

# Design and Implementation of Financial Accounting Information Management System of Shipping Companies Based on ERP



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## ABSTRACT

Lin, P., 2019. Design and implementation of financial accounting information management system of shipping companies based on ERP. In: Gong, D.; Zhu, H., and Liu, R. (eds.), *Selected Topics in Coastal Research: Engineering, Industry, Economy, and Sustainable Development. Journal of Coastal Research*, Special Issue No. 94, pp. 470-474. Coconut Creek (Florida), ISSN 0749-0208.

With the coming of information age, the traditional financial accounting information management of shipping companies cannot meet the needs of their development and competition. Based on the detailed analysis of the requirements of financial accounting and management accounting of shipping companies, this paper proposes the financial accounting information management system of a shipping company based on ERP, and design its business flow in detail. Finally, the design system is tested and the test result is basically consistent with the design expectation, providing a kind of more efficient integrated information management system which can be referred to for the financial management system of shipping industry. The research result has the positive reference significance to shipping management companies.

**ADDITIONAL INDEX WORDS:** *Shipping companies, financial management system, financial accounting information, ERP.*

## INTRODUCTION

With the continuous popularization and development of information technology, the information technology has entered various fields, the traditional financial accounting information management of shipping companies cannot meet the needs of their development, especially in recent years, facing increasingly fierce competition in the industry, only by applying information technology to daily management can we improve our service quality and work efficiency, provide more and better quality products, and be invincible in the competition.

The degree of application of informatization in foreign shipping companies is much higher than that in China, so the domestic shipping organizations need to learn from the advanced financial management experience of foreign shipping companies and apply the information technology to the financial management system in light of their own actual development, which not only can improve the efficiency, but also can regulate the shipping business (Amihud and Mendelson, 1988).

By analyzing the project flow and management methods of the financial system of the shipping company, this paper fully considers the factors affecting its quality and efficiency, constructs an ERP-based financial accounting information management system for the shipping company (Filbeck and Lee, 2000), and describes its concept and implementation process in detail, providing a more efficient information management system which can be referred to for the financial management system of shipping industry.

## ANALYSIS OF FINANCIAL MANAGEMENT DEMAND OF SHIPPING COMPANIES BASED ON ERP

In order to be able to take into account the various problems that may arise during the design phase and subsequent use of the system, the detailed demand analysis and business process analysis (Peel and Wilson, 1996) are carried out for important businesses such as financial accounting and management accounting of shipping companies.

### Introduction of ERP

It is generally believed that ERP is widely used in the industry management of physical products such as logistics industry, especially the understanding and R & D of ERP in China is far behind that of foreign countries. In fact, ERP manages enterprises from the perspective of corporate executives and its core function module has strong consistency with the core business of the shipping company (Lawrence, Alam, and Lowe, 1994), especially the shipping company must unify the business and data in order to better serve the customers. Therefore, the shipping company is aware of the importance of ERP software and is willing to apply it to the financial management of the company.

### Analysis of Financial Accounting Demands

The financial accounting demand analysis can be divided into three parts: general ledger management demand analysis, asset management demand analysis and payable management demand analysis (Collier, 2001).

#### (1) General ledger management demand analysis

The general ledger management module needs to be able to automatically generate the financial general ledger after collecting the accounting general ledger and relevant business

DOI: 10.2112/SI94-093.1 received 12 February 2019; accepted in revision 1 March 2019.

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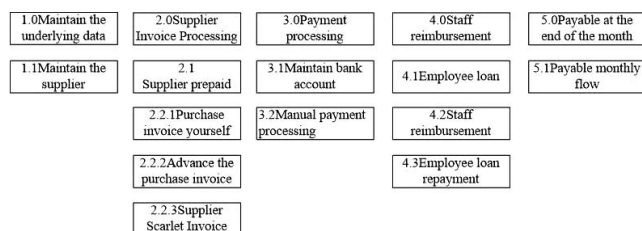


Figure 1. To cope with business flow display.

data collected from each financial system, and conduct in-depth analysis and mining. The results of the analysis can provide some reference for the management to formulate the corresponding financial management plan and the future development strategy (O'Hanlon and Peasnell, 1998).

The construction of general ledger management system must also meet the following conditions (Sloan, 2001): (1) the subject system; (2) perfect financial accounting system; (3) a new accounting standard system; (4) statement managements, and various statements must be provided in accordance with the relevant format; (5) large general general ledger processing, including year-end processing and day-to-day processing.

### (2) Asset management demand analysis

The asset management module is mainly aimed at the company's existing fixed assets management, consumables management, management of projects under construction, non-physical capital expenditure management, asset depreciation or amortization management. It should specifically include the following sub-modules (Bushman *et al.*, 2004): (1) asset change, (2) asset increase, (3) asset information query, (4) asset liquidation, (5) asset inventory, (6) asset allocation, (7) depreciation of fixed assets, (8) management of projects under construction, (9) management of debt assets, and (10) management of low-value consumables.

### (3) Payable management demand analysis

Figure 1 shows the business process of the payable management module, which mainly includes five sub-modules such as supplier invoice processing, supplier information maintenance, employee loan and repayment processing and payment processing (Cloyd, Pratt, and Stock, 1996).

### Analysis of Management Accounting Demand

The analysis of management accounting demand can be divided into three parts: internal capital transfer pricing demand analysis, profitability demand analysis and asset-liability management demand analysis (Guenser and Young, 2000).

#### (1) Internal capital transfer pricing demand analysis

The internal capital transfer pricing demand mainly includes: (1) transfer pricing for corresponding internal funds when customers repay in advance, (2) calculation of precipitation rate of current deposits, (3) adjustment of pricing policy, (4) adjustment of business scope, (5) adjustment of pricing economic capital factor, (6) adjustment of price difference according to pricing deposit reserve ratio.

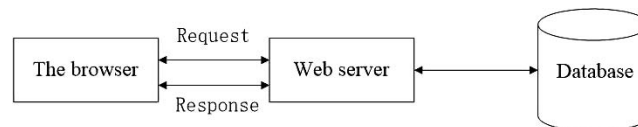


Figure 2. B/S three-tier structure.

### (2) Profitability demand analysis

The profitability demand analysis of the shipping company mainly includes the following aspects: (1) the profitability analysis of the product, (2) the profitability analysis of the account, (3) the profitability analysis of the responsibility center, (4) the profitability analysis of the customer, (5) the profitability analysis of the customer manager, (6) institutional profitability analysis, (7) regional profitability analysis, and (8) industry profitability analysis.

### (3) Asset-liability management demand analysis

The asset-liability management demand is mainly to manage the possible liquidity risk and interest rate risk, and to design and analyze through the simulation of the changes in interest rate, prepayment, new businesses and other scenarios and the combination of changes in various scenarios.

### Database and Programming Language Demand Analysis

#### (1) Database demand analysis

Currently, there are many kinds of commonly used databases. After comparing and analyzing the characteristics and application scope of each database and taking into account the actual conditions and requirements of the shipping companies, this paper uses a large ORACLE database (Holthausen and Watts, 2001), which has huge storage, high security performance and good compatibility.

#### (2) Programming language demand analysis

This paper uses the B/S service mode management system architecture, namely the client/server service mode, which is different from the traditional C/S (client/server) service mode and develops with the universal application of Internet technology. As long as the client has a browser, the client can login remotely to enjoy services, and this mode does not require the client's hardware to have a higher configuration, which can reduce the cost of the system. Figure 2 is a system diagram of B/S three-tier structure (Nwankpa and Roumani, 2014).

## DESIGN AND IMPLEMENTATION OF FINANCIAL MANAGEMENT SYSTEM OF SHIPPING COMPANIES BASED ON ERP

### Functional Modules of Financial Accounting Information Management System of Shipping Companies

According to the above analysis of the financial management demand of the shipping company, based on the ERP technology, this paper integrates the existing business process of the shipping company to develop a functional module diagram of the financial management system of the shipping company

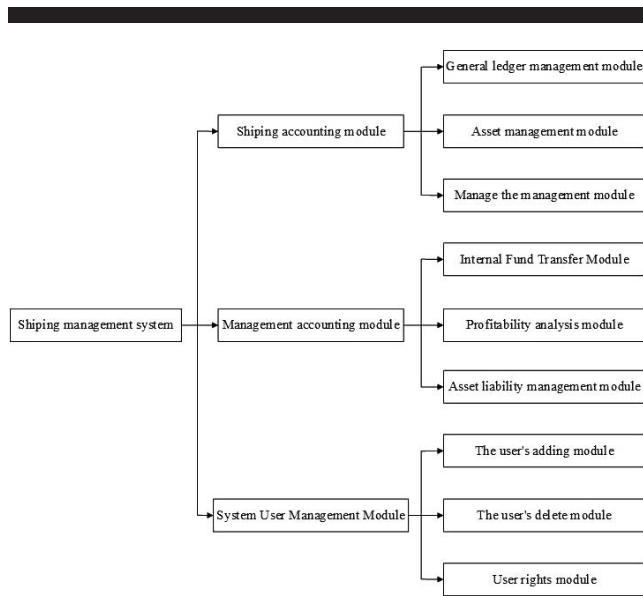


Figure 3. Shipping company's financial management system function module diagram.

(Teittinen, Pellinen, and Järvenpää, 2013) as shown in Figure 3, and design the business process of each sub-module in detail, which will not be described one by one here. The general ledger, asset and payable management modules under financial accounting is the focus of this paper.

### Design of Financial Accounting Information Management System

#### (1) Design of financial accounting business

(1) **Design of general ledger module.** According to the comprehensive design by referring to relevant materials, the functions included in the general ledger module of the shipping company are shown in Figure 4.

(2) **Asset management module.** One of the important links in asset management is the division of asset class. Table 1 provides a detailed division of the assets of shipping companies (Hellström, 2006). According to the different use state of assets, the assets can be divided into six states: in-use, idle, lease, non-physical assets, operating lease and damage. They are the important indicators of asset analysis and inventory.

After the classification of assets, it is necessary to design in detail the processes of fixed assets increase management, fixed assets adjusting management and fixed assets disposal management, and also design the end-of-month settlement business and possible future demand of assets.

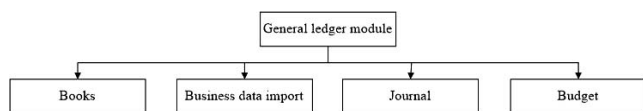


Figure 4. General Ledger Module Function Chart.

Table 1. Shipping company asset class.

Asset Class	Detailed assets
Fixed Assets	Houses and Buildings
	Machinery and Equipment
	Transportation Equipment
	Utensils Tool Furniture
	Electronic Equipment
Investment Real Estate	Investment Real Estate
Intangible Assets	Intangible Assets
	Office Furniture
Low Value Consumables	Electronic Equipment
	Construction in Progress
Construction in Progress	Construction in Progress
Prepaid Expenses	Long-Term Prepaid Expenses

### Implementation of Financial Accounting Information Management System

In order to verify whether the ERP-based financial management system can run normally, a simple test is carried out after the completion of the system design. The scope of the test includes the login of users for different functions of the system, input of vouchers in financial accounting function module and allocation of management expenses in management module.

#### (1) Implementation of management system module

Figure 5 is an ERP-based login interface of the financial accounting information management system of a shipping company, which mainly verifies whether the user has the right to login the system and whether the login information is correct, only when the user inputs the correct user name, password and verification code with confirmation can the user enter the management system. If the user forgets the password, the user can search for the password and then re-login the system, and the interface displayed for users with different permissions will be different.

#### (2) Implementation of financial accounting function

After successful login, the user with practical permissions for financial accounting enters the financial accounting function module. Figure 6 shows the flow chart of daily book. The user can also select to enter other modules or select other accounting functions under the module according to the prompts in the menu bar and the requirements. The operation of the module can only be carried out when the corresponding accounting period is opened, so that the phenomenon of confusion of information input in the accounting period can be avoided.



Figure 5. User login interface.

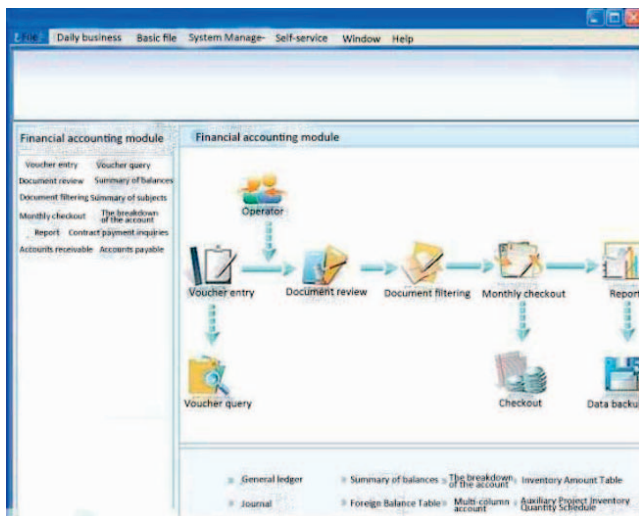


Figure 6. Shipping company's financial management system financial accounting interface.

Figure 7 shows the voucher input interface under the financial accounting module. The corresponding voucher can be input according to the requirements. After the input, inquire by clicking on the input voucher or through the inquiry interface.

### (3) Implementation of management accounting function

Figure 8 shows the interface after login when the user permission is management accounting, including management, finance, sales expenses, internal capital pricing, and asset-liability management, of which the first three are designed for the profitable system. A dialog box pops up for the setting of cost sharing after you click on the management cost.

When the manager clicks the financial accounting function on the left side of the page, the interface will automatically jump to the interface shown in Figure 7, and when the

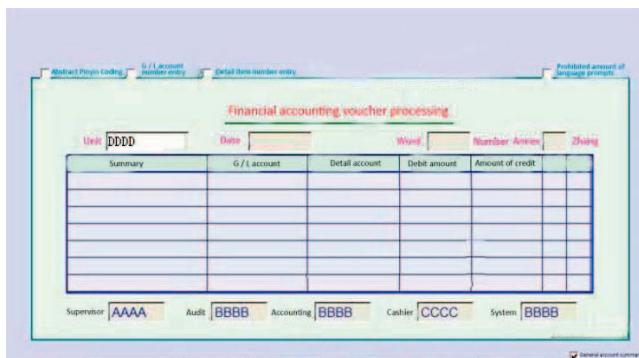


Figure 7. Shipping company's financial management system accounting voucher interface.

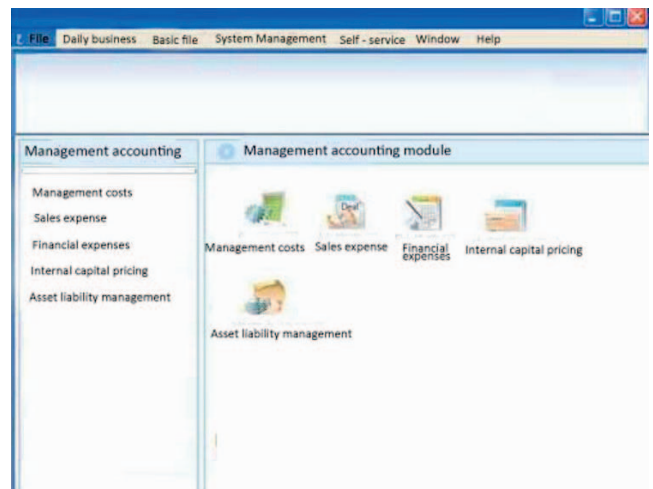


Figure 8. Financial company financial management system management accounting interface.

management accounting function is clicked, the interface will automatically jump to the interface shown in Figure 9. At the same time, the manager can clearly view the contents of each notice as well as the tasks handled and to be handled, and approve or reject the tasks submitted by the subordinate according to the actual conditions.

Through the simple test of the system, this paper introduces the concrete operation method of the system, and it is proved that the financial accounting information management system of the shipping company based on ERP can basically meet the various financial management needs of the shipping company.

### CONCLUSIONS

Based on the analysis of the present situation and problems of the shipping company's financial management system, and considering the future development of the shipping company, this paper adopts the B/S service mode management system framework to analyze the financial accounting, management accounting, database and programming language of the shipping company in detail, and constructs the financial accounting information management system of the shipping company based on ERP, with the following conclusions drawn:

- (1) On the basis of detailed analysis and research on the financial management system of the shipping company, referring to relevant research contents at home and abroad, this paper uses the method of management science, finds out the factors affecting the implementation of each business of the shipping company, and integrates and optimizes the business process of the shipping company.
- (2) The financial accounting information management system of the shipping company based on ERP is constructed, and the simple test of the management system has proved that the system can basically meet the financial management demand of the shipping company in practical application, with certain feasibility.

- (3) The application of the system makes it more convenient for the shipping company's managers to control and supervise the financial management, and it better provides the managers with the scientific evaluation of the management condition of the shipping company. It provides the reference for the managers to the future financial planning and the development of the company, improving the operation efficiency of the financial management and reducing the operation cost of the company.

### ACKNOWLEDGEMENTS

This paper is a scientific research project of institutions of higher learning in Inner Mongolia Autonomous Region, "Research on the relationship between frontier professional settings of vocational schools in underdeveloped areas and local economy" (No. 2017NJSZ17597).

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