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A Study on the Application of ERP Financial Management System in Logistics Enterprises Based on Agile Financial Chain Model

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Abstract: As the information technology keeps on accelerating nowadays, more and more enterprises introduce Enterprise Resource Planning (ERP) to enhance their competing competence. Financial management system, as the core of the ERP system, provides important information for management and decision-making of the enterprises by integrating with other subsystems. Meanwhile, the rapid-changing market environment requires the enterprises' information system being able to respond to the changes of every aspect, so as to support their own behavioral agility, which means the agility of the information system is needed. Therefore, when conducting ERP, the enterprises must take a dynamic, flexible and low-cost financial business as the basis, in order to ensure the agility of the financial management system and thereby achieve the agility of the enterprises. This study firstly gives an overview of ERP financial management system theory, agile financial chain model theory and discusses the relationship of agile financial chain and ERP financial management system. Then it analyzes the logistics enterprise's application of ERP financial system based on agile financial chain model, combining present conditions of logistics company's financial management informationization. Finally, the study makes an agility evaluation of the effects of the financial management system.

Key words: ERP, financial management system, agile financial chain, logistics enterprises

INTRODUCTION

Rapid technological development brings new opportunities and challenges to information system builders and managers of enterprises. In this information age, the level of enterprise informationization is a key sign of economic and social development. The introduction of Enterprise Resource Planning (ERP) system is not only an important content of enterprise informationization, but also a critical system which can help decision makers and managers make full use of the resources, create the optimal solutions for the enterprise of manufacturing products and providing services, achieve the business objectives and create profit maximization (James and Henry, 2004). As the most important subsystem, financial management system can create enormous economic benefits for the enterprise.

ERP financial management system, which is based on process optimization, relies on the computer, network and database, forms open dynamic financial management information system of the combination of modern information technology and financial management. With

the function of controlling and integrating enterprise financial information, it also provides the basic decision analysis for enterprise management. The enterprise information and resources can be efficiently used; as a result, the enterprise can achieve its business efficiency and competitiveness. Differ from computerized accounting, it can unify finance and accounting and get high decision support on financial management. It puts emphasis on financial systems and ERP other subsystems integration. What's more, it services for company's comprehensive information.

However, most companies who use ERP financial management software have not substantively improved their financial management efficiency. Problems like unable to access to information timely, separation of financial and business, financial staff's onerous workload, disjoint links in financial chain, all affect ERP financial management efficiency. So, the smooth running of the financial chain has a major impact on the successful implementation of overall financial management system. Therefore, according to the characteristics of ERP financial management system, combined with the theory

of agility, this study puts forward the concept of agile financial chain and applies agile financial chain idea into the implementation of ERP financial management module and uses entropy model for its agility evaluation.

CHARACTERISTICS OF ERP FINANCIAL MANAGEMENT SYSTEM

Continuous variability: Enterprises make different strategy based on the changing business environment. Moreover, the company's financial controls and financial decisions should follow the changing strategy. Different corporate strategies lead to divergences between financial decision strategy and control strategy, which essentially determines the continuous variability of financial management system. Thus, there must be continuous improvement based on the development of enterprises (Goldman et al., 1995).

Management leadership: ERP financial management system provides services to senior management. As a result, financial decision analysis, control and prediction process must be decided by the management. Therefore, corporate management must lead the ERP financial management systems.

Integration: Financial management system is an important component of the ERP system, which is closely linked with other systems. Basic data, which is required for financial decisions, is from other relevant subsystems. The achievement of the data is relied on the integration and sharing of other subsystems.

Openness: Financial management system must be open to meet different decision-making environment of enterprises. This openness includes: The system should be adapt to different database system and heterogeneous network; users can define own financial decision-making process and financial process according to the change of environment Anon, 2000; realize the optimization of enterprise financial process; various functional modules should be scalable and maintainable and support continuously changing financial management process.

ANALYSIS OF ERP FINANCIAL MANAGEMENT SYSTEM'S FUNCTION MODULES

According to the accounting matters relating to financial management business process and financial activities, there are five basic functional modules (Amos and Gibson, 1995).

General ledger module: It is the main part of accounting. It leads and supports other modules of the system. General ledger's function is to handle accounting vouchers, accounting books and finally, generate accounting statements and so on. General ledger helps the management of enterprises keep abreast of production and operation of enterprise and guide for financial decision-making.

Accounts receivable module: Its functions include invoice management, notes receivable management, improving accuracy for payment processing and forecasting capital inflows and loan recovery for customers. Finally, it can automatically generate receivables related accounting entries and pass management, provide detailed information about customer; it can be also used for aging analysis.

Accounts payable module: It provides management of checks, invoices, suppliers and carries out aging analysis. It is integrated with the inventory, procurement and other modules. It can also understand the enterprise debt situation in time and then generate corresponding accounting entries, transmit to the general ledger module.

Cash management module: It includes management of cash, bank deposits of various bills and prediction of cash flows. It integrates accounts receivable, payable, procurement, sales and other modules.

Fixed assets accounting module: It contains basic data maintenance, depreciation of assets, assets maintenance, assets retirement and asset leasing management etc. It can automatically generate accounting entries to the general ledger.

AGILE FINANCIAL CHAIN MODEL

Definition: Agile Financial Chain (AFC) refers the financial accounting, analysis and evaluation, formed from the relative aspects of financial work of an enterprise which based on the integration of financial and business, to achieve a whole dynamic financial network with a better flexibility and quick response through the financial business process optimization and event driven. It improves timeliness and effectiveness of financial work, reduces operating costs and makes a scientific and reasonable financial projections or decision. Ultimately, it achieves the business agility to respond to the financial diversity.

The Agile Financial Chain is required to achieve three optimization target states:

- Agile financial chain has strong market competitiveness, which is reflected in the mutual integration and reasonable configuration between various links in the financial chain. It is a dynamic process with constantly evolving.
- Agile financial chain can make a quick response to the changing environment and achieve rapid reconstruction and adjustment for the formation and disintegration of the dynamic financial supply and demand alliance.
- The whole financial chain system should provide a low cost, which can be achieved by improving the usage efficiency of resource and reducing the respective process cost in the financial chain.

CHARACTERISTICS OF AGILE FINANCIAL CHAIN

Dynamic: According to the decision requirements of production and management, it dynamically and flexibly provides relevant financial changes, including the constant improvement and perfection of all aspect functions in financial activities, the constant innovation of financial analysis technology, the reconfiguration of financial management processes and so on.

Cooperativity: Various aspects of the agile financial chain interrelate, synergy drive and share information together, in order to make a seamless integration in the businesses and achieve the agility for financial chain.

Accuracy in time: It shows that online reflection, online feedback and real-time analysis are prompt.

RELATIONSHIP OF AFC AND ERP FINANCIAL MANAGEMENT SYSTEM

Agile financial chain is a precondition for ERP: As an innovative enterprise management, ERP implementation needs enterprises to improve technological solutions. Without analysis deeply on enterprises' actual situation, the effect of ERP implementation can not be guaranteed. The integration of the western enterprise management software and the Chinese-style company needs to regulate the enterprise business flow in accordance with the ERP's requirements. Agile financial chain can ensure the process of the enterprises' financial activities and the idea of agile financial chain is always throughout the ERP implementation process.

ERP system is the agile financial chain's technical guarantee: The powerful information technology is strong backing for agile financial chain. With the help of

powerful information system, agile financial chain's information and data processing can be easily shown up. Therefore, it improves the operation effect of agile financial chain. In addition, the ERP system provides overall operating platform for agile financial chain in the company and achieves timely information delivery and valid service control.

Fusion framework of agile financial chain and ERP financial management system:

When corporate finance departments perform ERP implementation, they can obey to the general methodology of ERP system. However, due to the organizational functions and its flow characteristics, it should fully consider the financial business process integration during the implementation of financial system modules. It concludes the financial internal process optimization (which is adapting the application of the financial system modules) and the responsibility's definition of the financial external processes (which can adapt the coordination of business activities between the financial department and other departments). The agile financial chain model, which is referred previously, can reflect the flow of enterprise cash flow and depict the relationships between the financial department and other business units. Under the guidance of the model, it can analyze and optimize some specific process. For one new process, it will perform the secondary development to mainly adapt the specific financial business activities. Those business activities are mainly based on event driven thought, which builds a new flowchart at first and then analyzes and optimizes through the integration ideal of the financial business and implements in the system at last.

LOGISTICS ENTERPRISES' APPLICATION

In order to emphasize the value for the agile financial chain idea to ERP, this part will focus on researching the stage of project preparation and blueprint drawing for most of logistics enterprises.

STEPS OF ERP IMPLEMENTATION

Project preparation stage: The major purposes are to determine the main objectives, main points and key points of project, to determine the implementation scope and main strategy, to establish the project team and membership configurations, to make the implementation plan and standards and to prepare and arrange resources of each aspect. The major task of project preparation stage contains overall plan of the project and preliminary design of the plan, the initial implementation plan of the

project, the establishment of project specifications and standards, the preparation of technical environment and project initiation.

Blueprint drawing stage: The major objectives include the specific refinement of project target, detailed plan, requirements analysis and target determination of the project implementation, the determination of organization structure and business processes and difference analysis of business process. The main tasks of blueprint drawing stage are project management, training of ERP theory and knowledge for middle and senior management, the establishment of technology environment of the system, the optimization of organization structure and system demonstration of key business processes.

System implementation stage: The major objectives include progressive realization of business blueprint, implementation of a complete system testing and confirmation for the users to the system. The major tasks are project management, the advanced training of project team, the initial implementation of system configuration, the confirmation of the system, the development of the reports and interfaces program and testing, the data analog conversion, the testing of system unit, system integration and user acceptance, the definition and settings of the user permission and the establishment of user manual and user training.

Online switching stage: It aims to the preparation of online launch formally and the confirmation of the correct running for the system. The major tasks include the project management, the module management of ERP system, the installation and testing of the system in formal operation environment, data conversion, the establishment of technical support system and formulating the management system of the system operation and the schemes of system switches, system parallel and system contingency.

Official launch and online support stage: The major purpose is to ensure the correct operating of the system. The major tasks of this stage are providing the user support and the usage of system optimizing, the follow-up training, the system upgrading, maintenance and so on.

PROJECT PREPARATION STAGE

Industry background analysis: In recent years, Chinese social logistics has grown rapidly as the rapid growth of national economy. The total social logistics in the year of 2012 totaled 177.3 trillion Yuan, a growth of 9.8%

compared with the previous year. It is forecasted that Chinese total social logistics of 2013 will amount to 203 trillion Yuan; an increase of 14.5% compared to 2012. Meanwhile, the increase value of domestic logistics in the year of 2012 totaled 3.6 trillion Yuan and increased by 9.1% year on year. It accounted for 6.8% of the GDP and 15.3% of the increase value of service industry. In addition, logistics industry invested 4 trillion Yuan in fixed assets, an increase of 23.9%.

On the other hand, with the increase of the total social logistics, the domestic social logistics costs rapidly increase. In the year 2012, total domestic social logistics costs amounted to 9.4 trillion Yuan, which increased 11.4% year on year. The total social logistics costs to GDP ratio reached 18%, an increase of 0.2 percentage points. In addition, statistics shows that due to relatively high pressures from an increase in fuel prices, high labor costs, warehousing rents and taxes, logistics enterprises are still facing large operating pressures.

Therefore, logistics enterprises need to increase their competitiveness and profit. The use and implementation of advanced ERP financial management system will play a crucial role in the competition and development of logistics enterprises

Building target analysis: The ERP building of the logistics industry requires three implementing goals. Firstly, it should construct an information integration platform through vertical and horizontal integration inside the logistics company and achieve the information sharing between the company and organization. Secondly, it should establish business applications responding to the internal management needs, including financial management, materials management, project management, equipment management, human resources management and other functions to improve the management capacity for each department of the company. Finally, it should establish a perfect information security system to promote the healthy, stable and sustainable development for the informationization.

Today, Most of Chinese large enterprises generally apply the ERP software packages supplied by SAP. SAP (System Application and Products in Data Processing) is an internationally top-ranked provider of enterprise integration application and it is an advocate of ERP ideological. The R/3 standard ERP software which is the flagship product of SAP, including the main function modules such as the quality management, human resources management, project management, asset management, controlling, finance and accounting and so on.

Staff organization: As the logistics enterprises take pilot project for ERP, they need coordination by the head of the company and the participation of the leader of each department. It also requires hiring professional IT consulting firm or technical personnel, as the external consultant, to guide the ERP project and ensure that the company can effectively implement the ERP project plan.

Project plan: The implementation of making plan chart is the basis for ERP to implement the project management. It contains four phases. The first is the ERP project design phase, which mainly includes requirement analysis, template application, process design and development of function design. The second phase is the ERP project testing phase, which includes system configuration, the secondary development and testing and integration testing. The third phase is the ERP project trial operation stage, which includes the user training, system parallel and complementary data entry and online preparation. The fourth phase is the phase that ERP system officially put into use; it includes the on-site support, system acceptance, project acceptance, the official implement of each department and so on.

Business blueprint design: Logistics enterprises can chose a certain quantity of the agile financial functional requirements and achieve the following goals by focusing on business process design, including grasp requirements accurately, standard design patterns, reduce implementation difficulty and save implementation time.

Business process design: During the design of business processes of ERP financial management system, logistics enterprises should first consider the establishment of a complete internal LAN to guarantee the smooth flow of information between various departments. Then based on the integration principle of financial and business, logistics enterprises should set up a dynamic financial database platform to make the connection for each sub-system within the company. It ensures the timely registration process for related businesses and the automatically passing the information through the LAN from the dynamic database, as the business occurs. Throughout the operation of financial chain, the data information can be transported and shared on-time, reducing a great of repetitive work. It specifies the business to corresponding department to make clear responsibilities definition and achieve the implementation of agile financial chain ideas.

After completing the above works, the relevant departments should consider the own characteristics of

logistics enterprises to utilize the key technologies of the process design and system design. It provides the event driven to promote the business processes to ensure the smooth running of the related processes.

Logical architecture: During the building of the SAP system, each process should rely on the event driven to remind finance department, the department responsible for process and the related leader to implement the system operation. This operation includes financial module and the corresponding asset or project management module for all processes.

Blueprint review: The significance of blueprint assessment is the quality control of implementation of ERP. During the project, the quality control should throughout the whole project. The business blueprint design is an important node of the implementation, which requiring key control. The control includes some major contents, such as typical design conformity, the validity of data sources, settings of process interface and applications of standardized coding and so on. When the logistics enterprise is reviewed, it should completely consider the differences between the position settings within organization and departments. It also needs to rely pm the actual condition to adjust the ERP financial management system and achieve the different requirement for different logistics enterprises.

AGILE EVALUATION OF ERP FINANCIAL MANAGEMENT SYSTEM

With the help of the agile decision-making entropy model and the establishment of ERP financial management system about the evaluation of agility, the company gets the value of assessment. Meanwhile, according to the index weights results, the enterprise also obtains the key indicators to optimize financial management system.

Agility of financial management system: After taking the agile financial chain idea, the enterprise achieves the agility conversion in the implementation of ERP financial management system. It requires the enterprise has the ability to deal with the information processing of financial activities in a fast, flexible, high-quality and low-cost way. In the same time, according to the requirements of enterprise development strategy, it can plan the business and evaluate the effect of financial activities to gain strategic advantage. Agile financial management system has features with dynamic, fast response, accuracy and low cost sharing characteristics (Yin, 2011).

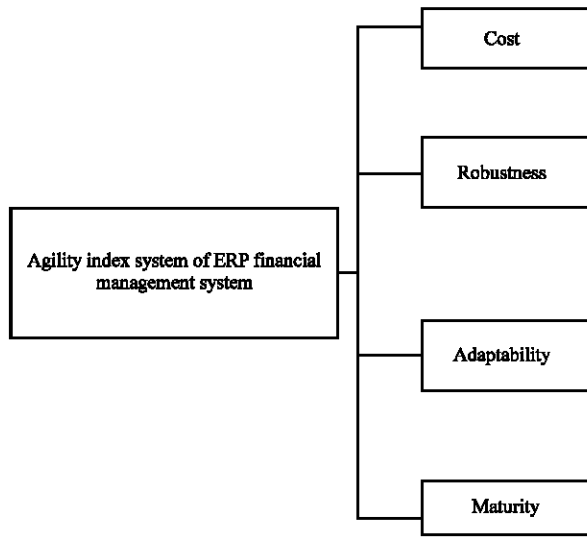


Fig. 1: Evaluation index system

Based on the research results of agile measurement system, the study proposes a financial management system agile metric system and evaluation model. It aims to assess the financial management system with scientific, reasonable, comprehensive as well as providing guidance for the agility transformation.

Evaluation of agility: This study establishes the evaluation index system (Fig. 1).

Explanation of the evaluation index system:

- Costs include purchase cost and implementation cost of the system. The purchase cost is from the software providers such as financial management module applications (such as SAP R/3 system FICO module) and the implementation cost refers to the cost of implementation and application of the financial module in the enterprise, including third-party implementation consulting cost and time cost
- Robustness contains the system response time, abnormal occurrence rate and integration degree with other ERP systems. The response time refers to the personnel operating the system's response time. Abnormal occurrence rate refers to the system runtime errors, mostly owing to the system configuration errors and defects from secondary development. Integration degree with other ERP systems refers to the integration degree of the financial subsystem and materials management system, human resources system and equipment management system. Usually, advanced ERP software subsystems integration is very high

However, considering the secondary development especially the workflow-driven process has subsystem integration problems, the integration degree will be included in the comprehensive evaluation system

- Adaptability includes reconfigurability and expansibility. Reconfigurable modular system measures the degree, which will affect the system's adaptability. Expansibility ensures the independence and integrity of the system, at the same time, it should leave system interface with other external systems. If the company adopts dual system operation, it is necessary to ensure expansibility with external systems
- Maturity refers to the integration of financial and business and timeliness and accuracy of financial activities. Integration of financial and business refers to optimize the financial business in the implementation process and achieve the unity of the system operation and financial business process. Accurate and timely financial activities investigate the function of the system itself, such as automatic report generation and financial statements analysis. What's more, they analyze the operating proficiency and timeliness of financial persons

Calculation method and principle of evaluation:

Information entropy can be used to measure the desired information in a piece of information content, so the entropy can be used as a measure of indefinite indicators. Since the decision matrix contains a certain amount of information, entropy method can determine the weights of attributes as a tool.

This study, by using multiple index decision entropy model for agile evaluation of ERP financial management system, works as follows: If there are m objects being evaluated, n indicators, constituting a decision matrix A by use multi-attribute decision making, among which, a_{ij} is the measurement of the i object and the j index value. If a value is an interval, then the midpoint will be taken.

According to the decision matrix A, it can be measured under evaluation object I weight of index j is:

$$r_{ij} = a_{ij} / \sum_{i=1}^m a_{ij}$$

where, $i = 1, 2, \dots, m, j = 1, 2, \dots, n$, thus it can get the column normalized decision matrix R, then base on the provided information of using the entropy measure j index, the entropy of the j index can be defined as:

$$e_j = -(\lg m)^{-1} \sum_{i=1}^m r_{ij} \lg r_{ij}$$

where, the information difference of the j index $g_j = 1 - e_i$, $j = 1, 2, \dots, n$. The difference of g_j reflects the respective different evaluation data size. If decision makers do not have a preference between indicators, it can be considered the n indexes have the same preferences. Therefore, when the weight information is uncertain, the definition of the weight of the j index is:

$$w_j = g_j / \sum_{j=1}^n g_j$$

So, the greater the value of g and j , the greater degree of variation in the j index date, as well as the index weight and vice versa. Through the weighted sum of the i index values, it will obtain the comprehensive evaluation value of the evaluation object:

$$z_j(w) = \sum_{j=1}^n a_j w_j$$

The comprehensive index values of different evaluators are sorted; it can determine the merits of the evaluation object. In addition, according to the obtained target weight, it can determine which index is a key factor for ERP financial management system and which should be focused on.

CONCLUSION

The competition in the modern logistics industry is ultimately economic competition and economic benefits

are finally achieved by the use of efficient financial management. It has a positive effect on the logistics enterprise information construction if the company fully carries out the advanced integrated ERP financial management system. Therefore, logistics enterprises must pay attention to the construction of financial management system. This study provides the concept of agile financial chain and uses its ideas to guide the implementation of ERP financial management system.

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