Abstract: With the popularization and application of Internet technology, the integration of Hadoop resources is becoming more and more important for enterprises, and at the same time, it also brings some influence to the traditional financial management of enterprises. This paper analyzes the opportunities and challenges brought by Hadoop to financial management, and puts forward the problems existing in the enterprise management mode in the era of Hadoop. Take Suning Tesco as an example to analyze its financial performance after applying big data. On this basis, it is proposed that enterprises can promote the transformation and upgrading of enterprises management, improve financial performance and promote the digital transformation of enterprises from the aspects of professional talents and information prevention and control.

Keywords-components: Hadoop; Enterprise financial management; Financial performance

1. Introduction

With the development of the Internet of Things, cloud computing, block chain and other information technologies, the era of Hadoop has come. Hadoop is an information asset, which can be understood as a new tool for information collection, processing and analysis. It has the characteristics of large quantity, complex structure type and high data processing efficiency. The main tasks put forward in the "14th Five-Year Plan" for Hadoop industry development include accelerating the cultivation of data factor markets, giving full play to the advantages of Hadoop to accelerate the aggregation of "large volumes" of data, strengthen the "diverse" processing of data, promote the "timely" flow of data, strengthen the "high-quality" governance of data, and promote the "high-value" transformation of data. In the era of Hadoop, the management mode of enterprises has changed and is developing to information and network. The value of information acquired by enterprises is decentralized, that is, it is more difficult for enterprises to identify the authenticity and effectiveness of information, which will bring multiple impacts to the management of enterprises.

As the core department of an enterprise, the financial department needs to deal with complex information to provide support for the business activities of the enterprise, which is related to the economic benefits and value creation of the enterprise. Relying on Hadoop, strengthen the construction of data, deepen the Hadoop applications, the data acquisition, storage, integration and analysis, form a unified, standardized data planning system, so as to improve the efficiency of financial resource allocation, provide more support for the enterprise strategy and management, financial new competitive advantage, promote enterprise's financial performance.

This is also the key for enterprises to improve their value creation ability and market competition ability in the context of Hadoop era. Therefore, exploring how to improve the financial performance of enterprises in the era of Hadoop is an issue that enterprise managers should ponder.

2. Opportunities and challenges brought by Hadoop to enterprises

2.1 Opportunities

Improving financial information and enhancing decision making ability. Enterprise financial management work is closely linked to future business decisions, and the direction of decision-making will directly affect the benefits obtained by the enterprise. Applying Hadoop in financial work such as obtaining and processing information not only improves the efficiency of obtaining data, but also can provide more comprehensive data support for enterprises[1]. Enterprises can use Hadoop to obtain information external to the enterprise to help them make more reasonable economic decisions.

Improving budget management and reducing operational risks. In this era of information technology, enterprises are facing a changing market environment[2]. With the promotion of Hadoop technology, enterprises will form a digital financial exchange information platform, and managers can understand the changes of internal and external information of enterprises more timely and avoid potential risks effectively in advance.

2.2 Challenges

Raising the requirements for financial personnel. Financial staff are the main body of financial management. In the era of Hadoop, the operation and management of enterprises are gradually integrated with online and offline development. The more important task of financial personnel is to analyze the data of the enterprise and to be able to integrate various aspects.

Low data security. In the era of Hadoop, there will be more and more data sharing among various departments of enterprises. Enterprises or individuals can use the shared information to carry out data intrusion. The explosive growth of all kinds of information data leads to the increase in the difficulty of processing information, so it is more likely to leak corporate information.

3. The problem of enterprises improving financial performance in the era of Hadoop

3.1 Enterprise financial management lack of technical personnel

Financial personnel is an important support for enterprise management. In the era of Hadoop, financial personnel need to combine professional and digital skills to create greater value. In the era of Hadoop, financial management is becoming electronic and intelligent. Most enterprises are still traditional financial management systems, which cannot meet the requirements of enterprise management in the era of Hadoop. At the same time, the function of financial work has changed to high-level budget management and data analysis, and the lack of profes-

sional and technical personnel in financial management has limited the play of the role of Hadoop technology.

3.2   Information quality and security are not high

The sharing of information resources in the era of Hadoop will improve the efficiency of financial management and risk management ability of enterprises. But high levels of information sharing can also be dangerous. Many enterprises are not paying attention to the quality and security of data. The huge amount of information increases the difficulty of identifying and using effective information. For example, especially in the current e-commerce enterprises, in the decision-making is lack of comprehensive and effective data support, which leads to the increase of business risks. In addition, in the era of Hadoop, more and more information of enterprises depends on the Internet to operate, and network hackers are becoming more and more aggressive. Once the data transportation process is leaked or the system is maliciously attacked, it will bring harm to both enterprises and users.

4.   Case study

4.1   Sample Selection

In 2013, Suning Tesco started to build an online shopping platform and changed its name from "Suning Electric" to "Suning Yunshang", which revealed that Suning Tesco would then take the development path of combining online platform and offline stores. In 2017, Suning officially launched the expansion of "Retail Cloud", which helps small merchants complete their retail transformation through the digital reconstruction of the whole scene and the platform empowerment of the whole value chain. Suning Tesco's investment assets have changed from heavy assets to light assets, and resources have been reconfigured. At the same time, Suning Tesco provides big data and supply chain support for franchisees. There are some problems in its strategic transformation, and the current profit level is not high, but its use of big data is the right strategy to comply with the times and will bring long-term benefits to the business.

This paper uses factor analysis to analyze the financial impact of Suning.com after using big data. The article selects 10 relevant indicators that reflect the comprehensive financial performance of Suning.com, including operating capacity, profitability, solvency, and growth capacity, for evaluation and analysis. The selected data were obtained from Sina Finance and the company's 2012-2020 annual report. The data were then analyzed by KMO and Bartlett's spherical test using SPSS.17, and the test value was greater than 0.5, indicating that the selected financial indicators can be used for financial performance analysis by factor analysis.

Table 1 Financial Index

Classification	variable symbol	variable name
Operation capacity	X1	inventory turnover ratio
	X2	total assets turnover
Earning capacity	X3	Main business profitability

	X4	Return on equity
	X5	Return on assets
Debt paying ability	X6	Liquidity ratio
	X7	Quick ratio
Developing ability	X8	Growth rate of main business
	X9	Net asset growth rate

4.2 Model Building and Analysis

The eigenvalues of each index and the variance contribution rate were calculated. By extracting factors through principal component analysis, based on statistical principles, the cumulative variance contribution of common factors should be greater than 80% and the eigenvalues should be greater than 1. Therefore, three common factors can be extracted in this paper. The post-rotation sum-of-squares loading of component 1 (F1) is 23.239%; the post-rotation sum-of-squares loading of component 2 (F2) is 67.836%, indicating that F2 has the highest degree of explanation; the post-rotation sum-of-squares loading of component 3 (F3) is 4.274%, indicating that F3 ranks third in terms of explanation. The cumulative of these three extracted components to the overall reached 95.349%, indicating that F1, F2, and F3 go well to explain most of the information covered by all indicators.

From the table of component score coefficients, it can be seen that the correlation coefficients of principal component F1 with X6 and X7, current ratio and quick ratio, are relatively large, so F1 can be called the solvency factor; the correlation coefficients of principal component F2 with X9 and X10, net assets and total assets, are relatively large, so F2 is called the growth ability factor. The correlation coefficient between principal component F3 and X4, the return on net assets, is relatively large, so F3 will be referred to as the profitability factor.

Table 2 Component Score Coefficients

	Component		
	1	2	3
X1	.003	.000	-.020
X2	.000	.000	.000
X3	-.009	.008	.124
X4	.006	.019	.806
X5	.008	-.002	.014

X6	.409	.003	.344
X7	.378	-.031	-.253
X8	.256	-.048	-.428
X9	-.280	.861	-.121
X10	.098	.169	.222

4.3 Combined score calculation

After analyzing the various indicators mentioned above, the component score coefficient matrix obtained using spss17.0 was used to derive the principal component F1, F2, and F3 scores for each year from the component score coefficient matrix, which was calculated as follows.

$F1=0.003*X1-0.009*X3+0.006*X4+0.008*X5+0.409*X6+0.378*X7+0.256*X8$
$-0.280*X9+0.098*X10$
$F2=0.008*X3+0.019*X4-0.002*X5+0.003*X6-0.031*X7-0.048*X8+$
$0.0861*X9+0.169*X10$
$F3=-0.02*X1+0.124*X3+0.806*X4+0.014*X5+0.344*X6-0.253*X7-0.428*X8$
$-0.121*X9+0.222*X10$

The scores of each factor are then multiplied by the variance contribution ratio and summed to obtain the composite score: $F=0.24377F1+0.71115F2+0.04448F3$

The calculation results are shown in the figure below. From the chart, we can see that since the digital transformation of Suning.com, its composite score has generally been on an upward trend, while the decline in the composite score in 2020 is mainly due to the impact of the new crown epidemic received.

	F1	F2	F3	F
2012	0.01699	0.31301	0.84126	0.26
2013	-0.18221	-0.4797	-0.10942	-0.39
2014	-0.35334	-0.39416	2.03966	-0.28
2015	0.46541	-0.39446	-1.19148	-0.22
2016	-0.41905	2.54018	-0.28812	1.69
2017	1.12356	-0.0884	-0.69427	0.18
2018	1.69944	-0.30302	0.19056	0.21
2019	-0.65779	-0.37692	0.23382	-0.42
2020	-1.69301	-0.81654	-1.022	-1.04

CHART I Composite Score

5.   Corporate financial performance improvement path

The era of Hadoop has brought new opportunities and challenges to enterprise management, and also exposed the existing problems in the development of enterprises. Therefore, enterprises should timely change and continue to innovate, follow the basic principles of the "14th Five-Year Plan" Hadoop industry development plan, and achieve value leading, integrated innovation, foundation first, safe development, system promotion, open cooperation. Actively take measures to promote the system of information construction, transfer to value creation, seize the opportunity to innovate and develop continuously.

5.1   Strengthening the construction of professional talent team

We need to train enterprise managers and cultivate "business + technology" composite talents. Using the relevant technical platform or software equipment, we train and lead the personnel of each position to conduct simulation exercises, use big data technology to mine relevant data, and be able to organize and analyze the database. It is also necessary to re-educate enterprise managers to accept the way of working in the era of big data and to develop a digital way of thinking, so that the concept of big data can be applied to their daily work. Only after the professionalism of the managers is improved can the big data technology be more fully integrated into the management of the enterprise.

5.2   Strengthening information prevention and control management

To plan and build data governance platform, implement data standards, data sources, data security related policies, specify data verification rules, as far as possible to collect reliable, complete data, speed up the process of value development, promote the "high value" transformation of data. Define the scope of data governance responsibilities, if data problems occur, directly feedback to the relevant responsible department. Enterprises can also set up professional accounting and auditing information personnel according to their actual conditions to supervise the internal information content of enterprises and strengthen "high-quality" data management. At the same time, the enterprise management personnel enhance the awareness of risk prevention and control, conduct regular risk assessment for the operation of the system, and maintain the safe operation of the management system.

6.   Conclusion

This paper summarizes the opportunities and challenges brought by the era of Hadoop to enterprise management, which not only raises higher requirements for enterprises, but also promotes the development of digitalization and intelligence of enterprises. In the context of the rapid development of Hadoop, the management mode of enterprises also shows some problems. The application of big data in Suning Tesco is taken as an example to prove, and it is proposed that enterprises and their managers should seize the opportunity, constantly innovate and make use of new technologies in the era of big data to improve financial performance.

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