Structure and Development of Management Information System in Furniture Enterprises

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Abstract: Under the drive of the booming development of information technology, some furniture enterprises construct Management Information System (MIS) to acquire competitive advantages. This research was conducted by literature research method to determine the structure and development of management information system in Furniture Enterprises. Generally speaking, MIS in furniture enterprises mainly consists of sub-system of production and manufacture, sub-system of marketing, sub-system of materials management, sub-system of finance and sub-system of human resources. The development method of MIS in furniture enterprises mainly has the three ones of Structured System Development Methodology, Prototyping Approach and Object Oriented Design Method. Each method has its own limitations and range of application. In the actual application, furniture enterprises should select an appropriate development method in accordance with the specific condition, such as, comprehensive scale, degree of complexity and development instrument, etc., or, several methods may be combined for application.

Key words: Management information system, structure, development, furniture enterprise

INTRODUCTION

Creation and development of information technology has given birth to such new types of electronic information products manufacturing industry as computer. It has also brought about a series of revolutionary changes in the production means and operation philosophy of such traditional manufacturing industry as furniture, machinery and metallurgy through penetration and exposure (Chu, 2003). Informatization has turned to be a general trend in development of the current global manufacturing industry. It has become a fundamental guarantee to develop the traditional manufacturing industry and an important measure taken to respond to the economic globalization tendency. That is, informatization drives industrialization, industrialization boosts informatization and high and new technology and advanced and applicable technology is employed to transform and enhance the traditional industry. Now, the enterprise management information system development methods mainly include structured life cycle method, prototype method and object-oriented method (Wei, 2010).

As far as the furniture enterprises are concerned, in order for them to seek for survival and development in the fierce market competition, it is a must to increase their management efficiency (Dong and Guo, 2008). Information industry not only itself has unlimited development space but also infiltration and influence the furniture industry (Chuo and Yu, 2008). So, it naturally becomes a necessary choice to apply modern information technology to set up Management Information System (MIS) of enterprises. This study gives the conception and functions of MIS in furniture enterprises. And propose the structure and development method of management information system in Furniture Enterprises.

DEFINITION AND BASIC FUNCTIONS OF MANAGEMENT INFORMATION SYSTEM IN FURNITURE ENTERPRISES

Definition of Management Information System in Furniture Enterprises: Management information system in furniture enterprises is a system comprising of person–computer used for collection, transfer, storage, maintenance and application of information. It is able to make an actual measurement of all kinds of operation conditions in furniture enterprises and predict the future based on the historical data in the past. It is able to assist the furniture enterprises in making a decision by taking an overall consideration of the furniture enterprises. And it is also able to help the furniture enterprises to fulfill their planning objective by using information to control the behavior of enterprises.

In terms of concept, management information system in furniture enterprises is constituted by 4 components, namely, information source, information processor, information user and information manager. Figure 1 shows the connection between these four components. Information source is the birth place of information. Information processor shoulders the tasks of information transfer, processing and storage. Information
Basic functions of management information system in furniture enterprises: In order to meet with the demand of furniture enterprise managers on information, the management information system needs to finish a large amount data or information processing work. Its basic functions may be summarized as the following five ones (Zhu and Wu, 2004).

Collection of data: Data can only become useful information after being processed. The source of data can be classified into two kinds, namely, primary data and secondary data. If the data are directly accepted and collected in the very place where the data appear, this kind of data is called primary data, such as furniture inventory record and on-spot management record, etc., Collection of secondary data means collection of data which have been recorded in the media and which have been disconnected from the entity described both in terms of time and space. Data collected from the report forms of furniture enterprises are also included.

Storage of data: Management information system has to possess the function of storing information. Otherwise, it is neither likely to break through limitations of time and space nor play the role of providing information support in decision making. The information storage issue to be considered by furniture enterprises includes volume of storage, information format, storage mode, application mode, storage time, security and secrecy, etc.

Processing information: There are a variety of categories in information processing. Considering processing in itself, information processing can be classified into the two major categories of numeric calculation and nonnumeric processing. Numeric calculation includes simple arithmetic and algebraic operation, calculation and checking of all statistical magnitude in mathematical statistics, all optimum algorithm in operations research and simulation prediction method, etc. Nonnumeric data processing includes sequencing, merger, assortment and word processing, etc.

Transfer of information: Information transfer is not simply an issue of transfer. The manager and the planner of an information system have to take full account of the factors of category, volume, frequency and reliability requirement of information to be transferred. In the actual work, information transfer is usually connected with information storage. Scattered storage of information may reduce the amount of information transfer. Nevertheless, scattered storage of information may also bring about a series of storage management issues, such as, security and consistency, which are difficult to be resolved. Concentrated storage of information may resolve the issue of storage at ease but the burden of information transfer will be largely increased. Thus, the working staff have to make a choice between the balance and rationality of the two modes of information storage.

Information providing: Providing means is an interface between management information system and its manager and is determined by the two aspects of information condition and condition of information user to be provided.

All the above listed are the five basic functions of management information system in furniture enterprises. In an actual operating management information system, the mechanisms playing functions are extremely different and the priority to be considered in design also differs with different systems. Nonetheless, any information system has to be equipped with necessary equipment to play all these five basic functions.

STRUCTURE OF MANAGEMENT INFORMATION SYSTEM IN FURNITURE ENTERPRISES

The typical functions of a furniture enterprise comprise production and manufacture, marketing and market, finance and accounting, materials management and human resources. Therefore, based on the management function, the management information system in furniture enterprises is constituted by the following sub-systems.

System of production and manufacturing information: The function of production and manufacture information system consists of production design and manufacture,
planning of production equipment, task scheduling and running, quality control and checkout. In the sub-system of production and manufacture, the typical business processing contains manufacture order, assembly order, end product order, waste products order and working hours order. Operational control requires to make a comparison between the actual progress and the plan and to find out the bottleneck (Li, 2003). Management control calls for a generalized report to reflect the performance alteration of scheduled plan, unit cost and working hours in the whole plan. Strategic management contains selection of the manufacture method and all kinds of automation programs.

**System of marketing information:** The function of marketing information system usually consists of sales and promotion of products as well as all activities in after-sale service. The business processing includes sales order and promotion order. Operational control contains all programs in employing and training sales personnel, working out a sales plan and promotion of products as well as a periodical analysis of technical area, products and sales volume of customers. Management control involves a comparison between the general achievement and the market plan, which requires the data concerning customers, competitors, competitive products and sales force. Strategic management includes pioneering of a new market and strategy of the new market and the information it uses contains customer analysis, competitor analysis, customer survey information, income forecasting and technical forecasting.

**System of materials management information:** Materials management information system consists of purchase, taking delivery of goods, inventory control and granting of products. The data in business processing include purchase of goods, application, purchase order, processing order, report of taking delivery, inventory ticket and bill of lading. The operational control requires to make a comparison between the actual material supply and the plan and make an analysis report concerning inventory level, purchase cost, delivery from storage and inventory turnover. Management control information contains comparison between the planned inventory and the physical inventory, costs of out sourcing, stockout and inventory carry rate. Strategic management mainly involves new material supply strategy, the new policy for suppliers and information with regards to the new supply program and new technology.

**System of financial and accounting information:** The financial and accounting information system consists of collection management, cash management and fund raising, standard for working out a financial statement, budgeting and assortment and analysis of cost data. The business processing contains application for buying or selling on credit, sales, making a bill, voucher of receiving an account, voucher of payment, check, transfer slip, ledger and share transfer. Operational control uses daily statement, exceptional case report, delay disposal report and report of untreated matters. Management control mainly uses the information of financial resource cost, cost of accounting data processing and error rate. Strategic management is mainly to ensure long-term strategic planning of adequate capital, long-term tax accounting policy for reducing tax revenue impact and planning of cost accounting and budgeting system.

**System of human resources:** The function of human resource information system contains personnel employment, training, assessment record, wages and termination of service. The business processing contains recruitment condition, training introduction, basic employee information, wages alteration, working hours, welfare and notice of termination of service. The operational control contains completion of recruitment, training, termination of service, alteration of wages and of issuing of welfare. The management control mainly makes a comparison between the actual condition and the plan. The reports and results are used to account for the number of on-post workers, recruitment expense, constitution of technical expertise, wages payable, distribution of wage rate and whether the policy complies with the government employment policy. Human resource strategic plan includes evaluation on all kinds of strategic plans, such as, recruitment, wages, training, welfare and performance evaluation. These strategies will ensure whether an organization is able to acquire the human resources required for fulfillment a strategic objective. Strategic management also contains an analysis of employment system, educational condition, alteration of local wage rate and the personnel recruited and retained.

**DEVELOPMENT OF MANAGEMENT INFORMATION SYSTEM IN FURNITURE ENTERPRISES**

**Principles in development of management information system in furniture enterprises**

**Principle of integrity:** According to the idea of systems engineering, management information system is a whole constituted by multiple sub-systems which correlate and interact with each other. Thus, a view of integrity is necessary in development of management information system and to overcome drawbacks in decentralized processing of manual information. To the end, functions of all sub-systems need standardizing as far as possible, collection of data needs unifying, language description
needs to be consistent and information resources need sharing. It is necessary to ensure that all sub-systems perform their respective tasks in harmony so as to avoid reduplication and redundancy of information and search for integrative optimization of the system.

**Principle of User:** Firstly, development of management information system can’t do without participation of users. Close cooperation between users and system development personnel is indispensable in the whole process from the initial system planning and feasibility analysis to system analysis and system design until the ultimate system implementation. Demand on the system originates from users and the material and data required for development of system also come from users. Therefore, system development without participation of users can’t go with a swing. Secondly, management information system serves for decision making of managerial personnel who are the final users of the system. Users in themselves are involved in development of management information system. They are both the master to use management information system and the master to develop management information system. Close cooperation between system development personnel and users is the key to successful development of the system. All in all, system design is aimed to be geared to the needs of the ultimate users. Thus, it must be guaranteed that the system is easy to be operated, understood and taken under control and any problem existing in the system is likely to be predicted in due course and resolved rapidly. Only the system that leaves an impression of convenient and satisfactory use on users is qualified to be called a nice system.

**Principle of advancement:** The so-called advancement refers to advancement of the technology employed in management information system and advancement of the managerial idea embodied in the system. Modern information technology is developed quite rapidly. Hence, it is duty-bound to know about new technology and apply new technology in time and to let the target system make a qualitative leap on the basis of the original system. Furthermore, management information system is not merely a technical system but more a management system. Therefore, it is necessary to integrate a large number of advanced managerial methods and managerial ideas in the process of development, such as, Supply Chain Management (SCM), Just-In-Time (JIT), Lean Production (LP) and Concurrent Engineering (CE).

**Principle of practicability:** Construction of management information system has to be established in the actual situation of an enterprise, including both internal and external environment, operation characteristics and business flow. It has to reflect the features and characteristics of the enterprise instead of inhibiting any mechanical copy. It is necessary to employ mature technology to organize application and development of the system and put forward feasible and effective resolutions in the light of user requirements. It is also necessary to adhere to the principle of unified planning and implementation by step and to begin fundamentally with satisfying the need of business. The focus of practicability is flexibility and swift response capacity of the system. The system is likely to make flexible re-organization in the face of any adjustment for the organizational structure and business flow and to adapt to the need of management and business.

**Principle of reliability:** Only a reliable system is able to gain trust of users. Thus, in designing the system, stability of both software and hardware equipment of the system and quality of the data collected should be guaranteed. The function of data verification and corresponding system security precautions are required. Only in this way, can the reliability of the system be adequately assured.

**Principle of economy:** The principle of economy is to cut down on the development cost as far as possible on the premise of meeting with the requirement of the functions. In the process of development, it is necessary to economize expenses and to shorten the development cycle as far as possible. After the new system is put into operation, it is also necessary to receive the input as soon as possible so as to increase the economic benefit and the social benefit of the system.

**Frequently used development method of management information system in furniture enterprises**

**Structured system development methodology:** Structured System Development Methodology is an outcome of combination of engineering system development methodology and life cycle methodology and has been, by far, the most widely applied and the most mature system development technology among all management system development methods (Zhang, 2003).

The basic idea of Structured System Development Methodology can be generalized as follows. Firstly, this method adopts a structured idea, a systematic engineering view and an engineering method. It makes a modular decomposition on the entire management information system with the design technology of modularization structure from top to bottom according to the principle of
user first. Then, it combines all separate modules according to the structure of the system from bottom to top and finally fulfills development of the system. Specifically, this method firstly divides the development of the entire system into several relatively independent development stages according to the principle of life cycle. These stages include system planning, system analysis, system design, system implementation and system operation management and evaluation. Then, at the stages of system planning, system analysis and system design, it adheres to the principle of top down for structured division of the system. From an investigation on the management business on the top until the business at the bottom, this method firstly optimizes the entire logical or physical structure. Then, it optimizes local logical or physical structure in the overall program analysis and design of the system. Finally, at the stage of system implementation, this method adheres to the principle of bottom up and makes gradual combination and debugging from the bottom module programming until development of the entire system.

The prominent merit of SSDM is that it emphasizes integrity and globality in system development and stresses specific analysis of the design issue on the premise of overall optimization, a top-down view. In the meantime, this method makes a strict distinction of development stages and emphasizes strict system analysis, design and implementation step by step. Each step of work should be summarized in good time so as to discover any problem and give feedback for correction. The subsequent work has to be done on the basis of the previous step of work. In this way, each step of work has reliable evidence and a blind and chaotic work condition will be avoided in the process of development, which greatly enhances the success ratio of system development.

Nonetheless, on the other hand, there also exist drawbacks in the Structured System Development Methodology which are mainly reflected in the following several aspects. In the first place, the development cycle is too long and the strict division of stages and requirement for document waste both time and effort. In the second place, it is difficult to adapt to the rapidly changing environment. The development cycle is too long and it is not likely to alter at random the achievement of the previous step of work. Thus, the following step might be unable to report in due course the change in the environment in the development program. This will cause the ultimately developed system to be break away from the reality. In the third place, the instrument employed is laggard, so a lot of analysis and design charts are unlikely to be finished by computer. Instead, they have to be drawn by manual work, which wastes both effort and time. In the final place, it violates the regularity in cognition of things. The system development personnel are required to get an adequate mastery of the demand and managerial condition of users at the very beginning of the investigation and to predict any possible change. This does not comply with the regularity in cognition of things step by step.

Given the above analysis of both the merits and drawbacks of the Structured System Development Methodology, it is concluded that this method is suitable for development of large scale and complex management information system.

Prototyping approach: A bottom-up and rapid management information system development method is proposed, namely, Prototyping Approach. This is to the end of overcoming the drawback of long development cycle in the Structured System Development Methodology and making the development process accepted easily by the users.

The basic idea of the Prototyping Approach is that at the very beginning of development, the focus is not on a comprehensive survey and analysis of the system in operation. Instead, only a simple survey is required. After having an idea about the basic demand of the users, the development personnel quickly develop a system (prototyping system) with rich development experiences which initially meets with the demand of the users. Afterwards, they give this prototyping system to the users for a trial use who put forward suggestions for improvement after the trial use. The development personnel modify the prototyping system in accordance with the feedback and suggestions from the users and then deliver the system again to the users for another trial use. As such, after several turns of trial use and modifications, a system which is finally satisfactory to the users is available. The so-called prototype, as a matter of fact, is the working version of an information system or part of a system. However, it means nothing more than an initial model. Once put into operation, this prototype will be further modified until it precisely complies with the demand of the users. And in case the design is ultimately determined, this prototype will be converted to an information system without any drawback.

Simply speaking, the Prototyping Approach is to establish a test system in a quick way and at an easy rate and to give the opportunity of evaluation to the terminal users. After coming into contract with the prototyping system, the users have a relatively complete perception of their demand on information and the prototype recognized by the users may be used to establish the template of the
ultimate system (Zhu and Wu, 2003). This approach is a repeatedly and continuously evolved development process with the four steps in which the prototyping party determines the demand of users, develops a prototype, uses the prototype and modifies and enhances the prototype.

The feature of the Prototyping Approach lies in its rapid construction of a test version for management information system. This version can be used for demonstration and evaluation by users. They have the opportunity to witness the rudiment of the system at the very beginning of its development, know about the management information system and propose their own demand in more details. Firstly, this helps them to participate in the development process as early as possible and stimulate their enthusiasm and initiative in participation and development. Secondly, the work of training on users can be simultaneously started, which is helpful for successful operation and maintenance of the system in the future. The system development personnel can also resort to this test version to explore the demand of users and then make modifications on the test version of the system accordingly.

The Prototyping Approach is suitable for a simple system which has an explicit process of processing. It is suitable for a narrow and small scale system instead of large scale, or complex processing system with strong logicality which is difficult to simulate or has a lot of arithmetic. Neither is this approach applicable for management of a system which is not perfect in basic work or which is not standard in the process of processing.

**Object oriented design method:** Object Oriented Design Method is gradually developed from the various object oriented programming methods (such as, Smalltalk, C++ etc.,) in the 80s of the 20th century. It is a kind of development method based on the concepts of object, category, encapsulation, succession and polymorphism (Zhou and Sun, 2005). Its basic idea is to make a natural segmentation on a problem space and identity the objects underlying and their mutual relations on the basis of the problems studied. Then, it is to construct an information model of the problem space, make a systematic design accordingly and construct system with a software module of the corresponding objects and their mutual relations. The purpose is to enhance reusability, expandability and maintainability of the software system and to develop the software system in the direction of generality. In such way, the software system is able to be constructed by software integrated package just as assembling of hardware. The development process consists of the four steps of problem defining, object identifying, problem designing in detail and fulfillment of program.

The merit of Object Oriented Design Method is that it is close to the real world, constrains the impacts of subjective factors and effectively controls any deviation in perception of the system as a result of different perceptions. Application of this method resolves the problem of inferences between the descriptive instrument in the objective world and the software structure in the traditional Structured Development Method. Furthermore, it also diminishes the development cycle and settles the complicated process of repeated conversion and mapping from analysis and design to the software module structure.

Inevitably, the Object Oriented Design Method also has its limitation and its application has to be supported by software with powerful functions. In developing large scale information system, adoption of a bottom-up method all throughout without a top-down process of overall division might fail to get an overall perspective of the whole system. It may also give rise to the issues of irrationality of the system structure and imbalance of all separate parts.

**CONCLUSIONS**

In brief, it can be found from the above discussion on several frequently used management information system development methods in furniture enterprises, each method has its own limitations. Thus, in a manner of speaking, so far, there hasn’t had any perfect management information system development method. In actual application, the optimal development method is to select an appropriate development method in accordance with the specific condition of the management information system in furniture enterprises to be developed. The conditions include comprehensive scale, degree of complexity and development instrument, etc., or, several methods may be combined for application. The current era is one when economy is constantly developed and information resources become more and more important. In such an era, it is a must to get information tendency in the nick of time and construct a reasonable and effective management information system. This is to seek for development in the fierce competition and to stand out among a huge number of enterprises.

**REFERENCES**