An ERP Customizing Methodology Based on Process Model

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Abstract

As a result of the policy for enforcing the information technology led by government and the effort of companies to get over economic crisis through the reformation of business process, the ERP market is being active. However, because imported ERP products that are supplied currently are designed for standard and rationality, they have a limit to support custom processes of domestic companies in South Korea. On the contrary, ERP products by domestic companies in South Korea are unable to support a consistent methodology of constructing ERP system. This is main reason why much time and costs are consumed than that of an original plan.

To succeed in ERP construction, the purpose of ERP setup must be defined. To accomplish this end, it is required to analysis business process completely and to make a plan in detail. For ERP providers, they must support a characterized ERP construction methodology and lower the construction cost by improving an ERP package easy to customize[5].

Key Word : *ERP, Business Process Model*

1. Introduction

ERP(Enterprise Resource Planning) System, as a visible means for reducing computing cost with verified and standardized business process, enable to improve efficiency and productivity greatly. With this reason, the effort to introduce ERP has being spread. But ERP setup is very difficult work because of restricted technical expert and know-how.

The ERP package system is in spotlight as the solution of these problems. The EPR package technology is that make it possible to use applications at any company by some program modification[6]. It is impossible to apply ERP package to various companies or business categories without this technology. On the other hand, in case of constructing ERP system with an ERP package, the effect is little compare to investment. These are because the plan for introducing and constructing of ERP system is not clear or there is not consistent methodology in ERP package. Especially, the selection of a suitable ERP

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package is the very important factor for success of ERP setup. Concept,, functionality, realization, easiness, supports of an ERP package must be considered.

Under heterogeneous and decentralized environment, system integration is processed by many engineers for a long period. So, management and control – i.e. the management and methodology for project – are must be supported. In Addition, toolkits for ERP design and development must be supported too. That is, modeling methodology by analyzing and understanding problems in the point of the real world and the toolkits that use the model by that methodology are required necessarily.

To model the decentralized business processes in global environment, it is efficient to define and model each business process as an object. In this way, real world is designed easily.

In ERP system construction, it is one of the most important factors that decide the cost that how easily making a customized ERP system from ERP referencing model. We intended to explain the ERP customizing methodology in this paper by parameter adjustment and process selection based on business process model.

2. Business Process Model

2.1 Process Model

Methodology that has various modeling expression ability must be used for a successful ERP system development. As an important tool of ERP construction, this modeling methodology must have a distinction from others. A Modeling methodology must have a high modeling ability about various business areas on the basic structure and CASE Tool and toolkits for systematic documentations[4].

The existing business system modeling models problems as procedures, and regards data as passive objects. So it has problems about business process reuse and information exchange between procedures. For solution of these problems, we used methods that develop data and procedure in integration base on business objects. With this method, it is possible to unify the operations for data object and improve reuse of application software source code.

BPR(Business Process Reengineering) is a system that reject the traditional modeling methodology that make business processes specialization by dividing them in several stages and removing errors by checking reciprocally[2]. Instead, it provides efficiency by integrating similar processes. BRP is a management reformation toolkit that makes customer's satisfactions by using information technology creatively and redesign business process, and improve a company's competitive power rapidly by maximizing internal efficiency. Because BPR is efficient when business process is supported by reformed information systems, in order to process BPR successfully, the related information system must be designed for supporting BPR. For successful BPR, the following three requests are satisfied. Improvement of manage processes – short life cycle, decreased profit, complex management, a great deal of information, and variance, the necessity for internal change – central management of information, process redesign, flexible management system, the necessity for

external change – globalization, internationalization, challenge of a external competitor.

To do modeling resources in the enterprise point of view based on processes, the modeling toolkit must support an integrated modeling and documentation ability for organization, data, function, and system. And it must support various analyzing abilities for analyzing problems of current processes from modeling results.

Besides, the modeling result must be able to make it possible to take whole process from parts, and a part process form whole. And the process model must be applied to a system development and management.

Generally, the business process modeling in ERP must be satisfied these requests.

- A process reformation by doing BPR efficiently
- Providing a consistent method from BPR to ERP package install
- Improvement of efficiency of collaborative works between business managers and system developers by a visible process model
- Customizing ERP package in short period

2.2 Modeling Methodology

Process modeling Methodologies with modeling toolkits can be divided into a top-down methodology and a bottom-up methodology[3]. A top-down methodology is what process modeling from definition of large business process and organization to specialization of each model. On the contrary, a bottom-up methodology is what firstly define function and role in detail and merge them to large module.

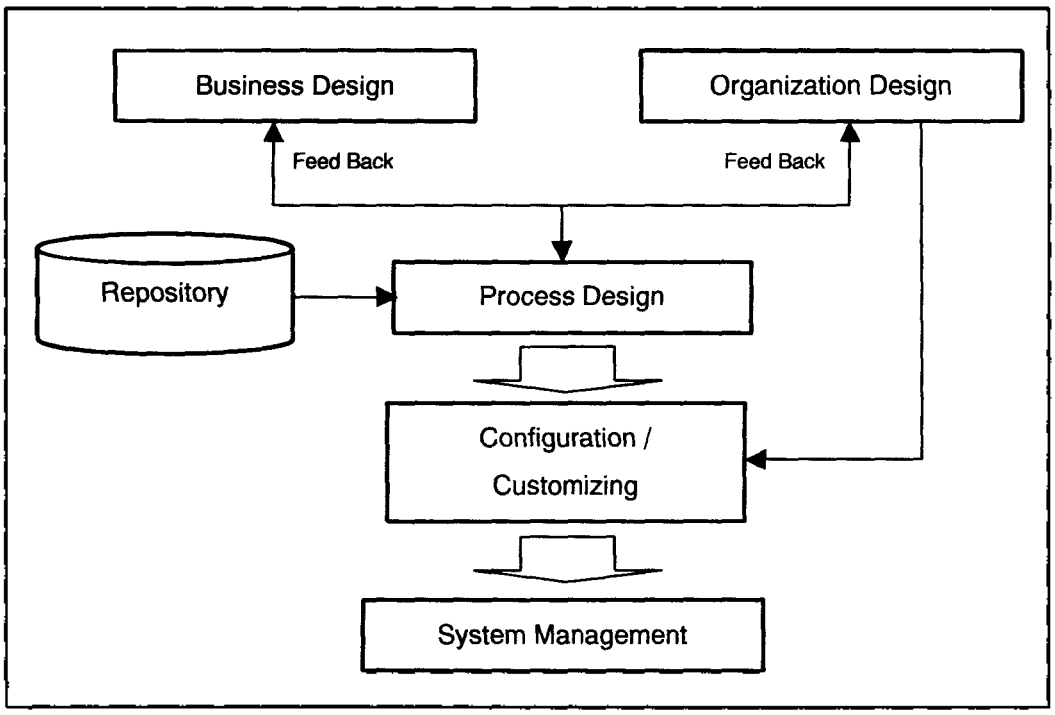

Fig. 1 Process Design

The top-down methodology has a shortcoming that early mistakes propagate the whole system, and modification is very difficult. A weak point of the bottom-up methodology is that it requires long time and it is difficult to design a to-be model of customer. For these reasons, to design process efficiently, these two methodologies are used in mixed properly. We used the top-down methodology in business design, and the bottom-up methodology in process design.

In business design, a large model is described without regard to detail technology or business with top-down methodology. At this stage, make overall business model by considering strategy and as-is model of company, and discard the faults of custom, and create the new concept of business process from the result.

In process design, define detailed process and the person in charge based on the result of business design using bottom-up methodology. At this stage, designers define modules, select of reference model, and add additional module. Developers support technical requests, define what modified, added, deleted form original modules in detail, and use them in customizing.

This two stages are processed through complement each other continuously. That is, business modeling is not completed once, but updated by the result of process modeling. And this result influences the process modeling. Fig. 1 shows the process of business process modeling. The following explains works at each stage.

- Business Design

  Make overall business diagrams by considering the company's strategy and present condition (AS-IS) and ideal changes (TO-BE). Each process in diagram is subdivided in a scenario diagram.

- Organization Design

  Design organization model. Not to mention department and position, define role and level of person. With this organization design, a personnel DB can be created automatically.

- Process Design

  Make scenario diagrams by specifying each module in business diagram. Compare created diagram with standard reference model, and do mappings. With this result, modules in each reference model are modified and removed, or new modules are added.

- Configuration / Customizing

  By Appling diagrams to configuration and customization, construct a ERP system.

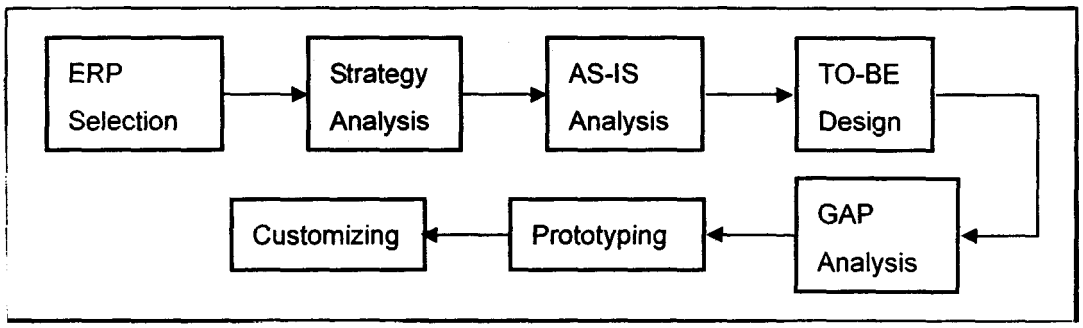

Fig.2 ERP Implementation

- System Management

With correspondence to new technologies and process changes, update ERP system.

2.3 Reference Model

The ERP package constructs an ERP system based on reference model[7]. How various and flexible reference models are provided is the important factor of the success of ERP. The reference model has the following features.

- Description of functionalities of standard business application component business processing
- Graphic representation
- Starting point and guide for activity-based implementation
- Derive company-specific model by selecting, adapting, extending
- Presentation of information flow, data, organizational structure, and temporal function sequence
- Documentation ability

3. Target ERP System

3.1.Basic Requests for ERP System

To construct an ERP system, internal information of company need to be integrated and shared, and for this, enterprise information system must satisfy the technical, functional, and systemic requests[1]

With technical requests, open system, distributed DBMS, 4GL, GUI, client/server environment, multimedia support, and object oriented design and development must be possible.

With functionality requests, functional integration of design, production, and management system is needed. Connection with external system is also needed. And it must be able to support various companies from small sized companies to large multinational corporations.

With systemic requests, integration with interfaces completely, abundant functionality, global applications, and easy installations are needed.

Currently system operation environment has changed from host to client/server, and again changed to n-tier environment with a middleware. The middleware component technology assumed the role of downsizing with the distributed database technology. Because the component architecture makes it possible to develop system rapidly using previous system, more than 3-tier architecture is desirable.

3.2 Standard Application & Architecture

SEA+(Standard Application & Architecture) is the ERP system being developed by ETRI. SEA+ supports the concept of business application components for processing business work. SEA+ has abilities to develop and execute applications through its own develop toolkit and run-browser. It is based on DCOM, which is distributed component middleware technology of Microsoft.

SEA+ provides IDE consist of various development and execution tool. Developed components are stored in repository for reuse. With the repository, development toolkits are organized in component concept. SEA+ has the following differences compared to other domestic ERP systems.

- Accommodation to various distributed computing environments include internet
  Easy to apply 2-tier, 3-tier, and n-tier using DCOM middleware and component server.
- Guarantee of timely development and execution by interpreter
  By interpreter execution with not compiled execution code but ordered code, development and modification is possible at any time. And these are reflected immediately.
- Support standardized and coded data
  By using data element concept.
- Constitution of object-oriented ERP process modules
  By using methods pointed to data with analysis and design by UML, modification and extension is simple and reusability is increased..
- Realization of component of software modules using repository
  By standardized process modules are stored in repository in the form of components.
- Package system, which provides its own development toolkit
  By using its own development and execution toolkit, works related to ERP operation are processed.
- Constructing an high quality and low cost ERP system by customization
  Not by programming application but by selecting and modifying reference model.
- Easiness for managing and upgrading a constructed ERP system.
  By differentiating added process module from built-in process module, upgrade is supported continuously.
- Workflow system
  By providing workflow system, the flow among the business processes is automated.

3.3 Customizing

Customizing functionality of SEA+ is used when EPR system is constructed, when functionalities of ERP system are reinforced, and when system or ERP is upgraded as a mean of supporting system engineers.

Generally, Customizing is not support to modify the basic functionality of ERP system. This is because the modification for basic functionality makes the management of ERP system impossible or very difficult. The customizing of commercial ERP packages supports the following in addition to characterized methodology.

- Support toolkits for configuring ERP system and writing documents
- Support toolkits for evaluation of management, progress, result of customizing
- Support advices for system setup and toolkit for this work
- Support the movement from development environment to operational environment
- Support the system upgrade and toolkit for ERP upgrade

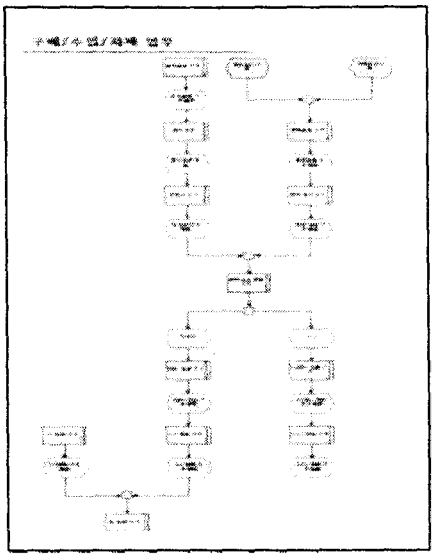

Fig.3a Reference Model

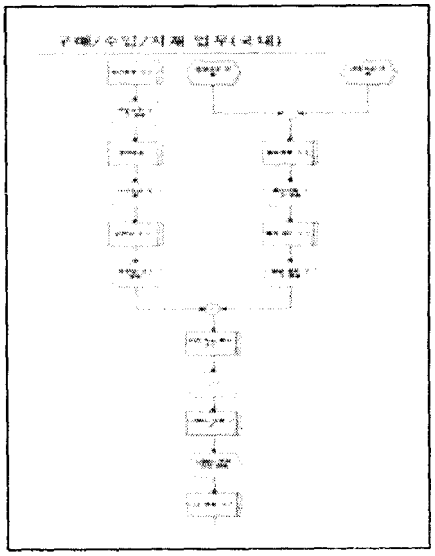

Fig.3b Customized Model

4. Sample Process

SEA+ provides several toolkits for creating customized model from reference model easily in a consistent way. We intend to show the flow of ERP customizing with an simple example.

Derivation form reference model to customized model is made by system transport toolkit. The system transport toolkit copy selected reference model to destination ERP system. At this stage, user can select intended modules based on model that is analyzed and designed process model. This toolkit provides GUI environment and enables construction of model by only user click, so user can design business process model easily.

Each process area in reference model has a corresponding business transaction. The business transaction is an application, and it has the information of related screens, programs, tables, and data. The database transport toolkit copy all data based on models selected by user. New ERP system is constructed after data copy is finished. Next, system modification is carried based on user requests and custom works of company. These processes are carried out using ERP application editors included in SEA+ ERP system.

The ERP application editors provide a data ER model analyzer and a program sequence analyzer. With these tools, user can modify system more easily. These tools support the customizing process by providing analyzed system information to developers. Figure 4a, 4b and 4c show the screen shot of ER model analyzer, screen editor, and program sequence analyzer in order.

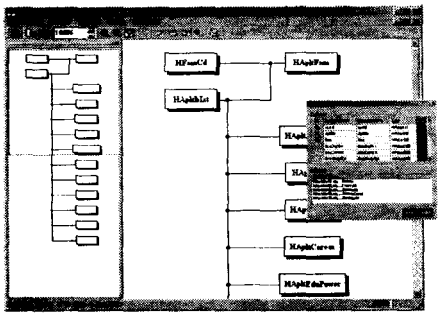

Fig.4a ER Model

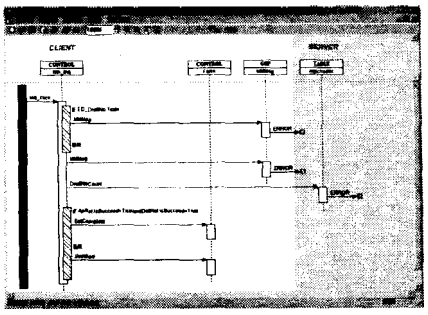

Fig.4b Sequence Diagram

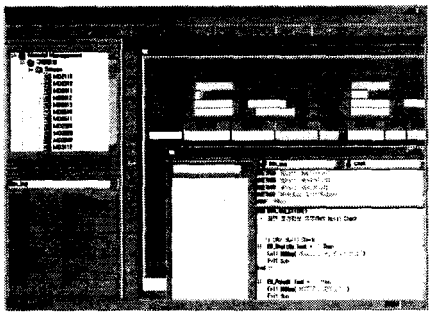

Fig.4c Screen Editor

5. Conclusion

Recently, although the domestic companies that develop and provide ERP solution have accumulated know-how and advanced technology in application department, they have suffered from losses in support and management. Without developing tool and customizing tool that support design, development, distribution, and management, it cannot be solved.

We introduced the SEA+ ERP system that uses software developing methodology base on component and UML. And we explained the business process modeling methodology and customizing process in SEA+ system.

The ERP customizing toolkits have been developed to the extent of basic functions. If it will complete, as the ERP package that support the whole process stage – design, development, operation, management of ERR system, it provide functionality not behind other exported ERP packages.

However, research and development about applications, like human resource, finance, accounts, SCM, CRM, and SEM, are needed. And the reference model construction is the important subject.

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