



ERP and SCM systems integration: The case of a valve manufacturer in China

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ABSTRACT

Many modern organizations integrate enterprise resource planning (ERP) and supply chain management (SCM) systems, as they work in a complementary fashion. This often results in technical and organizational challenges. Neway, a Chinese organization, recently went through this complex process. This required efficient procurement and management of hardware, software, and human resources for successful completion. The integrated system was found to improve operations, foster a paperless environment, and provide efficient inventory tracking and picking. It also had several tangible benefits, including reduced lead time and improved inventory accuracy. ERP and SCM systems integration is still a novel concept for a Chinese manufacturing organization. Our case study details the organization's experience, identifies challenges that were faced, and describes solutions adopted to overcome them.

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1. Introduction

Enterprise resource planning (ERP) and supply chain management (SCM) systems have been implemented and used successfully in many organizations. But managing the operation of such systems is not easy. It is important for operations managers to understand how ERP and SCM systems complement each other. Due to a paucity of case studies on ERP–SCM systems, especially in Chinese manufacturing organizations, we developed a case study of the integration of these systems at Neway, a Chinese valve manufacturer.

2. ERP and SCM systems and their integration

Efficient management of supply chains require continuous adjustments of the decision-making process including dynamic pricing and risk assessment, and evaluation of sourcing and logistics alternatives. While SCM systems are suitable for these functionalities, ERP systems are not designed for it. In ERP systems, material, capacity and demand constraints are considered separately. However, SCM systems consider all constraints simultaneously and develop a higher quality plan relatively quickly. The study by Akkermans et al. [1] identified the limitations of ERP

systems in coping with the challenges of SCM, including difficulties in crossing organizational boundaries, lack of flexibility in dealing with ever-changing requirements, and dearth of functionalities that focus on managing transactions.

While ERP captures and processes necessary data and assists functions such as sales and services, procurement and logistics execution, product development and manufacturing, etc. SCM provides additional layers of decision support both within and beyond organizational boundaries. ERP systems are primarily built on transactions-based systems, while SCM provides visibility, planning, collaboration, and control across and beyond the enterprise. Hence, it is natural that ERP and SCM should be integrated to provide higher business value [14]. Such integration can also support strategic objectives of the organization [6,27]. It has been argued that if companies implement enterprise systems, they need to change their management processes, reconsider their organizational structures, and reengineer business processes [18]. A number of success factors and potential issues in implementing enterprise systems have been discussed and some of the key considerations are summarized in Table 1.

There are additional considerations for enterprise system implementations in China, where only one-third of the ERP implementation projects have been found to be satisfactory [26]. Companies update purchasing plans more frequently to incorporate latest prices of raw materials and information flow between cost-control modules of ERP and SCM systems need special attention. Additional challenges in China include justification of systems automation and ROI, which is difficult to achieve due to

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Table 1
Key considerations in enterprise systems implementations

Items	References
Top management support, project management team competence, interdepartmental cooperation and communication, clear goals and objectives, vendor support, careful package selection, data analysis and conversion, dedicated resources, user training, education on new business processes, business process re-engineering, minimal customization, architecture choices, change management	[2,19,23,24]
Internal and external integration through consolidation of system instances, use of integration technologies, standardization of data and process definitions, process flow improvement to fit with the system and business needs, addition of analytical capabilities transform robust data access to useful business knowledge	[7,23]
Consideration of social, cultural, and organizational aspects	[15,20,30]
Strategies and sequences for realigning business processes, use of quality management programs	[22]
Emergence of right strategic plans overcoming power struggle and politics	[13,16]
Software suitability, appropriate system integration strategy and technology, information quality	[25,28]

lower cost of labor, cultural uniqueness that puts more emphasis on personal familiarity than on scientific decisions [21], lack of appropriate infrastructures at suppliers' and customers' organizations, and a fragmented market with many service providers [4]. Despite the presence of global vendors like SAP and Oracle, local ERP providers have played a major role in China [9,10].

3. Research using case studies

The case method is popular in business research [17,29]. We used it because we could study the challenges and benefits of ERP–SCM integration in the context of a fully functional organization: Newway—a major manufacturing organization in China.

3.1. Research framework and research questions

The basis for the case study was the MECI framework, as depicted in Fig. 1. The first step in the framework is *Motivation*: it aims at understanding a company's reason for systems

integration. The second step is *Execution*: it studies how integration is carried out and includes knowledge about management of project, use of existing resources, and procurement of new resources. *Challenges* is the third step: it is concerned with the obstacles faced in completing the project and innovative steps taken to overcome hindrances, reflecting on lessons learnt from the project. The final step is *Impact*: it includes the effect of the integration project on existing business processes.

We wished to investigate the roles that these four components played in systems integration at Newway. The research questions studied in the case study were:

- Why was the organization prompted to integrate the ERP and the SCM systems?
- How was the integration project managed and what resources were required to manage it?
- What challenges and obstacles were faced by the organization and how were they solved?
- What changes were required to the existing processes due to integration?

3.2. The use of a single case

We chose to conduct a single case study because we wanted to restrict our study to Chinese organizations. The phenomenon was a complex one that had to be studied in detail over a long period of time, and projects like this are not very common in China.

3.3. Nature of case studies

Case studies may be one of three types: exploratory, explanatory, or descriptive. An *exploratory* case study is usually a precursor to a detailed study intended to identify key research questions and hypotheses. An *explanatory* case study attempts to establish cause–effect relationships between items of interest. A *descriptive* case study reports issues of interest [8]. The Newway case study is descriptive in nature: we detailed the events taking place in the organization due to the integration of two complex software systems. The Newway case is an interpretivist case study providing a cultural and historical interpretation of the implementation.

3.4. Context and time of the case study

We collected information about the sequence of events that took place at the organization and recorded when they occurred. One of the authors participated as part of the implementation team and collected material related to the project. Thus this author could relate to all problems and analyze and record them during the implementation process while the other authors were responsible for case related data collection.

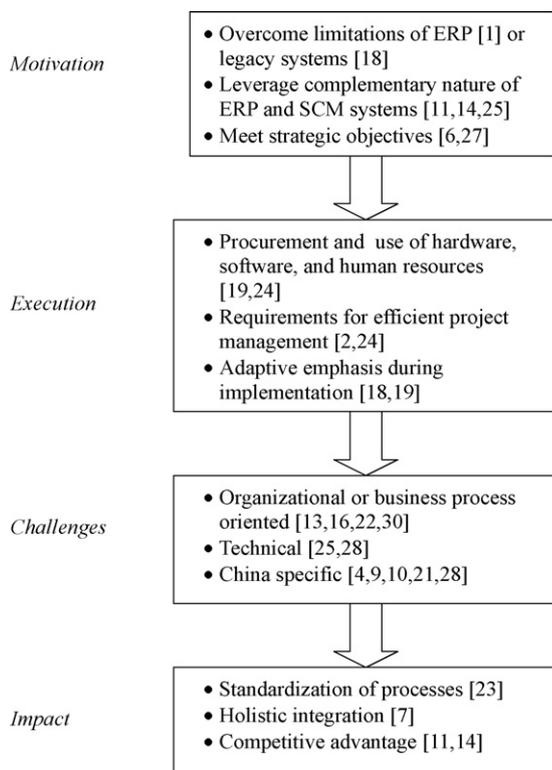


Fig. 1. MECI framework for Newway case study. (See Ref. [11]).

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