

A Web-based Architecture of e-Procurement System Research for School Administration Information System-A Study of M University

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Abstract

Nowadays, the Private Universities and Colleges upgrade and change status one after another, in order to increase their administrative efficiency and take the improvement of the competitiveness as their key imperatives. At present, those systems of domestic Private Universities and Colleges for dealing with various administrative businesses all have been computerized, except for the procurement system whose computerization only reached 57.94%. Most schools still have done business in manual way, and it will become an important project that how to improve the administrative efficiency of the universities by making good use of the computerization of the school administrative businesses and merging the e-procurement.

The purpose of this study is taking the Minghsin University of Science and Technology as an example. we hope computer online can be adopted in those procedures belonging to the process of pushing the e-procurement

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system like the marshaling of the budget, the filling of the buying requisition and the evaluation of the procurement list. And take the measurements above to substitute the traditional mode with paper working which is not only time-consuming and efforts-consuming but also of low efficiency. The e-procurement system is imperative with the operating environment of internet.

With the help of the on-line e-procurement system, the process of procurement demands of each department can be finished in the way of filling in & checking the buying requisition on line, and it will also results in the updating of the procurement messages, the improvement of the work quality and the shortening of the deposing time of the procurement process. While the detailed beneficial scheme put forward later will achieve the lessening of the complicated operating process as well as the reducing of the cost of human resource. Then all this will contribute to the improvement of the internal controlling situation of the Universities and Colleges as well as the avoiding of the wasting and overusing of the budget. Lastly, the most effective application of the expenditures will be achieved.

Keywords: School Administration Information System, E-Procurement, Web-based Architecture

JEL Classification: L94, L96

1. Introduction

In view of the prompt development of the computer science and technology, internet has become an indispensable tool in our lives, while the traditional manual processing mode cannot meet the demands of modernists to pursue innovation, change and speed. We must make use of the computerized system to help procurement operation, thus the administrative sources can be saved & the work efficiency can be improved. At present, the business circles are the majority to guide in the procurement system, and the development of the procurement system of the Universities and Colleges have been gradually valued. Most of the school which have adopted the computerized procurement system develop and design the system themselves, and the outsourcing development is also popular, however most of those systems all singly design focus on the procurement department and have not operated with the general affairs department & financial department. The disadvantages of the system designing and the function consequently be expressed, and the integration of each department of school still needs to be relatively discussed and developed.

During the traditional procurement process, all need to be finished in manual way from the filling of the purchase requisition to the delivery of document to various entities for signing,. From the current perspective of paperless, it will lead to the wasting of papers, the difficulty of preserving papers and a lot of time and spaces for managing. If it needs to be read later, a lot of time and energies will be needed again. What's more, the executive efficiency of manually delivering documents is so low that problems like delaying and loss can hardly be avoided during the delivering process, and some urgent procurement cases cannot be delayed.

Consequently, the study case of this thesis is Ming Xing Science and

Technology University, the purpose is to take the first step of integrating procurement system with the administrative computerization of Minghsin University of Science and Technology as the reference and suggestion for the future design and integration of procurement system of other Universities and Colleges. And this purpose will be achieved not only by the settlement of the lack traditional procurement system with the help of the research, but also the analysis of the rationalization & institutionalization of the current operation process.

This research got a conclusion with the literature survey that the e-enterprise integration should be equipped with the basic structure of procurement operation function (Perkins & Gunasekaran, 1998; Yonezawa, 2008), and it should be applied in the school procurement system process. This study is intended to compare the government procurement method by taking the Minghsin University of Science and Technology as the object, while the procurement period shall be from the establishing date of the legal budget to the final acceptance, including the procedures of budget establishing, buying requisition, bid inviting, bid submittal, bid reviewing, bid opening, procurement, goods delivery, acceptance checking, payment and law suit settlement. The procurement administrating situation of each entity will be evaluated and discussed schematized for its performance in this study.

2. Literature Review

In E era, school affairs comprehensive electronic is irresistible trend. It can improve the efficiency of procurement departments in schools and enhance transparency in the procurement process by positive implement electronic procurement. Therefore, school system can be perfected and achieve integration with departmental systems.

2.1 Significance of Procurement

The procurement is defined as using right price to buy the goods which meet the requirements specification from supplier in the appropriate time. Appropriate procurement can reduce the purchase price and total operation costs. Corporate procurement procedures are start from the purchase requisition which puts by demand units and inventory control units. Then purchaser shall check the purchase requisition content, vendor data, purchase record and other relevant data. At last, the purchaser shall consults with supplier about business of inquiry, bargaining and parity to execute the delivery management, inspection and storage, and other business processes (Ageshin, 2001; Chen et al., 2011; Essig & Amoid, 2001).

2.2 Importance of e-Procurement

The e-Procurement is enterprise procurement solutions which based on Web system and workflow management. The traditional manual-based procurement process can be used in Internet technology and tools that achieve the benefit of automation (Hult et al., 2000; Hossain et al., 2011). The traditional procurement process is so petty that procurement equipment for a long time. Because it must make through four stages which including purchase requisition, procurement, receiving inspection and cancel after verification, and every stages all made by artificial.

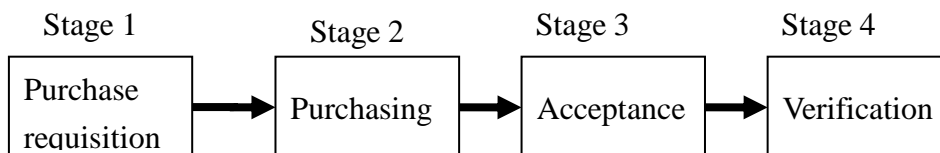


Fig. 1. Procurement process
(Source: Lin et al., 2012)

Due to the complex procedures, electronic procurement has changed. Through build electronic procurement, system operator can utilize this system to control the processing of procurement and manage the last news of procurement. Therefore, the all processing of procurement become transparent and the relevant buyer also can use this system to audit evaluation which reduces the rate of human error to improve administrative efficiency of school procurement department and achieve the purpose of procurement efficiency.

2.3 Guidance of Accounting Core

Because modern information technology trends in competitive private school system, to use computerized operations are the best way to improve efficiency. However in today's market, the software personnel developing accounting software products based on accounting general ledger system. The first reason is market demand, and another reason is it not affect by market segmentation because of the accounting treatment accord with the regulation of private schools accounting system made by Ministry of Education (González-Benito et al., 2003; Mishra & Agarwal, 2010).

A complete school administration information system is closely related to the accounting and financial. Except accounting department of information systems, the relevant information also including educational administration, education, general matters, personnel, books and other R&D program and cooperative system (Perkins & Gunasekaran, 1998; Rai et al., 2009). As the following chart shows:

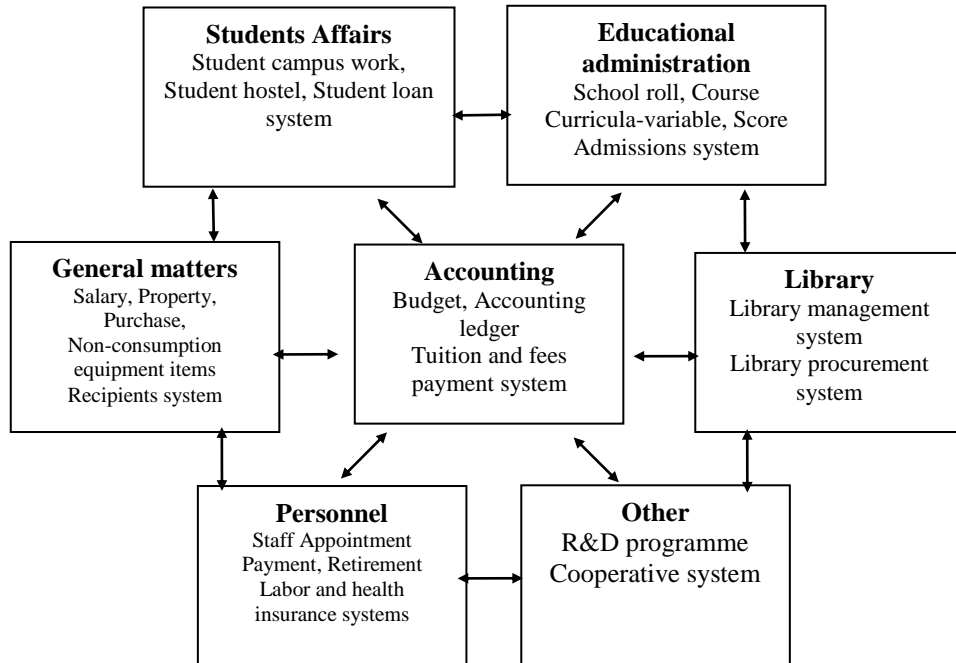


Fig. 2. Basic framework of School administration information system
(Source: Lin et al., 2012)

3. Design and Development of Procurement Management System

3.1 System Architecture

This system is a procurement system of Web 2.0 framework with recently the most widespread 3-tier Architecture. Users take advantage of Browser in the Client end of first layer to connect with Web Server (or generally known as Application Server) in second layer through HTTP. In the server of Web Server, there are web pages and various application systems, including CGI program connected with data pool, Java program and so on. When the front end need information, Browser will deliver the

order to second layer through HTTP, while after the Web Server receive the order, it will make use of CGI program in the Server to connect with JDBC agreement through standardized data pool, and transform the requirement into standardized data pool to obtain SQL order, then deliver SQL to the data pool server of third layer in order to achieve required data. After that, deliver the data back to Browser of first layer in accordance with opposite order (Liao et al., 2003; Kameshwarana & Naraharia, 2007). The system development framework concept map is as shown in Fig.3:

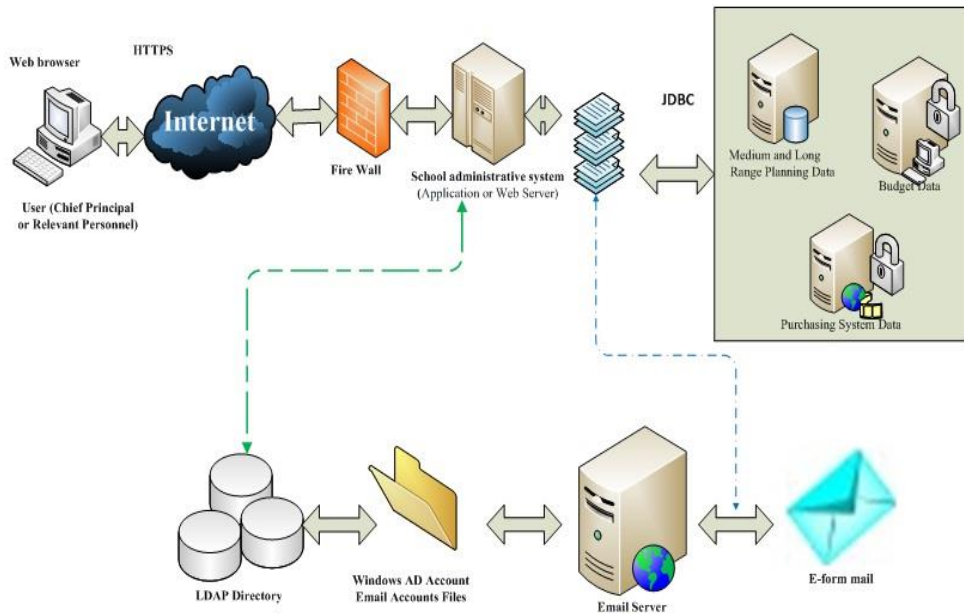


Fig. 3. System conceptual diagram
(Source: Lin et al., 2012)

3.1 System Characteristic

3.2.1 Beginning with Medium and Long Range Planning

School financial planning shall be able to match with the medium and long period school development plan as the key point and beginning to arrange budget for several years. The budget control for several years in the process of implement financial planning will rely on internal control and coordinative action to make the funds distributed function effectively, and take action in accordance with the procedure of medium and long range planning so that there will not be any delay and waste (Teo & Lai, 2009). This budget system will contribute to the effect of accounting administrative execution. Recently the vast majority of the private colleges and universities have not done from this execution point, the proposal of this study takes medium and long range planning of Minghsin University of Science and Technology as main beginning and basis of budget arrangement, then divert the proposal from data pool of budget system to data pool of procurement system acting as guidance.

3.2.2 Operation Procedure of Importing Budget System into Procurement System

This system will list the procedure by assisting with the budget system, and on the basis of the long range development planning data pool of every department, careful protocol the contents of working budget project plan and details, and arrange the priority schedule of budget execution, and then implement it doubtless. In this way, not only connect with the medium and long range planning, but also make sure the implementation of budget planning avoiding plan delay and waste. Moreover, when arranging the budget, every department can directly check the data through on line and true time searching function of data pool over the years, and treat data as basis and reference of budget arrangement in current year. So it can greatly decrease unnecessary budget outlays, and assist the procurement and price tracking examining and whole basis unified procurement. All the procedure will be opened to the

Web through true time information and the data of procurement details will be controlled more accurately to achieve the purpose of procurement procedure effective open and transparent (Teo & Lai, 2009).

3.2.3 System Function

1. Manufacturer data management: The category setting, data maintenance and application of building document (forms) of manufactures.
2. Procurement operation: Disbursement application, disbursement subject inquiry, disbursement subject inquiry, procurement file building (forms), enquiry and quoted price and order, installment operation, historical quoted price inquiry.
3. Tender offer operation: Tender offer file maintenance, impress of blank tender form, the way to pay performance bond, bid opening maintenance.
4. Contract management: The contract formwork maintenance, contract execution phase setting, contract basic information maintenance, contract execution record maintenance, contract execution record inquiry.
5. Disbursement procurement setting: Procurement category setting, payable subject setting, procurement unit setting, procurement method setting, disbursement note setting, limited tender item, free procurement condition, control of authority unit.
6. Acceptance operation setting: The condition for exempting from customs examination setting, acceptance punishment item, acceptance unit setting, inform of acceptance formwork.
7. Acceptance management system: Acceptance record maintenance, maintenance of acceptance record, acceptance meeting notification, acceptance meeting notification replacement, acceptance delay notification, acceptance delay notification and acceptance

punishment notification (forms).

8. Margin retreating application: The margin retreating application (forms), margin retreating application (forms) and note setting.
9. Cancel after verification operation setting: procurement inspection attaching data, margin subject setting.
10. Procurement verification operation: procurement verification application, batch verification application, manufacturer default subject setting, procurement verification review.
11. Relevant report forms: procurement saving details form, acceptance record schedule, disqualified acceptance schedule, margin schedule, disbursement un-review schedule, procurement condition schedule (Ageshin, 2001).

4. Benefit Analysis of Traditional & Electronic Procurement

In this unit, we will do a complete comparison analysis about the differences on the effectiveness & impact that generated by the different procurement methods (traditional & electronic) from the points of school and manufacture. As table below shows, we can obviously understand the differences in the periods that before and after electronic import.

Pre-importing: The lack of integrative data bank of procurement operation system in each offices leads to the leak and loss when manually operating. The inconformity of data in the part of school business operation also became an occasional situation. The combination of school business became difficult because of the hardware/software devices surroundings being not integrated. While because of the lack of the professional staffs and the shortage of the quality of the administrative staffs make the process of management and maintenance run unsmoothly. As to the manufacturers, overmuch wasting of human resources and the reducing of the quality of product & after-sale service all may appear.

Table 1. Advantage of solution of electronic procurement

Comparing item	Pre-importing	Post-importing
Improvement of the quality of the administrative staffs	No	Yes
Efficiency & convenience of the operation process of the school business	No	Yes
Reduction of the cost in human resources and management	No	Yes
Integration of purchasing data	No	Yes
Inquiry of the real-time condition of order	No (unknowable)	Yes (knowable when on line)
Transparency of the purchasing process	No	Yes
Purchasing operation enter the paperless times	No	Yes
Automatic disposal of purchasing process	No	Yes
Circle of single purchasing process is of quick speed	No (take "day" as unit)	Yes (take "hour" as unit)
Integrative school business data system combined by various offices	No	Yes
Both the manufacture and school carrying can review needed information real-timely	No	Yes
Get to know the situation through reconciliation with manufacturer	Yes (complicated formalities)	Yes (speed is quick when on-line)
Automatic settlement of annual report	No	Yes
Unification of surroundings and devices of each entity and their information equivalence	No	Yes
Each offices interflow and share information with each other	No	Yes

Post-importing: The e-procurement system in the research is wished to be dealt with operation method of on-line and real-time. Reviewing historical data in this way will not only save time, human resources and cost, but also break the limit of time and geography. Besides, the system can also be used for inquiry.

Consequently, the successful importing of the informational system of high quality can improve the work efficiency of teaching staffs as well as organize the internal & external management performance & competitiveness advantages, then achieve the target & impact of the organization (Perkins & Gunasekaran, 1998).

5. Conclusions

The main purpose of this system is to get the procurement process on-line operated with the computerized administration. Thus all entities can make use of the system to directly conduct procurement application, inquiry and reviewing. The disclosure and clear information results in the easy control of the degree of budget conduction of various entities in the school. And then, the wasting of capital belonging to each entity will be reduced, while the revolution and application will be more flexible.

The operation of the procurement system shortens the steps for manually marshal and checking, and reduce the cost of human resources and time; the unnecessary manual comparison and checking is omitted by the procurement system which perfectly combined the 4 parts (procurement requisition, procurement, acceptance checking and charging off) with the help of the convenient & quick on-line operation as well as the accurate & timely automatic process guiding. This system can be conveniently used for the inquiry of budget, procurement balances and process profile. The time spent on budget marshal and procurement process is largely reduced by the connection of data bank. The quick improvement of administration efficiency & the competitiveness of private school all be achieved by the analysis & evaluation about the right data that got by various entities in the process of marshal and procurement.

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