

Study on the Ways of Enterprise Financial Accounting and Management Accounting Integration at the Era of Big Data through Algorithms Data Models

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Abstract: Financial accounting and management accounting are two branches of accounting, the integration of the two can create a good business environment for enterprises, create greater economic benefits for enterprises, so as to help enterprises to obtain optimization and development. The era of big data has fully arrived. How to deal with this major challenge and maximize the integration value of financial accounting and management accounting in enterprises has become an urgent issue for all enterprises to consider. Based on the current situation of the integration of financial accounting and management accounting, this paper analyses the basis of the integration of financial accounting and management accounting in the era of big data by using algorithms data models, and focuses on the integration of financial accounting and management accounting, which can provide guarantee for the sustainable development of enterprises.

Keywords: The era of big data; Financial accounting; Management accounting; Algorithms data models; Fusion pathway

1 INTRODUCTION

In the process of enterprise management, accounting work is one of its important components (Yin, 2017 and Yu, 2019). The development of accounting work is conducive to the correct management of enterprises according to the scientific way, and promote the smooth and orderly operation and management of enterprises (Li, 2017 and Zhang, 2021). Under the background of big data era, enterprises are facing increasingly fierce competition (Liu, 2020). Whether they can master the analytical ability of information and data has become one of the important conditions for enterprises to compete. Rapid, effective and accurate data analysis can help enterprises improve their competitive strength and provide reliable data support for business planning and solutions (Yang, 2019 and Liao, 2013 and Cai, 2016). With the popularization and application of big data technology, most enterprises expect to master the ability of data analysis as soon as possible, so as to better improve their competitiveness (Huang, 2014 and Guo, 2018). In this environment, it also has a significant impact on enterprise financial accounting and management accounting (Dai, 2018 and Chang, 2018). Based on this, in order to maximize the value of enterprise accounting work, should be effective integration of the two, in order to provide effective data support for enterprise leaders and managers to carry out decision-making, for enterprises to achieve healthy and sustainable development of a solid foundation.

2 ALGORITHMS DATA MODELS

In order to collect the required data better and more comprehensively, the data model algorithm chosen in this paper is genetic algorithm. The effectiveness evaluation indexes of some clustering algorithms are summarized as follows:

(1) The square of the distance between samples in each cluster and the clustering centre: the smaller the square is, the better the clustering effect will be.

(2) Hubert statistical method:

$$S = \left(\frac{1}{m}\right) \sum_{i=1}^{N-1} \sum_{j=i+1}^N P(i, j) Q(i, j)$$

where, in the curve of S changing with the number of clusters, there is a turning point of abrupt decline, and the number of clusters at this turning point represents the number of clusters of the data object itself.

(3) Dunn index

$$D_{nc} = \min_{i=1, \dots, nc} \min_{j=i+1, \dots, nc} \left[\frac{d(c_i, c_j)}{\max_{k=1, \dots, nc} \text{diam}(c_k)} \right]$$

where, the larger the value of D, the better the tightness and separation, that is, the better the clustering effect.

(4) Separation coefficient

$$J = \sum_{j=1}^k \sum_{i=1}^n (u_{ij})^\alpha D^2(x_i, c_j)$$

where, α stands for fuzzy factor and u_{ij} stands for fuzzy membership degree. The separation coefficient is as follows:

$$F(U, K) = \frac{1}{n} \sum_{i=1}^n \sum_{j=1}^k (u_{ij})^2$$

The number of clusters is as follows:

$$\max_k \left\{ \max_\lambda F(U, K) \right\}, k = 2, 3, \dots, n - 1$$

(5) Separation index

$$H(U, K) = -\frac{1}{n} \sum_{i=1}^n \sum_{j=1}^k \log(u_{ij})$$

The number of clusters is as follows:

$$\max_k \left\{ \max_\lambda H(U, K) \right\}, k = 2, 3, \dots, n - 1$$

where, if all u_{ij} are closer to 0 or 1, the entropy will be lower, thus getting better clustering effect. If u_{ij} approaches 0.5, the higher the entropy, the worse the clustering effect. The separation coefficient and separation index are proposed for fuzzy clustering, but they are not related to the data itself.

(6) Index function of tightness and separateness

$$\max_k \left\{ \max_\lambda S(U, K) \right\}, k = 2, 3, \dots, n - 1$$

where, $S(U, K)$ represents the ratio of the mean distance between the data objects and their corresponding clustering centres to the minimum distance between the clustering centres. Therefore, the smaller $S(U, K)$ is, the better the clustering effect is.

3 CURRENT INTEGRATION OF FINANCIAL ACCOUNTING AND MANAGEMENT ACCOUNTING

From the traditional concept, financial accounting is mainly an accounting method to measure the internal business activities of enterprises through money, and the final need to use financial statements to present the relevant financial data of enterprises. However, management accounting is a management mode that assists managers and departments of enterprises to formulate corresponding plans and make decisions based on the development of economic activities within enterprises (Yin, 2017). Management accounting will be directly involved in the whole process of business decision-making and management control (Yin, 2017).

3.1 Management decision makers' cognition of management accounting is not comprehensive

In our country, the earliest type of accounting experienced by enterprises is financial accounting. Nowadays, with the development of information technology and the accumulation of financial experience, financial accounting has become a relatively mature accounting system. From the perspective of accounting application, financial accounting of enterprises is far higher than the development level of management accounting. Although management accounting has been developed to some extent, there are still some problems in the practical application. Especially with the development and application of information technology, usually enterprises in order to rapidly improve the quality and efficiency of financial accounting, often use all kinds of financial software for office work, but this kind of software is basically more focused on the functional level of financial accounting. Therefore, this makes most of the financial information inside the enterprise cannot be shared, and then restricts the application of management accounting in the enterprise industry. In addition, the general enterprise management decision-makers pay more attention to the financial accounting work, thus downplaying the role of management accounting, and ultimately will inevitably limit the further development of management accounting in enterprises.

3.2 Financial accounting and management accounting integration is not sufficient

It is understood that many enterprises fail to achieve effective integration of financial accounting and management accounting in internal management, but independent separation of the two. The reason analysis, on the one hand, the enterprise has not established an effective communication mechanism, in the daily accounting work between financial accounting and management accounting communication content is very little. On the other hand, there is a difference in the information management system used inside the enterprise, resulting in the cooperation between departments cannot form close coordination, resulting in the difficult integration for them.

4 BASED ON THE BIG DATA ERA OF ENTERPRISE FINANCIAL ACCOUNTING AND MANAGEMENT ACCOUNTING INTEGRATION BASIS

4.1 Integration of theories

Enterprise financial accounting and management accounting although in the accounting work of the emphasis is completely different. However, its ultimate purpose is to maximize the economic benefits for the enterprise and effectively help the enterprise to improve the internal management ability. Therefore, from the perspective of theoretical integration, there are three theoretical bases for the integration of enterprise financial accounting and management accounting. First, the source of basic information is consistent. Although financial accounting and management accounting belong to two different branches of accounting, one of the main reasons why management accounting can guide the development decisions of enterprises is that it has accounting data as the basis. The reason why financial accounting can calculate and form internal financial statements is based on some original vouchers that can truly feedback the production and operation of enterprises and economic exchanges. Therefore, it can be said that the basic information data sources required by financial accounting and management accounting are consistent. Second, the objectives of financial accounting and management accounting are consistent. There are many core contents inside the enterprise, including human resources, intellectual capital and so on. However, these values are often not calculated in the financial statements, which indirectly reflects the enterprise needs the mutual integration of financial accounting and management accounting, in order to better develop a plan for the business development of enterprises. Any department and resources within the enterprise are designed to promote the sustainable development of the enterprise. This makes the financial management department need to contribute enough resources to the development of enterprises. And this is the common mission and task of financial accounting and management accounting. Therefore, in general, the objectives of enterprise financial accounting and management accounting are consistent. The third is the close relationship between financial accounting and management accounting. Enterprise management accounting is the further extension and expansion of financial accounting. And financial accounting is the fundamental basis of management accounting. Enterprise financial accounting daily face is all kinds of production and operation activities. Management accounting should deepen the analysis and processing of the content of

financial accounting, and then apply it to the guidance and control of enterprise management, so as to lay the foundation for the development of the in-depth work of management accounting.

4.2 Integration of personnel

At present, accounting practitioners mainly focus on financial accounting. However, the relevant content involved in management accounting is obviously insufficient, which will inevitably restrict the effectiveness of the actual accounting work of enterprises (Yu, 2019). In view of the environmental background of big data, China has gradually realized the inevitability and importance of the integration of enterprise financial accounting and management accounting (Yu, 2019). Therefore, we should strengthen the training of high-quality and strong professional financial compound talents in the fields of accounting science and economic management (Yu, 2019). It demonstrates the importance of management accounting in accounting work based on the real operation needs of enterprises, laying a foundation for the scientific, reasonable and effective implementation of accounting work (Yu, 2019).

4.3 Integration of values

It is the key to improve the reliability of accounting information to effectively integrate financial accounting and management accounting scientifically and reasonably. From the perspective of users of accounting information, it includes both internal and external users (Li, 2017). However, from the perspective of the mastery and application of accounting information, the internal users of enterprises have stronger monitoring ability and the use of management accounting is more reliable (Li, 2017). Only under the premise of correct and effective use of management accounting, it can guarantee the reliability of accounting information, and then enhance the reliability of the overall accounting. In addition, the daily management and accounting work required by financial accounting not only contains the relevant content of monetary measurement. There is also non-monetary measurement work. In this regard, we should effectively avoid or eliminate the probability of fraudulent behaviour by means of scientific fusion form, and lay a foundation for the fusion of financial accounting and management accounting.

4.4 Integration of technologies

The rapid development of current science, technology and economy has greatly boosted the reform of accounting information in our country. Accounting information technology is therefore widely used in enterprise accounting work. The core technology dominated by big data promotes some advanced and pioneering information technology to provide great support for enterprise management and decision making. In the era of large data, big data technology has become the main means for enterprises to obtain profits. Big data technology can provide strong and reliable technical support for the implementation of enterprise accounting and management, thus providing a technical basis for the mutual integration of enterprise financial accounting and management accounting.

5 BIG DATA ERA ENTERPRISE FINANCIAL ACCOUNTING AND MANAGEMENT ACCOUNTING INTEGRATION APPROACH

5.1 Create a favourable external environment for development

In the context of social market economy, the national regulatory system should play a positive guiding role in promoting the integration of enterprise financial accounting and management accounting (Zhang, 2021). Create a better opportunity and environment for the organic integration of the two (Zhang, 2021). Based on this, our country needs to further improve the relevant systems and systems, so as to provide legal support for the integrated development of financial accounting and management accounting (Zhang, 2021). The implementation of this work should have rules to follow and laws to follow. In particular, the enforcement of laws should be used to strictly regulate the current accounting behaviours and lay a solid foundation for the healthy operation of the social market economy, so as to ensure that the market can play its auxiliary role and maximum advantage under the reform of the accounting system (Zhang, 2021).

5.2 Develop a sound internal financial management system

Enterprise internal financial management system is the basis of enterprise accounting implementation work, and enterprise management is extremely important, in helping enterprises to achieve standardized management at the same time, but also effectively promote the improvement of enterprise operating efficiency. At the same time in order to make the organic integration of financial accounting and management accounting, it is necessary to develop a perfect internal financial management system of enterprises. First of all, the enterprise should clearly define the accounting branch, establish the main content of financial accounting and management accounting, clarify the job responsibilities and work categories of the two in the work, avoid the cross-over of the work content and the duplication of the nature of the work, and then promote the enterprise internal resources to play the maximum effect, for the enterprise managers to carry out decision-making to provide strong data support. Secondly, in the process of enterprise operation and management, management accounting needs to carry out confidential information communication with different departments. Therefore, enterprises should establish an information sharing platform in time to ensure efficient and accurate internal communication and operation.

5.3 Make full use of big data technology

Enterprises should actively use big data technology to promote the mutual integration of financial accounting and management accounting. At present, big data technology has been widely used in various fields of society, and it will inevitably affect the development of enterprise financial management. With the help of big data technology, information database is formed in enterprises, and various financial data of enterprises are analyzed, classified and stored with the interaction of data. Financial personnel can search and optimize some of the data, and then improve the applicability of the data, and finally meet the needs of enterprise

management decision-makers. At the same time, enterprises can also use big data technology to realize real-time monitoring, remote management, instant retrieval and other functions of information data, effectively meet the personalized and targeted needs of enterprise financial management, and ensure the timely accuracy of data supply. Through information technology to promote the organic integration of financial accounting and management accounting, effectively reduce the difficulty of accounting data collection, effectively help financial workers to improve the level of financial management and efficiency.

5.4 Improve the comprehensive literacy of financial workers

Talents are the most fundamental premise for the integrated development of financial accounting and management accounting of enterprises. High-quality and professional financial compound talents are one of the important capitals for the sustainable development of enterprises. Specifically, enterprises can improve the comprehensive ability of financial workers from the following places.

1. Improve the entry threshold of enterprise financial workers. When hiring financial personnel, enterprises should assess the candidates' professional knowledge in both financial accounting and management accounting, and require the employers to have certain management accounting ability. By raising the entry and employment threshold, we can improve the comprehensive quality of financial workers at the source.
2. Strengthen internal training to improve the comprehensive ability of financial workers. Enterprises should organize financial personnel to carry out professional training or lectures, to help them establish advanced financial management concepts, and really clarify the connotation and role of financial accounting and management accounting. Improve their financial literacy by understanding the connections and differences.
3. Develop financial work evaluation and incentive system. In order to better stimulate the enterprise financial workers in the integration of financial accounting and management accounting development of positive initiative, it is necessary to evaluate their work content and results. Those who can conscientiously perform their duties and overfulfill their tasks should be rewarded accordingly. And for the failure to complete the task on time and effectively should be given corresponding punishment. Through the examination to promote the financial workers always hold a positive work attitude, improve their sense of work responsibility, promote the improvement of their comprehensive quality.

5.5 Timely change the thinking mode of enterprise management decision makers

Financial accounting and management accounting to be truly integrated development, must be the enterprise management decision makers in the recognition of thinking and behaviour support. In the traditional accounting model of enterprises, most people think that financial accounting and management accounting are not only the division of labour is completely different, but also consider the influence factors on the original work after integration. As a result, enterprise management decision-makers often do not have high enthusiasm for their integrated development. Therefore, first of all, it is very important for enterprise management decision-makers to change this traditional concept. We should recognize the importance of systematic

operation and management of enterprises from the perspective of improving enterprise management level, so as to better urge the transformation and development of enterprise accounting and realize the integration of finance and management. Secondly, as professional financial personnel, also should be deeply aware that the financial work is not just a simple accounting data. At the same time, in-depth analysis should be carried out for the data, so as to fully explore the potential utilization value behind the data.

6 BIG DATA ERA ENTERPRISE FINANCIAL ACCOUNTING AND MANAGEMENT ACCOUNTING INTEGRATION CASE

Taking variable liability costing as an example, this paper divides all costs into fixed and variable costs on the basis of variable costing. Then it apportioned the variable costs among different products and calculated the variable costs of finished products and semi-finished products, and finally transferred the differences between the variable costs and fixed costs to the financial management department. The responsibility runs through the whole process of cost division, the responsibility cost of different departments is confirmed according to the specific responsibility, and then the further cost budget is carried out to analyse the difference between costs and give performance appraisal (Liu, 2020). Taking the total production cost of the enterprise as the main direction, the financial management department apportioned the fixed cost and variable cost among each product, and calculated the actual output cost of the product. Use big data technology to build a cost measurement system. Through the system integration to meet the enterprise financial accounting and management accounting application requirements.

For example, a company is engaged in the production of A and B products, involving management, processing and assembly departments. In this paper, the integration of financial accounting and management accounting under the application of big data in variable responsibility cost accounting is explained in a simple way. In the absence of finished products and semi-finished products, the cost required by the processing department of the enterprise is shown in Table 1.

Table 1: Controllable cost and uncontrollable cost of management department (unit: Yuan)

Item	Actual yield	Actual unit variable cost	Actual variable total cost	Standard variation total cost	Variable cost variance	Actual fixed cost	Uncontrollable cost	Actual cost (total)
Product A	12000	210	2520000	2400000	120000		30000	2580000
Product B	18000	98	1764000	1800000	-36000			1764000
Fixed cost						1100000	18000	1118000
Total			4284000	4200000	84000	1100000	48000	5462000

As can be seen from Table 1, the total cost of standard changes of A and B products is 25.2 million yuan and 1.76. 4 million yuan respectively. According to the analysis of product A, the

uncontrollable cost of the management department is 30,000 yuan, which shall be borne by the management department. The actual carry-over of finished products in the processing department can be reflected in Table 2.

Table 2: Controllable cost and uncontrollable cost of management department (unit: Yuan)

Item	Relevant departments			Total
	Producing department	Administrative department	Accounting department	
Product A standard variable cost	2400000			2400000
Product B standard variable cost	1800000			
Uncontrollable variable cost of product A		30000		30000
Product A variable cost variance			120000	120000
Product B variable cost variance			-36000	-36000
Controllable prescribed costs			1100000	1100000
Uncontrollable prescribed costs		18000		18000
Total	4200000	48000	1184000	5432000

Finally, check the completion of the responsibility cost of the assembly department, as shown in Table 3. As can be seen from Table 3, overspending was caused by the failure of the processing department to properly control the cost.

Table 3: Assembly department actual cost carry-over (unit: Yuan)

Item	Responsibility cost budget	Actual liability cost	Reduction of liability cost
Variable cost of product A	2400000	2520000	-120000
Variable cost of product B	1800000	1764000	36000
Fixed cost	1080000	1100000	-20000
Total	5280000	5384000	-104000

7 CONCLUSIONS

In the era of big data, the organic integration of financial accounting and management accounting is an important means to realize the innovation and development of enterprises, and is conducive to enhancing the core competitiveness of enterprises in the market competition. Enterprise management decision makers should actively change the financial concept, establish information data sharing platform, rational use of big data technology, improve the internal financial management system and improve the comprehensive quality of financial personnel and a series of measures, in order to promote the deep integration of the two in accounting work. To provide more scientific and reasonable development planning path for enterprise management decision makers, in order to ensure the sustainable and healthy development of enterprises.

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