Research on Financial Business Integration and Financial Management Function Transformation Based on Thermal Power Plants

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Abstract. The traditional financial management mode is challenging in the operation and management of modern thermal power plants facing the acceleration of informational process. It is necessary to seize the footsteps of informational to accelerate the integration of financial business and realize the transformation of financial management intelligence. Infiltrating information technology into financial management, the financial management work is no longer out of touch, enabling various businesses to achieve centralized and integrated management on the information management platform. The paper revolves around the investigation of thermal power generation thermal power plants, and summarizes the integration of financial information business and the transformation of financial management functions. It is expected to provide new ideas for reshaping the work structure and functional transformation of the financial management work of thermal power plants.

1. Introduction

China's market development has entered a period of further deepening reform. In order to continue to develop steadily, thermal power plants must adapt to the market trajectory of diversified operation, and adjust the management system of modern thermal power plants with reference to the trend of the world economy. Especially for large thermal power plant groups, to improve the competitiveness of the industry and improve the operational efficiency of thermal power plants, it is necessary to reposition the financial functions. At present, in order to strengthen the financial system's ability to respond to business conditions, thermal power plants have incorporated financial operations into the financial automation management system and established an integrated model for thermal power plant financial services. Various financial data of thermal power plants can be quickly transmitted through the information platform and integrated according to needs, thus avoiding the subjective interference factors of financial personnel, so that various information data is shared on the information platform, avoiding repeated operations of financial work, so that the efficiency of the finance department has been greatly improved [1].

The integrated management of financial business of thermal power plants is a system theory, which integrates the management of thermal power plants into financial management, implements management from the source, implements dynamic management of finance through remote processing and online management, and truly realizes financial Pre-planning, in-process control and post-event feedback to achieve full process management of the business. This paper compares the management of

the integrated management of thermal power plant headquarters with the traditional manual accounting mode. In-depth exploration of financial integration management, the realization of the optimal allocation of financial information resources, and the restructuring of financial management functions under the financial business integration model.

2. Overview of the integrated management mode of financial business

2.1. Definition of related concepts

Integrated management of financial business refers to the use of modern network technology and information integration methods to integrate finance with business and supply chain, pursuing overall efficiency and efficiency improvement, shortening production lead time, and improving overall flexibility and reduction of thermal power plants. The inventory of materials enables the thermal power plant to have high efficiency and quick response capability, achieve a high degree of uniformity of logistics, capital flow and information flow, and real-time financial management to meet the market requirements of flexible production, flat organization and individualized products.

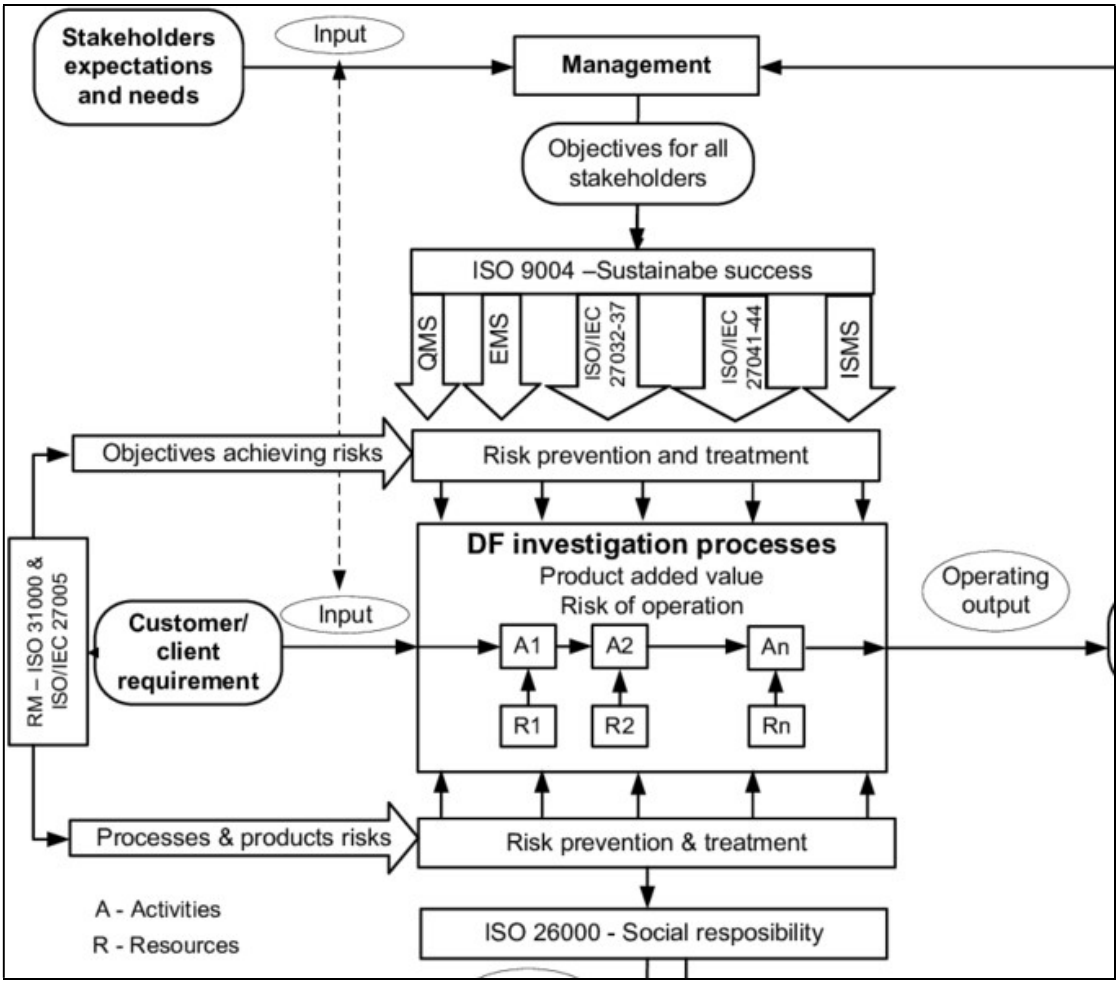

Figure 1. Financial integration management process.

2.2. Features of integrated management mode

The integrated financial management model has three basic characteristics: First, integrated management, which not only manages the financial aspects of the group. Moreover, it manages the business aspects of inventory, production, sales, etc.; not only within the group. And it is integrated

with the entire supply chain management. Second, direct management, through the network technology to reduce many intermediate links in traditional financial management, computerized information can be directly closed-loop management. The third is real-time management. After the entire supply chain is connected through the network, the headquarters can make financial arrangements in time according to the dynamic accounting information, and communicate through the network to realize online financial management. It needs to be pointed out. Integrated financial management is different from thermal power plant resource planning system (ERP) or financial management information system. The former is a system management idea, while the latter is a specific management software or operation plan. The former is more extensive than the latter [2].

3. Design and implementation of financial business information integration

3.1. Dynamic Accounting Platform IT Model

In the process of integrated implementation, automatic conversion of thermal power plant business information to financial information is the core key. The dynamic accounting platform IT model design can complete the automatic generation of accounting vouchers, and the business information of thermal power plants can be transformed into financial information in time. The basic elements of the dynamic accounting platform IT model include: event acceptor, credential template, generator, and accounting vouchers.

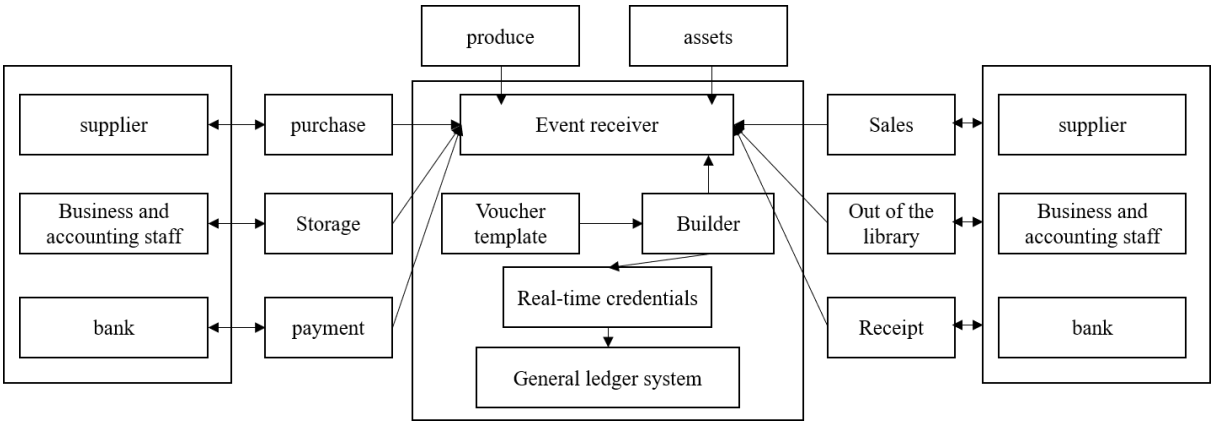

Figure 2. Dynamic Accounting Platform IT Model.

3.2. Reengineering design of financial integration process in thermal power plants

3.2.1. Business Process Reengineering. The business process reengineering of thermal power plants is roughly divided into three parts: business process analysis and diagnosis, business process redesign, and business process reorganization implementation. The purpose of business process reengineering in thermal power plants is to realize automatic transfer of business information. The so-called automatic transfer means that after the business occurs, the voucher template is invoked according to various original vouchers, and the accounting vouchers are automatically generated and transmitted to the general ledger system [3].

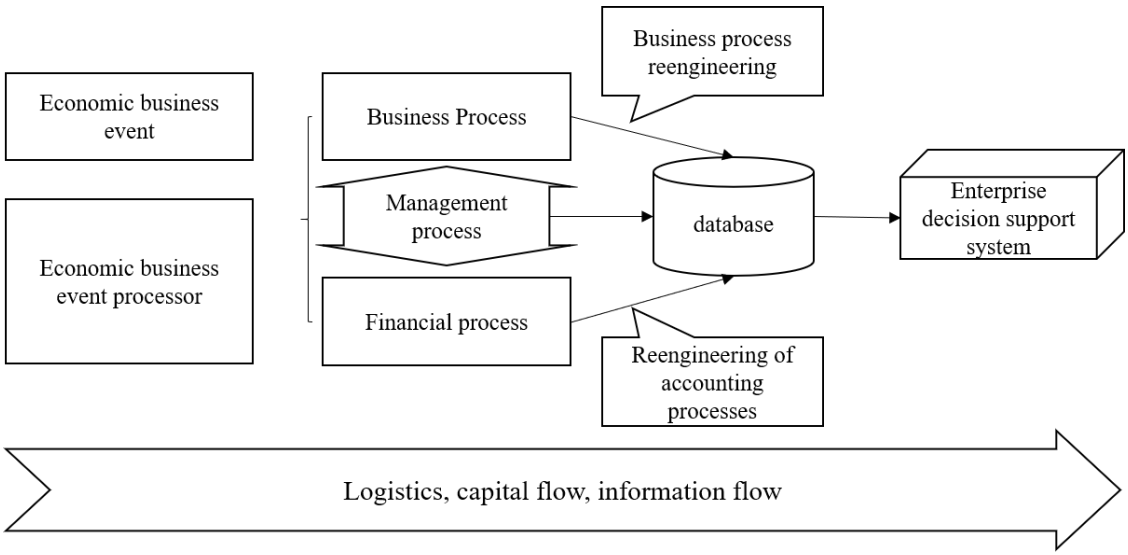

Figure 3. Reengineering of financial business information integration process.

3.2.2. Reengineering of accounting procedures. Accounting process reengineering is designed to adapt the accounting process to business processes. The traditional accounting process is to generate accounting vouchers in the form of manual processing of original vouchers and prepare financial statements, which makes the thermal power plant business information and financial information disconnected [4]. The integration of financial business information focuses on the timely generation of financial information from thermal power plant business information when business activities occur. Therefore, accounting process reengineering must closely integrate accounting processes with business processes to ensure the timely transformation of business information into financial information and ensure the business information is matched with the financial information, and finally the financial business information is integrated.

4. The practical effect of thermal power plant integration of financial business information

4.1. The unit price of coal standard coal entering the furnace is decreasing year by year.
Through the implementation and operation of the fuel-intensive information management system, the fuel business has achieved lean management, and the management level of the business department has been continuously improved. Through the continuous optimization of procurement plans, centralized procurement of fuels has improved the fuel purchase bargaining power and effective reduced fuel purchase costs. During the period of 2014-2017, the coal price in the coal market continued to operate at a high level, and the thermal power plant continued to optimize through the purchase of coal into the factory. The unit price of the integrated standard coal in the furnace decreased year by year, which was a significant decrease compared with the coal price change in the coal market.

Table 1. 2014-2017 integrated coal standard coal unit price unit.

Index	2014	2015	2016	2017
After the optimization, the unit price of the integrated tax standard coal	943.03	868.51	709.79	608.57

4.2. Optimization of coal injection plan after financial integration
Through mining and statistical analysis of fuel acceptance data and fuel settlement data, fuel management secondary expenses and other data, using mathematical tools, comprehensive

consideration of standard coal unit price, contract redemption rate, railway plan approval, mine delivery capacity and boiler combustion For the requirements of coal quality and other indicators, and then combined with the coal quality fluctuation degree of the previous batches of coal, the average standard coal price, the standard deviation of the standard coal, the coal production and supply, etc., to optimize the unit price of the standard coal. The calculation will generate a reference plan for the coal injection plan for the next month. At the same time, the fuel management experts will modify the system-generated plan according to the actual situation of the coal and the expert experience, so that the plan can be adapted to the actual coal intake situation to the maximum extent. The problem of coal price optimization scheme is actually the application of mathematical linear programming problem in fuel management. The target value is the lowest unit price of integrated coal in the coal, and the decision variable is the unit price of standard coal at each mine. The parameters in the mathematical model are the number of coal mines should be planned for each mine.

For example, suppose the initial inventory of power plants is 150,000 tons, and the average low heat generation is 20.281 MJ/Kg. According to the monthly power generation plan C=600 million kWh, the low calorific value of the incoming coal needs to reach Qu=21.33MJ/Kg (the coal index for stable combustion of the boiler), and the amount of coal to be purchased Wu can be calculated by formula (1).

$$Wu = \left(29.271 * C * \Delta W / 100\right) / Qu \tag{1}$$

Among them: C: monthly planned power generation, unit: 10,000 kWh

Qu : Average low calorific value in the furnace, unit: M.T/Kg

ΔW : Average standard coal consumption rate of power plants

After calculation, the raw coal used this month is: Wu =293176.47 tons

Assume that the power plant needs to increase the end-of-month inventory to 180,000 tons, and the heat value of coal storage in the coal yard is higher than 20.511 MJ/K [5].

(1) Based on the above assumptions, determine the number of coal injection plans for the month.

$$Wp = Wu + Wsn - Wso \tag{2}$$

Planned coal consumption this month: $Wu=29317.47$ tons.

End of month planned inventory: Wsn =180 thousand tons.

Early month inventory: Wso =120 thousand tons.

(2) The comprehensive operation cost of furnace coal combustion should be considered in the optimization scheme.

Corresponding changes in the coal quality of the incoming coal coals caused by the blending changes will result in the dusting, ash removal system, and coal handling system, suction fan, blower power consumption rate and boiler operating parameters (boiler oxygen, main steam temperature), fly ash combustibles, reheater accident water spray, reheat steam temperature, boiler exhaust temperature), in this model, the correction of the combustion cost of the coal into the furnace, all converted into the furnace heat value and plan The effect of changes in calorific value on cost.

The change will be expressed as ΔF (yuan/ton of standard coal) on the unit price of coal into the factory.

$$\Delta F = \Delta F_1 + \Delta F_2 + \Delta F_3 \tag{3}$$

$$\Delta F_1 = 4.562946 * 10^{-4} * \frac{Q_i^2}{Q_0} \tag{4}$$

$$\Delta F_2 = \left[3.3566 - 3.6649 * 10^{-4} * \left(Q_i - Q_0 \right) \right] * 10^{-4} * Q_i \quad (5)$$

$$\Delta F_3 = 1.7218 * 10^{-7} * \left(Q_i - Q_0 \right) * Q_i \quad (6)$$

In the above formula, ΔF_1 : The influence of the change of calorific value on the power consumption of the ash removal, the milling system, and the coal handling system.

ΔF_2 : The influence of the change of the heating value on the power consumption rate of the blower and the suction fan.

ΔF_3 : The influence of calorific value on main steam temperature, reheater accident water spray, reheat steam temperature, boiler exhaust temperature, fly ash combustibles, boiler oxygen.

Q_0 : The average calorific value of the coal target coal entering the factory. According to the test, the factory takes 213207/g (5100 calories/Kg as the target calorific value).

Formula (3)-(4) is the thermal test data of a single coal type. According to the historical data collected from the production and operation records, it is summarized and refined. The fluctuation of the calorific value of the coal in the single coal of the incoming coal is the operating cost of the coal entering the furnace, the empirical calculation formula of influence.

After calculation, the lower the coal heat value of the incoming coal, the higher the operating cost of the furnace. Therefore, in the case of the same standard price of coal, it is necessary to purchase as much coal as possible into the mine with a higher calorific value. It can be seen that if the coal is imported according to the optimized coal intake plan and the quality inspection of the coal into the factory is completed, not only can the standard price of the standard coal be reduced, but also the coal consumption can be reduced by rationally feeding the coal. The cost of coal loss, milling loss, coal mill treatment, etc., reduce the emission of fly ash combustibles, thereby indirectly reducing the plant power consumption rate and reducing environmental protection costs. Through the use of rich fuel management experience by fuel management professionals, taking into account the quality and quantity factors of coal storage in coal yards, and taking into account the rational blending of coal into the furnace, while adhering to the principle of acceptance of good and bad, through the establishment of mathematical models, by using the powerful computing function of the computer system, the optimal and optimal coal-introduction planning plan can be obtained in a short period of time, so that the unit price of the coal standard coal entering the plant can meet the requirements of the power plant. At the lowest level, it further guided the procurement of fuel and optimized the transportation plan.

5. Transformation of management functions after integrated financial optimization

5.1. Accounting institution setting framework under the financial integration management mode

In accordance with the general principles of integrated management of subsidiaries, the accounting agency framework under the centralized financial management and control model is set up. The accounting institution framework should reflect the "six unifications" and the three "favors" and consolidate a "platform", as follows:

First, we must achieve the "six unification", that is, the financial management system, accounting methods, accounting statements, financial management software, budget management, fund management and asset management assessment to achieve uniformity, and further improve the quality of accounting information. Second, it is conducive to promoting the construction of a unified information system, focusing on the promotion and implementation of the four core business information modules such as budget, engineering, assets and electricity. Third, it is conducive to the promotion of a unified financial security management system, especially the fund security of county-level subsidiaries. Fourth, it is conducive to promoting the construction of a unified risk management and control system, and increasing financial supervision of key production and management areas.

The fifth is to consolidate a “platform”, that is, a comprehensive budget management platform, which will further strengthen the “big cost” control of the five major costs of power purchase, power supply, line loss, financing and infrastructure. Strengthen budget control and increase the rigidity of budget execution [6].

5.2. The framework of accounting institutions under the centralized financial management mode

Based on this, the accounting institutions under the centralized financial management and control mode are set as follows: First, the accounting personnel are uniformly appointed and managed by the provincial companies, and may consider sending financial directors (responsible persons) to the molecular companies. The accounting institutions implement vertical leadership and flatten financial affairs. Management to achieve "six unification". The second is to set up a financial accounting center, fund management center, and financial reporting center (or three-in-one or other combination) at the regional or provincial level to achieve accounting and capital concentration. The third is to set up full-time budget posts and deepen comprehensive budget management. Fourth, it is to set up special duties for analytical posts, strengthen business analysis including finance, timely discover and solve abnormal situations in the business process, and improve management and management efficiency. The fifth is to unify the four core business information modules, such as budget, engineering, assets and electricity bills, to achieve seamless integration of data between business modules and financial system modules, to achieve timely, accurate and efficient financial data generation, and to ensure business data and finance data consistency.

6. Conclusion

Financial integration management is a systematic and comprehensive management innovation work. It is necessary to use all aspects of the enterprise resources to comprehensively sort out the business processes. Promoting financial integration management is a long-term and arduous task, and it is a gradual process. It is necessary to fully realize the arduousness, complexity and long-term nature of promoting financial integration management, and to advance in a step-by-step manner, which should be combined with the actual situation of the enterprise. Formulate a long-term plan for the company to promote financial integration management, and develop a detailed work plan for a long period of time, and comprehensively plan, design and implement financial management to ensure that it is implemented and effective.

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