

Efficient Business Administration and Configuration Methodology for Rapid Deployment of EPC-IT System in Target SMEs

J. Zhou, W. He, J. Zhang and C. Chee

Abstract – The efficient business administration and configuration methodologies are developed to rapidly deploy EPC-IT system in target SMEs. Issues addressed include system specification, system installation, system configuration, system structure management, business environment set-up, business processes automated, system upgrading, changing management, and CAD integration.

The methodologies can be adapted for the rapid deployment of EPC-IT system in similar industry sectors and licensed to third party implementers. The methodologies are repeatable, robust and efficient.

Keywords: Business administration, Configuration, Rapid deployment, System upgrading and changing management

1 BACKGROUND

Enterprise Resource Planning (ERP) [1-2], Manufacturing Execution Systems (MES) [3] and Product Data Management (PDM) systems [4-7] are very powerful enterprise systems, which help companies to manage their enterprise information effectively. They are integrated together to manage the entire business process [8-11]. In Singapore, most of the SME can't afford such large systems. EPC-IT is an affordable solution that helps the company to manage all the information in the entire business process. EPC-IT system was developed in SIMTech and has been successfully implemented in mould making industry. Research work is currently undertaken to adapt the methodologies to a pilot site in the printing industry. In order to deploy EPC-IT successfully we developed the methodologies to support the needs for both system and business processes requirements.

There are two complementary projects (C02-M-045AR & C02-M-023AR). Project C02-M-045AR provides a model-based reference framework and deployment methodologies for deploying EPC-IT systems. It focuses on the "soft" issues of software deployment such as process and information requirement audit and analysis, end-user training, phasing-in strategies, and contingency measure. Project C02-M-023AR focuses on the "hard" issues of software deployment. The relationships between the two projects are

shown in Fig. 1.

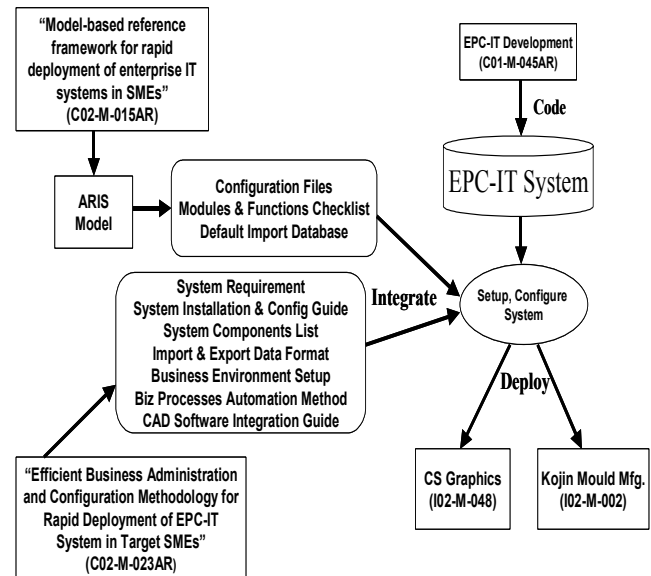


Fig. 1. Relationships between "Soft" issue and "Hard" issue projects.

2 OBJECTIVE

The objectives of this project are to provide efficient business administration and configuration methodologies for rapidly deploying EPC-IT systems in target SMEs.

These methodologies address the issues of EPC-IT deployment such as system specification, system installation, system configuration, system structure management, business environment set-up, business processes automated, system upgrading and changing management, and CAD integration.

The deployment methodologies can be adapted for the rapid deployment of EPC-IT systems in similar industry sectors and licensed to third party implementers.

The methodologies are repeatable, robust and efficient.

3 METHODOLOGY

There are many approaches in deploying an IT system. For example, Oracle [12] and Windchill [13] use script files or configuration graphical user interfaces to install and customize their sys-

tems. This approach is not user friendly and is error-prone. Time is wasted when a misconfigured system had to be reformatted and reinstalled.

An enterprise system is more difficult to deploy because it configures both business processes and system set-up. Currently most of the enterprise system deployment methodologies are template-based using Microsoft Office suite of software. The disadvantage of this approach is that whenever there are revisions across multiple disciplines, it becomes difficult and messy to maintain. Fig. 2 illustrated the typical use of script file, UI configuration, and templates for system deployment.

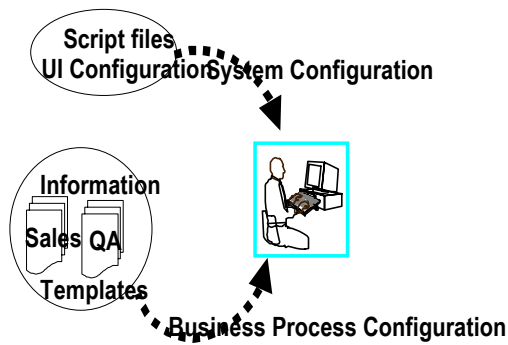


Fig. 2. Current approach to deploy an enterprise IT system.

In this project, a more efficient approach was developed to semi-automate the deployment of the EPC-IT system for both business processes and system set-up (Fig. 3). The key idea to system set-up is to first identify the modules, functions and data format of current EPC-IT system and differentiates the modules and functions that are essential for system set up or can be changed. Checklist and XML files will be used to provide a flexible and easy way for setting up the system structure. The key idea to flexible business processes configuration is to import the business environment, workflow and lifecycle encoded in comma-separated variable (CSV) files. Design document management is another important feature of EPC-IT that integrates with the UG CAD. This feature is needed immediately in the mould making industry.

4 RESULTS & DISCUSSION

4.1 EPC-IT installation & configuration guide

EPC-IT installation guide helps implementers to install EPC-IT system. It covers the following task:

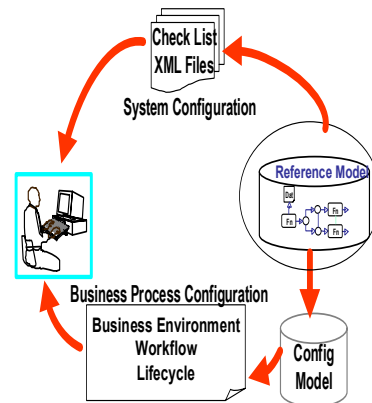


Fig. 3. Semi-automate deployment methodology for EPC-IT system.

- Set-up the environment;
- Install Info*Engine (and required third-party products);
- Install the Oracle server and client;
- Install Windchill Foundation and PDM (and required third party products);
- Install and configure EPC-IT modules;
- Install required other EPC-IT vertical application products;
- Customise EPC-IT system to meet site-procedures;
- Test customisations using site-specified procedures;
- Load legacy data;
- Test new data and customisations using site-specific procedures; and
- Bring the new system online as production system.

4.2 EPC-IT system structure guide

EPC-IT is a complex system (Fig. 4), which includes many modules that covers all the functions of entire enterprise. In each module, there are many functions. The data structures for each module are complex too. We developed a system structure guide to illustrate the module structures; function structures and data input structure in the EPC-IT system. It also differentiates the essential and supplementary system module, function and data. It also documents configurable and fixed data fields. This document is very helpful for deploying and implementing EPC-IT system on customer site.

4.3 EPC-IT data format documentation

This document illustrates the data format of all the modules in EPC-IT system. A data loading tool uses these data formats for importing and

exporting the basic setting up data into EPC-IT system. On the other hand, ERP systems use costly and time-consuming manual data entry methods. Therefore our data importing and exporting method will speed up the EPC-IT system's deployment and implementation on customer site.

- Design the EPC-IT domain, cabinet and folder structure;
- Identify business objects life cycle; and
- Plan access control rules for users within each domain, which allows users to create and modify objects.

4.5 Automated business process guide & data loader

EPC-IT Business Environment Data are also loaded from CSV files, which also speed up the deployment. This data loader works together with the Business environment configuration guide to automate the Business environment set-up in EPC-IT system.

4.6 Design change management process guide

The EPC-IT Change Manager tracks modifications of product information, including parts, documents, and CAD documents. This module covers the product development lifecycle stages of the concept design, product design and design release. In design management, change manager is a key control that links design changes to other processes affected by the product changes. The guide presents the out-of-box change environment for the EPC-IT System. This pre-configured default change environment contains the best practice in the industry. Although they can be directly implemented in the SMEs under most circumstances, they can be customised to specific requirements of particular companies.

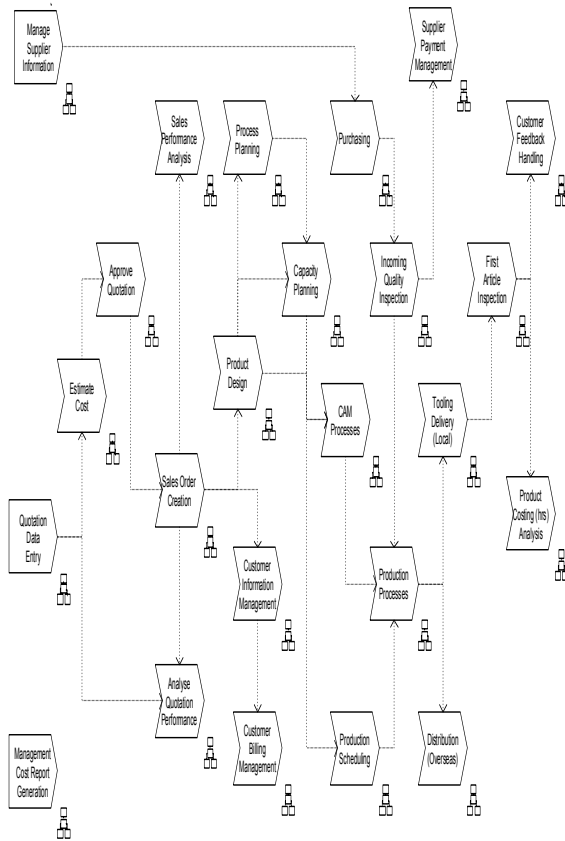


Fig. 4. EPC-IT system.

4.4 Business environment configuration guide

EPC-IT Business Environment configuration controls user's access rights to the data and functions of EPC-IT system. It configures:

- User accounts;
- Cabinets and folders where users store and share data and files; and
- Access permissions that users and groups have within those cabinets.

We provide the template for user to

- Identify users and plan user accounts;
- Organise user accounts into groups;

It is accomplished by the following functionalities:

- Workflow and lifecycle that define and control the processes of changes to product data;
- Change documents that hold change information;
- Change that are accepted by electronic sign-off; and
- Revision Control that are applied to the affected design data.

4.7 CAD integration with EPC-IT guide & toolkit

This document guides the implementer to install & configure the Windchill Workgroup Manager for Unigraphics, both at the server side (where the Windchill server is installed) and at the client end.

This guide is written for Windchill Release 6.2.2 & 6.2.6. The procedures were tested for Windows NT & Windows 2000 on the server side and Windows NT & Windows 2000 on the client side.

This guide also includes the procedure for installation and/or configuration of the following Windchill applications,

- Windchill Workgroup Manager for Unigraphics; and
- CAD worker installation (for both Local & Remote).

Additionally, the guide also includes the installation and/or configuration procedures on the HP-UX platform (Operating System version HP-UX11.0) for the following software;

- Netscape;
- Java software development Kite (SDK); and
- Java web browser Plug-In.

4.8 CAD migration from legacy system guide

This guide is about migrating CAD data files from a typical share folder management system based on the operating system (e.g., Windows) to an EPC-IT product data managed system through the CAD integration layer of the system. After the migration, all CAD systems can directly access the CAD data from the EPC-IT system through an integration layer as illustrated in the following figure (Fig. 5).

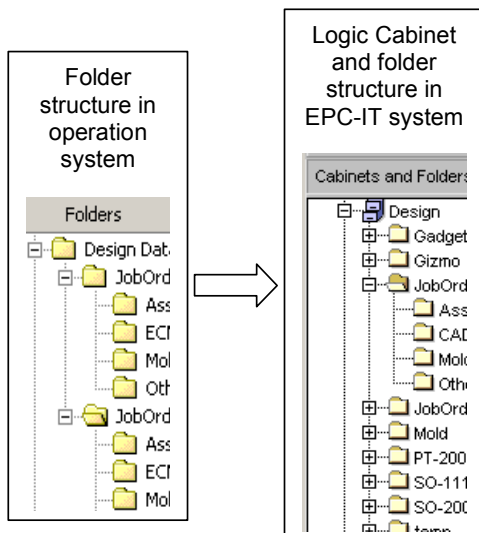


Fig. 5. Shared-folder and EPC-IT product data repository.

The EPC-IT system will manage the CAD data files through the system meta-data generated

during the migration process and provide the following benefits:

- Facilitating the creation and management of product configuration and Bills of Material;
- Linking product data, such as documents, to parts configuration;
- Supporting product design variant;
- Indicating the versions at which a component part is used in a product structure;
- Storing, managing, and securing information generated by diverse engineering authoring tools;
- Ensuring product data availability for reuse by other individuals and applications;
- Managing engineering information of CAD Integration linked to EPC-IT managed enterprise objects; and
- Supporting collaborative Publishing and Notification.

5 CONCLUSION

The efficient business administration and configuration methodologies are successfully developed for rapidly deploying EPC-IT system in target SMEs. These methodologies address the issues of EPC-IT deployment such as system specification, system installation, system configuration, system structure management, business environment set-up, business processes automated, system upgrading, changing management, and CAD integration. The deployment methodology was adapted for deployment of EPC-IT system in mould making industry; and can be similarly adapted for the rapid deployment in similar industry sectors. It can also be licensed to third party implementers. These methodologies are repeatable, robust and efficient.

6 INDUSTRIAL SIGNIFICANCE

EPC-IT is an affordable solution that helps the SME Company to manage all the information in the entire business process. EPC-IT system was developed in SIMTech and it has been successfully implemented in mould making industry, and it's currently being deployed to a pilot site of printing industry. The deployment of EPC-IT at two pilot sites, Kojin Mould Pte. Ltd. and CS Graphics Pte. Ltd., requires a good set of methodologies to ensure successful system deployment. This methodology will be used to support the future deployment of EPC-IT system in other companies and make available for licensing to third party implementers to deploy EPC-IT system.

REFERENCES

- [1] A. Shtub, "Enterprise Resource Planning (ERP) : The Dynamics of Operations Management", March, (1999).
- [2] L. Hatlestad, "ERP Charges Ahead", *Red Herring Magazine*, August, (1998).
- [3] M. McClellan, *Applying Manufacturing Execution System*, St Lucie Press, July, (1997)
- [4] *Product Data Management Report*, Vol. 4(1), January, (2000).
- [5] G. Schultz, "PDM Sees More Integration, New Adherents", *Managing Automation*, August, (1997).
- [6] A. Mendel, "PDM in the Next Millenium", *CIMdata*, August, (1999).
- [7] "PDM : Organizing Data for Enterprise-Wide Usefulness", *Automotive Manufacturing & Production*, August, (1997).
- [8] E. Miller, "Systems Integrators Target PDM", *Computer-Aided Engineering*, June, (1999).
- [9] S. Lozinsky and P. Wahl, "Enterprise Wide Software Solution : Integration Strategies and Practices".
- [10] www.pdmic.com
- [11] www.omg.org/archives/manufacturing
- [12] www.oracle.com/ cached
- [13] www.ptc.com/products/windchill