CHUCK C.H. LAW

Managing Enterprise Resource Planning Adoption and Business Processes

A Holistic Approach

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By

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Cambridge Scholars Publishing

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Dedicated to the memory of my late parents,
Shing S. and Chung-Sin Law

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PREFACE

Enterprise resource planning (ERP) systems are the lifeblood of modern business enterprises. Unfortunately, this important phenomenon is also associated with many negative stories. Unsatisfactory system adoption outcomes may be attributable to a number of mistakes such as unclear adoption objectives, poor support from management and users, excessive customization, poorly managed business process changes, and a misplaced focus primarily on implementation with the requirements of on-going maintenance and support understated or neglected.

Besides, some of these organizations placed their focus primarily on the technical aspects of ERP adoption but not on business objectives and requirements. Generally speaking, ERP adoption should be treated as a business project. It is necessary to stress the very close relationship between ERP systems, and business and organizational issues. An ERP cannot be successfully deployed in isolation of such requirements and constraints while the major challenge of ERP adoption lies in the difficulty of integrating and satisfying the highly diverse requirements originating from the multiple facets of an organization.

In addition to technical requirements associated with setting up and operating an ERP system, it must also be planned and deployed with due considerations given to such issues as IT governance and strategic alignment, business practices and process improvement, change management, ERP customization, on-going system maintenance, human resources development and training. Moreover, the long lifespan of an ERP installation makes sound lifecycle management particularly important. Thus, the holistic full lifecycle approach espoused by this book emphasizes a broader and comprehensive view that encompasses the technical, business and organizational factors of an ERP project. This approach also urges ERP adopting organizations to treat post-implementation requirements as important factors that must be carefully considered in ERP planning and strategy formulation. System design and implementation decisions must be made appropriately to result in a stable, and maintainable system for the long run.

This book intends to address ERP adoption and management together with many of the aforesaid business and organizational issues.

Chapter 1 presents the basic concepts about ERP systems, information about vendors, and mistakes made by ERP projects. It also discusses the reasons that incentivize me to write this book.

Chapter 2 discusses the strategic intent, and critical success factors of ERP adoption.

In Chapter 3, the Full Lifecycle ERP Adoption Reference (FLEAR) model is proposed and illustrated in simple plain English. The FLEAR model highlights seven perspectives to guide an organization to understand the requirements and constraints pertaining to ERP adoption. Strategic considerations for ERP adoption are also discussed in this chapter.

Chapter 4 discusses organizational issues which include strategic alignment, organizational culture, IT governance, IT infrastructure, and the relationship between ERP deployment and the overall information management environment. This chapter also discusses the structure, roles and responsibilities of a typical project organization, and stakeholder and communications management issues.

In Chapter 5, human resources management issues, particularly those pertaining to the development and retention of critical skills, consultant management, knowledge transfer and training, are discussed.

Chapter 6 and Chapter 7 address the important issues of managing changes in ERP adopting organizations. Chapter 6 focuses on high level change management theories and principles while Chapter 7 discusses the levels and issues of IT and ERP-enabled process changes. Guidelines for change management and process changes are presented respectively in these two chapters. The order fulfillment process of Tradeco is also analyzed as an example of business process changes in Chapter 7.

Chapter 8 discusses the maintenance and support activities, and other post-implementation issues of the operations phase of the ERP lifecycle.

Two in-depth case studies are also included in this book for the readers. Chapter 9 presents the Tradeco case, and Chapter 10 the Controlco case. Both are the Asia Pacific operations of American multi-national conglomerates. In addition, the ERP experience of these two international firms is referenced to support our discussion of various important ERP and management issues throughout this book.

The case studies and many topics presented in this book are selected with the needs and interests of several categories of readers in mind (such as MIS practitioners, business professionals, and advanced university students). I hope readers would find this book interesting and useful.

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I was motivated to write this book by many people, including my colleagues, clients, and students over the years as a management practitioner, and later as an academic. The completion of this book project was delayed until recently because of many other priorities in my hectic life that competed for time allocation.

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I was lucky to have benefited from the knowledge of many scholars throughout the process of learning to become a management researcher. In this respect, I would like to express my gratitude to Prof. Ngai, Prof. Peter P. M. Yuen, and Prof. Margaret Shaffer who taught me quantitative and qualitative research methodologies while I was a student of the Doctor of Business Administration Programme at Hong Kong Polytechnic University.

Several other organizations have also contributed to the completion of this book, resolving many hurdles in the publication process. I sincerely

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CHAPTER ONE

THE ERP PHENOMENON

Abstract

This chapter begins with an introduction to the concepts of enterprise resource planning (ERP) systems. It then shares with readers basic information about top-ranking ERP vendors and their products in the world. As the author points out, ERP adoption is an important global phenomenon in recent decades, but unfortunately, many ERP projects across the world have failed. In this chapter, he explains the difference between the hype and reality about ERP, and highlights the mistakes made in ERP projects in advanced and developing countries.

One of the misconceptions and malpractices commonly found in many ERP projects is a misplaced focus that stresses implementation, and downplays the importance of post-implementation requirements of the ERP lifecycle. In concluding the chapter, he explains why he writes this book. In order to avoid, or at least mitigate, the problems reported by so many ERP-adopting organizations, he emphasizes a full lifecycle approach by which an organization takes a broader view of the requirements of the whole ERP lifecycle when it plans for an ERP project. By this approach, organizations do not limit its focus to implementation, but should also consider post-implementation requirements (such as those of on-going maintenance and support) when defining the overall strategy for the ERP project. A balanced set of resources and competence supporting this strategy must be recruited, developed, and retained to get the organizations ERP-ready ahead of time for not only the implementation phase but also the remainder of the ERP lifecycle.

Fundamental concepts of ERP

Enterprise resource planning (ERP) systems refer to suites of application systems comprising multiple integrated software modules that help organizations to manage their resources (Teltumbde 2000). The predecessors of ERP first appeared in the 1960s as material requirements planning (MRP) and, later, evolved into a more advanced system called manufacturing resources planning (MRP II). MRP is a system that is used in planning and scheduling production. It translates the requirements of finished goods into those of low-level materials (i.e. raw materials, component parts, and subassemblies) for various time fences. MRP II extends the functionality of MRP to include the functionality of capacity requirement planning and those for other functional areas such as finance and marketing. Today, ERP systems are generally more sophisticated, and more effective in supporting multiple functional and business units, including but not limited to, accounting and finance, sales and operations planning, order management, purchasing, supply chain management, manufacturing, human resources management, and customer relationship management.

ERP enables seamless integration of business processes (Mabert, Soni, and Venkataramanan 2003), and information sharing (Davenport 1998) across departmental boundaries within a company, and even with its business partners. The capability of information sharing along a company's value chain is vital to effective decision-making and operating efficiency. In general, ERP packages provide built-in workflow engines to enable workflow automation. With these engines, companies can define business rules and approval matrices so that information, messages, and documents can be routed automatically to operational users for actions to be taken for business transactions, and to managers and directors for review and approval.

ERP is the lifeblood of daily business operations for many companies. However, its importance is not limited to online transaction processing (OLTP). Because of its integrated database, it is a facilitator or an enabler for organization-wide knowledge management, strategic planning, and decisions at levels well above the transaction processing level (Bendoly, Soni, and Venkataramanan 2004). ERP vendors enable online analytical processing (OLAP) by supplying clients OLAP tools, and business intelligence modules.

Potential impacts of ERP systems

Accompanying the ERP is a remarkable phenomenon of empowerment, occurring at the various levels of the organization. It may have profound impacts on how work is to be accomplished, and thus consequently on the effectiveness and efficiency of the whole enterprise. We may illustrate the potential impacts of an ERP by taking a glance at the tasks performed by a sales assistant or customer service staff before and after ERP implementation.

Without an ERP system, he captures sales orders using either paper-based forms, or a standalone sales order management system. The sales orders are then routed to the various departments that are involved in the order fulfilment process. The information pertaining to the sales orders is later entered into the standalone systems of the departments involved. The whole process is inefficient and infested with several problems, namely, duplication of efforts, potentially more data entry errors, and delay in information processing. As information concerning sales orders and order fulfilment-related activities is scattered over more than one unintegrated functional system, information sharing among various departments is limited. In many circumstances, he lacks the ability to respond promptly to customers' queries about order status. Generally speaking, workers involved in each stage of the order lifecycle are blind-folded, and straitjacketed by the lack of information about what has been completed by colleagues in other departments.

An ERP addresses the abovementioned problems by bringing together all those involved in the value chain through integrating the application modules used by various functional and business units. For instance, information integration enables sharing of information along the order fulfilment process. It provides those involved a consistent picture of the sales order at every point of the order lifecycle. With the ERP, the sales assistant or customer service staff may be granted access to the relevant information about customer credit status, inventory level, and warehouse and shipping schedules, whenever appropriate, to support his order-related decisions. Such information can be displayed at the screen of the workstation within seconds as requested to facilitate his work activities. With access to real-time information, he is able not only to inform the customer of the estimated order delivery date but also to remind procurement staff of the requirements of the order.

With the ERP, the same worker is empowered with information to do a lot more in a more effective and efficient manner. In short, the ERP helps the company realize the benefits of eliminating data entry errors, reducing

order fulfilment cost and cycle time, enabling speedy delivery of goods and services, and raising customer satisfaction levels. Generally speaking, ERP deployment is not solely a game of system implementation and process automation. Its potential benefits can be maximized only if those involved are willing and committed to take advantage of system capabilities to innovate and improve the business practices and processes of the company on an ongoing basis.

Given the wide range of features available from ERP products, many executives and management information systems (MIS) consultants believe that ERP systems can deliver strategic competitive advantages. In fact, ERP systems have demonstrated to result in significant reduction in operational costs, and improvements in efficiency, productivity, and service quality if they are implemented properly. ERP systems can contribute not only to internal, cross-functional, integration, but also supply chain integration which will be discussed further in the following paragraphs.

Therefore, it is not surprising that many companies, especially large enterprises, have already adopted ERP systems (Van Everdingen, Van Hillegersberg, and Waarts 2000), while many small and medium-sized enterprises (SMEs) are also eager to embark on the journey of ERP implementation. The recent years have witnessed an upward trend for the number of SMEs adopting ERP systems. Many enterprises in developing countries such as Brazil, India and China are also actively pursuing their ERP dreams.

Recent trends of ERP

ERP II or value chain resource planning

Since the last decades, business enterprises are increasingly aware of the value of collaboration between business partners in the value chain or network. Linkages to business partners' systems and B2B e-commerce sites are implemented first using electronic data interchange (EDI), and later using web-based technologies. ERP consultants and scholars have also proposed extensions to the concept of ERP for the extended enterprises. Gartner Group called its new conceptual model ERP II (Bond, Genovese, Miklovic, Wood, Zrinsek, and Rayner 2000). ERP II emphasizes inter-enterprise collaboration while a pure ERP system has its focus on the internal requirements of an enterprise.

Bendoly and colleagues described their conceptual model as value chain resource planning (VCRP) system (Bendoly, Soni, and Venkataramanan

2004). At the centre of the model is the ERP domain of the firm which is connected to other internal applications such as data warehouse. The ERP domain has an intra-firm focus, managing the operations and relationships of the internal units of the firm. Added to this internal ERP domain are supplier and customer relationship (SRM, and CRM) modules and connections to e-commerce systems that make up the value chain resource planning domain. The VCRP has an inter-firm focus, meaning that the value proposition and business strategy of this model have shifted from an emphasis on the firm to the collaborations across the value chain or network.

Implementing and managing an inter-firm ERP II or VCRP system will doubtlessly be more complicated and challenging than a pure ERP because each of the individual firms participating in a value chain may have their own business objectives, requirements, and constraints, some of which may be incompatible with those of their business partners. ERP vendors have noted such concepts, and recognized the ever growing importance of collaborative commerce (or c-commerce). They have responded by producing more system features or modules that cater to the requirements of managing customers and business partners such as the customer relationship management (CRM) and supplier relationship management (SRM) modules, or by acquiring such application modules through merging with or taking over other pure-play CRM and SRM software producers. ERP II suites also began to appear in the market recently. These enhanced software products emphasize a new design oriented towards inter-firm collaboration. Among them is the ERP II suite produced by Data Systems Consulting Co. Ltd. of Taiwan, and marketed in many Asian locations under the subsidiaries of Digiwin Software. It would surely be interesting to hear clients' assessment about this product and the like.

Although the VCRP and ERP II are idealistic models that are very complicated and challenging for ERP vendors to fulfil all of the proposed functionality requirements (Bendoly, et al. 2004), vendors have at least demonstrated the intention to move towards such an inter-firm collaborative model. In recent years, many ERP vendors (such as SAP AG) have added to their portfolios of ERP solutions application modules that support inter-firm interactions with customers and suppliers. Such modules enable and facilitate collaborative planning, procurement, replenishment, logistics management, and product design.

Some enterprises are also pursuing the dream of c-commerce by themselves, taking the "best-of-breed" approach. They have added to their core ERP system third-party supply chain management (SCM) modules such as those offered by i2 Technologies and Manugistics (both of which

are now part of JDA Software Group, Inc.) to support collaborative activities with business partners. Such attempts successfully enable, to some degree, the benefits of collaborative planning, forecasting, and replenishment (CPFR) and vendor managed inventory (VMI) (JDA Software Group, Inc. 2010). Bendoly, and colleagues discussed the efforts of several large enterprises in building their own versions of VCRP (Bendoly, et al. 2004). For instance, Georgia-Pacific connected its core SAP R/3 to a supply chain management system developed by RedPrairie to manage carriers, and a collaborative logistics system offered by Nistevo to enhance fleet-sharing capabilities with other companies. Georgia-Pacific also linked its SAP ERP to a B2B e-commerce exchange using software offered by webMethods, a software firm taken over later by Software AG in 2007.

Some companies facilitate CPFR, for instance, by granting data warehouse access to business partners. An example offered by Bendoly, et al. (2004) was Wal-mart which did so using NCR's Teradata software product. In fact, collaborative efforts between suppliers and retailers began much earlier. It was pioneered in the late 1980's by Proctor & Gamble with Wal-Mart and K-Mart on continuous replenishment. The value of such a development was so well received by Wal-Mart and other companies that it was later expanded into a full-fledged CPFR functionality (Koch 2002).

When c-commerce is becoming increasingly important nowadays, and business strategies are shifting more and more from originally an intra-firm focus towards an inter-firm focus, we should anticipate more innovations in ERP or ERP II software products. However, in my opinion, the advent of c-commerce and VCRP or ERP II is not by any means heralding the death of the ERP as suggested by Bond and colleagues (Bond, et al. 2000). Even in the perfect scenario that all partners share the same objectives of unselfishly maximizing the total profitability of their value network, every participating firm in the network would still inevitably have its own profit and loss requirements, assets, and other resources to manage. Simply put, you need to keep your own house in order before being qualified for partnership. In fact, realizing the idealistic vision of VCRP depends on two requirements, namely, those at the technological, and relationship management levels. Firstly, partners need to agree on the common technological and data standards, and ERP solutions to be adopted. While there exist so many brands of ERP products in the market which may complicate the planning, implementation and management of inter-firm ERP solutions, data sharing across enterprises has become simpler with the advent of XML-based solutions. This is a

consolation to VCRP or inter-organization system (IOS) advocates. Secondly, adoption of VCRP and data sharing is not possible unless there exists an acceptable degree of trust among business partners. Thus, the challenges for VCRP are not only technological, but also relationship management issues.

Because of the above-mentioned reasons, the traditional core functionality of ERP and look-alive software will continue to exist, perhaps in more sophisticated forms and possibly in different system architectures while the collaborative features of such systems will be accorded increasing importance in future ERP releases.

The future is uncertain but indisputably interesting. What is certain at this moment is the increasing demand for project management skills for the deployment of more sophisticated and complicated enterprise or inter-enterprise systems.

SaaS ERP and freeware

In terms of the evolution of product features, many ERP products nowadays have embraced the service-oriented architecture (SOA) and are enabled to support web-based technologies, RFID, cloud computing, and the Software as a Service (SaaS) model. Social media look and feel is usually added to user interfaces of recent ERP products, and some ERP products support access by mobile devices (such as smart phones and tablets).

Traditionally, when we talk about ERP, we are referring to on-premise ERP systems which are implemented for and under the control of individual firms. In recent years, cloud and SaaS-based ERP products began to emerge in the market. SaaS originally refers to software vendors' or application service providers' business models for providing (selling) software services to subscribing clients, while cloud-computing is a term that describes the distributed computing architecture of IT systems. However, both terms are often used together by the trade press nowadays for ERP products, and their original meaning is blurred.

SaaS-based ERP products are often set up and managed as multi-tenant systems by the ERP vendors (such as Epicor and UNIT4) or application service providers (ASP), and shared by multiple clients who subscribe to such services. This kind of ERP products and subscription model would allegedly save client firms from the intimidatingly high initial costs of software licenses and implementation, and the trouble of on-going management of on-premise ERP systems. An advantage of cloud-based ERP systems is related to the scalability and ease of deployment of their

functionality. Potentially, such characteristics may contribute to the adoption of a multi-tier ERP architecture by some enterprises in which less complex cloud-based ERP modules are added to co-operate with the main centralized on-premise ERP (Shinde 2015).

In adopting an on-premise ERP system, a firm not only has to incur the initial investment for software licenses and implementation, but also has to worry about the acquisition and retention of ERP implementation and system administration expertise. By contrast, a small enterprise could gain access to SaaS-based ERP services as long as it has network connectivity to the ASP's system infrastructure. The rest would be taken care of by the ASP. Thus it is a good news for small and medium-sized enterprises (SMEs) which usually do not have a sizable IT department. However, it is worthwhile to bear in mind the reminders from some ERP experts, such as Eric Kimberling of Panorama Consulting. For the shorter term, it is less expensive to subscribe to a SaaS-based system, which, unfortunately, may be more costly than on-premise systems in the long term. SaaS-based ERP systems require a recurring monthly or annual subscription fee, while on-premise systems are estimated to have a break-even point of approximately five years. After this point, an enterprise would have to pay for primarily maintenance and support (M&S) expenses for its on-premise ERP-installation (unless new modules are to be added). Thus, the use of SaaS-based ERP may be more costly than on-premise systems over the longer term (Teach 2016).

In addition, there are other concerns about cloud and SaaS-based systems. Many larger enterprises are still looking at multi-tenant cloud and SaaS-based ERP environments with suspicion (unless the cloud-based systems are implemented in company-controlled private clouds which are used exclusively by themselves). Their concerns are primarily about data security, and the degree of flexibility in configuring the ERP instances to support their more complicated business processes (Wailgum 2008a; Shinde 2015; Webster 2016). First, they naturally have concerns over placing confidential and proprietary business data in a shared environment that is not under their own control. Second, traditional on-premise ERP systems provide a large number of parameters for client firms to configure the ERP instances to support their own business practices and processes. At present, many cloud-based ERP products are still weaker in terms of functionality breadth and configurability than on-premise ERP products (Webster 2016). How much of such flexibility would be available to a firm in a multi-tenant cloud and SaaS-based ERP environment? This is surely a valid question for ERP-adopting firms. An on-premise ERP permits a firm the flexibility to select its own combination of application modules, and if

necessary, to integrate legacy or other applications with the ERP instance. Thus, the advantages of SaaS-based (multi-tenant) ERP for SMEs discussed above may possibly be perceived as constraints by some larger enterprises. That explains why on-premise systems will continue to account for a significant share of the ERP market though cloud and SaaS-based ERP products are gaining in popularity (Columbus 2013). According to Panorama Consulting, fifty-six percent of ERP systems adopted are on-premise systems, thirty-three percent are implemented as SaaS-based systems, and eleven percentage are cloud-based ERP hosted and managed off-site (Teach 2016).

Nevertheless, the upward trend for cloud and SaaS-based ERP systems must be noted. Some consultants predict that the concerns about data security, functionality breadth, and configurability may eventually become less of an issue, and cloud and SaaS-based ERP would be increasingly accepted in the market (Teach 2016).

Recent years have also seen the advent of open-source ERP products such as OpenERP, Compiere, WebERP and others. Such software products are free of charge. Unlike proprietary commercial ERP products (such as Oracle and SAP), firms adopting open source ERP have access to the source codes so that they can customize (or modify) the modules directly, instead of only adding bolt-on functionality, to fit their specific functional and process requirements. These are the advantages offered by open-source ERP software. Firms, in particular SMEs, may find it appealing considering the cost savings.

However, unlike commercial products which are supported by their vendors and consulting partners to guarantee the quality of software and on-going enhancement, firms adopting open-source ERP are on their own. They will have to be fully responsible for developing the needed expertise, the quality of the software, and on-going maintenance and support of the system implemented. That is the price to pay in exchange for the benefits of using a free software and the flexibility of customizing the source codes. Firms which intend to take this route of the ERP journey can also contact independent consultancies for help. Some consulting firms offer open-source ERP implementation and support services.

The ERP market and products

There are over 100 proprietary commercial ERP products in the market that target customers in various business sectors (Teach 2016). Table 1-1 lists 15 popular ERP vendors and their profile information. Oracle Corporation and SAP AG are by far the largest vendors in the global ERP

market, and they are often called the "tier-1" vendors (Columbus 2013). Other vendors trailed far behind these two giants in revenue and market share. Readers who are interested in pursuing further information about these companies can browse their websites, using the URLs provided by Table 1-1.

The global ERP market in the recent decade can be characterized as anything but "dull". It was full of dramatic mergers and takeovers. The global ERP market was traditionally dominated by a few big players, and it is even more so today after rounds of consolidation in the last decade. In 2003, J. D. Edwards was purchased by Peoplesoft, Inc, which was taken over by Oracle Corp. in 2005. In fact, Oracle has also bought Siebel (a pure-play CRM producer) in 2005, and Primavera Software, Inc. (a project portfolio management system producer) in 2008. In the same period of time, Baan, an ERP producer founded in the Netherlands in 1978, was acquired by SSA Global Technologies in 2003. In 2006, SSA Global Technologies was bought by Atlanta, Georgia-based Infor Global Solutions. In the same year, Infor took over MAPICS, and Geac Computer Corporation. In 2014, SAP also took over Concur, an USA-based vendor of cloud-based travel and expense management solutions. Both SAP and Oracle have added cloud-based products to their product mixes in recent years.

According to Gartner Group, the overall ERP market grew only a meagre 2.2 percent in 2012, and the ERP market may see further consolidation in the coming years. An interesting observation by Gartner Group, and other ERP consultancies (such as Panorama Consulting) is that the sales of cloud and SaaS-based ERP products have expanded at a faster rate in recent years than traditional on-premise ERP. It is predicted by many consultancies that the upward trend for cloud and SaaS-based systems will continue into the future (Columbus 2013; Teach 2016).

In addition to the popular global commercial ERP products, many countries and regions produce their own local or regional products. I list only five examples here. Data Systems Consulting (Digiwin Software), YonYou, and Kingdee products are popular in the Greater China area. Netsoft is an Indian ERP producer and consultancy based in Bangalore while TOTVS is a Brazilian vendor. There are many more small ERP producers in various countries that serve the local or regional markets which are not covered in our discussion.

Table 1-1 A Partial List of Commercial ERP Products and Vendors 2016

Company	Primary ERP Products	Company Website
Data Systems Consulting Co. Ltd.	TIPTOP ERP; Workflow ERP II; Smart ERP	http://www.dsc.com.tw; http://en.digiwin.biz/
Epicor Software Corp.	Epicor ERP; Epicor Cloud ERP; Epicor Eclipse	http://www.epicor.com
Infor Global Solutions	Infor Cloud Suite; Enterprise Asset Management; Financial Management; CRM	www.infor.com
Kingdee International Software Group Ltd.	Kingdee Enterprise Application Suite (EAS); K/3; K/3 Cloud; Business Operation System (BOS)	www.kingdee.com/en/; http://www.kingdee.com.hk
Kronos Incorporated	Global Workforce Solutions; HR & Payroll	http://www.kronos.com
Microsoft Corp.	Microsoft Dynamics AX	www.microsoft.com
Netsoft Solutions Ltd.	Impact ERP, CRM, HRM & SCM Solutions	www.netsoftindia.in
Oracle Corp.	Oracle E-Business Suites, Peoplesoft, & cloud products	www.oracle.com
Plex Systems	Cloud/SaaS ERP for business & manufacturing	http://www.plex.com/
QAD, Inc.	QAD Cloud ERP (formerly MFG/PRO)	http://www.qad.com/erp/
Sage Group	Sage ERP X3 and related products	www.sage.com
SAP AG	SAP ERP (SAP Business ByDesign, SAP Business One, SAP Business One Cloud)	www.sap.com
UNIT4 Business Software	UNIT4 Cloud ERP & industry specific solutions	http://www.unit4software.com
TOTVS	Distribution & logistics, manufacturing, & financial	http://en.totvs.com/
Yonyou Software Co., Ltd (formerly UFIDA)	Yonyou financial management, supply chain, human capital, and CRM solutions	http://www.yonyou.com.hk

The hype and reality about ERP

The advent of ERP systems is one of the most amazing phenomena in business management. If implemented properly, ERP helps a business enterprise to achieve its strategic and operational goals. Many vendors have touted their products as representing the "best business models". Needless to say, the "best practices" incorporated in their products are advertised as the panacea for many operational problems encountered by client organizations.

That is impressive indeed. Unsurprisingly, many large corporations and small and medium-sized enterprises (SMEs) in advanced countries either have already implemented or are planning to implement their ERP systems. The ERP movement has also made inroads into developing economies such as India, China, Brazil and others in the last decade. However, a reality check would awaken any rational business manager or IS professional from idealism and optimism. The last two decades have seen many ERP disasters that are so unforgettably disappointing. Among the most notorious failures are ERP projects of Hershey Foods, Nike and HP (Wailgum 2009b). Organizations which got trapped in such disasters not only suffered substantial financial loss from wasted project investments, but also enormous loss of revenue, and tarnished corporate image.

According to Robbins-Giola LLC, fifty-one percent of the ERP projects they surveyed were reportedly unsuccessful (Robbins-Gioia 2002). Likewise, forty percent of the one hundred and seventeen organizations participated in a Conference Board Canada survey said that their ERP projects had failed to meet business case objectives (Cooke, Gelman, and Peterson 2001). A review of academic studies and the reports published by trade magazines has shed light on many problems and mistakes that might be the culprits for the disappointing outcomes of ERP projects. Among the critical problems reported by consultants and researchers are the misfits between the ERP products selected and the business requirements of the ERP adopting organizations, and failures in redesigning or integrating business processes with the ERP systems. We shall take a closer look at more problems below.

Mistakes and problems

I have listed in Table 1-2 a subset of the mistakes and problems found in ERP projects reported by the trade press and academic literature. I have also mapped the entries in the table to the relevant sources which readers

may review for more detailed information concerning ERP-related malpractices.

Generally speaking, ERP failure can be attributed to a plethora of mistakes and problems. The seed for disasters may be planted early on in the planning and selection of ERP solutions. In my analysis of many problematic projects, I found that some business enterprises took on the ERP challenge before they clearly understood their own objectives and what an ERP could contribute to their business strategies. Replacing their legacy systems was the primary reason for some companies to adopt ERP systems. Such projects were obviously technology-driven, instead of business-driven, and were aimed to achieve operational gains but not strategic benefits. Here I would like to point out that implementing ERP solely for technical reasons limits an organization to narrowly-focused objectives, and benefits. The chance of success is slim if an ERP initiative is motivated primarily by technical reasons and led by the IT group without the endorsement and sufficient involvement of business stakeholders.

According to the trade press and academic case studies on ERP projects, some enterprises learned their ERP lessons the hard way after paying a heavy price. Many started before acquiring a basic understanding about ERP systems and their own abilities. No assessment was made for their own levels of readiness, and thus there was not enough training and preparation to get themselves ready for the endeavour. Some companies selected improper ERP solutions that did not fit their organizational culture, capabilities, and business practices and processes. Many of them failed to seize the opportunities to improve or re-engineer their business practices and processes, and their attempts to implement the legacy processes with an ERP compromised the benefits that they might realize from ERP adoption. Furthermore, some of them eventually had to struggle with huge challenges in on-going maintenance and support of their systems when they tried to solve ERP-business process gaps by excessively customizing (or modifying) the native ERP features.

ERP vendors usually encourage their clients to adjust their business processes to achieve an acceptable fit between ERP features and business processes. Every ERP package comes with a large number of parameters to enable clients to configure (or set up) the ERP to suit their process requirements. By turning on or off a combination of selected parameters, it is possible for an organization to tailor a standard off-the-shelf software product to meet its own needs.

In reality, many organizations have reportedly made some customizations (or modifications) to their ERP installations by creating add-on

functionality and making changes to the database schemas. Some of the aforesaid organizations that I studied evaluated the risks, and technical and business impacts before implementing such changes. Thus, change requests and scope of work were carefully controlled. Small amount of customization made by such organizations might have helped fulfil unique company requirements, but did not result in system stability and maintenance problems. Unfortunately, many organizations' excessive attempts to customize their ERP installations had led to unstable and unsupportable systems.

Some organizations have reportedly purchased unsuitable ERP products, consequently causing insurmountable difficulties for their adoption projects, when decision-makers naively accepted ERP vendors' words without question, and gap analyses were not conducted carefully. In fact, several prestigious global ERP vendors allege loudly that their brands of ERP packages have encapsulated the so-called "best practices" of some countries, and therefore, are universally ideal solutions for many organizations in the world. Their "one-size-fits-all" allegations have been greeted with scepticism and criticism. At least a few academic studies have criticized such allegations as only fallacies and marketing gimmicks. Gradually, we learn from experience, and begin to recognize that organizations across the world differ in their business practices and requirements because of country-specific requirements engendered by cultural attributes and government requirements (Soh, Kien, and Tay-Yap 2000; Xue, Liang, Boulton, and Snyder 2005; Ngai, Law and Wat 2008). ERP packages developed in a country may not always fit the requirements of organizations in other countries. National culture may affect not only organizational culture but also beliefs and behaviours of individuals that may eventually impede technological and organizational changes, according to Li, Chaudhry, Chaudhry, and Wang (2001). Thus, it is critically important for organizations to conduct thorough evaluation before making a purchase decision of ERP packages.

My research has also discovered that some ERP adoption projects in the last two decades were also plagued by project management-level problems, such as mistakes involving ERP strategies, data management, and quality assurance practices. Hiring and retaining good people is always a challenge for ERP projects, and in fact, many of the above-mentioned ERP projects were adversely affected by a high turnover rate of qualified staff. Human resource problems are even more acute in developing economies (Liu, and Zhou 200; Tsai, et al. 2005) where the talent pool for ERP skills may be more limited than that of the advanced world.

Many organizations have also suffered because of inappropriately managed training for their ERP teams and user communities (Sunmer 2000). Training that was geared towards learning the standard ERP features but did not address the actual business practices and processes left users ill-prepared and shocked for the new system environment. These are negative stories that often repeat in the ERP world.

Moreover, it is always a challenge to develop and retain in-house ERP expertise. Inevitably, we have to rely on external experts. External consultants need to be carefully screened before they are recruited, and monitored properly after being hired. A review of practitioner reports, and the actual experience of some companies shows that some projects suffered from the mismanagement of consultants, and limited knowledge transfer from consultants to internal staff. For example, Controlco, one of the case companies covered in this book, reported negative experience with unqualified consultants hired from the ERP vendor's consulting division when the MIS department neglected to carefully screen the candidates recommended by the vendor. (Refer to Chapter 10 for the Controlco case study.)

Over-reliance on external expertise for the implementation phase without proper planning and knowledge transfer has put many organizations in awkward situations after the "go-live" date when the consultants left for other clients. Disappointingly, this is a recurring mistake that leaves many organizations unprepared for supporting and maintaining their ERP systems over the remainder of system lifecycle (Law, Chen, and Wu 2010).

Table 1-2 Problems and Mistakes in ERP Adoption

Problems & Mistakes Identified	Sources
Over-promises by ERP vendors: Vendors often promote their ERP solutions as "panacea" for their clients located in different business sectors and countries.	Soh, et al. (2000)
Failure of a foreign-made ERP package to fulfil country specific requirements: National culture and government requirements of some countries may hinder ERP deployment.	Soh, et al. (2000); Li, et al. (2001)
Misfits between the ERP products and business processes of client organizations: Misalignment between ERP features and the organizational culture, business strategies and requirements of clients may be accountable for ERP faihires.	Soh, et al. (2000); Weightman (2004); Xue, et al. (2005)

Problems & Mistakes Identified	Sources
Integration problems affect the outcomes of ERP adoption.	Davenport (1998)
Organizations and users are not ERP-ready: Lack of or inadequate training and knowledge transfer for IT staff and business users may compromise the benefits of ERP adoption.	Law, et al. (2010); Sumner (2000); Ngai, et al. (2008)
Gaps between ERP features and process requirements: Mismanagement of customization, and failing to conduct business process changes to achieve an adequate degree of "ERP-process fit" is a cause of many ERP failures.	Sumner (2000); Law, et al. (2010)
Putting too much emphasis on technology, but not enough on business requirements: Projects that are "technology-driven," or "IS-led", but not "business-driven" or "business-led" are prone to project failures.	Weightman (2004); Peterson et al. (1998)
Putting too much emphasis on implementation but paying insufficient attention to post-implementation requirements: Malpractices, and lack of resources and capabilities in handling maintenance and support requirements over the long term may jeopardize ERP systems installed, and hinder the realization of benefits.	Weightman, 2004; Law, et al. (2010)
Lack of top management commitment, and user involvement.	Sumner (2000); Chen et al (2009)
Inadequate human resources management and development: Lack of expertise, and poor management of internal human resources and external consultants are threats to ERP projects. Lack of appropriately designed training is also a reason for poor ERP outcomes.	Stedman (1999); Liu, and Zhou (2001); Tsai, et al. (2005)
Miscellaneous mistakes in project management: business case development, ERP strategies, technical and application architecture, quality assurance, scope management, and data management.	Weightman (2004); Chen et al. (2009); Law et al. (2010)
Poor planning for maintenance and support: M&S of ERP systems are not well planned and prepared in advance, and customizations to native ERP features often create obstacles in ERP maintenance and upgrade.	Davenport (1998); Weston, 2001; Law et al. (2010)

Implications of findings

Apparently, many of the above-mentioned organizations have suffered ERP-related setbacks because they lacked an adequate understanding of ERP products, and of the proper approaches and methods for implementing and managing ERP systems for the long term. They bravely attempted the ERP challenge without first assessing their own readiness level, and equipping themselves with the appropriate knowledge, and skills.

Some of them fell into the trap of making excessive amount of customization to native ERP features and allowing it to proliferate. For instance, while taking customization lightly, they tried to add their in-house modifications to native ERP features without seriously figuring out how the added-on features, and the whole ERP installations, were to be managed throughout the lifespan of the systems. To their dismay, they soon found themselves in a quagmire that their ERP installations were so unstable, and hard to maintain and support. The vendor-client relationship or cooperative model was disrupted by excessive customization, and the path to enjoy software patches, and to migrate to enhanced releases produced by the ERP vendor was severed.

The mistakes made by many ERP-adopting organizations might be attributed to a misplaced focus that over-emphasized implementation but neglected the importance of the post-implementation phase. Such organizations made in-house modifications to standard ERP features to fit their business practices and processes, and naively believed that they were fulfilling their proprietary business process requirements which were considered the sources of competitive advantages, and, therefore, needed to be preserved. Many of them never thought a little further ahead of time about how they were going to maintain and support the excessively customized ERP. Neither did they spend enough efforts to plan in advance for the expertise and resources required not only for the implementation requirements, but also the post-implementation challenges. They only found themselves in a quagmire when it was really too late. Such difficulties were a result of their own myopia, and inappropriate approach for ERP adoption.

ERP is a costly long journey, extending years into the future, which can be made productive only if it is managed properly. Focusing only on implementation requirements, and neglecting or taking lightly the maintenance and support requirements in the long run would be a mistake which must be corrected in order to be successful in any ERP endeavour, and to avoid the pain associated with poor system-related outcomes. That

is a very critical message that I have for organizations which are planning for their own ERP initiatives.

This analysis of problematic ERP projects points to two challenges that must be addressed carefully. Firstly, ERP adoption projects have to deal with very diverse requirements originating from many technical, business, and organizational sources. A successful project needs to integrate various types of requirements, and address different categories of constraints that exist at the ERP and business practice levels, and in the organizational environment. Secondly, the above-mentioned unfavourable project outcomes and the long lifespan of ERP installations call for better lifecycle management. It is necessary for us to recognize the fact that ERP and business process decisions must be made with careful assessment of the impacts on subsequent lifecycle phases. Appropriate decisions and efforts must be made to result in a stable, and maintainable system for the long run.

I believe that ERP adoption requires a broader integrative perspective that encompasses many dimensions of requirements and expertise. Organizations adopting ERP systems have to manage not only the complex application suites but also process and organizational changes. It may also require behavioural changes among users and other stakeholders in order to arrive at a long lasting mutual fit between new systems and work processes if the organizations intend to maximize the benefits from such an enormous investment. To be successful over the long run, it is necessary to establish a solid foundation in many aspects of the organizations to support the ERP installations. In addition to improvements made in business processes and organization structure, a sound IT infrastructure, an appropriate pool of internal and external expertise, and a comprehensive set of standards, procedures and practices to guide project management and system operations must be put in place. All these elements require careful planning in advance, and on-going efforts to cope with evolving needs in a dynamic business environment. These technical, business and organizational factors must be cautiously analysed and managed in the process of ERP adoption.

Objectives of this book

Much of the effort leading to this book is motivated by the intention to correct the erred thinking, approach, and practices of ERP adoption. Every organization must avoid and eliminate the traps that may lead them down the frustrating path of painful ERP disasters.

In this book I strive to emphasize a broader and proactive approach to replace the myopic implementation-focused approach. I simply call this proposed approach the full lifecycle approach, which treats requirements of all phases of the ERP lifecycle as equally important. That means, maintenance and support requirements for the ERP must be considered early in the project as an integral element of your overall planning. Such issues are considered in light of other issues, for instance, the sourcing of external expertise versus reliance on internal human resources, and ERP customization versus process adaptation, when defining the strategy and approach for the ERP initiatives. A balanced set of resources and capabilities supporting this strategy must be recruited, developed, and retained to get the organizations ERP-ready ahead of time, for not only the implementation phase but also the remainder of the ERP lifecycle.

I shall share with you principles as well as practical experience of ERP implementation and management in this book. Both types of knowledge are based on years of commercial experience of managing system projects, and academic research into the subject matter. ERP adoption often comes hand in hand with business and organizational changes, which are the challenges business and IT executives of any ERP-adopting organization must deal with. Added to these challenges are national and organizational cultures, and country-specific requirements that often magnify the difficulties in systems adoption, and change management.

Cultural differences and country-specific requirements also nullify the naïve "one-size-fits-all" assumption of global ERP vendors, whose European or North American-centric best practices may not be entirely suitable for other fast expanding economies. Recognizing these factors with an open mind is important since business operations of multi-national corporations (MNCs) span across national and cultural boundaries, and the management of ERP and business issues may differ among divisions located in different countries. For these reasons, I have incorporated both North American and international experience in this book, and selected for readers two in-depth case studies about the ERP experience of North American MNCs operating in the Asia/Pacific region. I believe readers in North America, Europe and other parts of the world will benefit greatly from the case studies derived from an international context.

Subsequent to the introduction to ERP in this chapter, I shall discuss the objectives, benefits, and critical success factors of ERP adoption in Chapter 2. These first two chapters are meant to provide readers a basic understanding of the ERP phenomenon to prepare for more in-depth discussions in the following chapters. Methodologies and strategic considerations for ERP adoption are presented and elaborated in Chapter

3. The full lifecycle approach and model for ERP adoption is proposed and illustrated in the same chapter. In contrast to vendor-supplied methodologies that address ERP implementation assuming that an ERP purchase decision has already been made, the Full Lifecycle ERP Adoption Reference (FLEAR) model covers the relevant issues and activities from the very beginning, when an organization envisions adopting an ERP, conducts an assessment of organizational readiness, and evaluates and selects an adequate ERP solution. This approach emphasizes a healthy operations (or post-implementation) phase which requires proper planning and decisions in earlier lifecycle phases. As a means to complete the holistic approach of ERP adoption, the FLEAR model requires organizations to examine project-related requirements from seven perspectives. The dimensions of the ERP Adoption Body of Knowledge (EABOK) will also be discussed in Chapter 3.

Organizational and human resources issues will be addressed respectively in Chapter 4 and Chapter 5, while change management and business process change issues will be discussed in Chapter 6 and Chapter 7. We shall examine the challenges that may arise from organizational and people issues, and the approaches that are conducive to accomplishing favourable outcomes from an ERP and process change initiative. Equally important is the post-implementation phase, which is the longest one in the ERP lifecycle. Thus, it is justifiable to devote Chapter 8 to discuss ERP maintenance and support issues. In this chapter, we shall also examine the reasons for maintaining a partnership relationship with ERP vendors, the risks for not doing so, and other options clients may have. I shall conclude the chapter with a discussion of project close-out and post-implementation review practices that may benefit ERP initiatives in terms of improvements in project management practices.

Finally, I have incorporated two ERP adoption case studies (in Chapter 9, and Chapter 10) which are real-life examples valuable for anyone who are interested in learning more about the challenges, risks and successful practices of ERP adoption. The case studies are based on ERP implementation in an international setting and would provide valuable insight into the effects of cultural factors on ERP practices. They are worth the reading time of business and MIS professionals who are engaged in expatriate assignments.

The approaches, model, and practices provided by this book are not exactly a science that will fit all situations. Nor have I the intention to delve into the technical set-up details of any brand of commercial ERP product. Apparently, the focus of this book is on project management issues.

ERP is primarily about managing business and people. It is a very challenging endeavour in that the successful experience from one site is not likely to be directly transplantable and applied without adjustments in a new situation or organization within a country. Direct transplantation of such experience to an organization in a foreign culture will be even less likely to succeed. However, experience and knowledge covered in this book will be useful to level the learning curve for ERP adoption, especially for such projects in an international setting, and to open your mind to a wide range of issues that may be relevant to your ERP project or research assignments. With appropriate adjustments, what readers learn from this book would be conducive to arriving at better project-related decisions, and implementing professionally sound practices for ERP engagements.

Concluding remarks

ERP is one of the most interesting business management phenomena in recent decades. It is also one of the greatest challenges encountered by many enterprises which has resulted in frustration, inefficiency and disruptions to normal businesses when ERP systems were poorly planned and implemented. Thus, the mistakes, and approaches discussed in this chapter and the remainder of the book are important and would be conducive to improving ERP project management.

CHAPTER TWO

THE STRATEGIC INTENT AND CRITICAL SUCCESS FACTORS OF ERP ADOPTION

Abstract

In this chapter, the author shares with readers more fundamental concepts about ERP adoption to prepare for the advanced topics of ERP project management covered in the remainder of this book. He points out that an ERP project should begin with clearly defined strategic intent, and business and system objectives to be achieved. He emphasizes that any organization planning to adopt an ERP needs to be sober and clear about the objectives and justifications for the project, and the measures to be used to gauge the benefits of such a large investment. Defining the objectives, providing justification, and selecting performance measures for the project are not easy for the business and IT leadership because of the elusive nature of the business value of information technology (IT) and systems. While it is correct to carefully examine the quantitative financial analysis of costs and benefits of an ERP project, many benefits may be intangible and hard to quantify. Organizations must not be blinded by their preference for tangible benefits, and ignore the strategic intangible benefits which may be highly critical for the organizations' future.

In the second half of the chapter, the author discusses the critical success factors for ERP adoption. He highlights the issues concerning customization and on-going maintenance and support of ERP systems. He points out that organizations must also consider maintenance and support issues up front in order to be successful in the full ERP lifecycle.

Introduction

In the first chapter we have talked about many problems associated with ERP implementation. What are the reasons that drive so many organizations to engage in such costly but risky investments? What are the benefits anticipated by such organizations? These are the questions frequently asked by consultants, academics and students who are interested in this world-wide ERP phenomenon.

Strategic intent and alignment

Before we start, it is necessary to reiterate that large-scale information systems (IS) projects require objectives and strategies to be well thought out and defined before the approval and inception of such projects. ERP strategies need to be aligned with business strategies (Cline and Guynes 2001; Gefen and Ragowsky 2005). Such a fit, or IS-business strategic alignment, is extremely critical to an organization since projects with poorly understood requirements, unclear strategic alignment, and ambiguous objectives are prone to failure, and at best, would result in only mediocre outcomes for stakeholders and the organization as a whole. The alignment between ERP systems and business strategies is often considered critical to realizing gains in organizational performance (Kotha and Swamidass 2000; Irani and Love 2001).

Strategic intent represents the "long-term goals" of a firm (Weill and Broadbent 1998), and the information systems literature identified four types of IT investment, namely strategic, informational, transactional, and threshold (Turner and Lucas 1985; Weill and Broadbent 1998; Weil 1992). Here, the term IT refers not only to information technology but also application systems. Strategic IT helps transform the way a firm conducts its business and competes in the market. Informational IT is concerned with the provision of "information for the management of the firm", while transactional IT aims at reducing the costs of processing repetitive transactions (Turner and Lucas 1985). Conversely, Weill and colleague defined threshold IT as technology and system platforms that are required for a firm to enter and continue to operate in an industry (Weill and Broadbent 1998). According to Cline and Guynes (2001), it is important to understand the roles that a technology or system plays within an organization, and to align it appropriately with organizational objectives.

The strategic intent of IT and ERP investment of an organization can be categorized into four focuses: dual focus, market focus, operational focus, and undefined focus (Tallon, Kraemer, and Gurbaxani 2000).

Market focus refers to the intention of using IT to change the practice of the industry, or the structure of the market as well as to expand a firm's market reach, while operational focus is the intention of utilizing IT to improve operational efficiency, enhance the quality of services, and reduce the cost of transaction handling.

The notion that the strategic intent, and the magnitude of the perceived benefits of ERP adoption are related is supported by observation as well as research. In one of my studies on the ERP experience of international firms operating in the Asia Pacific region, I discovered that firms with dual (i.e. both strategic and operational) focuses reported the highest degree of perceived benefits, followed by firms with only a strategic focus, and firms with only an operational focus. Firms with an undefined focus ranked lowest in perceived ERP benefits (Law and Ngai 2007). This finding coincides with the results of Tallon, et al. (2000)

Doubtlessly, an operational focus is beneficial to a firm as it relates to improving current business practices and processes to bring the firm to a better operational state. This state represents a foundation for maintaining or improving the well-being of the firm. However, such a focus or perspective will also limit the benefits of ERP usage to only enhancements in operational efficiency and effectiveness while foregoing new business opportunities, and other strategic changes that may bring new competitive capabilities. Dual-focused firms reportedly enjoyed the highest degree of benefits, and it implies that it is important to combine focuses, rather than relying on any one alone, in order to maximize gains in organizational performance.

Objectives of ERP adoption

According to Stedman (1999), ERP systems are used for not only transactional purposes, but also for strategic ones; for instance, enabling sales growth, reducing production lead times, and improving customer services. Stedman's observation highlights the importance of aligning ERP features with the business strategies of ERP adopting firms. Many authors have expressed the view that the fit between ERP systems and business strategies is very important to achieving gains in organizational performance (Somers and Nelson 2003).

For examples of ERP objectives at different levels, we can look at those of the three firms reported in one of my articles (Law and Ngai 2007). The drivers for ERP adoption of these firms are listed in Table 2-1 below:

Table 2-1. Drivers of ERP Adoption

Background & IT Focuses	Drivers of ERP adoption
Adapted from interviews of Law and Ngai (2007)	
Firm A	
• Hong Kong-based home appliance maker, found by local investor and acquired by MNC • Operational focus for IT and ERP • Low IT spending level relative to revenue • IT manager reported to Financial Director	• ERP adopted to (1) replace an in-house legacy system • and (2) for compliance with corporate IT and application standards • Benefits targeted: (1) business process efficiency, and (2) reducing production and operational cost.
Firm B	
• Hi-tech/IT products reseller, founded by local & Asian investors • Operational focus for IT and ERP • Low IT spending level relative to revenue • IT head reported to Financial Director	• ERP adopted to (1) replace an in-house legacy system and (2) to leverage ERP vendor's expertise in software development and maintenance. • Benefits targeted: (1) resolving data and system maintenance problems, and (2) reduction of IT staffing and operating cost. (3) Supporting new business as a secondary objective
Firm C	
• International division of American automated control systems producer in Greater China • IT & ERP emphasize both operational and strategic roles	• Compliance with corporate IT & applications standards • ERP-enabled business process redesign to standardize processes across Greater China offices

Background & IT Focuses	Drivers of ERP adoption
• Adequate IT spending level relative to revenue • IT director was positioned as member of TMT & reported to MD	• Primary benefits targeted: IT and ERP as enablers to achieve (1) market expansion, (2) operational efficiency and cost reduction, (3) regional inventory visibility for reducing backorders and obsolete stock, and (4) improving customer satisfaction.

The first two cases exemplify the operational focus for ERP adoption. Company A, an OEM founded by local investors, is headquartered in Hong Kong and operates manufacturing facilities in South China. Its product lines yield only a narrow profit margin, and therefore the company stays profitable through a low cost strategy in running its production and internal infrastructure. It was acquired in recent years by an American multi-national but the acquisition did not bring about any material change in its business strategy and product mixes. Consequently, the strategic intent for its ERP endeavour was primarily operational, aiming to reduce production and operational costs. Among the drivers for its ERP project were replacing an in-house legacy system and aligning its business systems with corporate IT and systems standards. It implemented the financial and distribution modules first, and planned to deploy the manufacturing modules in the near future.

Company B is a reseller of high technology equipment and software founded by investors of Hong Kong and Asia, with sales operations in Hong Kong, and South China. The primary objective for ERP adoption was also to replace its legacy system. The management team decided to implement an ERP to address a few urgent problems, such as resolving the difficulty in maintaining the legacy system, and the data inconsistency and duplication issues of the legacy files and databases. Following the departure of some key IS staff and after many rounds of modifications in the past years, the company found it very difficult to maintain the system effectively. There was simply not sufficient internal knowledge and documentation, for the modifications made over the years, to support the required maintenance tasks on an on-going basis. It was anticipated that an ERP system would resolve these problems. Around that time, the company was conceiving a new business division for IT solutions consulting, in addition to its existing businesses in software and hardware sourcing, and hardware maintenance services. Supporting new business services with an

ERP was considered only in a later stage of the project, and thus at best it was only a secondary objective for the project.

By contrast, Company C considered both strategic and operational aspects of ERP adoption. Its parent is an American multinational corporation (MNC) that markets process control systems and consulting services, and is renowned for its maturity in IT management. As a subsidiary operating in the Greater China and Asia Pacific regions, it considered IT as a critical enabler of its business strategies. The primary objectives for its ERP endeavour included enabling market expansion, raising regional inventory visibility, increasing process efficiency, and reducing cycle time and operating costs.

Company C was ambitious to expand its market into the interior of China at the time when the interview took place. Its business operations were primarily in major cities along the east coast. In order to increase sales and secure its market share before its competitors did, the company planned to penetrate into the interior, in particular western China by establishing smaller satellite offices there. After three decades since China opened up for foreign investment, it is much easier to hire qualified staff in major cities of the east coast than the interior. Locations farther away from the coast, particularly those in western China, lagged behind in both infrastructure and human resources development. The company's workforce in the offices located near the coast was stronger in both number, and expertise. The management hoped that an ERP system with structured efficient processes would help guide and control the operations of the new satellite offices in the remote and less developed regions.

Another objective was to enhance inventory visibility, not only for operations within China but also across those of the Asian Pacific region. Inventory visibility across these locations would enable the company to minimize backorders, improve customer satisfaction, and reduce obsolete stock and inventory costs. As a subsidiary of an American MNC, compliance with the corporate decision to move towards global IT and system standards was necessary.

Types of benefits and performance measures

From the preceding cases, we now have some understanding of the objectives driving these expensive and risky projects. Since enterprise-wide projects are so costly and complicated, they may become a major challenge and even a burden for the ERP-adopting firms in terms of financial and human resources, and business risks. Therefore, it is natural that many business executives would become very cautious every time

they look at the cost estimates of ERP projects. It is the responsibility of the project director and the chief information officer (CIO) to justify the investment, and secure the buy-in and approval from the top management team. Needless to say, it is a tough job. I can remember the responses from the strategic business unit (SBU) heads after they saw the business case and cost estimates for an ERP project proposed by my department. The following questions still echo in my mind today: Chuck, how do you justify the costs for such a project? Would my SBU get more sales orders and revenues with this ERP?

The challenge facing the IT heads is enormous. The difficulty is compounded by the elusiveness of the business value of IT and ERP. This is a mind-boggling phenomenon termed the IT productivity paradox by economists such as Steven Roach, and academics specializing in IT adoption impacts. Many companies and countries have invested heavily in IT infrastructure and systems, but the contribution of such investments is not always clear. Studies by consulting firms and academics yield not only positive findings but also mixed and negative findings at both the macro- and micro-economic levels.

Most business executives like my peers mentioned above are used to financial figures, and tend to justify projects by costs-benefits analysis, return on investment, savings in operational expenses, and other financial measures. In reality, not all benefits are tangible and assessable by quantitative financial measures. If intangible benefits are not considered, many major enterprise-wide IT and application systems endeavours may look unjustifiable. The IT productivity paradox is at least partly the result of the measures chosen, and types of data collected, for evaluating the investments.

There is much discussion in the literature on issues surrounding the objectives and organizational benefits of adopting ERP (Stedman 1999; Murphy and Simon 2002; Shang and Seddon 2002). Many studies examined MRP II and ERP benefits at different levels of organizational objectives, for instance, strategic benefits, and operational benefits. Strategic benefits may be intangible and non-quantitative; while operational benefits are generally tangible and quantitative (Irani and Love 2001). Neglecting the intangible benefits of major IT and systems investments, for instance, improvement in services quality, and customer satisfaction, while focusing only on financial analysis may render these projects unacceptable. IT investment decisions based solely on a narrow perspective of financial evaluation may prevent firms from implementing such systems, limiting their pursuit of strategic goals.

Doubtlessly, objective quantitative financial measures are important tools for evaluating investment opportunities. However, we must caution ourselves not to fall victim to the misconception that everything can be justified financially. We need to extend our perspective to include measures of both tangible and intangible benefits in evaluating system projects. A balanced approach would save the firm from the myopia of obtaining quantitative financial returns in the short-run, and overlooking less tangible strategic opportunities.

Critical success factors for ERP Adoption

ERP consultants and researchers have identified subsets of critical success factors (CSFs) for ERP adoption in their consulting or academic endeavours. In order to compile a comprehensive list of CSFs and compare the importance of them across geographic regions, I and my associates have conducted a very thorough review in 2008 of professional and academic literature. Together with those identified and discussed previously in our own publications (Ngai, Law and Wat 2008; Law, Chen and Wu 2010), we produced a comprehensive list of eighteen categories of critical success factors that appeared in studies conducted in Europe, North America and some developing countries. The summarized information presented here is aimed at giving readers a comprehensive understanding of the factors and sound practices that are conducive to successful outcomes in ERP adoption before we discuss selected topics in greater detail in the remainder of this book.

ERP product and vendor selection

There are many ERP packages and vendors in the world-wide market, which target different market segments. As mentioned in Chapter 1, some are international vendors which target large enterprises, while some are local vendors producing ERP packages for domestic and regional markets (e.g. Kingdee ERP products of Shenzhen, China-based Kingdee International Software Group Limited, Data Systems ERP products of Taiwan-based Ding-Sun Consulting, and Impact ERP products of Bangalore, India-based Netsoft Solutions Limited). The foremost step for a successful ERP journey is to select a package that fits the ERP adopting firm's requirements. Selecting a suitable ERP vendor is as important, since a qualified vendor is expected to provide support on an on-going basis throughout the lifespan of an ERP system. Critical support services include implementation consulting services, post-implementation technical

support, and training (Bingi, Sharma, and Godla 1999; Somers, and Nelson 2004; Zhang, Lee, Huang, Zhang, and Huang 2005). In practice, clients evaluating vendors often examine the vendors' reputation, financial strength, technical capabilities, and corporate vision and direction. Partnering with a strong vendor would be essential to the success of implementing and operating the installed systems (Verville, and Halingten 2002; Somers, and Nelson 2004).

Alignment between ERP and business and process requirements

A company planning to engage in ERP adoption must select an ERP package that fits its business practices and process requirements (Law, and Ngai 2007; Davenport 1998; Hong, and Kim 2002). In other words, choosing an ERP package that does not align with one's business and processes is tantamount to deliberately asking for trouble. The requirement of ERP-process fit is such a critical issue that surely deserves more discussion in the upcoming chapters.

Any organization selecting an ERP package among so many products must conduct a gap (or fit/gap) analysis between company requirements and ERP features, with the involvement of MIS staff, business managers, and key users. The primary objective in this exercise is to identify a package with the smallest gap and highest degree of fit. A package with the smallest gap will surely minimize the effort, time and risks for business process changes and system implementation.

In practice it is almost impossible to find an ERP package of perfect fit, but selecting one with minimal discrepancy would reduce the costs and risks for achieving the desired fit through either business process changes or non-excessive ERP customization.

Business justification and planning

ERP projects often take a lot of precious time and resources. Convincing the top management team to allocate resources and to mobilize the whole organization to work together towards the usually very challenging project objectives requires a consensus among executives, and the support from all stakeholders. Therefore, a well-developed business plan which explicitly defines the visions, goals, and justifications of the project, is a must (Holland and Light 1999; Nah, Zuckweiler, and Lau 2003; Zhang, Lee, Zhang, and Banerjee 2003). A business plan should clearly delineate the anticipated tangible and intangible benefits, resources

required, and risks and costs involved during and after the implementation of the ERP. Objectives must be defined in measureable forms and should be tracked.

Business process changes

A certain degree of organizational and process changes would usually be required for the implementation of an ERP system, as the selected packaged software may not be fully compatible with all the needs and business processes of the organization (Bingi, Sharma, and Godla 1999; Nah, Zuckweiler, and Lau 2003; Somers, and Nelson 2004).

Business process changes would occur for one or both of the following reasons, namely, to narrow the gap between ERP features and process requirements, and to maximize the contribution of the ERP to business operations by improving or redesigning the practices and processes of the organization before system implementation. In order to narrow the gap, and to improve the alignment between the selected software and its business processes, an organization often reengineers its business processes to fit the software instead of trying to modify the software to fit its current business processes (Sumner 1999a).

On the other hand, the cost and the risk of errors will increase if the software is customized by modifying the program codes or adding bolt-on logic to native software features (Davenport 1998; Weston 2001). The complexity, risks, and costs of customization may deter organizations from the ERP adaptation (or customization) approach as hinted in the study conducted by Mabert, Soni, and Venkataramanan (2000), in which most respondents reported only minor customization. Research indicates that an adequate degree of mutual fit between the ERP package and the organization is critical to ERP success (Hong, and Kim 2002), and business process change is an important phenomenon associated with ERP projects (Gattiker, and Goodhue 2002)

Culture and practices for change management

ERP implementation is an exercise that inevitably involves making, sometimes drastic, changes to existing business practices, processes, organizational structure and management culture. That means, the ability of initiating, leading, and controlling changes at the process and organization levels is an essential element for success. One of the objectives of change management is to effectively balance the positive and negative forces to eliminate, or at least mitigate, resistance to business and

technology changes (Stebel 1992). Effective business process re-engineering, and system implementation require an organization to understand its own culture, and to develop skills for formulating and executing strategies of change management. This involves the balancing acts of managing risks, costs, benefits, and stakeholders' diverse interests.

The change management process should be supported by appropriate thinking, methods, and procedures. In this sense, training and education would be an essential element for change management. If planned and executed properly, training and education can help mitigate misunderstanding, anxiety, and resistance, create positive feeling among the various stakeholders, and enhance the level of support the project team receives from stakeholders. Consultants and researchers tend to converge on this point, and many reports have indicated that training and education should be provided to system users and, in general, various categories of employees. An understanding of ERP functionalities, the positive implications of adopting the ERP system, and the associated technological and organizational changes may enhance the readiness level of the stakeholders to pave the way for accepting the new system into their daily work life. It must be noted that user training will be effective only if it also includes business practices and processes as part of its content (Legare 2002; Robey, Ross, and Boudreau 2002).

Planning and management of communications

Sound stakeholder management calls for clear and effective communication at all levels of an organization, and it is necessary not only in the initiation stage but throughout the system lifecycle (Bancroft, Selp, and Sprengel 1998; Nah, Zuckweiler, and Lau 2003). Communication is not limited to the formal meetings, and the reporting and advertisements of project status offered to various groups of stakeholders, but should also include informal information sharing and interaction among all levels of the organization (Holland and Light 1999). Communication is also treated as one of the 10 areas of project management body of knowledge (PMBOK) promulgated by the Project Management Institute (Project Management Institute 2017). No wonder that many ERP practitioners, project managers, and academics have stressed that effective communication is a critical success factor that influences the acceptance of the ERP systems (Amoako-Gyampah, and Salam 2004). To be successful in communication, an open and honest information policy is necessary (Sarker, and Lee 2003; Welti 1999).

ERP strategy and implementation methodology

Organizations planning to implement an ERP system must decide the strategies for this highly complex and costly enterprise-wide endeavour. Lacking a well thought out strategy for ERP adoption and business changes may result in compromised project outcomes and even disasters.

Most ERP adoption models described in the literature underestimated the importance of determining the appropriate implementation strategy before project initiation (Holland and Light 1999). For instance, Holland and Light (1999) briefly described the skeleton approach and single-module approach for ERP implementation. They stressed that business and project leaders should decide whether the company was willing to change its business flow to fit the software (i.e. process adaptation), or whether it preferred to change the software to fit the business flow (i.e. software adaptation or customization). Based on my research, and experience as an MIS practitioner, I shall go a step further to remind the readers that post-implementation issues such as on-going maintenance and support (M&S) strategies and practices must be considered upfront in planning and defining ERP strategies (Chen, Law, and Yang 2009; Law, et al. 2010). The challenges and practices of ERP M&S, and their impacts on ERP success will be discussed in detail later in this book.

Some practitioners and academics pointed out that ERP implementation should not be treated simplistically as a technology project. Rather, it is one requiring a balanced approach to manage technological, business, and organizational requirements (Kraemmerand, Moller, and Boer 2003). It must be re-iterated that the aforesaid categories of requirements should be assessed carefully with respect to each other (Al-Mashari, and Al-Mudimigh 2003). Therefore, selecting and developing an appropriate ERP strategy is rightfully regarded as one of the critical success factors, and this step should be completed before other project management activities.

Data management

The implications of data management for organizations that choose to adopt ERP are three fold. First, before selecting an ERP package an organization must ascertain that the data model supported by the ERP product is compatible and consistent with its corporate data requirements (Soh, Kien, and Tay-Yap 2000). Second, data conversion from legacy systems to ERP database can make or break the project. Therefore, the mapping and conversion of data should be planned early, and treated as an integral task of any ERP project plan (Ahituv, Neumann, and Zviran 2002;

Langenwalter 2000). Third, data quality is always critical to the implementation and on-going operations of the installed system. Because an ERP comprises multiple integrated modules that are intricately linked with each other and with other business applications, any problem in data quality would have repercussions throughout the information flows of the value chain. Thus, data integrity, accuracy and security issues are considered top issues by experienced project managers.

Researchers, such as Zhang, Lee, Zhang, and Banerjee (2003), have demonstrated that data accuracy has a positive impact on the success of any ERP project, and data should be validated and converted into a single and consistent format before the system is launched for production use (Somers, and Nelson 2004; Welti 1999).

Project management

The importance of this factor seems to be so obvious to everyone. Project management as one of the critical success factors of ERP adoption is often cited by practitioners and researchers (Reimers 2003; Shanks, Parr, Hu, Corbitt, Thanasankit, and Seddon 2003; Zhang, Lee, Zhang, and Banerjee 2003).

Unfortunately, the last decades have seen many enterprise software project failures which were attributable to poor project management. The challenge facing an ERP project manager is enormous because of the complexity of technology and intertwining business issues and interests across so many business units and among very diverse groups of stakeholders. Since ERP implementation is a very complex enterprise-wide exercise, which covers a wide spectrum of critical issues such as hardware, software, and organizational issues, effective project management enables companies to plan, coordinate, and monitor various activities throughout the project lifecycle in a systematic manner (Akkermans, and Helden 2002; Somers, and Nelson 2004). Doubtlessly, a clear and well defined project plan, explicitly listing the goals, objectives, strategy, scope, schedule, human resources requirements, and performance requirements for the project is regarded as a very important factor by ERP practitioners and researchers.

Composition and expertise of ERP project organization

Having noted the complex nature of enterprise-wide projects whose requirements span across business and functional boundaries, we should bear in mind that ERP projects typically require a balanced combination of many kinds of expertise and roles. I have also emphasized earlier that ERP is not strictly a technology adoption project but should be more appropriately regarded as a business project. We therefore must respect the fact that technical and business competences are equally important in ERP projects (Allen, Kern, and Havenhand 2002; Al-Sehali 2000; Bingi, Sharma, and Godla 1999; King, and Burgess 2006; Somers, and Nelson 2004).

An ERP implementation project is highly complex that it will require a wide range of knowledge and skills, including data communication, software applications, database, hardware, business knowledge, process redesign and change management. The Project Management Institute (PMI) has espoused 10 knowledge areas for project management, namely, scope management, time management, cost management, quality management, human resources management, communications management, risk management, procurement management, stakeholder management and integration management (Project Management Institute 2017). In addition to the various kinds of skills required, the project manager should be experienced in procurement management (for instance, for managing external consultants). We shall look into some of these relevant areas of knowledge and skills in the case studies and other chapters of this book.

Moreover, the key members in the project team should know their responsibilities well and be empowered to make quick and effective decisions (Parr, and Shanks 2000; Parr, Shanks, and Darke 1999).

Monitoring and evaluation of performance

Performance monitoring is a key component of project management for any information technology and systems projects. ERP projects are no exception (Al-Mashari, and Al-Mudimigh 2003). Performance objectives and metrics need to be defined early in the system lifecycle, and project progress must be monitored and measured regularly for efficiency and effectiveness (Mabert, Soni, and Venkataramanan 2003; Welti 1999). By monitoring and analysing feedback from users, and comparing such

information to business goals and objectives, the performance of an ERP project team, and the commissioned system can be determined.

Organizational characteristics

Doubtlessly, the planning and execution of large enterprise-wide projects are often affected by the characteristics of an organization. Organizations with prior experience in managing IT and system projects involving organizational change of a significant scale may fare better in ERP implementation (Allen, Kern, and Havenhand 2002; Marsh 2000). Characteristics of, and situations faced by, the organizations may affect their business requirements, management styles, investment priorities, and the decision process itself. For instance, organizational culture and management styles may affect the decisions in IT and systems investment, the selection of ERP packages and vendors, and business process changes. Some organizations may operate within very competitive industries, and the decision to implement an ERP may be affected by the actions of their competitors. According to Bradford and Florin (2003), the competitive pressure to adopt an ERP system can have a negative effect on the process and outcomes of ERP implementation of an organization.

Thus, before decisions are made about ERP adoption, an organization should assess its own strengths and weaknesses in many aspects, such as finance, technical skills, project management, business process management, and so on, to determine whether it is ready for implementing an ERP.

Role of project champion

Project champion is a well-publicized role in the IT and ERP literature. Many reports have described how project champions successfully contributed to the realization of organizational and project objectives (Parr, Shanks, and Darke 1999). This role is critical to ERP success not only because ERP adoption is a risky and costly enterprise-wide endeavour that affects very diverse groups of stakeholders, but also because the champion is a catalyst and facilitator of technological, business and organizational changes, which may be perceived negatively by many of those affected. A project champion is there to impart a positive atmosphere, legitimize the efforts and challenges required by the changes, and help mitigate or resolve the fear and resistance of the various interest groups.

A champion should be a senior business executive who has the authority and influence to promote the ERP project throughout the organization (Sumner 1999a). In some situations, he may be assisted by other less senior business managers, each of whom performs parts of the champion role. ERP adoption projects often require employees to work long hours and overtime beyond the normal daily responsibilities required by their own jobs. The long hours, and excessive workload may spawn stress, conflicts and other morale problems. The champion, being high up in the organizational hierarchy, has the authority and influence to allocate resources to institutionalize actions to mitigate or resolve such problems (Nah, Zuckweiler, and Lau 2003).

Software development environment and practices

ERP systems often involve integrating multiple application modules from one vendor, or more than one vendor as in a project that takes the "best of breed" approach. Sometimes the vendor's application modules may be integrated with third-party software modules and legacy systems that exist in the organization (Bingi, Sharma, and Godla 1999). Experience tells us that the integration of many system modules, especially those of other vendors, and legacy systems, is not an easy task. Managing the quality of the ERP systems and the results of integration tasks is an enormous challenge. It may result in accuracy, integrity and stability issues if integration is not managed properly.

Organizations need to establish the infrastructure, procedures and quality practices for the development, total quality assurance, and maintenance of ERP systems. For instance, servers are set up for development and testing purposes. Using these server platforms, an ERP system is implemented, tested, and later commissioned for production in the production server(s). Abilities in system testing and troubleshooting are necessary for any ERP implementation project. Organizations that implement ERP should work closely with staff from vendors, or other consultancies throughout the system lifecycle (Holland and Light 1999).

Support and commitment of senior management team

Senior management support is critical to ERP projects because they usually involve very diverse interest groups, and processes that span across business and functional boundaries. Many studies have confirmed the relevance of this factor to project success (Law and Ngai 2007), and it

was the most frequently cited CSF for ERP implementation in the information systems literature.

ERP implementation projects require a lot of resources and participation from stakeholders because of the nature of ERP systems. Senior business executives must be willing to approve and commit precious, but often limited, resources to their projects. Their involvement in financial decisions, and technological and business changes is very important (Holland and Light 1999; Nah, Zuckweiler, and Lau 2003). On the other hand, much of the contribution of senior executives is political. The boundary-spanning nature of ERP systems may affect the interests of many stakeholders in an organization. Senior executives need to mediate between various interest groups to resolve political conflicts when necessary (Davenport 1998).

An important indicator or measure of senior management support is the seniority of the manager(s) leading the ERP project and the MIS function. The seniority of such leaders was found to be conducive to success in ERP adoption, and business process change endeavours (Law and Ngai 2007). According to our studies, there is a consensus among practitioners and academics on the importance of this factor.

National culture

Is national culture relevant to ERP implementation? I must say that it is. This assertion is based on my observation in the real world, and recent research. Some authors emphasized this point in their studies, because they believed that organizational culture was embedded in national culture (Gulla, and Mollan 1999; Krumbholz, and Maiden 2001; Zhang, Lee, Zhang, and Banerjee 2003). Hofstede (1994) defined national culture as "the collective programming of the mind which distinguishes the inhabitants of one country from another". Basic values, beliefs and norms in different countries would affect organizational culture. These values and beliefs would translate into different management styles, and investment priorities which may in turn affect the practices of professional activities, including technology and systems adoption, and organizational changes (Krumbholz, and Maiden 2001). For instance, Asian managers and professionals may behave differently from their counterparts in the West. Chinese managers tend to have a higher degree of tolerance of unclear information, and value the past more (Xue, et al. 2005). They may have a tendency to consider business data as their own assets rather than company resources (Davison 2002). I consider these beliefs and attitudes very

important to ERP projects since they may affect information sharing, technology usage, and business process changes.

Country-related functional requirements

Many ERP consultants and researchers, including myself, have questioned the allegations made by international ERP vendors that the so-called "best business models" underlying their ERP products are universally suitable to organizations across the world. We disagree with the "one-size-fits-all" approach. Quite a number of reports and studies pointed out that ERP packages developed by Western countries might not fit the requirements of organizations in some countries (Davenport 1998; Soh, et al. 2000). For instance, Soh and colleagues have identified a few gaps or misfits between an international ERP product and a Singaporean health care institution (Soh, et al. 2000). The ERP project of this Singaporean client was hindered by local data, functional and output requirements that the selected ERP package was unable to support.

I am not surprised with Soh and colleagues' findings at all. Many country-specific requirements account for the abovementioned discrepancies. The cultural factors, and taxation and accounting requirements of a country can significantly affect the business practices of the enterprises operating in the country. Many organizations in Asia have experienced similar misfits when they tried to implement the ERP packages produced by Western vendors (Soh, et al. 2000). Take companies in China as an example. The Chinese government has its own accounting and financial reporting requirements. Chinese users also need Chinese language user interfaces. These are challenges for Western ERP vendors to address if they want to succeed in this market (Li, Chaudhry, Chaudhry, and Wang 2001; Xue, et al. 2005).

Some authors may consider such discrepancies "cultural issues". I would simply categorize them as gaps in functional requirements rather than cultural issues, although some of such requirements may be related to certain cultural conditions in a country, for instance, Chinese language user interfaces (Xue, et al. 2005). I believe that it is natural for organizations in different countries to have country-specific functional requirements. Both international vendors and the clients need to understand and manage the implications. Clients need to choose an ERP package which aligns with their own business requirements while ERP vendors should be more sensitive to country-specific requirements when planning, developing and marketing ERP products for foreign markets.

On-going maintenance and support

It is unfortunate that many organizations and researchers involved in ERP adoption put their focus primarily on the implementation phase, with only limited attention and efforts given to post-implementation issues. As Clive Weightman has pointed out, it is wrong to think that an ERP project ends as soon as the system is put into production (Weightman 2004). In fact, in order to extend the useful lifespan of an ERP installation, and maximize the benefits from such an enormous investment, an ERP-using organization must not take the operational (i.e. the post-implementation) phase lightly. It is important to establish a strategy and a set of practices for the on-going upgrade, maintenance, and support of the ERP installation as early in the ERP lifecycle as possible.

In my opinion, organizations need to consider maintenance and support requirements upfront before they decide on implementation strategies (such as decisions regarding ERP customization and business process re-engineering) (Law, Chen and Wu 2010). I shall discuss these important issues in detail later in this book.

Concluding remarks

In summary, it is necessary for any organization planning to implement an ERP system to clearly define its strategic intent, objectives, and performance measures. Business case justifications and performance measures should not be limited to only quantitative financial measures with which the business executives are more familiar. A balanced approach should also consider unquantifiable intangible benefits which may be strategic for an organization's well-being and competitive advantages.

In defining the strategic intent and objectives for ERP adoption, no one should focus only on operational efficiency as a strategic focus would likely create new opportunities beyond the current business situation. Organizations with dual focuses (i.e. both strategic and operational focuses) of ERP adoption were found to enjoy more benefits than those with only a strategic or operational focus.

This chapter has also identified eighteen critical success factors for ERP adoption. These factors are derived based on academic research and professional reports across the world, and deserve the attention of practitioners and academics when they pursue their ERP-related endeavours.

CHAPTER THREE

METHODOLOGICAL AND STRATEGIC CONSIDERATIONS

Abstract

Methodological and strategic issues for managing ERP adoption are discussed in this chapter. In addition to briefly discussing ERP vendors' implementation methodologies, the author conceptually illustrates, in simple plain language, the lifecycle phases of ERP adoption from planning, ERP selection to implementation and post-implementation management. He describes this generic holistic methodology as the Full Lifecycle ERP Adoption Reference (FLEAR) model.

The author re-iterates that ERP adoption should be managed with proper considerations given to all the lifecycle phases and project management dimensions. Such a model also emphasizes lifecycle total cost of ownership. Using Project Management Institute's PMBOK as the foundation he identifies additional knowledge areas required for successful ERP adoption. In the latter part of the chapter, he also highlights strategic considerations for ERP adoption and on-going management.

Introduction

ERP implementation methodologies guide and add discipline to project management. Thus, ERP vendors have developed their own implementation methodologies to facilitate ERP adoption. For instance, Microsoft offers the Sure Step Methodology for its Dynamics ERP customers. Likewise, SAP AG and Oracle Corporation have developed the Accelerated SAP (ASAP) methodology, and Application Implementation Methodology (AIM) respectively for their clientele.

ERP vendor's proprietary methodologies

The ASAP methodology, as shown in Table 3-1 below, is a six-phase methodology, which includes such phases as Project Preparation, Business Blueprint, Realization, Final Preparation, Go-Live Support, and Run. Oracle's Application Implementation Methodology (AIM) also consists of six phases as summarized in Table 3-2. They are: Definition, Operations Analysis, Solution Design, Build, Transition, and Production.

In recent years, Oracle introduced a new methodology, known as Oracle Unified Method (OUM), to replace AIM (Anand 2011). This incremental iterative software methodology (Figure 3-1) appears to owe its origin in part to Ivar Jacobson, Grady Booch and James Rumbaugh's Unified Software Development Process (Jacobson, Booch, and Rumbaugh 1999). Such ERP implementation model is divided into five phases, namely, Inception, Elaboration, Construction, Transition and Production (Oracle Corporation 2014).

In the Inception phase, project objectives and scope are defined, and agreements among stakeholders are sought. High level requirements identified in this phase are expanded into detailed requirements in the Elaboration phase. Other activities and outcomes in the Elaboration phase include defining system architecture, developing and partitioning solutions, and building prototypes. Detailed design models are to be implemented in the Construction phase during which the solutions are brought through various levels of testing, eventually to integration, and user acceptance testing. Preparations are conducted in the Transition phase for rolling out the ERP system for production use. After the go-live point, the ERP system enters its last but longest phase, the Production phase. In the early days after system go-live, the ERP project team devote much effort to stabilize the system and fix bugs reported by users. Throughout this operational phase, on-going maintenance and support efforts are required to address various technical issues and emerging user requirements. ERP adopting organizations must continue to seek improvement opportunities for the installed systems.

Requirements, and other information developed in the course of an ERP project are to be grouped into various views, such as Manage Views, Implement Views and Envision Views (Oracle Corporation 2014). Manage views are project management views which focus on project management such as project planning, budgeting, execution, and controlling issues while Implement Views focus on analysis and design matters, which need to be eventually addressed to result in a solution for the clients. Noteworthy are the Envision Views which form the framework

for IT strategy planning and definition of the overall information architecture of an organization, into which the ERP project fits. It is the foundation for ERP development and maintenance strategies (Anand 2011).

●UM emphasizes its nature of being iterative and incremental. That is very much unlike the traditional structured (or waterfall) model of software development under which the processes or activities within each phase are assumed to be completed in entirety before beginning the next phase. In reality, project processes or activities, for instance, requirements definition, and logical and physical design would take several iterations to complete. As shown in Figure 3-1, the sixteen ●UM processes span across the five project phases. For instance, the bulk of the "Business Requirements", and "Requirement Analysis" tasks are to be performed in the Inception and Elaboration phases, and carried on to later phases. The "Mapping and Configuration" process begins in the first phase, but most of the required work occurs in the Elaboration phase. The "Data Acquisition and Conversion" process begins early, and most of the work actually occurs in the "Construction and Transition" phases. An important message to take note of from the ●UM model is that many processes need to be planned in the very early stage of the project lifecycle.

The introduction to the vendors' methodologies is deliberately kept brief, and readers should refer to the vendors' publications for details.

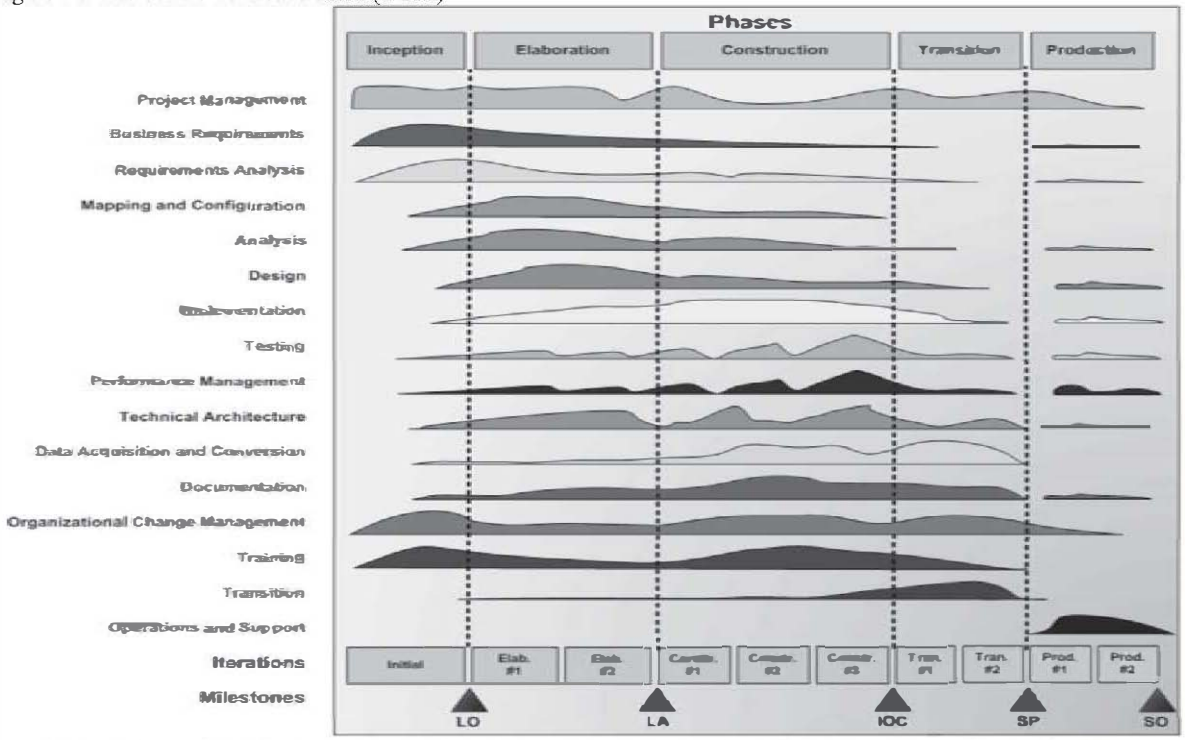
Table 3-1 Phases of SAP AG's Accelerated SAP (ASAP) Methodology

Phases	Descriptions
Adapted from Musil, and Hoeliner (2009)	
Project Preparation	Initial project planning and preparations are performed in this phase by ERP adopting clients.
Business Blueprint	Business and processes requirements are defined.
Realization	Business and processes requirements are implemented.
Final Preparation	Actions are completed to prepare for Go-Live.
Go-Live Support	ERP systems are changed over to production mode.
Run	The ERP systems are operated to fulfill business requirements. Continuous efforts are made to maintain and support the ERP and users.

Table 3-2 Phases of Oracle's Application Implementation Methodology

Phases	Descriptions
	Adapted from Anand (2007)
Definition	Planning and justifications for projects are conducted in this phase. Activities may include defining project scope and objectives, analyzing feasibilities and budgeting.
●perations Analysis	Business and process requirements are defined in detail. Such requirements are mapped against the standard functionality of the ERP package to identify gaps and proposals for potential solutions.
Solution Design	Detailed solution design will be produced by considering the clients' requirements and the features of the ERP package to arrive at solution alternatives. At the end, the most cost effective solution is chosen for the "Build" phase.
Build	Implement the solutions and conduct various levels of testing.
Transition	Preparations are made for changeover to production mode. They include data conversion, contingencies planning and training.
Production	ERP is in operations mode to fulfill business needs, and maintenance and support are offered to the system and users. Also included in this phase is further improvement to the ERP.

Figure 3-1 The Oracle Unified Method (OUM)



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These vendor-defined methodologies begin with the assumption that the ERP adopting organizations have already selected their software products, and do not address the organizational and product selection issues. Although vendors' methodologies such as those discussed above accord much importance to on-going ERP maintenance and improvement, ERP project teams usually place their focus on implementation. On-going improvement activities are usually not performed properly after the departure of the consultants following system go-live. ERP adopting organizations may be poorly prepared for such activities that will occur subsequent to system changeover while they are overwhelmed by the enormous challenges of implementation to meet the go-live schedule. Neither have the consultants the incentives to allocate their precious time and resources to prepare their clients for the post-implementation phase because their primary objective is to get the ERP installed and operational to fulfil contractual requirements.

Thus, in this chapter I shall discuss the ERP adoption process with a generic full lifecycle reference model. This model illustrates the management of the ERP endeavour, from the perspective of a client organization, beginning with a review of organizational readiness through ERP product evaluation to implementation and post-implementation phases.

The Full Lifecycle ERP Adoption Reference Model

The Full Lifecycle ERP Adoption Reference (FLEAR) Model diagram (Figure 3-2) shows seven phases and seven perspectives of a typical ERP adoption process. Although this model is divided into phases, the primary emphasis is not on the sequence of its phases. Rather, the activities of this model can be iterative and carried out through more than one phase until they are considered to be complete. For instance, the business and systems requirements may be captured in more than one point of time, and it takes several iterations to finalize the requirements. Unlike the traditional waterfall model of system development, the phases in the FLEAR model do not have to be rigidly adhered to, but simply are used to guide and add discipline to project management.

Another important characteristic of this model is its emphasis on process-orientation. ERP adoption requires the co-operation of many organizational units of the firm in order to be able to streamline the business processes and to simplify the interface between one team of business users and the next. Be reminded that the functional focus is invalid for ERP endeavours, and in worse situations, it may degenerate

into a silo mentality for some units of an organization. When it happens, the members of such units may place the objectives of their own departments above those of the organization as a whole, and neglect the importance of collaborating to realize efficient and effective end-to-end business processes.

Thus, the philosophy behind this model hinges heavily on cross-functional collaboration, and managing process and system requirements in totality. In such a totality or holistic view, all the phases of the ERP lifecycle are regarded as equally important. ERP adopting organizations need to consider the overall quality, and cost impacts resulting from the activities of all the lifecycle phases. Thus, total cost of ownership (TCO) thinking and practices must be applied in project planning and management such that the long-term costs and benefits of operating the ERP system would be carefully assessed. Following such a holistic view, ERP-adopting organizations define project-related activities and assess human resources requirements for all the lifecycle phases. We shall examine some of the essential elements of the model more closely in the following paragraphs.

The seven perspectives of ERP adoption

According to the FLEAR model, ERP adoption can be understood and approached from seven perspectives, namely, the project management perspective, the business perspective, the enterprise architectural perspective, the user perspective, the design and implementation perspective, the deployment perspective, and the maintenance perspective as described in Table 3-3. Each of these perspectives has its own focus, and guides ERP adopting organizations in their project planning and management efforts. That is, project activities are guided by the seven perspectives to minimize the omission of requirements, some of which were often treated lightly or neglected in past projects. Take the business perspective and user perspective as examples. It is critical for ERP planners and designers to understand the business models and strategies of their companies as well as how the users carry out their actual business transactions. These represent the business requirements viewed from the different levels of the companies (i.e. the senior executives and the workers). Likewise, ERP project managers are reminded that the ERP must be considered and designed as an integral part of the overall enterprise information architecture of their firms, and the operational and maintenance requirements must also be carefully planned and managed in order to achieve satisfactory outcomes. We need to take a broader

comprehensive view in planning and managing an ERP project beyond the implementation focus.

In the various lifecycle phases for planning, implementing, and maintaining the ERP, all of these seven perspectives prevail at least to some degree. System professionals are reminded to examine ERP requirements, solutions and challenges from these perspectives in each of the seven phases of this reference model.

Table 3-3 Seven Perspectives of ERP Adoption

Perspectives	Descriptions
Integrated Project Management Perspective	Understanding, and deciding how to manage and control project requirements, activities, and deliverables. This perspective also links ERP adoption and lifecycle management to the activities of other PMBOK knowledge areas.
Business perspective	Understanding and definitions concerning business models and strategies from business executives' perspective. It encompasses assessing the costs, benefits, and impacts on business operations of the ERP. It also involves developing an understanding of ERP-business fit by mapping ERP features to high-level business models, processes and data entities.
User perspective	Understanding and definitions from users' perspective. It encompasses operational requirements such as detailed business processes, and system features that they need to improve their work performance.
Enterprise architectural perspective	This perspective treats the ERP as a component of the overall information infrastructure. It defines the relationships and integration between the ERP and the IT infrastructure (such as networks) and other business applications of an organization.
Design & implementation perspective	Understanding and models from the designers and implementers' perspectives for developing a solution for fulfilling the requirements of various stakeholders. It is accomplished by mapping user requirements to actual ERP features, and developing the system solutions. The ERP features are mapped to detailed business processes and data requirements.

Deployment perspective	This perspective refers to the preparation, and actual deployment of the ERP and business processes for production use. It also covers the operating policies and procedures, and training of various personnel.
Maintenance perspective	The maintenance perspective refers to the understanding and approaches for operating, supporting, and maintaining the ERP installation. The latter may include business process changes, bug fixes, ERP patches, enhancements, and new modules to further improve the ERP installation and business operations. It also encompasses the on-going updates to business continuity plans and procedures.

The seven ERP lifecycle phases

We shall examine and illustrate the FLEAR phases with a fictitious scenario.

Phase 1: Assess and plan

In this very first phase, an organization initiates project planning, and assesses its own business and system needs as well as capabilities and constraints.

Many ERP projects failed because the organizations engaged in such endeavours before they were ready. They initiated their ERP projects without clearly understanding what they wanted. In some situations, they were driven solely by the intention to match the actions of their competitors. In this book, I have included two examples, namely, Tradeco (Chapter 9) and Controlco (Chapter 10) to illustrate the problems encountered by the organizations which were unprepared for ERP projects. In both cases, the companies lacked the required understanding and experience of ERP systems, and consequently were poorly prepared for such challenges. Thus, any organization planning to adopt an ERP system should ask the following questions:

- What are our business needs and strategies that can be supported or enabled by an ERP system?

- How can an ERP be exploited to transform our business practices and processes?
- Are we ready for it? What should be done to get ready?

The organization should engage in rounds of soul-searching and preliminary investigation to answer these questions. Definitely, it needs to think about the current and future business requirements, and how an ERP, aligning with business strategies, would enhance efficiency, and engender competitive capabilities. Usually this phase begins with a preliminary requirement study and business process mapping exercise for defining high-level current business processes (or "As-Is" process models), and future business processes (or "To-Be" process models) envisaged by the organization. Opportunities for improvement (OFIs) are highlighted. A basic definition of such business processes and systems requirements serves as the basis for sound project planning, and investment decisions.

Moreover, the organization should conduct an organizational readiness review. Here, organizational readiness refers to conditions in many areas, but is not limited to the technical capabilities for ERP design and implementation. Such a review would assess many aspects of the organization, for instance:

- the knowledge and experience in using ERP for strategic and operational goals;
- the culture, mentality and consensus for ERP adoption and business process changes;
- the skills and experience in managing organizational and business process changes;
- the computing infrastructure to support the ERP, and the skills to maintain such an infrastructure;
- the IT governance process complete with standards, and metrics for prioritizing and evaluating information systems investment; and
- the quality assurance and project management practices of the organization.

Technical ERP skills of the IT function are important, but the possession of such skills is only one of the success factors for ERP adoption. As ERP adoption is an enterprise-wide project, it will inevitably bring about business process and organizational changes that affect many stakeholders. It is important to know whether people at all levels are ready to face the challenges in technical as well as business changes. A basic understanding

of ERP systems, and a positive mind-set for adopting changes are the prerequisites for initiating an ERP project. Moreover, senior leaders need to reach a consensus for project directions and strategies, and to offer unswerving support to ERP and business transformation activities.

Certainly, the ERP system cannot be implemented and operated in isolation of the computing infrastructure and management practices. We need to evaluate the capabilities of the organization in these areas. In the next chapter, we shall discuss these issues in greater detail.

What if the review indicates that the organization is not ready yet? Senior leaders must decide whether they are willing to take the risk or not. My advice is simple. Never take ERP adoption lightly. An organization should not embark on such a journey unless it is well-prepared for it. It either suspends the ERP plan, or takes actions to remedy the deficiencies identified in the assessment. It often means an investment of time, efforts, and money to address the gaps identified by the readiness review. Senior leaders need to invest time in rounds of internal debates and negotiations to reach consensus on major directional and strategic issues. They must be convinced of the importance of the project and be willing to assume responsibilities in leading changes, and making critical business and project decisions. For instance, they must be willing to participate in steering committee activities in an on-going manner.

By leading, I mean senior leaders must be willing to become role models in adopting changes. Role modelling in this sense is an important means for educating the rest of the organization to prepare for the project. On the other hand, deficiencies in required skill areas should be addressed by proper workforce planning and related human resource management activities while those in the computing infrastructure area must also be addressed with adequate investment.

In this phase of the ERP journey, the organization should invest time and efforts to develop a comprehensive business case to examine the challenges, feasibility, costs and benefits for such an expensive project. It needs to understand and define the strategic and operational benefits, and how the ERP can be exploited to enable business strategies. A well-developed business case would help business leaders make an informed decision on ERP investment.

After approving the ERP initiative, the organization should begin to assemble a project management team if it does not exist yet, with adequate human resources assigned for the development of the project plan, and to prepare for the next phase. It is very important for the organization to decide who should assume the senior project leadership role. Project director or manger may be appointed from within, seconded from the

vendor, or hired from the market if necessary. The choices may have profound implications on the management of the project. It will be advisable to have a knowledgeable project director who is independent of the vendor and competent to make impartial judgement and decisions.

By this time, a detailed project management plan should be developed to establish the schedule, deliverables, budget, and quality targets.

Phase 2: Elaborate

In this phase, business processes and system requirements are elaborated. Detailed business process mapping is conducted on the basis of the preliminary definitions developed in the previous phase. Note that the intent for the preliminary business process analysis exercise of the previous phase is to capture enough information to support strategic planning, business case development, and investment decisions for the project. The resulting models and definitions still lack the details required for the selection of an ERP package.

Proper ERP selection decision hinges on a clear and thorough understanding of one's requirements. Therefore, the organization must conduct a detailed requirement study in this phase, which expands the definitions of business process models, data requirements, and functional and non-functional requirements inherited from the previous phase. The effort of requirement studies would result in the elaborated definitions of current process models, and possibly future process models and opportunities for improvements.

Note that the requirements and process models defined in this phase are still independent of the ERP products available in the market. Be reminded that it is important to conduct a neutral review of the organizations' needs without being affected by any ERP product before ERP evaluation occurs in the next phase. The organization may not be sure about what it wants the future business processes to be in this early stage. However, it is important for its business and MIS leaders to have at least some preliminary high-level ideas for their future business practices and processes. The ideas and requirements collected at this time are purely business-driven. These ideas will be important for successful interactions with potential ERP vendors, and unbiased ERP selection in the next phase.

In the process of requirement and business process studies, many tools can be used to document the findings. They range from simple flowcharting tools to more sophisticated process modelling software. Many software products are available for drawing flowcharts and swim lane diagrams. In some organizations, Grady Booch's use case diagrams

are used to describe the high-level processes, and the interfaces between processes and actors, while entity-relationship modelling notations and software are used for modelling data requirements.

Phase 3: Select

Selecting an ERP product (or package) that fits the requirements of an organization is one of the most critical decisions in any ERP endeavour. The aim is to find a product with the greatest degree of ERP-business process fit, and, of course, smallest discrepancy between the organization's requirements and native ERP functionality.

Following the capturing of elaborative business and systems requirements in the previous phase, the organization can begin to identify potential ERP vendors. The very first step is to conduct a preliminary market research regarding ERP vendors and their products. Many sources of information may be considered for this purpose. The organization may collect relevant information from trade magazines, vendors' publications, surveys conducted by consultancies, external ERP consultants, and peer companies using similar ERP products.

It is advisable to collect information concerning many aspects of the potential vendors, in addition to that of their ERP products. Information that is relevant to making an informed decision in vendor selection includes information about corporate culture, financial strength, business competence, technical competence, ERP product development and support policies, and performance track records. Some vendors perform better in some industries than others, while some serve primarily domestic but not international markets. It is necessary to understand the vendors' consulting and support capabilities in one's business locations. Such information helps an organization to shorten its list of candidates. The organization should focus on the ERP vendors that share commonalities with itself in, for instance, business knowledge, customer services culture, and quality management philosophies. This organizational fit between clients and vendors is a critical success factor for long-term co-operation (Ngai, Law and Wat 2008).

Information concerning the vendors' ERP products is reviewed to identify a compatible product. The aim is to identify a product that has the greatest degree of ERP-business process fit. Product information is usually available from the vendors' websites. The trade press often publishes reviews concerning ERP products, and stories on ERP successes and failures. If you know of other organizations that are using similar products, it is worth your time to talk to them. These preliminary assessment

activities would help an organization to identify potential vendors and products that deserve further actions.

Very often, organizations would initiate a formal request for proposal (RFP) process to solicit responses from vendors. In this fictitious ERP adoption scenario, RFPs would be sent to the shortlisted vendors who would respond with a proposal of potential solutions and counter-suggestions. The organization reviews the responses from the ERP vendors, and the gaps between standard ERP features and business processes are noted. Rounds of meetings and demos will be organized for MIS staff, business managers, and users so that questions can be clarified by the vendors' staff about how the gaps are addressed. Such gap analysis (or fit/gap analysis) and responses from the vendors may take several iterations until questions raised by MIS and users are resolved.

In addition to ERP functionality and licensing fees, the organization should also assess the consulting and support services, and understand the product development and support policies of the shortlisted vendors. An understanding of the vendors' support and maintenance-related charges, and training options is necessary since these costs are critical components of the total cost of ownership for the ERP products.

Phase 4: Design

After selecting an ERP product, the design phase begins to define a solution to fulfil the organization's business process and system requirements. Business process mapping is performed specifically considering the features of the selected ERP product. The gap analysis and process models developed in the previous phases are expanded. While the outcome of the elaboration phase can be regarded as a logical or conceptual design that describes what is needed, the solution(s) defined in this phase can be described as a physical design. It proceeds by first finalizing the "what", and then specifying the "how" by considering the native features and technical aspects of the selected ERP product, the detailed business processes to be implemented, the firm's IT infrastructure, and other relevant computing hardware and software that also need to be acquired and installed.

There are give-and-take decisions to be made here since in many circumstances the ideal "To-Be" process model may need to be adjusted in light of the ERP features available. The business processes to be implemented for the organization, and the appropriate features of the ERP to be set up to support these processes are decided. The parameters and values for configuring the ERP features and workflows are identified.

Surely many ERP features and parameters that are inapplicable or incompatible to the organization's process needs would be clearly excluded from the solution. The ERP comes with a large number of standard features, some of which will be included in the design, while some features will never be turned on. Through selecting and configuring the right combinations of such parameters or switches, the functionality (such as chart of accounts definitions, costing standards, screen interfaces, workflow components and standard reports) of the organization's ERP installation will be determined.

A critical issue that must be addressed is the ERP-business process gap. How challenging this effort would be depends largely on the size of the gap. The organization may choose the process adaptation, or ERP customization approach to close the discrepancy. The feasibility, costs, risks and impacts of each approach must be carefully assessed before a decision is made. Moreover, the requirements for, and the difficulties in maintaining and supporting a customized ERP must be evaluated.

The design must also concretely describe the data models to be implemented by the ERP database. Concomitantly, detailed data definitions must be finalized, and the sources of data and data migration approaches must be identified. The ERP project team should also consider the requirements pertaining to the IT environment of the organization, such as networks, data and application servers, and client hardware and software to support the selected ERP system functionality. The ERP modules may need to interface with other business applications, and detailed integration requirements must be defined at this stage.

The "To-Be" process models will be finalized. The ERP features to be set up, and the parameter values for such features will be documented. The overall project management plan should be updated to reflect the tasks of ERP configuration, process changes, programming required for customizing the ERP (if the organization decides to customize), data conversion, and integration with other business applications.

While documenting the design models is an important output of this phase, some organizations also resort to prototyping to experiment with ERP features. There must be one or more system development and testing platforms set up for this purpose, and also for the build phase.

Phase 5: Build

Following the final review and approval of the design solution, an ERP development instance will be set up in a development server. The design specifications are translated into ERP configurations. That means, the

selected ERP functionalities are configured by ERP application experts or consultants. Similarly, the database management software and physical database design are implemented in the same or another development server. It is advisable to have more than one server allocated for application development. In many occasions, multiple ERP and database instances are needed to support various learning and testing activities.

The ERP functionalities set up by the experts are tested individually (as in unit testing), and together with other ERP application modules (as in integration testing). The first type of testing activities aims to ascertain that the individual ERP features have been set up according to specification and are free of errors, while the second type of testing is primarily for determining the compatibility of the implemented ERP modules. It may take many rounds of such tests and trouble-shooting to address configuration errors.

Also finalized in this build phase are the test plan and test cases, and the scripts required for data conversion and system integration. The test plan and cases will be used in various types of tests. Data conversion scripts will be tested and refined while various versions of databases are populated for ERP development and testing. Business operations procedures, user guides, system administration manuals and ERP support documents are developed. While system development and testing activities are performed, these documents are updated and refined.

As external consultants and internal project team members are working side-by-side, knowledge transfer occurs. The latter should assume the responsibility of documenting such precious experience and knowledge to prepare for the development of in-house training for other MIS staff and end-users. The goal is to retain and disseminate such knowledge to others within the organization on a continuous basis.

End user training strategy and training plans are finalized. Training materials are developed while the development ERP instance is configured and tested. The build phase offers the technical staff and key users (process owners) the opportunities to learn about the ERP, and the "To-Be" business processes. Such documented experience can be used as valuable input for developing user and technical training materials. Process owners should work with MIS personnel and consultants in developing business-specific training courses.

Once the ERP installation is determined to be stable and acceptable in quality, a user acceptance test (UAT) is scheduled. A UAT emulates the real-life work environment, and a successful UAT ends the build phase and starts the transition phase.

Phase 6: Transition

In the transition phase, the organization implements the ERP and new business processes into production. In preparing for the go-live event, a roll-out plan, and a contingency plan must be clearly defined. The training plan developed since the initial ERP planning phase should be enhanced to reflect the pre-roll-out training requirements and schedules. Careful planning is critical for successful changeover and for minimizing disruptions to business operations. If the new ERP system does not perform as expected in the production environment, it would be disastrous to business operations, and detrimental to the reputation of the project team and the whole enterprise. Risk management is, therefore, a key consideration in transition planning. The organization's risk tolerance level largely determines its transition approach for the ERP.

The critical activities pertaining to system changeover, and organizational and process changes need to be listed and scheduled clearly in the roll-out plan, which is a very important mechanism for coordinating all the stakeholders for the forthcoming changes. In preparing for the transition, some activities can be executed well in advance of the go-live date. For instance, right after the UAT, the project team may start building the production ERP and database server(s). Data migration, from the legacy system(s) to the ERP database server, can be performed in advance up to a particular date, while the remainder of data between this date and the go-live date can be downloaded from the legacy system(s) and transferred to the new production platform before system cut-off. By completing some critical tasks in advance, it may expedite the schedule, and ensure that the organization is ready for changeover by the cut-off time.

Another critical element in roll-out planning is training. Instead of being identified by one or a few lines in the roll-out Gantt Chart, a separate detailed training plan should also be developed to clearly define the strategies, and scheduling. If the organization already has a training plan developed in early phases of the ERP initiative, it should be enhanced to include the aforesaid details pertaining to go-live preparations. Training is a large requirement in ERP projects, and should never be underestimated. It would surely consume a great deal of staff resources and time. Before the go-live date, the organization should train a critical number of workers in the new ERP and business processes. It is advisable for ERP adopting organizations to take the train-the-trainer approach. By such approach, the process owners (key users) assume the role of trainers

because they know very well the configured ERP functionality and the business processes.

In the roll-out plan, the organizational and process changes to be effective by the go-live date are also defined. Organizational units may be created, modified or eliminated. Some staff would be assigned to new roles and responsibilities for carrying out the business workflows defined in the design phase for the new production environment. Business process-specific training is offered to users according to their new roles, and work steps they will perform, to simulate real-world business operations in the new ERP environment. Such kind of training rehearses users for the upcoming changes.

Sound contingency planning will enable the organization to minimize losses, and to roll back system and process changes promptly if the new ERP fails. In this plan, risk management issues are addressed. An assessment will be conducted for the potential risks and business impacts of system failures. It also explores and defines the measures the organization could take to prevent or minimize the probability and impacts of such risks. For instance, the plan will address how business continuity is safeguarded if the system fails to operate steadily. Is it feasible to roll back to the old system and business processes? To what extent can the organization continue its business with the old system or semi-manually? What would be the impacts on critical business partners and customers? These questions must be addressed in contingency planning.

Activities that need to be defined clearly in the contingency plan include system preparation activities and rollback activities. Examples for the former include the checklists, procedures and actions for taking a full backup of the relevant databases and the legacy and new ERP systems before system roll-out. A pre-defined list of the rollback activities guides technical staff in undoing system changes and bringing the computing environment back to the original state in emergency situations. For instance, in the worst scenario when the ERP fails to perform in a reliable manner, the organization may decide to shut it down, and the legacy system would be restored for transaction processing.

In addition to the system-level activities, the contingency plan must address business continuity issues. Guidelines and procedures must be defined to guide staff in performing business activities without the ERP system.

In consideration of its needs and risk mitigation, the organization chooses an appropriate changeover approach for its ERP project. There are four changeover approaches which are different in terms of costs and risks, namely big bang, parallel, phased, and pilot approaches. The most risky is

the big bang approach, by which, the legacy systems will be shut down and replaced by the new ERP system for all office locations at the designated point of time, while the least risky approach is the parallel approach. By the latter approach, the legacy system and the new ERP system are run in parallel for a period of time. Both systems are kept synchronized by entering transactions twice into the systems. Thus, it is the safest but most costly approach.

The organization may also consider a pilot, or phased approach. By the pilot approach, the system will be deployed to a smaller office first. Once it is certain that the new system is reliable, and the users successfully adapt to the system and business processes within a reasonable period of time, the system will be deployed to the rest of the organization. Similarly, the organization may schedule ERP and business process deployment to office locations by phases. This approach allows the new system and processes to be deployed in a limited scale each time so that the changes can be assessed and fine-tuned before the system is deployed to more users in other locations. In some situations, a phased approach allows preparations and user training to be completed by subsets of application modules and locations. This helps the organization schedule preparation work over time to balance workload against resource constraints. The challenge of pilot and phased approaches is how to satisfy the information processing requirements of users who use the new systems, and those who would continue to use the legacy system for a longer period of time. Maintaining two systems for users in different locations, and keeping the databases synchronized is an enormous challenge.

The phased approach also has a different meaning. It may refer to the division of the ERP initiative into subprojects. In this broader definition, the phased approach divides the overall schedule and scope of ERP adoption project into smaller subsets in which selected modules are analysed, configured and deployed to their users. This is a more reasonable application of the phased approach in comparison to applying it only to system changeover.

Phase 7: Operate and improve

Once the ERP is commissioned for production, it enters the longest phase of the ERP lifecycle. In the early months, usually six to seven months, of this phase, the ERP team would be busy in troubleshooting the system and providing end-user support. Bugs and configuration issues are addressed. Users may still be unfamiliar with the new ERP environment, and it may take them more time to adapt to the system and business

processes. Thus, end user support accounts for a large portion of user requests received by the helpdesk or ERP application support team.

As time progresses, the ERP environment gets stabilized and users are more skilled with the system and business processes. The number of user requests begins to decline. The original project organization may cease to exist, and external consultants may also leave the project. Maintenance and support responsibilities are transferred to the in-house MIS ERP application support staff. However, the overall ERP challenge of the organization is not getting any smaller. It would be wrong to treat this phase as less important than the previous phases. There will still be a lot of work to do for the remainder of the ERP lifecycle. As a healthy practice of ERP lifecycle management, the FLEAR model emphasizes the importance of improving the ERP on an on-going manner.

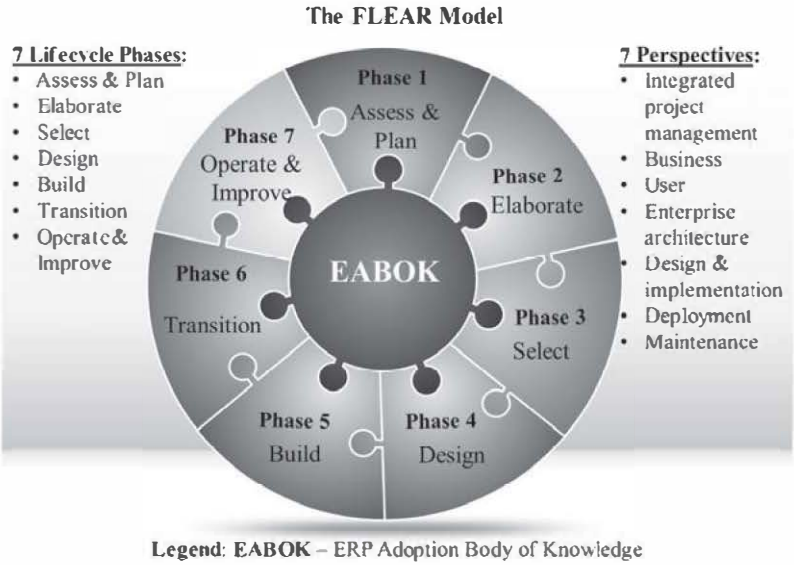
After operating the new system for a substantial period of time, it would be a good practice to conduct a post-implementation review (PIR). Usually it is conducted six to twelve months after go-live. Although some ERP adopting organizations do not conduct PIRs, it is a recommended practice. It not only assesses how well the implemented ERP and business processes satisfy user requirements but also identifies additional business needs to be addressed in the future. A PIR also sheds light on project management mistakes and pinpoints good practices for future projects.

Throughout this phase, the MIS application team will have to handle patches, enhancements, and new releases distributed by the ERP vendor in order to keep the ERP installation up to standard. In addition, the organization must not be complacent, but needs to continue to seek opportunities for improvement. The MIS application team, internal functional specialists, and process owners need to work closely together to identify ERP features for further improving business processes. The organization's business practices and system requirements usually evolve over time. Needs may also arise for implementing additional ERP modules. As the ERP project team may cease to exist soon after it is rolled out, the on-going interaction and collaboration between MIS application staff, and business managers and their key users must be maintained. Readers should refer to the Controlco case (Chapter 10) which discusses the use of a user needs prioritization committee in this multi-national firm, as a standing forum for MIS and business functions to jointly manage problems and opportunities for improvement.

It is critical to develop and retain in-house ERP and business process expertise over the long run. Thus, the organization needs to commit resources for training its MIS application staff, and end-users as an on-going investment. Appropriate in-house on-the-job training or formal

classes should be organized for new hires and other inexperienced staff. New MIS application team members are given opportunities to get familiar with the architecture and setup of the ERP installation. In some occasions, it may be necessary to make use of the vendor's standard courses, for instance, in training staff on advanced product features, and new application modules. ERP application support staff and, in particular, process owners continue to carry a very important role in designing and offering business process-specific training to enhance users' capabilities in using the ERP to perform their business activities efficiently.

Figure 3-2 The Full Lifecycle ERP Adoption Reference Model



Legend: **EABOK** – ERP Adoption Body of Knowledge

The ERP Adoption Body of Knowledge

We have discussed the perspectives and phases of ERP adoption above. In order to be able to understand, plan for, and execute the ERP adoption activities, an organization needs to be equipped with a very diverse set of expertise. In the following paragraphs, we shall look at the various dimensions of the ERP Adoption Body of Knowledge (EABOK).

The Project Management Body of Knowledge (PMBOK) has identified 10 knowledge areas (Project Management Institute, 2017), namely, project integration management, scope management, time management, cost management, quality management, human resources management, communications management, risk management, procurement management, and stakeholder management, as described briefly in Table 3-4. Using PMBOK as the basis, EABOK has been enhanced to include four additional ERP project specific knowledge areas. They are business process and change management, ERP application knowledge, IT infrastructure management, and training. For EABOK, I have also renamed "project integration management" of PMBOK to "ERP lifecycle integration management". While EABOK adopts the content of this PMBOK knowledge area, it needs to emphasize the importance of managing the full ERP lifecycle as a set of highly related requirements and activities. It is necessary to recognize the fact that all the lifecycle phases are important to the health and success of an ERP installation. Design decisions and configuration work accomplished in preceding phases would have a direct impact on subsequent phases.

To prepare for an ERP endeavour, an organization needs to bring to an acceptable maturity level its competence in the ERP specific knowledge areas as well as those generic areas identified by PMBOK. Functional knowledge and business process management are doubtlessly important for ERP endeavours which often bring about organizational and business process changes to the enterprise. While PMBOK puts the focus primarily on controlling changes, EABOK emphasizes both leading and controlling changes. That is, business and project leaders need to be able to proactively initiate and lead these changes, and to take the organization through many kinds of challenges as an ERP progresses through the lifecycle phases. This surely is not mechanistic in nature, but requires the leaders to be equipped with the vision for business changes, and the charisma to secure buy-in from stakeholders.

At the operational level, it is necessary for middle managers, and workers to become familiar with the business practices and processes of the organization, and to be able to embrace the responsibilities for

proposing opportunities for process improvement, and implementing the changes.

In an ERP adoption context, the abovementioned changes need to be evaluated against ERP features. This necessitates knowledge and competence in specific ERP applications. An organization, in addition to using external expertise, must also develop its own knowledge and ability in ERP application modules among its employees. Senior business and project leaders need to possess high-level knowledge about ERP features which would help them envisage opportunities for using the systems to support or enable new business strategies.

Operational staff such as functional experts and users, and MIS personnel must learn ERP functionality in detail and be equipped with such competence to define and redesign business processes. Functional experts and key users (or process owners) need to be given the opportunities to develop and retain such knowledge, and to transfer it to successive generations of workers. The organization needs to establish an in-house training strategy and program to provide business process-specific ERP learning sessions and workshops regularly over the long run. ERP training does not limit itself to classroom activities, and it often utilizes on-the-job training with mentors assigned to guide new workers. The competence in managing in-house ERP-related training and knowledge transfer is thus critical for the success of the ERP endeavour, and for developing competitive capabilities for the organization.

Besides, an organization needs to develop the knowledge and skills in provisioning and managing a sound IT infrastructure, to support the ERP project, which encompasses many facilities, ranging from computing hardware and network connectivity to helpdesk operations and various standards and guidelines. The importance of these types of knowledge and skills should not be discounted to any degree since ERP deployment cannot be achieved in isolation of the organizational environment. We shall discuss such issues again in Chapter 4.

Table 3-4 ERP Adoption Body of Knowledge (EABOK)

Knowledge Areas	Descriptions
	Revised PMI Project Management Body of Knowledge (Project Management Institute 2017)
ERP Lifecycle Integration Management:	Knowledge, processes and activities to co-ordinate all other processes and activities throughout the ERP lifecycle from planning to post-implementation.
Scope Management:	Knowledge, processes and activities to identify requirements and deliverables that are to be completed by a project. PMBOK focuses on change control while EABOK emphasizes both leading and controlling changes.
Time Management:	Knowledge, processes and activities to make duration and resources estimates, and to manage scheduling of project activities in order to complete project on time.
Cost Management:	Knowledge, processes and activities to make cost estimates for activities, determine budget, and control costs of project.
Quality Management:	Knowledge, processes and activities to establish quality management plan, and perform quality assurance and control for project.
Human Resources Management	Knowledge, processes and activities to establish staffing management plan, and to acquire and develop required human resources for project.
Communications Management:	Knowledge, processes and activities to develop, manage, and control communications for project.
Risk Management:	Knowledge, processes and activities to develop risk management plan to identify and analyze risks for project. Risk management plan should also identify potential responses to mitigate negative risks, and to enhance positive risks.

Procurement Management:	Knowledge, processes and activities to manage procurement of materials and services contracts for project.
Stakeholder Management:	Knowledge, processes and activities to manage stakeholders' needs, and expectations, and to maintain good relationships with stakeholders for enhancing their support of the project.
	ERP Project Specific Knowledge Areas
Business process & change management	This knowledge area encompasses business functional knowledge, and competence in leading and implementing organizational and process-level changes.
ERP application skills	This knowledge area is specifically related to the understanding of the functionality of specific brands of ERP, and the skills in configuring relevant system features to enable and support business processes.
IT infrastructure management	This knowledge area consists of the various types of skills in managing the IT technical infrastructure of a firm to support business applications (such as an ERP installation). Included in this category are also the policies, standards and procedures for managing the infrastructure.
Training	This knowledge area refers to the competence in developing and managing in-house business process-specific ERP training on an on-going basis.

Strategic considerations

When examining failed ERP projects over many years, we can find many common mistakes. It would be important for us to learn from these mistakes to enhance the likelihood of success in ERP adoption. The following are important issues that ERP adopting organizations need to consider. I hope this list of issues would help such organizations improve their understanding of, and prepare for their ERP initiatives.

Aiming for strategic benefits

Some companies either are not clear about their ERP objectives, or are driven primarily by technical or operational reasons to embark on their

ERP journey. Consequently, the resulting benefits may be too mundane to justify such an enormous investment.

Never confine yourself to operational objectives, such as process efficiency, since the resulting benefits may not be sufficient to justify the cost of ERP adoption. Aim for both strategic and operational benefits, and always seek the opportunities to use the ERP as an enabler of innovative business strategies.

Global standards versus local requirements

Would the ERP vendors' "one-size-fits-all" approach fit your requirements? When you are evaluating global commercial ERP products made by foreign vendors, it is important to review the specific requirements of your own country, and to identify the functionality gaps between national requirements and ERP product features. For instance, taxation laws and reporting requirements are different across countries. It is advisable to closely examine each of these gaps to determine if there are acceptable solutions for them before signing any licensing agreement.

Multinationals operating in different countries need to take note of the unique local requirements that their international divisions may have to cope with. It is idealistic to require every division to fully comply with the corporate ERP standards. However, in some circumstances, unique local requirements in some countries may cause deviations from corporate standards. It is important to find a balance between corporate global standards and country-level requirements.

Legal structures and reporting requirements

An ERP adopting company must clearly identify the legal structure of its organization, and the financial reporting relationships between the corporate office, and divisions and associated companies. This is one of the critical exercises that must be performed very early in the ERP lifecycle.

The tax reporting requirements of the corporate office certainly would affect the timing and approach for divisional financial results to be rolled up to the corporate financial reporting system. Some of the international divisions of a multinational firm are incorporated as separate legal entities under the laws of the host countries. The existence of international operations makes financial reporting more complicated as these divisions have to comply with legal requirements of the host countries as well as those faced by the corporate office.

In addition to business divisions, it is necessary to consider the number, and the locations of inventory organizations in the overall organization chart. Be sure to select an ERP product that is able to support this multi-organizational structure of corporate office, divisions and subsidiaries, and inventory organizations.

Here the phrase "multi-organizational structure" has a generic meaning. However, "multi-org" also refers to the special features and the architecture of some ERP products. ERP products supporting "multi-org" functionality can support multiple sets of books such that in a single global instance of ERP installation, the accounting information and transactions of more than one legal entity can be managed.

Sequence of module implementation

ERP suites consist of many modules from which you select a subset to fulfil your business and system requirements. It is advisable to start implementation from the financial modules (i.e. general ledger and others) since all other modules will communicate with, and eventually post financial data to the financial systems. It is logical to get the chart-of-accounts, sets of books, and relevant workflows defined, and the financial modules successfully configured first before attempting the implementation of other modules (such as the purchasing, and sales order management subsystems).

Subsequent to defining the legal structures and financial reporting relationships, the organization will define the chart-of-accounts, and detailed account codes. These accounts codes are the links between the financial modules and modules used by other departments of the company. They are critical for supporting transaction processing and financial reporting.

Currencies and character sets supported by ERP products

Among the important features to consider in ERP evaluation are the currencies and character sets supported by the ERP products. These features are especially important for multinational firms when their operations scattered across more than one country or region. ERP instances set up for international divisions may need to support multiple currencies (e.g. local currency, and US dollar) and multiple languages (i.e. national language of the country, and English). I have observed a real-life case in which a multinational firm operating in Greater China (including the Chinese mainland, Hong Kong, Macao, and Taiwan) needed to

configure its ERP system to support both English and Chinese. The ERP product in question supports English character set, and only one of the Chinese character sets (i.e. traditional Chinese, or simplified Chinese). The Chinese mainland uses simplified Chinese characters, while Taiwan uses traditional Chinese characters. This problem was resolved only when Chinese mainland users agreed to drop their simplified Chinese requirement to accept the traditional Chinese character setup.

Highly customized, best of breed, or vanilla with only minor customization

An ERP adopting organization has to make a choice between the approaches of business process adaptation, and ERP customization. Vanilla implementation of an ERP product means that the organization has to change its business processes (i.e. business process adaptation) to fit the standard features of the ERP. On the other hand, ERP customization requires modifying the standard features of an ERP product by adding bolt-on functionality or modules. Some organizations may take the customization approach, hoping to preserve their unique proprietary business practices and processes. I have observed many ERP project failures that resulted from excessive customization. The primary considerations here are unstable systems resulting from this approach, and the subsequent challenge of maintaining and supporting the excessively customized systems over the long run. Before you decide to take this path, it is critical to consider carefully the justification and risks for doing so, and the ability of the MIS team to support such a system. Note that excessive customization would sever your relationship with the ERP vendor, and preclude you from applying future patches and upgrades to the ERP. In short, excessive customization may result in dire consequences.

While some ERP-adopting organizations source their integrated ERP suites from a single vendor, some companies take the best-of-breed approach and select the strongest products from different vendors to fulfil specialized requirements. There are indeed successful cases in best-of-breed implementation. Moreover, the service-oriented architectures adopted, in recent years, by software producers may reduce the hurdles in integrating modules from different vendors (Merritt 2010).

After all, this approach would still create more challenges in implementing, integrating, and maintaining the installed ERP applications initially and over the long run. Again, my words of caution are to consider the pros and cons in your overall ERP planning process early on. This

issue should not be taken lightly. The following critical questions can be asked in ERP planning:

- Are your business requirements so unique that it is justifiable to go for the best-of-breed approach?
- Is it possible to take the pain early on to re-design your business processes in order to enhance the feasibility of adopting an integrated suite from a single ERP vendor?
- Would the benefits of preserving the unique proprietary business processes more than offset the costs of adopting a highly customized or best-of-breed ERP?
- Do you have the expertise required to implement, integrate, and continuously support the best-of-breed or customized system?

Functional focus versus process-orientation

Emphasize a process-oriented approach in any ERP project. The focus on the end-to-end business processes of an organization naturally renders the functional orientation inadequate. ERP adoption is an enterprise-wide exercise that requires the cross-functional co-operation of all the units and people in the organization. The silo mentality is invalid here.

The focus should be on the business processes, but not on the organizational hierarchy. For example, the customer order lifecycle of a customer order management and fulfilment process starts when an order is captured by a sales staff. The order goes through several stages when the employees in different functions contribute their efforts in fulfilling the order. Goods on-hand are reserved, and delivered, and revenue is recognized after delivery. The activities performed by the workers of various departments can be considered sub-processes which must be seamlessly integrated to form the overall order management and fulfilment process.

Key business users who are familiar with the work practices and processes must be empowered and assigned the responsibility of process management and improvement. They are sometimes called super users, or process owners who should work together to ensure that the interfaces between sub-processes are simplified and smooth.

Total outsourcing versus other choices

In discussing ERP planning in the first phase of the FLEAR model, I have raised the issue concerning who to lead and manage the ERP

endeavour. The same question can be asked regarding the design and implementation roles of the project. Surely, total outsourcing would be a viable option if an organization has a large budget. Outsourcing to ERP vendors or their consulting partners resulted in satisfactory project outcomes in many situations while the same approach ended up in disasters and disputes in other cases. Oftentimes, even after their ERP systems were successfully implemented, some organizations still suffered from insufficient knowledge transfer, and other difficulties in ERP maintenance and support subsequent to the departure of the consultants.

Thus, I would like to emphasize the importance of having internal staff assume major roles throughout the ERP lifecycle. Client organizations can take a multi-pronged approach in fulfilling the manpower requirements by using expertise from not only the vendor, but also other independent consultants. In any case, internal staff must work side by side with external consultants to acquire the skills for supporting the system over the long run. This approach also reduces the over-reliance on one party, and improves the bargaining power of the client organizations.

Generally speaking, external consultants usually do not have the incentives to learn your business practices and long-term needs. Internal staff should always shoulder the responsibility for identifying business requirements, and proposing improvements to business processes and application systems. In order to be able to use the ERP as a business strategy enabler, it is critical for an organization to develop and retain its own competence.

Reduced project scope and phased adoption

There are more than one approach to ERP adoption. Never underestimate the challenges of implementing and learning the functionalities of a new ERP product. They are never simple tasks. A smaller project scope minimizes project risks, and it would be easier for a firm with limited ERP experience to master it. Give the project sufficient time and work out a reasonable project timeline. Any attempt to rush the project would exacerbate the ERP challenge.

If possible, adopt a phased approach, implementing a few critical modules in the first phase, and other modules in subsequent phases. As discussed above, it is logical to start with the financial modules.

Business specific ERP training

ERP-adopting organizations need to factor knowledge transfer, and training requirements into project planning. Training includes standard vendor-offered training on ERP product features, and business process-specific training designed to develop skills among users to improve business operations using the functionality of a firm's ERP installation.

It is useful to introduce management, information systems staff and the key users (or process owners) to standard ERP features before and during the project. Such training would expedite learning. However, never over-rely on such standard training. Business process-specific training is a must in order to prepare the user community for successful transition to the new ERP environment. In the case studies of this book (Chapter 9 and Chapter 10), I shall discuss more real-life experience in ERP training.

An organization should train a sufficient number of users on ERP functionality and business processes before the ERP is commissioned into production. Training should be managed on an on-going basis to train new hires, and as a means to enhance the competitive capabilities of the organization. It needs to re-iterate that processes owners (key users) should play a key role in designing and delivering business-specific training.

Concluding remarks

In this chapter, three vendor-specific ERP implementation methodologies are briefly reviewed before illustrating the Full Lifecycle ERP Adoption Reference (FLEAR) model, and discussing the knowledge and skills relevant to ERP project management. This reference model espouses a holistic approach to ERP implementation and maintenance, and emphasizes the need to understand and plan for the ERP from multiple perspectives. In addition, strategic issues are also highlighted for ERP adopting organizations to consider.

CHAPTER FOUR

ORGANIZATIONAL ISSUES

Abstract

For any enterprise system project to succeed, the project leadership needs to carefully consider and manage the challenges arising from the organizational environment. Experience indicates that it is advisable to create a supportive organizational environment before any organization embarks on such large-scale projects. Likewise, the project leaders of ERP initiatives must take note of the idiosyncrasies, limitations as well as strengths of their organizations, and act accordingly.

The author begins this chapter with a discussion of the information management environment that needs to be in place to support a successful project. He highlights the importance of establishing a sound IT governance practice, and a solid IT infrastructure in an organization. In his opinion, there are hard tangible, and soft intangible aspects of information management that an organization needs to develop and improve over time.

Added to the aforesaid hard and soft components are the cultural characteristics, formal authorities, and informal political influences in the organizational environment that project leaders must deal with. In this chapter, the author reviews the impacts of organizational and cultural issues, for instance, the management styles of executives, the seniority of IT and project leadership, and the concepts concerning data ownership and information sharing, on ERP adoption and business process changes, drawing upon relevant research and his own observations in international project settings.

This chapter also discusses project organization structure, roles and responsibilities, and stakeholder and communications management practices in an ERP setting.

Introduction

The well-being of any project is closely tied to the larger organizational environment. Thus, enterprise resource planning (ERP) initiatives must be planned with due considerations given to the practices and competencies of the organization in many aspects, such as those pertaining to business processes, and the overall information management environment. ERP adoption often affects a large number of stakeholders of diverse cultural and business background. It often involves changing the business practices and processes, and consequently disrupts the status quo with which some stakeholders feel comfortable for a long while. That explains why so many ERP failures were attributed to resistance from the user community.

Having said that ERP is primarily a business movement that affects a large number of people, we should recognise the fact that cultural factors and political influences often yield as much impact on project management as power created by the formal organizational hierarchy. Thus, it is necessary to note the cultural idiosyncrasies, and constraints of an organizational environment in which the ERP initiatives are embedded. It is especially important to do so if the ERP initiatives are situated in an international setting involving multiple divisions across a region, and personnel of diverse cultural backgrounds.

I shall discuss the relevant topics starting from the more tangible elements of the environment, and examine the intangible elements later in this chapter. Needless to say, ERP projects need a supportive information management environment, and an IT governance mechanism to facilitate project management decisions and tasks. Issues concerning IT governance and IT infrastructure will be examined followed by a discussion of the cultural and organizational factors. Finally, the structures, and roles and responsibilities of typical ERP project organizations will be reviewed, and such important project management issues as stakeholder and communications management will be discussed.

The academic theories and principles concerning cultural issues are discussed only briefly in this chapter. Instead, I have put much effort into discussing relevant empirical findings, and observations in the commercial world. Readers who are interested in academic theories concerning national and organizational cultures may pursue related knowledge further on their own by following some of the references provided at the back of the book.

The information management environment

ERP deployment projects are business but not purely technology adoption initiatives. This notion is widely recognized nowadays. However, ERP systems cannot be planned, implemented and operated in isolation of the overall information management environment. Its success is subject to many factors in an organization, of which the state and practices of IT governance and IT infrastructure are also important.

IT governance and business-IT strategic alignment

IT governance is an integral part of corporate governance, and it encompasses such critical issues as seeking opportunities for IT-enabled operational efficiency and innovation, prioritizing and justifying IT investment opportunities, measuring the business value of IT investment, and establishing IT strategies and objectives for an organization (IT Governance Institute 2003). Indisputably, an enterprise's practices and maturity level of IT governance would have a direct bearing on ERP decisions and outcomes. ERP failures in some organizations were not only caused by malpractices at the project management level but were rather rooted in poor decisions resulting from the lack of "fit" between the business and information systems strategies of the organizations.

In Chapter 2, we have seen in the discussion of the strategic intent and objectives of ERP adoption that some companies were driven to ERP endeavours strictly by operational or technical reasons. ERP initiatives with simply operational or technical objectives will very likely yield limited benefits, primarily resulting from increased process efficiency, and reduction in cycle time and manpower following automation. If these are the criteria against which project outcomes are measured, many companies can declare their ERP projects successful.

However, there is little worth celebrating if you only get the abovementioned operational benefits from such an enormous investment. The biggest value of ERP systems lies in its potential to enable new business strategies and to reshape the way business is conducted. Central to realizing this objective is business-IT strategic alignment. The chief information officer (CIO), the chief executive officer (CEO) and other executives in the top management team (TMT) all share the responsibilities for accomplishing such an alignment. A mutual understanding between the CIO and CEO (i.e. CIO-CEO convergence) and others in the TMT is vital for adequate IT investment decisions, and the effective use of IT as enablers of business strategies (Johnson and

Lederer 2003). This requires a trustful and healthy relationship between the CIO and his executive peers and other stakeholders of the company.

The opposite is a situation that is characterized by distrust and hostile relationship between IT and business executives. Such an environment will not be conducive to achieving alignment between business and IT strategies, and making sound IT investment decisions. Willcocks and Sykes (2000) described cases in which business executives by-passed the IT function and approached vendors directly. Vendors, who were eager to sell directly to non-IT executives, often over-promised their solutions and services, and consequently many such projects ended up in significant cost and time overrun.

In reality, some business executives tend to treat the IT function only as a cost centre which engages in expensive projects but seldom delivers value in a timely manner. That is a sign of poor IT governance. I was fortunate (or unfortunate) enough to have experienced such a situation years ago when I was with the Information Technology and Systems (ITS) Department of one of Canada's petroleum giants in Alberta. The project was not about ERP adoption, but about the deployment of an integrated computer-aided design and imaging solution to automate the engineering drawing control practices involving ultimately 600,000 raster drawings to be stored online in large arrays of optical disk jukeboxes. The vendor envisioned a total solution that would revolutionise the business workflows of engineers, draftsmen, and the reprographics department for "quantum leap" productivity gain (in the words of the vendor's vice president of sales). This was indeed a very brilliant proposal.

All along, the IT function in this petroleum company was not known for timely service delivery and customer satisfaction. The engineering department with the support of the vice president of technology dealt directly with the vendor this time. The proud engineers were all too keen to keep ITS away from the project. They outsourced the project to the vendor, and hired a few senior IT advisors from consultancies to help them. After bathing in rounds of publicity at national media for this large-scale project and breakthrough technology, they gradually found themselves in very difficult situations. Users participating in project activities and later in testing were unhappy and raised many concerns. The vendor failed to deliver a usable solution in a timely manner. It was not only because of the gaps between what was promised by the vendor and the company's business requirements, but also the fact that this error-plagued software system was very unstable that resulted in so much resistance and many concerns from users. This was the first site in the world to implement the immature solution, and our users were there to

debug the component systems for the vendor. The vendor was eager to have this system accepted, put into production, and got paid as soon as possible. They promised to fix the outstanding bugs later after production.

The engineering project management team soon became divided in the face of major system problems and embarrassment after the initial celebratory media publicity around project kick-off. Some of them listened to users' concerns while others wanted to just wrap up the project in a low profile and to address the outstanding issues after system acceptance. The external IT consultants were very unhappy when their opinions and criticism of the system and the vendor's project management practices were either ignored or suppressed. They quitted and the consultancies refused to send replacements to this problematic project.

The engineers were leery of ITS' ability and intention, and continued to keep ITS assistance out of the project. It was only after rounds of political manoeuvring, and because of the pressure from the top to save this project that the engineering project management team agreed to my secondment to the project as an advisor. It was an uphill battle for me during the first several months with them. It took me a tremendous amount of efforts and time to build the trust and rapport with the project management team, and to convince them that the concerns of our users were valid. At that point, I got their support and agreement not to accept the system until all the critical issues were resolved.

After the repeated delays of project milestones, and of course, our payments, we had the honour of having a breakfast meeting with the founder and CE● of the vendor in its USA headquarters. Surely, we trusted the CE●'s serious commitment to address the problems when he said he wanted to resolve all the outstanding issues and did not want to see us back there again. I was put on the hot seat when the CE● asked about the person who was responsible for assessing system quality and making system acceptance decisions. "Chuck," said the project director and project managers unanimously after a few seconds of silence. ●f course, we professionally followed the mutually agreed upon user requirements and generally accepted quality assurance practices in evaluating the system. Eventually, we managed to put pressure on the vendor to address most of the fixable issues after paying a heavy price for the lesson: an eighteen-month delay to system roll-out, extra project costs, and a disappointed and disillusioned user community.

This is a good lesson for failed IT governance, and IT-business partnership. Had the engineers co-operated with the IT function in project planning and management, they might have avoided or at least mitigated much of the pain. In many circumstances, the IT leadership of this

company failed to understand and to act proactively as an advocate for business needs. When ITS took a passive approach, and put up with such an enormous gap between ITS and the stakeholders, in terms of IT-business relationships, and perceived business needs and strategies, we should expect more roadblocks stopping us from achieving the goal of using IT as an enabler of business efficiency and competitive capabilities.

In the case of this petroleum engineering drawing control project, the trust and appreciation of my contribution (as a representative of the ITS department) came a little late from the engineering leadership and users although I felt very happy to be eventually accepted and respected by them. However, I cannot stress enough that strategic alignment and partnership should not only be the efforts of a few enthusiastic and dedicated persons at the working level. What I did in this assignment was primarily not an effort of strategic alignment, but rather an effort to provide a professional service that helped fulfil project goals, and concomitantly contributed to a favourable IT-business relationship.

Business-IT strategic alignment should begin from the top with mutual trust and frequent interaction among the IT and business executives. It should also be accomplished through a systematic non-ad hoc approach, drawing proactive participation from the IT and business leaders to set the directions for the company, and co-operation from the talents working at all levels of the organization. That is what should be practiced in any company when it advances towards the higher levels of computing maturity. Appendix A shows the IT governance maturity levels defined by the IT Governance Institute (ITGI). The model was adopted and revised by ITGI for its Control Objectives for Information and related Technology (CobiT) framework on the basis of Carnegie Mellon University's Software Engineering Institute (SEI) Computing Maturity Model (CMM) (IT Governance Institute 2007).

In order to achieve an adequate degree of business-IT strategic alignment, a number of measures can be taken. According to the survey conducted by ITGI of two hundred and fifty-five non-IT executives in twenty-two countries, fifty-two percent of the respondents involved business management in IT decisions, forty-three percent held regular leadership meetings on IT for the purpose of strategic alignment, thirty-seven percent relied on an IT strategy committee, twenty-four percent established an IT alignment committee, and twenty-five percent used external consulting services (IT Governance Institute, 2009). Please note the survey allowed multiple responses for this question.

Many companies position the IT leadership as part of the TMT to minimize the distance between the CIO and the TMT in order to improve

the likelihood of strategic alignment. Issues concerning CIO-CEO convergence and the seniority of IT leaders will be revisited when we discuss organizational and cultural factors later in this chapter.

ERP is a colossal business solution often involving drastic organizational and process changes. Although it is a business initiative, surely the CIO and his IT function still have a critical role to play. When sound IT governance prevails in a company, the IT and business leadership works closely and visibly together as partners to define strategies and objectives, and to promote the enterprise-wide initiatives. The CIO needs to be knowledgeable about the strategic business priorities, and to establish IT priorities accordingly, while the senior business leadership serves very critical and highly visible roles as executive sponsors and champions for the ERP projects (Willcocks and Sykes 2000).

IT infrastructure

In the following paragraphs, we shall look at the issues concerning the IT infrastructure of a firm, and understand how it would affect ERP deployment.

IT infrastructure encompasses a wide spectrum of components such as networking systems, servers, desktops and mobile computing devices. Also bundled with these facilities are the operating systems and software that control such devices. Examples include the network backbone, local area networks (LAN), routers, application and database servers, and web portals of a company. This is a narrower definition of IT infrastructure, which focuses on IT facilities (i.e. hardware and software).

However, the list does not end here. Added to the preceding tangible facilities are such elements as data resources, procedures and standards, IT planning and management practices, quality management practices, documentation, and the expertise and services offered by the IT function to maintain such tangible components, and to support the user communities. It should also include the IT function's ability to continue to acquire and utilise new knowledge and facilities, and to offer training to prepare IT and non-IT personnel to make use of such facilities in conducting business activities. How solid, consistent, and comprehensive a company's IT infrastructure is often reflects its level of maturity in information management.

Broadbent and Weill (1997) defined three layers in their conceptual model of IT infrastructure (as shown in Figure 4-1). The lowest layer, labelled "IT Components", consists of such components as computing and networking facilities which generally are commodity products that can be

acquired from the market if funding is available. In the second layer, labelled "Human IT Infrastructure", are people with knowledge and expertise who maintain and support the IT components. A company's expertise to support, maintain and utilise these facilities requires careful planning, recruitment, and training. That explains why some companies are able to put these facilities into productive and strategic use while others are not. The third layer, "Shared IT Services", encompasses a comprehensive set of shared services made possible by the elements of the first and second layers. In their research, Broadbent and Weill (1997) identified twenty-three shared IT infrastructure services. Of these twenty-three services, those pertaining to communication network, messaging, security, IT architecture and standards, and disaster recovery planning are categorized as core services, critical to a company's business operations.

Likewise, Weill and colleagues, in a later research, identified and grouped seventy IT infrastructure services into ten categories, namely channel management, security and risk management, communication, data management, application structure, IT facilities management, IT management, IT architecture and standards, IT education, and IT R&D (Weill, Subramani, and Broadbent 2002). For the sake of brevity, I do not elaborate on the seventy services in these categories. Please refer to Table 4-1 for examples of IT infrastructure services.

Generally speaking, there is not a uniform definition for the composition of IT infrastructure. However, many consultants and researchers favour the broader definition, and they generally converge on the most important characteristics of an IT infrastructure. Needless to say, a modern IT infrastructure provides an enterprise with the foundation that connects its organizational units with the external world, supports common business processes, and enables innovative business practices. Furthermore, it must be flexible and agile to adapt to business changes, and to enable the strategic goals of the enterprise. Thus, many consultants and academics regard a well deployed IT infrastructure as the source of competitive advantages of an enterprise.

Residing at the top layer of the pyramid of Figure 4-1 are enterprise applications such as ERP systems which will operate reliably and efficiently only if they are supported by a solid IT infrastructure. Together with the infrastructure described by Broadbent and Weill (1997), these business applications automate work processes, enable innovative business practices, and support information integration and sharing across the enterprise if they are utilized properly. In Ross and colleagues' words, the IT infrastructure, applications, and processes form the "solid foundation for execution" for the enterprise (Ross, Weill and Robertson 2006).

A stable foundation for business execution is a critical state an enterprise must establish to co-ordinate its economic activities. It enables or enhances information transparency and accessibility, and engenders additional IT and business capabilities. In the execution, coordination, and control of economic activities, staff and managers require an adequate amount of timely and accurate information to cope with uncertainty (Galbraith 1973). The use of information technologies and application systems (such as an ERP) would help to fill the information gap faced by the various types of personnel involved in business processes. This ability to share information is important for the execution of business processes within an enterprise as well as across the value network.

ERP adoption and the information management environment

Thus, ERP adoption and operations must not be viewed in isolation. A holistic approach to ERP adoption calls for a broader perspective. Therefore, a company's ERP readiness and competency level must be examined up front together with other contextual factors, such as those concerning IT governance and infrastructure. When planning for ERP adoption, it is necessary to assess the general information management environment of the company to make sure that it is conducive for successful project and operational outcomes. For instance, we need to examine the strengths and weaknesses of a company's technical architecture, such as the capabilities of its network, and other hardware and software platforms. Are the current platforms adequate to support the performance of high volumes of ERP transactions? Are there other critical applications that would compete with the ERP for limited network bandwidth? Does each of these components have sufficient capacity? Do they need an upgrade in order to support the ERP?

Recall that we listed both system development environment, and data management as critical success factors for ERP adoption in Chapter 2. As part of the IT infrastructure, do you have development and testing platforms set up for the ERP project? Are there any budget and technological constraints for maintaining and enhancing these platforms? Bear in mind that these are important elements not only for the ERP implementation phase but also for the long run. In addition, how good is the quality of the legacy data and systems in the company? How would these two elements affect the quality of the new ERP system? These are the questions every project manager has to ask for their ERP initiatives. Likewise, he should make an assessment of many more related issues, for instance, the practices and competence of the company in IT management,

data management, and quality assurance, and the availability of standards and guidelines for these areas.

However, such an assessment should not be confined to the internal IT infrastructure of an enterprise. Rather, it should extend beyond the boundary of the company. If you are planning for a regional ERP project that spans across multiple geographic locations or countries, it is advisable to understand the internal and external strengths and constraints in each of the locations. For instance, it makes sense to examine the availability of the skills, and network bandwidth required by the ERP system in some countries. While I shall postpone the discussion of skills and human resources to the next chapter, I need to stress here that a company's own IT infrastructure is constrained by the state of the public infrastructure in the external environment.

As the ERP system is the lifeblood of a company's online transaction processing, imagine what would happen if the company has only very limited network bandwidth in some geographic locations. It is often an enormous challenge for the companies that operate across different countries, which are unfortunately not equal in information and telecommunications infrastructure development. This is a fact of life. For instance, cosmopolitan cities in Asia are very likely strong in telecommunications infrastructure, while the second and third-tier cities often lag significantly behind the first-rate cities. Throughout my career in IT management, my users in Shanghai, Taipei, Hong Kong, Singapore and Sydney were usually happy with network and ERP performance, but those in less advanced locations often had to put up with slower response time. China is a good example for such challenges. In major cities near the coast such as Hong Kong, Beijing, Shanghai and Tianjin, you may find very solid network infrastructure services offered by telecommunications bureaus that are comparable to those available in advanced countries. By contrast, some of the second and third-tier cities in the interior of the country may be less advanced in telecommunication infrastructure. Consolingly, everything is changing fast there, because the Chinese government allocates a huge budget annually to improve the country's infrastructure. Therefore, you may find the most modern optical networks developed very recently in some Chinese cities while some locations are still in a more primitive state.

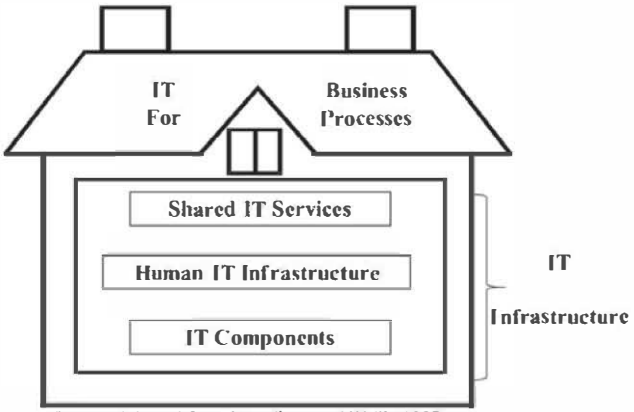
Many years ago when I worked as a director or chief information officer leading the Greater China and Asia Pacific IT operations for multinational firms, I was astounded by the naivete of my peers located in west Europe and North America. About fifteen years ago, one of the global hi-tech firms I worked for decided to deploy Scopus, a helpdesk

and problem database solution, to its operations across the world as a strategy to improve customer support services. One of the major features of this product was to capture and disseminate information about the problems and resolutions of user support requests submitted by customers across the world. The information captured in one location would be replicated to the databases in other locations at regular intervals. My colleagues at strategic business unit (SBU) headquarters in USA would find it relatively simple to fulfil its networking requirements given that T1 lines (which transmits 1.544 megabits per second) were available for subscription in advanced countries, and all data replication would be set to take place during night time. Unfortunately, it would be our business hours in the Asia Pacific region when data replication occurred. Another insurmountable hurdle was that network bandwidth was so limited in many second-tier cities in China and neighbouring countries at that time. T1 lines were not available in many of such locations then, and we were quite happy to have connected many Chinese offices with 256 kbps leased lines, a major upgrade from 56 kbps. Our network upgrade plans were constrained by the public infrastructure of those locations. Such a global helpdesk solution would doubtlessly compete with our ERP system for the limited network bandwidth we had at that time. I had to spend a considerable amount of time to "enlighten" my peers present in one of our quarterly global IT leadership meetings on the reality in Asia.

You may find similar situations in many developing countries. The developing world is a heterogeneous community that always poses enough challenges for the most experienced and confident IT manager. In the last decade or so, many developing countries such as Brazil and those in Asia have made considerable strides economy and technology-wise. However, don't be surprised to find situations in which you have to struggle with primitive public infrastructure. Remember not to take everything for granted if you want to be successful in your international assignments.

In planning an ERP project, always make an assessment of the strengths and constraints of the internal and external environments that may affect project outcomes, and take measures to mitigate or remedy the weaknesses. Note the situations imposed by the external environment, which may be beyond the ability of your organization, and manage the expectations of your stakeholders accordingly.

Figure 4-1 The Elements of IT Infrastructure



Source: Adapted from Broadbent and Weill (1997)

Table 4-1 A Subset of Shared IT Infrastructure Services

Examples of IT Infrastructure Services	
Adapted from Broadbent and Weill (1997) and Weill, et al. (2002)	
1.	Provisioning enterprise-wide and business unit communication networks and messaging services.
2.	Establishing and enforcing IT architecture standards (e.g. for hardware, operating systems, data, and communication).
3.	Managing security, and disaster recovery planning services.
4.	Conducting strategic IS planning for business units and the whole enterprise.
5	Providing consultation, training, and support services on IT and systems, and data management.
6.	Administering business unit and enterprise-wide data processing facilities, databases, and applications.
7.	Administering enterprise-wide and business unit networks (e.g. LANs and WANs).
8.	Establishing common system development standards and platforms.
9.	Providing information systems project management services.
10.	Providing applications development services (on a chargeback or contractual basis).
11.	Managing suppliers of IT products and services.
12.	Providing and administering online/EDI linkage to suppliers and customers.
13.	Developing and maintaining multi-media operations (e.g. videoconferencing).
14.	Conducting research and testing on new hardware and software technologies and products.

Cultural and organizational factors

Impacts of national and corporate cultures on ERP adoption

National culture refers to a collection of norms, values and beliefs that are commonly shared by the members of a society whose thinking, feeling and behaviour are subject to the influence of such societal characteristics. Organizational culture is inevitably affected by national or societal culture as its members are drawn from the society (Danisman 2010).

We need to bear in mind that ERP adoption may not be immune to the influences of such cultural forces. ERP suites are based on the "best practices" defined by the producers. Thus, these practices are likely affected by the norms, values and beliefs of the societies where the ERP designers and developers live, for instance, USA and Germany where Oracle and SAP ERP products are produced. When a company decides to adopt an ERP product, it may also mean that it has to cope with the impacts brought about by the product on its corporate culture and business processes. The incompatibility between the culture of the company and what is represented by the ERP product will likely trigger resistance from the members of the company.

On the other hand, multinational companies may find it more difficult to deploy an ERP product across its operations in different countries. Some ERP researchers are well aware of the challenges of implementing ERP systems across countries (Gulla and Mollan 1999). Warren (1999) indicated that ERP projects in North America realized a higher success rate than those in Europe because the latter needed to deal with more challenges arising from the complex and diverse national and corporate cultures of various European countries.

I can surely relate empathetically to the challenges of deploying ERP systems across a region of heterogeneous countries, and managing stakeholders and project team members of very diverse cultural background. Just take a few seconds to think about the situation of the Asia Pacific region and to look at the cultures of some countries, say, China, Malaysia, the Philippines, and Australia. It is not hard for readers to agree that this region is even more culturally diverse than Europe. Therefore, the ERP challenges faced by any multinational company operating in the Asia Pacific region must not be underestimated.

Organizational behaviourists have underlined, since decades ago, that remarkable differences exist between Western and Eastern cultures. Asian cultures are more oriented towards high levels of collectivism, power distance, and uncertainty avoidance, while Western cultures are at the

opposite ends of the spectra (Hofstede and Bond 1988). Often the influence of such cultural norms and values manifests in corporate culture, management styles, business practices, and even investment priorities. For instance, Chinese executives, being under the influence of Confucian values, would be noticeably different in leadership styles from their Western counterparts. Selmer's (1997) survey of Chinese middle managers working for foreign multinational companies in Hong Kong discovered that Chinese executives were perceived by the respondents to be more autocratic than their Western bosses. It was also pointed out by Li (1999) that many Chinese managers were less eager to take on initiatives, less participative in making decisions, and more hesitant in expressing opinions for fear of offending their superiors. Similarly, Davison (2002) indicated that Chinese employees might be less eager to assume decision-making responsibilities than their Western counterparts. These characteristics of Chinese managers and employees seem to be not conducive to business process redesign and ERP implementation, which require the active involvement of the business and functional units of a company (Weston 2001; Davison 2002). The findings of these studies coincide with my observations in international firms operating in the region. On one hand, the Asia Pacific operations are under the influence of the corporate culture and business practices of the parent headquarters. On the other, local culture often affects the behaviour of both senior decision makers, and individuals at the working level.

The effects of national cultural forces on corporate culture, management styles and business practices are obvious in state and privately owned enterprises in the Chinese mainland, and even more conspicuous in family controlled firms in Taiwan, Hong Kong and other parts of Asia. I would like to direct your attention to Chinese family controlled or dominated firms in Asia since a large number of business conglomerates there are owned by wealthy Chinese families. Some studies conducted in the region revealed that the leaders in Chinese family-dominated enterprises were paternalistic. Thus, Yu (2001) pointed out that Chinese business leaders would expect obedience from sub-ordinates, and their decisions not to be challenged. Li (1999) also described Chinese corporations as flatter in organization structure with autocratic senior leaders taking control of many aspects of the firm directly. This observation coincides with Carney's description that Chinese companies "made little use of organizational structures", and "[had] lower degree of role specialization and work standardization" (Carney 1998).

In short, it may be fair to say that Chinese managers tend to put more emphasis on person-to-person relationships, flexibility and discretionary

power but less on standardized practices and processes that are valued by executives of a Western background (Martinsons, and Westwood 1997). Furthemore, it is obvious that the business leaders of Chinese family-dominated firms are more frugal and have a lower propensity to invest in infrastructure and human resources development for the longer term. They may be more complacent with the status quo, less supportive of organizational initiatives, and often reluctant to invest in IT and ERP for improving business operations through information integration and sharing across organizational units (Martinsons, and Westwood 1997; Carney 1998).

The norms, beliefs and attitudes of the people leading or working for these firms may have a lot of bearing on their ERP initiatives. I would like to examine the impacts from several perspectives. First, the executives in Chinese family-dominated firms may have a very different understanding than their Western counterparts about the objectives of ERP adoption. Instead of using an ERP for enhancing information sharing and visibility, they may lean more towards using the system to control the company (Martinsons and Westwood 1997). Just as Schein (1994) said, a firm under authoritarian (Theory X) leadership would incline towards using information technology as a tool for surveillance and control. Second, Chinese executives and managers incline to treat business transaction data as a personal asset instead of as a company resource (Davison 2002). They would selectively share it with the members of their in-groups. Thus, business information is used as a source of power (Coombs, Knights, and Willmott 1992). I believe that the prevailing practices of information sharing in those firms may also become an obstacle to the successful deployment and effective use of ERP systems, limiting the degree of innovative business practices and processes improvement. Third, managers and employees alike in Chinese family-dominated firms generally have a higher degree of reliance on paper reports for controlling purposes. Such an inclination would often manifest itself as bureaucratic business practices, inefficient paper-ridden processes, and resistance to business process redesign. Obviously, there exists a huge discrepancy between what ERP is designed for, and the corporate culture and business practices of some of these firms. Such a discrepancy or misfit would give rise to many types of undesirable behaviour among employees (such as anxiety, resistance to process and technological changes, rejection of the ERP system, and avoidance of responsibility), consequently reducing their incentive to innovate (Schein 1994), unless the situation is remedied by education to prepare the stakeholders for the ERP.

I have deliberately selected the Tradeco case study (Chapter 9) for this book to illustrate the abovementioned problems. The company under study was in transition from a family-controlled SME, listed in the Stock Exchange of Hong Kong, to become a subsidiary of an American multinational when the study took place. The company's leadership and the composition of its workforces were largely intact despite organizational changes were looming following the takeover. It therefore offered a valuable opportunity for the researcher to understand how corporate culture affected ERP deployment and business process changes. One of the major problems reported in this case study concerned the concept of data ownership prevailing at the various levels of the firm. When managers and employees believed they owned all the business data generated by their sales transactions, they were reluctant to share it with other teams. This attitude created obstacles to business process improvement, and led to the overuse of ERP features to enforce data security.

The Tradeco case study reported only a subset of the information collected by the overall research project. In fact, I have observed quite a number of problems existing at the higher levels of the firm that showed how unprepared the firm was for an ERP. Many of these observed problems were very likely accountable for the failure of the firm's first ERP project. In general, the whole organization lacked knowledge and skills in ERP adoption. The executive team only showed limited support for the project, and the users were resistant to the attempts to redesign business practices and processes. Participation in steering committee and other working meetings was low.

The abovementioned problems may sound familiar to readers. They recurred in many poorly managed ERP projects. But the biggest mistake made by Tradeco was the purchase of an ERP product which did not fit its business requirements. Originally, the ERP evaluation team, consisted of managers and staff from MIS, finance, logistics and other departments, had their own recommendations after comparing several products with Tradeco's business requirements. Much to the dismay of those involved in ERP evaluation, the managing director (MD) signed a purchase agreement with another vendor without consulting them. Unfortunately, there were huge gaps between the company's business and process requirements, and the features of this ERP suite. Of the gaps, the most serious was that the ERP product supported only standard costing, but not actual costing required by Tradeco's business operations. The MIS, logistics, and finance managers were upset by the MD's decision, but their boss, the financial director, remained silent.

The real reason for this purchase decision was unknown. According to some interviewees, this erred decision was driven by the MD's intention to become a business partner of the ERP vendor, for instance, in software sales, and hardware solutions in the region. Moreover, the ERP vendor reassured Tradeco's MD that the functionality gaps were fixable and it recommended an ERP consulting firm to customize the ERP to address the gaps. The mistake in ERP selection had dire consequences for the ERP project. The way purchase decision was made by the MD harks back to the cultural issues discussed above. An autocratic and paternalistic leader failed to consider the opinions of his team members in the purchase decision, and key executives in the top management team, for example, the financial director, were unwilling to go against the erroneous decision made by the chief executive.

These true stories point to the need to assess a firm's organizational-cultural factors before ERP adoption.

Effects of seniority of business and IT leadership on ERP adoption

In Chapter 2 and the beginning of this chapter, we have briefly discussed several governance-related critical success factors for ERP adoption, namely, business-IT strategic alignment, and senior management support of the ERP and business process change initiatives. In order to successfully secure the support of the top management team (TMT) and to accomplish an adequate alignment between IT and business strategies, I often advocate to place the IT head at the executive level in the organizational hierarchy (Law and Ngai 2007). That is, the closer the IT head is to the chief executive and others in the TMT the better. The same philosophy is true for those leading ERP and business transformation initiatives. We shall examine in greater detail the relevant issues in this section.

The seniority of the IT leader within an organization is regarded as an important issue in IT and project management. The IT leader is the most senior person responsible for the IT function of an organization, often carrying the job title of IT manager, IT director, or chief information officer (CIO). IT heads in some organizations are positioned under the finance function (Jones & Arnett 1993). They are often just middle level managers.

According to a survey of IT leaders conducted in 1990, forty percent of the respondents reported to the chief operating officer (COO), and a much smaller percentage reported to the chief executive officer (CEO)

(Rothfeder 1990). However, the business world is increasingly aware of the strategic role to be played by IT leaders. According to Law and Ngai (2007), more organizations positioned their IT heads higher in the corporate structure in the recent decade.

In some organizations, IT leaders, especially those reporting directly to chief executive officers, are often members of the TMT. The proximity between the CIO and CEO and other business executives is said to be conducive to enhancing the mutual understanding between IT and non-IT leaders. Recent studies suggested that the proximity among such leaders would result in a higher level of executive support of IT and business process improvement initiatives (Law and Ngai 2007). Therefore, it would be more likely for the IT leader to contribute to the productive use of IT (Li and Ye 1999) and successful competitive strategies (Karimi, Gupta and Somers 1996).

CIOs positioned directly under the CEO are more likely respected as a senior executive, and granted the responsibility to participate in business planning with others in the TMT. This arrangement not only endows a CIO with a formal executive status, but also it creates more opportunities to stay closer to, and to communicate with, the CEO and TMT members. After all, it is the CIO's responsibility for promoting the strategic use of IT for the firm, influencing the executives' perception about the IT function, and establishing a closer IT-business partnership. Breaking down the outdated perception that the IT function is simply a cost centre is an enormous challenge for any CIO (Lucas 1999).

CIOs usually do not have the formal authority over other business executives and functional units. Such a positioning would create opportunities for the CIO to exert informal influence over the members of the TMT. The proximity of the CIO to the senior executives creates for him bilateral communication opportunities to understand business strategies, and to educate them about IT strategies in order to achieve an appropriate degree of convergence between the CIO and the latter (Feeny, Edwards and Simpson 1992; Johnson and Lederer 2003). Rational persuasion and personal appeal are the most effective forms of CIO influence behaviour in soliciting support from the senior management team (Enns, Huff, and Higgins 2003).

Unfortunately, many IT leaders have reportedly failed to obtain the acceptance from their peers, and are considered outsiders to the top management team (Rothfeder 1990; Strassmann 1994). IT leaders with a junior status, or in firms with a culture of informal communications may face more difficulties in communicating with the business executives (Cash, McFarlan, Mckinney and Applegate 1992). Often, a low-ranking IT

leader may place too much focus on handling daily operations, and managing his or her subordinates (Ives and Olson, 1981), but not enough on the more strategic responsibilities. Thus, I concur with other researchers that a formal senior position in the organizational hierarchy would give the IT executive more authority and influence within the organization (Jain 1997; Hambrick 1981).

So far, our discussion focuses on the seniority of IT leadership. The same would be true of the leadership of ERP initiatives. That is, ERP initiatives will benefit from a visibly senior project director or manager, and the support and sponsorship of influential business leaders. Sponsors and champions should be drawn from senior business executives who have the formal authority to commit resources to institute management measures to help the ERP projects, and to command support and co-operation from various stakeholders through using his political influences. Such ability is important especially when the sponsor and project leaders have to mediate between stakeholders to resolve conflicts of interests.

The project organization

ERP projects are very complicated as reflected by the diversity of required skills, and stakeholders. Project success depends tremendously on knowledge contribution and participation from various business areas, and also on the support of specialists possessing various types of skills, such as those in project leadership, ERP modules, business process improvement, and technical infrastructure.

The project organization for an ERP adoption endeavour can be structured in various ways according to the situation and needs of an enterprise as long as it clearly defines roles, responsibilities and authority, and facilitates sound leadership and control, prompt decisions by business and project leaders, and clear communications among all stakeholders of the project. A clearly and reasonably designed project organization will be conducive to the efficient and effective execution of project activities. Often a simpler organization structure may have many merits, for instance, in communications and the escalation of issues. An unnecessarily complicated organization structure or one with too many layers may blur the responsibilities and reporting relationships of the teams and individuals involved, and hinder communications and the escalation of critical issues.

Regardless of how the organization chart looks, one of the most critical success factors is the wholehearted participation by senior management as well as by users in the ERP initiative. The steering committee must be

chaired by senior executives (for example, the managing director, or executive sponsor of the project). Senior executives' lukewarm support has been cited too often as a reason for project failure. Take the first ERP project of Controlco (Chapter 10) as example. The senior executives in this company were reluctant to assume visible responsibilities in the steering committee. For any enterprise-wide initiative, this is an ominous sign which heralds more trouble down the road. It is also an indicator of low organizational readiness for the initiative.

For an ERP project to succeed, it is necessary for every functional and business unit affected to be represented by their senior leader(s) in the steering committee. Never let any of them stay out of the committee as it will damage the overall image of the project, and jeopardize the communications and decision processes. Senior business and IT executives participating in the steering committee must form a "guiding coalition" (Kotter, 1996) and co-operate in many matters such as business strategies, business process changes, and major decisions concerning project priorities and resources allocation. While I say that user involvement is critical to ERP success, visible signs of co-operation and ownership of project goals by the TMT may help influence the rest of the organization towards proper behaviour required for system adoption and innovative business practices.

The organization chart of Figure 4-2 is an example showing how an ERP project may be structured. Residing on the top of the chart is the steering committee, under which are the project leadership team, and individual functional and technical teams. I shall briefly describe each component of the structure before discussing the roles and responsibilities of the team members and participants in the project.

ERP adoption steering committee

This committee is also called information technology (IT) steering committee or executive steering committee. Whatever it is called, it serves a very important purpose for the success of the initiative. It is a forum where executives share their viewpoints, agree on business and IT strategies and priorities, and make decisions concerning business and ERP strategies, and resources allocation. The members of this committee also share the responsibility for championing and promoting the ERP initiative, and securing support from all stakeholders.

It should be chaired by a very influential figure in the top management team (TMT) who has formal authority or informal influence on other

executives. Thus it is often chaired by the executive sponsor of the project, or in some situations by the managing director or CEO.

Together with the senior business executives, the CIO and other senior leaders of the IT function should be present in the committee. If the project requires outsourcing arrangements involving either the ERP vendor's consulting units, or other service providers, the senior leaders of external consultants should be represented in the steering committee too.

Project leadership

An ERP project can be run by one project director or manager. In large-scale projects, more than one project manager may share the responsibilities with a more senior project manager or director. In such a situation, the roles and responsibilities of the project managers must be clearly defined. In some enterprises, a formal organization structure called the project management office (PMO) is established to undertake the responsibilities of project management.

The members of the project leadership team (or PMO in some enterprises) can be selected among internal senior information systems personnel, business managers possessing project management skills, or external consultants. In some situations that heavily involve services providers such as system integrators or ERP consultancies, the senior leaders representing these external agencies on site should also be included in the project leadership team.

The project leadership team plays pivotal roles, and carries very critical responsibilities in an ERP project. Project managers provide leadership, define schedules and milestones, and control the resources and operations of the project. They also form an important link between services providers, the users and leaders of individual organizational units, and the executives of the company. Their responsibilities are cross-functional, and therefore, they need to possess competence and experience in multiple skill areas. As in any enterprise project, they must be able to handle the challenges of managing stakeholders' needs and expectations. In fact, their contribution in this area is very critical to forging a positive and co-operative relationship with stakeholders, and to accomplishing favourably perceived project outcomes.

Functional teams

Each of these functional teams represents a business area and a set of ERP modules to be deployed. As shown in Figure 4-2, the finance team is

responsible for the finance modules, the supply team is responsible for the inventory and procurement modules, and so on. The leader of each team is responsible for the delivery of a solution that fulfils users' requirements in system functionality and business processes. The challenge requires an open mind to innovation, and a combination of business skills, and experience in processes improvement and ERP functionality. The incumbent of this position can be an internal person, a consultant from the vendor's consulting unit, or an independent consultant.

Under the functional team leadership are functional experts who may carry the titles of business analysts, systems analysts or functional specialists. They are competent and experienced in business processes and ERP configurations. In addition to the functional specialists recruited from consultancies, it is necessary to include internal functional experts in the team. These internal experts are knowledgeable and experienced in their own functional areas such as financial, and supply management.

Another source of internal staff is system or business analysts from the IT function who work side by side with the first two types of experts. This is a usual and necessary arrangement for knowledge transfer to prepare internal staff for the post-implementation phase. Having internal functional experts and MIS staff work with external consultants also serves practical and psychological purposes. External consultants bring with them knowledge and best practices from other organizations while their internal counterparts are familiar with the firm-specific business model, business requirements and cultural issues of the company to make sure the resulting solutions are compatible to reality. Solutions that are compatible to the culture of a company will secure buy-in from users more easily while incompatible solutions may be rejected or abandoned in a short period of time

Data management team

The data management team leader and analysts are responsible for the data requirements of an ERP project. They must be knowledgeable about the business and data models of the company, and the data required by the relevant business processes. Apparently, they must be capable of working closely with other functional experts and end users.

The responsibilities of these data experts are multi-fold, including defining data conversion strategy for the production ERP instance, and enforcing data quality standards. In some circumstances, the data team has to invest much time and effort in resolving inconsistent data definitions of legacy systems to prepare for commissioning the ERP system. Often

legacy data needs to be cleaned before migrating to the production database of the ERP system. In such cases, the data team has to work with the functional areas to sort out inaccurate, incomplete and obsolete data items, and to determine how much of the transaction history needs to be migrated to the production system. The team also performs data mapping between the ERP and other systems if integration between such systems is required.

The contribution of this team may not be confined to just one project. Their work, such as data definitions, models, and standards may also have an important bearing on corporate data management.

Technical team

This team comprises various types of technical experts, who develop and maintain the IT infrastructure which serves as the foundation supporting the ERP and other related systems. For instance, network specialists, database analysts and administrators, programmers, and operating systems experts are usually important members of this team. In some project organizations, other types of professionals may also be found, such as those who are skilled in quality assurance tools and methods. The team depends on the internal resources of the IT function, but in some circumstances, it also hires contractors and external consultants from service providers. Figure 4-2 shows one team of technical personnel being under a team leader for the ease of co-ordination while other firms may choose to group specialists of different types of skills into separate teams.

Although they are not ERP or business processes experts, the members in this team provide services that are critical to the maintenance of a supportive environment for the project, and to the operation of the development and production ERP instances. They also contribute to planning and implementing the transition to the new ERP environment. Moreover, this team is responsible for computer programming such as developing the scripts for data migration and the interfaces between the ERP and other systems if integration is needed.

Roles and responsibilities in typical ERP projects

We have examined in the preceding paragraphs the roles and responsibilities of many key players in an ERP project organization. At the executive level are sponsors, the CIO and other executive steering committee members representing the various functional and business

units. One or more executives may assume the champion role for the project. Under the steering committee are project managers and team leaders, internal and external functional specialists, data analysts and technical specialists of various skills. In addition, there are a few more roles that deserve our attention.

Process owners and other users

I emphasized many times in the previous chapters the process-oriented approach for ERP projects. By this approach, the focus is placed on the end-to-end processes that carry out the business of a firm across organizational boundaries. As one of the measures taken to realize this approach, key users are appointed as process owners and assigned the responsibilities to manage a business process or a set of processes in which they are highly knowledgeable. They may participate in the project usually on a part-time basis to work together with other functional specialists and external consultants to configure the ERP while they continue to take care of daily business matters of their own organizational units. Just like the internal functional specialists discussed above, they are experts in business practices and processes, and therefore competent enough to analyse and devise improvements to business processes to make use of ERP features.

They also contribute to the development of test cases for system testing, and training materials that are designed to suit actual business requirements. Usually, they assume the responsibility to train users to prepare them for acceptance testing, and for the operational use of the ERP system over the long run. Therefore, they are a valuable resource for companies to develop and retain for the long term.

The members of the project organization would not have enough time and manpower to accomplish all of the tasks. The ERP project would not be successful without the participation of other users who contribute their efforts to requirement meetings, process improvement, system testing and on-going learning to master the ERP features for improving their daily work. Thus, it is necessary to mobilise and secure the support of all users throughout the ERP lifecycle.

Change agents

ERP implementation is often associated with business process changes which in many circumstances are drastic and disruptive in nature. Many ERP projects were reportedly entangled in the resistance behaviour of some users and stakeholders that impeded the execution of business

strategies formulated by company executives. Independent change management consultants may play a productive role in helping company and project leadership mitigate the anxiety of stakeholders caused by system and business changes brought about by the ERP initiative. External change agents are neutral of company politics, and knowledgeable about successful change experience in other organizations. That is why the involvement of external agents in ERP and business transformation projects is recommended by many consultants and researchers.

Though external change agents may contribute to the above-mentioned enterprise-wide initiatives in many ways, their work in some situations could be constrained and compromised for the following two reasons. While they are knowledgeable in their own field, and are usually perceived as being neutral and therefore, aloft of conflicts of interests, the value and effectiveness of their advice could be compromised because of their lack of knowledge about the organizational culture, actual business requirements, and constraints faced by the employees of the client firms. On the other hand, some external change agents may be overwhelmed by their own predispositions, and reject any disagreement and counter-suggestions from the employees as resistance behaviour, blaming their own failures on other parties. In reality, change solutions that are incompatible to the culture, actual requirements, and concerns of the workers who are doing the job daily will likely result in resistance. Such changes will not last long. Thus, the value of internal change agents must not be understated.

Internal change agents in this sense refer to the members of a company who act as catalysts to changes in ERP initiatives. Included in this category are sponsors, champions, internal functional specialists, process owners and others who motivate the stakeholders of the company to support and embrace new ideas, and innovative business practices during and after the deployment of an ERP. Wholehearted collaboration between the external and internal agents will often result in synergy that is much needed to deal with difficult situations.

Project management office

Many business and IT persons have debated over the need for a formal project or program management office (PMO). I am among those who are in favour of such a formal arrangement for any application system project of a significant scale. According to practical experience and empirical data from the field, establishing a PMO is a crucial factor that helps facilitate sound project management, and mitigate the risk of failure for ERP

projects. According to a survey conducted by Robbins-Gioia, only fifty-six percent of the respondents to the survey had established a formal program management office for their projects. Of this subset of respondents, only thirty-six percent said that their ERP implementation was unsuccessful (Robbins-Gioia 2002), a figure which is much lower than the overall project failure rates reported by other surveys. This finding indicates that PMO is a positive contributor to ERP success.

A PMO, reporting to the executive steering committee, is a formal organizational structure that serves as a visible link between senior management, the project teams, and the users. In addition to its contribution to stakeholder management, it may improve the effectiveness and efficiency of project management practices in the following ways. First, it improves project scope management, resources allocation, and requirements prioritization by taking a proactive role in negotiating with stakeholders in order to reach a consensus over critical matters. Second, a PMO establishes a formal means that systematises the management and co-ordination of activities of one or more related projects. In this regard, it develops and publicises project management processes, standards and performance metrics, which will enhance the project management maturity level of a firm. Third, it is instrumental in providing a formal supportive environment for the project(s) by managing project information, and offering training and support services in a systematic manner.

Therefore, organizations adopting ERP systems should seriously consider formally establishing a PMO, which is staffed with one or more project managers and a small number of support staff, such as project co-ordinators, or administrative assistant(s). With the latter undertaking the routine tasks such as co-ordinating with service providers and stakeholders, issuing newsletters, arranging meetings, and managing project documentation, project leaders and specialists can focus on critical tasks with much less distraction. Thus a PMO helps improve relationships and communications with stakeholders, and overall project performance.

While some enterprises establish a PMO for a single ERP project, others treat it as an enterprise-wide organizational unit that manages all projects and project management resources. In the latter situation, project management processes, methods and standards developed and promulgated by the PMO will benefit the enterprises in many aspects.

Figure 4-2 An Example of Project Organization for ERP Adoption

Stakeholder and communications management

ERP initiatives often require enterprise-wide improvement or transformation at the process and organizational levels. Consequently, many people inside and outside the organization are inevitably affected. In many situations, looming and actual changes to the status quo will likely cause anxiety, and resistance among those affected unless their interests and feeling are managed properly. Thus, stakeholder management, and communications management are two very important elements of successful ERP project management. The efforts in these two areas should not be limited to the timeframe of the implementation phase. Plans for managing stakeholders and communications need to be established early in the planning phase, and updated on a regular basis during other phases of the full ERP lifecycle. Following the holistic approach espoused by this book, I would like to remind everyone that stakeholder and communications management should be practiced throughout the lifespan of the ERP.

Stakeholder management

Most companies perform some sort of informal assessment of their stakeholders in ERP planning, while fewer firms conduct systematic and comprehensive studies of their stakeholders. I shall not say that formal full-scale assessment is a must for organizations planning for ERP projects. Which approach to take depends on many factors, namely, time and resources available, budgets, the complexity of the projects, and the internal and external environments. Project leaders should consider these factors and determine how thorough their effort should be. However, I need to underline the importance of stakeholder management because some firms suffered tremendously from ERP failures when the needs, opinions, and feeling of stakeholders were not managed properly.

Early in the ERP lifecycle, it is necessary to conduct a stakeholder analysis of those who are likely to be directly or indirectly affected by, or who may have influence over the project. Direct stakeholders are those who directly participate in or are strongly affected by the ERP project while indirect stakeholders are those who are outside the project, but may have some influence on, be affected by, or simply be interested in the events and outcomes of the project.

The stakeholders of an organization usually comprise very diverse groups of people or organizations, for example, business executives, business and functional managers, system users, customers, suppliers, and

other business partners in the value chain. In reality, an organization's list of stakeholders can be extended further. For instance, it may be reasonable to include in the stakeholder list people who use the information generated by the system but do not interact directly with the system. The bank processing payroll cheques for a firm can be regarded as an indirect stakeholder because it receives payroll data from the firm's ERP system, but does not participate in the project or use the system directly. Some stakeholders are even more remote from the impacts of system projects. For instance, some members of the society and the media may simply be curious about what is going on in a large organization whose business and project leaders are also eager to disclose project information to the public as in the case of the petroleum firm discussed in the beginning of this chapter.

An understanding of the major stakeholders will help ERP initiatives secure more support from, and minimize the uncooperative and resistance behaviour of the stakeholders. Consider the following real-world examples. When a company making automotive parts in China planned to roll out online sales functionality in its ERP project several years ago, its internal sales teams were leery about the impacts of the system because they worried that their sales orders and commissions would be jeopardized by the online sales channel.

The second case occurred in one of the companies I worked for in the Asia Pacific region. Our strategic business units (SBUs) debated for a long time about selling home appliance products directly to customers through e-commerce. But the plan was put on hold until we have resolved all the critical issues, such as those concerning the standardization of product pricing, and the relationships with our local retailers in the region. Our products were produced in three factories located in Germany, and USA. It would be confusing and disturbing for our retailers and customers if our sales offices in different countries in the region charged significantly different prices for products made in the same factories. The Internet provides retailers and customers easy access to pricing information if it is posted by our websites. Inconsistent pricing across countries would surely create more issues for us. That was a serious problem, but not the worst. The online sales channel would create channel conflicts since it would undermine the roles and reduce the profits of our local retailers in each country. They surely had every reason to resist the threat of disintermediation. We relied so much on their services and customer bases. Thus, we thought twice before disrupting the partnership that we tried so hard to establish over the years. The global e-commerce initiative was suspended until we got a solution for these issues. However, one of

our Australian SBU's by-passed the global decision and hired consultants to build its own sales website. As soon as it rolled out the online sales channel to the public, the retailers in Australia and New Zealand revolted. They said if the SBU insisted on competing directly with them, they would stop carrying our products and direct all their efforts to serve our competitors instead. Needless to say, our Australian colleagues had to scrap the project immediately. This case demonstrates the importance of understanding and managing the needs and feeling of stakeholders. Stakeholders who are supportive of a project should be engaged to contribute effectively to project objectives. Negative stakeholders should be managed to contain their potential threats to the project or to incentivize them to become supporters by instituting measures to alleviate their concerns or to substantially increase their share of benefits resulting from the project.

We should start an ERP initiative with stakeholder analysis. The first step is to identify stakeholders, and their characteristics in light of the project, and to cluster them into groups of similar characteristics. Information can be collected through face-to-face interviews, brainstorming or focus group sessions of key actors, who are knowledgeable of the operations of the company. In order to collect input from a large number of stakeholders, questionnaire surveys can also be used.

Information to be captured about stakeholders includes their formal roles and responsibilities, authority, and informal influence in relation to the organization and project as shown by Table 4-2. It is also necessary to understand their opinions and interests, and the extent to which they will benefit or be affected by the project. From a different perspective, it is also necessary to understand their fears, problems, feeling, expectation, and the extent to which they can affect the project positively or negatively. The abovementioned e-commerce project of my Australian colleagues is a good example for what a group of disgruntled stakeholders (i.e. local retailer/business partners in this case) can do to a project.

While it is necessary to understand the power and influence of stakeholders, unfortunately this is not always possible if the latent influence of some stakeholders is derived from their informal relationships with some powerful people within or outside the organization. Tradeco, a reseller of high-tech office equipment operating in Hong Kong, South China and some Southeast Asian locations, offered a good example.

I had the opportunity several years ago to investigate the problems of Tradeco's poorly implemented ERP. A review of its business processes showed that the roles and responsibilities of its customer services team

were unclear, and partly overlapping with those of the sales and logistics departments. This redundant team added little value to the whole business process, but in some situations created delays and squabbles with the staff of other units. Any rational consultant would recommend restructuring the relevant organization units. In this case, the proposal by the ERP consultants would likely result in radically changing the responsibilities of or eliminating the customer services team. However, the consultants' recommendation to address these issues before system implementation was not adopted, and business process improvement was not accomplished because of the objection from the managing director. While the ERP consultants were outsiders and initially did not understand the reasons behind the rejection of their proposal, managers and employees knew too well that the customer services team leader was in the managing director's in-group. The chief executive was too eager to safeguard the interests of his close friends. Without the support of senior management, no improvement could be made to the inefficient business processes. I shall discuss the problems of Tradeco in detail in Chapter 7 and Chapter 9.

Finally, the information about the stakeholders needs to be documented in a report (i.e. a stakeholder register) with relationship management strategies and recommendations prioritized according to the impacts of the stakeholder groups. For smaller projects, a brief report may be sufficient while in complicated large-scale projects it deserves extra efforts to document the relevant information in greater detail.

Findings from stakeholder analysis are highly useful for project planning. Such information helps project leaders to determine the roles, and degrees of participation by various groups of stakeholders in the project. It also forms the basis for communication strategies. Because of these findings, project leaders will be able to decide the content, mode and frequency of communication that suit the interests and requirements of the stakeholders. An action plan needs to be defined and executed on a regular basis to manage and monitor the stakeholders.

Stakeholder analysis is performed early in a project's lifecycle, but it should not be treated as a once-off task. Stakeholder management should not be treated as static because it is indeed rather dynamic in nature (Assudani, and Kloppenborg 2010). As stakeholder management in a large-scale project is often more complicated, involving many diverse groups, it is not uncommon to find that the initial analysis is incomplete, and more stakeholders may be identified later. Stakeholders' opinions and interests may also vary as a project progresses from one stage to the next. It would be difficult to fully understand all stakeholders up front, and it takes more interactions between the stakeholders and the project team to

uncover their latent needs and feeling (Assudani, and Kloppenborg 2010). Additional information collected later in the project may call for splitting or merging some stakeholder groups. The stakeholder analysis report (or register) must be updated whenever necessary.

Sound stakeholder management should be performed in the early stage of project planning and throughout the ERP lifecycle. It requires not only the information about the stakeholders to be collected and analysed, but also the active involvement of the key stakeholders. Through active participation in project activities, both the stakeholders and project team will benefit. Frequent interaction between the stakeholders and project personnel creates rapport, and enhances mutual understanding between the various parties involved. It helps clarify the requirements, opportunities and constraints faced by all parties. Companies should keep the dialogue open between the members of their business and functional units, and the ERP and IT experts during implementation, and for as long as the ERP system is in operation. The Controlco case study (Chapter 10) identified a formal mechanism at the operational level (i.e. the user requests prioritization committee), which was used by the company to set the priorities for user requests and to allocate precious resources to address issues of high business impact. This committee was initially established following the commissioning of the company's first ERP system to tackle serious system problems. It was a successful instrument that enhanced the relationships between the IT function, and business and functional areas. Consequently, more positive perception about the ERP project and the IT function improved participation and co-operation from users. The mechanism was therefore treated as a permanent organizational structure to facilitate prioritization and stakeholder management during the implementation and post-implementation phases of the company's second ERP project.

Communications management

The output of stakeholder analysis is an important basis for fomulating communication strategies and plans. Key messages, tools, channels and frequency of communications are defined for each category of stakeholders for critical events and as regular communications throughout the project lifecycle. For instance, it is necessary to develop key messages for each type of stakeholders for project kick-off, and system go-live. Leadership and manager communications kits comprising the appropriate messages, tools, and guidelines should be prepared in advance. Throughout the lengthy period of transitioning from the legacy

system(s) to the ERP system, it is advisable to put more efforts on the needs and feelings of the stakeholders who will be negatively affected as a result of business and system changes. Open and timely communication is required to manage them. The messages sent out to stakeholders must be frank and factual. A well prepared set of communication plan and toolkits will doubtlessly help the executives and managers address difficult situations.

An understanding about the roles and influences of the stakeholders of the ERP initiative would help project planners to determine the approaches, channels and frequency of communication. For instance, powerful executives in the steering committee may be updated in formal meetings weekly or once every two weeks on project status and on a summary of project-related critical issues while those not directly involved in the committee may be updated briefly only monthly or quarterly in other executive meetings. Communication about project status and related details among team members will take place even more frequently (for instance, daily or weekly) in formal team meetings, or via email and other project documents. By contrast, other employees of the company who are not directly involved in project activities may be kept informed of the project through newsletters, intranet and email announcements, or informal information sessions (such as "coffee talk" as reported in the Controlco case study). In some situations, the curiosity of stakeholders in the community and journalists may be entertained by news releases at the time of project kick-off and when major milestones are completed.

Concluding remarks

In this chapter, we have reviewed the organizational issues that may affect an ERP project. The attributes of an organization such as the societal environment in which it is located, its corporate culture, its strengths and weaknesses in information management, and the characteristics of its stakeholders need to be assessed in planning an ERP project. Problems and limitations must be addressed, for instance, through providing appropriate education and training to its senior executives, users and various stakeholders, and engaging appropriate internal and external resources in the project, before the organization embarks on the difficult and long journey of ERP adoption. Throughout this journey, the relationships and communications with different categories of stakeholders must be managed properly.

Table 4-2 The Elements of Stakeholder Register

Elements	Descriptions	Example 1	Example 2
Stakeholders	List the name of the individual or organization unit. If it is an organization unit, include unit leader's name.	TMT (Managing Director (Mr. K. Patel) & business executives)	Logistics users (Mr. K. Lea, GM - Logistics)
Attributes	Is it an internal unit or external organization? List the key attributes of the individual and/or the organization.	Internal	Internal; 50 users & 2 warehouses in 2 cities.
Position & Seniority	List the formal position title(s). Describe the seniority of the primary person(s) representing this group.	MD (K. Patel); GM – Sales (A. Wang); GM-Logistics (K. Lea); Director – Fin. & Adm. (E. Tumer)	Team leaders (L. Huang, & S. Starchuk) reporting to GM-Logistics;
Primary Interests, Beliefs & Expectations	Describe the primary interests and expectations of this person or group in light of the ERP project.	Improve customer services & business visibility; reduce inventory, & cycle time	Simplification of data entry; Accuracy of inventory information.
Fears, Problems, & Concerns	Primary concerns, fears and problems described by the stakeholders.	Tight budget; annual amortization of project cost erodes profit.	New system & processes may require extra learning & jeopardize job security.

Elements	Descriptions	Example 1	Example 2
Power & Influence	Describe the formal authority and informal influence of this person/group in relation to the project. Identify unobvious relationships.	TMT of our company; authority over funding & headcounts.	Key contributor of logistics knowledge & experience to ERP processes.
Extent of Potential Impacts	List the potential positive and negative impacts of, and identify project risks for failing to manage this person/group for the ERP project.	TMT commitment critical for user involvement. May lack a consensus on business transformation strategies.	Involvement in BPR is required for successful ERP & BPR
Priority & Recommended Actions	Rank the importance (High, Medium, & Low) of this person or group in light of the project, and recommend actions to be taken.	High; To be engaged in steering committee, and in strategies formulation & decision processes.	High; Supervisors & key members to be engaged in functional team.

CHAPTER FIVE

MANAGING HUMAN RESOURCES AND EXPERTISE

Abstract

This chapter discusses the various types of expertise required by typical ERP projects, and the problems and approaches in managing various categories of human resources, including internal staff, ERP vendors, and third-party external consultancies. As in many principal-agent relationships, external consultants and ERP adopting organizations often differ in their objectives. External consultants focus primarily on revenue maximization, are expensive, and often lack the incentive to master the business practices and processes of their clients over the long run. Consequently, client organizations would suffer if they lack internal expertise and rely solely on external consultants.

Thus, the author espouses a more holistic and proactive approach to managing expertise and training, beginning with workforce planning to align recruitment, and training activities with the requirements of the full ERP lifecycle. That is, human resources should be recruited and trained to meet the needs of the various lifecycle phases from planning to implementation and system operations. This is a multi-pronged approach which avoids relying only on a single source of expertise (i.e. ERP vendor's consulting division or consulting partner), but emphasizes the importance of expanding an ERP adopting organization's portfolio of qualified resources by establishing long-term relationships with independent, large and small, consultancies, in addition to developing in-house expertise.

Specifically, he devotes much effort in this chapter to share his knowledge and experience in ERP knowledge transfer, training, and managing internal and external human resources. He also discusses different measures for improving staff morale, and various kinds of

bonuses that can be used in North American and international project settings for recruiting and retaining critical ERP skills.

Introduction

Many ERP failures are attributable to a lack of capabilities in handling the required tasks of the full ERP lifecycle. The fact that ERP initiatives are complex and therefore require a wide range of expertise makes it difficult for any organization to fulfil the knowledge and skills requirements from its own employees. Consequently, most organizations rely, to varying degrees, on ERP consultants as a source of expertise.

Although ERP vendors and their consulting partners are primary sources of good ERP expertise and have contributed to many successful projects, we often hear negative stories about consultant-led ERP projects that failed to meet clients' objectives. Just in recent years, many disputes and litigations between ERP vendors, consultants and clients were reported in practitioner media (Kanaracus 2013). This tells us that consultant involvement in ERP adoption is not a panacea for all project situations unless the client organizations manage their consultants and other related factors properly.

In this chapter, we shall examine issues pertaining to the management of internal human resources and services providers for fulfilling ERP system implementation and operational requirements. Over the last decades, some firms have suffered severely from lacking appropriate strategies, and internal capabilities for managing these issues. They learned their lessons only after wasting a great deal of time, and financial resources. Usually, they ended up in situations in which they struggled helplessly to stabilize badly implemented ERP installations with limited internal expertise after the departure of the high-priced consultants from their sites.

As ERP adoption is a long journey involving diverse stakeholders, and requiring a wide spectrum of knowledge and skills, it is imperative for client organizations to clearly establish long-term strategies for human resources, and knowledge management to meet the requirements and challenges of the ERP systems. In this chapter, we shall review the mistakes committed by some organizations, and discuss the strategies and approaches for tackling the challenges of managing internal human resources and consultants. We shall also examine the issues pertaining to knowledge transfer between consultants and internal staff, and the different types of training that must be institutionalized to prepare the

various key players to successfully support and productively utilize ERP systems throughout their lifespan.

ERP knowledge and skills requirements

In the previous chapter, we have examined the roles and responsibilities in typical ERP projects. Obviously, it requires a wide range of knowledge and skills to fulfil these roles. For instance, the knowledge and skills pertaining to project leadership and management, ERP functionality, and business practices are critical to ERP success. As previously discussed, the internal and external functional specialists are said to be experts, in ERP features and business practices and processes, who work closely together to configure ERP application modules and design business processes for the ERP environment. Other team members are said to possess the skills in data management, and technical infrastructure that encompasses many types of technologies, ranging from computer networks, databases, and operating systems. The diversity of skills required for ERP projects is obvious.

Boyle and Strong (2006) surveyed one hundred and five IT managers and professionals regarding key skills for graduates of university ERP programs. Table 5-1 displays five categories of key skills which were thought to be critical for university ERP curricula, namely, ERP Technical Knowledge, Business Functional Knowledge, Technology Management Knowledge, Interpersonal Skills, and Team Skills and Knowledge.

Although we need not fully agree with the Boyle and Strong (2006) model, it at least indicates that IT professionals generally recognise that ERP endeavours require a wide range of knowledge and skills. An individual may not have the expertise in all areas, but he needs to possess the skills in several areas. For instance, a functional expert needs to be not only well-versed in the practices and processes of a business area, but also well-equipped with interpersonal skills, and an understanding of ERP features. In my opinion, a few more skills should be added to this list. For instance, some positions in an ERP functional team also call for competencies in change management, and stakeholder management, in addition to ERP product-specific skills.

Doubtlessly, the skills and experience in leading changes, and managing the requirements and expectations of stakeholders are critical for functional specialists and project leaders. Moreover, project leaders need to possess other soft skills that are vital for building relationships with stakeholders, resolving conflicts, and motivating team members and user communities to support the business and technological changes

introduced by the ERP project. A set of knowledge and skills vital for project leaders is listed in Table 5-2. They are derived from a review of the ERP literature. For instance, Kraemmergaard and Rose (2002) identified 9 critical managerial competences, grouped into 3 categories, for ERP assignments. Included in the category of business competence are organizational competence, strategic competence, business processes competence, and project management competence, and in the category of personal competence are leadership competence, human resource competence, and communication competence. In addition, an ERP manager must possess ERP system competence and technology competence which belong to the category of technical competence. A manager may not be skilled in ERP module set-up, but a good understanding of the features specific to the ERP product selected will empower him to become effective in planning, and leading the project.

These are in addition to the generic project management knowledge areas (PMBOK) recommended by the Project Management Institute (2017) which I regard as the basis of competence for any project manager. While some knowledge areas identified by ERP researchers overlap with PMBOK, other areas are unique to ERP engagements. PMBOK stresses the importance of integration management that ties together the elements and activities of other nine knowledge areas. In the context of an ERP project, I would prefer to describe "integration management" as "ERP lifecycle integration management" (as indicated in the Full Lifecycle ERP Adoption Reference (FLEAR) model, Chapter 3). The latter concerns the knowledge and skills for overseeing and co-ordinating all activities across ERP lifecycle phases from ERP planning to system implementation and operations.

Here, I would like to point out a limitation of PMBOK that deserves the attention of ERP professionals. While integration management of PMBOK encompasses the knowledge and activities for change control, we also need to emphasize change management in an ERP project setting (Griffith-Cooper and King 2007). ERP and business process redesign are symbiotic phenomena. That ERP deployment often requires business and processes changes makes change management skills a precious asset for the project team and the organization as a whole. Therefore, we should value the ability to motivate, lead and manage innovative practices at the organizational and process levels, although skills for exercising relatively mechanistic change control over project requirements are still useful.

Challenges in managing ERP expertise

We have so far reviewed quite a number of knowledge areas and skills required by ERP projects. The non-exhaustive discussion given above is meant to show how diverse ERP skill requirements are. It is because of such a diversity in ERP skill requirements that many firms (including ERP vendors and consultancies) today find it extremely challenging to recruit, develop, and retain qualified people.

In the preceding paragraphs, I cited academic research findings to begin our discussion of ERP skill requirements (Boyle and Strong 2006). In fact, many universities and ERP vendors are trying to incorporate ERP education in university programs. For instance, SAP AG has established an SAP University program that assists universities in setting up ERP-related curricula, and facilitates the sharing of experience and teaching materials. Such effort by tertiary institutions and vendors needs to be accorded positive recognition. However, the effect is limited for several reasons which I shall discuss only very briefly. Universities are constrained by the lack of qualified faculty members to teach such courses, and also by the limitation of time. It is almost impossible to set up sufficiently complicated ERP projects in a university setting to emulate real-world situations for students. Neither is it easy for young inexperienced students to comprehend and absorb all the information pertaining to such sophisticated suites of ERP applications within the duration of one or two semesters (for three to six credit hours). However, I shall urge universities and vendors to continue such collaborative endeavours which after all would help students build up a conceptual foundation about ERP for life-long learning and career challenges in the real world after graduation.

That is the problem we face in teaching ERP adoption in universities though our good intention often results in frustration. Let us go back to the real world which is much harsher and our actions are always governed or straitjacketed by the triple constraints of project scope, time and cost, and other business or project-related factors. Because of the complexity of ERP applications, and the wide range of skills required of an individual for performing effectively in an ERP setting, qualified ERP experts are limited in supply in the market. The second problem faced by client firms and ERP vendors is related to the quality of people who claim to be skilled in ERP in the market. For the reasons discussed above, it is really difficult to develop thorough ERP skills, even over several years. Many experienced ERP professionals are only well versed in a limited number of modules of a specific ERP product instead of a large set of modules. As

observed over the last twenty years, I would say that most of the job applicants responding to our advertised ERP-related positions only demonstrated some ERP support experience, and skills in using report writing tools, and SQL (i.e. structured query language). They had only limited ERP application skills. In general, it is difficult to find ERP experts who are thoroughly knowledgeable in ERP module functionality, and application architecture. This explains why the shortage of qualified ERP professionals lingers.

As a result, many firms planning to implement ERP systems are affected. This shortage of ERP skills is said to be accountable for many ERP problems in developed and developing countries, and affects not only client firms but also prestigious ERP vendors such as Oracle and SAP (Wailgum 2008). According to recent reports, even ERP giants such as SAP have difficulties to find enough qualified staff for their projects.

It is hard to recruit ERP talents, but it is as difficult to retain them. The constantly high demand for such precious skills is exacerbating the problem. The turnover of employees of good ERP and IT skills remains high. Many IT directors and managers complain that as soon as their employees have acquired enough ERP experience from their projects, they are poached by head hunters. The widening gap in the supply and demand of ERP skills causes significant increases in salaries and turnover. Rising salary level for ERP skills hits small and medium-sized enterprises (SMEs) particularly hard because they cannot afford to compete with larger corporations for such precious resources in the market (Kanaracus 2008; Waligum 2008). According to researchers, such shortage of qualified ERP personnel is even more acute in developing regions such as Greater China (including Hong Kong and Taiwan) where ERP staff turnover has been identified as one of the major problems in ERP implementation (Xue, Liang, Boulton and Snyder 2005; Tsai, Chien, Fan and Cheng 2005).

Merits and issues of consultant involvement

ERP is just too complicated for most organizations to handle. They do not have enough internal experience and expertise to set up and manage their ERP systems. Moreover, the difficulty in recruiting and retaining talents with critical skills has driven organizations towards external consultancies. In many situations, organizations use the resources of vendors' consulting divisions, or consulting partners. There are also smaller independent consultancies that may help fill the skill requirement gaps.

Some large organizations especially those with a generous IT/ERP budget tend to hire the services offered by ERP vendors, or consulting partners recommended by the former, through total outsourcing or other arrangements. The vendor-only approach has its merits though it is not always failure-proof. Many organizations have experienced favourable project outcomes by outsourcing their ERP projects to ERP vendors. Thong, Yap, and Raman (1994) discovered that the vendor-only approach, involving only consultants from the vendor, was more effective in systems implementation than purchasing the software package from a vendor while hiring consultants from another organization.

Some organizations are less fortunate, and have reported unfavourable outcomes from their consultant-led projects. Although ERP vendors and consultancies are believed to possess a larger pool of qualified resources and a great deal of experience to assist client organizations to realize their project objectives, there were situations in which both parties ended up in disputes and litigations when the clients were disappointed by the consultants' performance and project outcomes. The more recent examples of disputes were the projects involving Deloitte Consulting, Epicor, and their clients (Stedman 1999a; Vijayan 2010; Kanaracus 2013). ERP projects involving consultants are not immune from client-consultant disputes, and failures to achieve project objectives. Consequently, more organizations took control of project management for their software projects in the last decade while they continued to utilize consultants in well-defined tasks (Koch 2002). We shall examine the reasons behind this upward trend of client-consultant collaboration in the following paragraphs.

Problems with external consultants

It is not difficult to comprehend why disputes arise between client organizations, and ERP vendors and consultants if we consider the fact that the former (i.e. the principals) and the latter (i.e. the agents) often possess different objectives. Actions taken by consultants in their professional engagements may be motivated by their own objectives which are not always in the best interests of their clients. Simply put, their behaviour is primarily driven by revenue and profit. Thus, it is not surprising to find that they sometimes engage in opportunistic behaviour, and give out controversial advice unless the clients have the knowledge and abilities to manage and control them.

I have mentioned an example of controversial advice or over-promises provided by the ERP vendor in the Tradeco case study (in Chapter 4 and

Chapter 9) which led the managing director of the company to purchase an ERP product that did not match the firm's business requirements (for example, actual costing). The vendor's sales team understated the difficulty and risks of resolving the ERP feature-business requirement gaps by customization, and consequently Tradeco suffered severely in many respects. Likewise, Haines and Goodhue (2003) documented several examples of inappropriate or unprofessional consultant behaviour. For instance, the consultants hired by Retailco reported project activities that they never performed, while Pumpco's consultants gave its project team controversial advice over training and testing. The consultants working for Pumpco had underbid the project and therefore wanted to complete the engagement as soon as possible. Pumpco managers understood only later why the consultants proposed only limited training for the users, and implemented only negligible amount of testing for the ERP system (Haines and Goodhue 2003).

Another problem that occurs often in client-consultant disputes is the misrepresentation by the consultants of their own abilities (Haines and Goodhue 2003). As Haines and Goodhue pointed out, some consultants might not possess the required skills, and they often learned more from project assignments than they contributed while they were paid handsomely by the clients. Similarly, the ERP vendor's consulting division sent mostly junior consultants to Controlco's first ERP project (refer to Controlco case study, Chapter 10) who were on the phone frequently, to ask for instructions from senior colleagues working for other clients. In this case, the company lacked the knowledge and experience in handling the ERP and consultancies. It costed Controlco dearly because project leaders did not screen the consultants properly in the first place.

Unfortunately, negative experience concerning under-qualified consultants occurred and keeps occurring to many firms. This phenomenon is not surprising at all if one understands that even the ERP vendors are troubled by the shortage and turnover of qualified manpower (Kanaracus 2008; Wailgum 2008). Many years ago and soon after I left industry to become a full time academic, a friend of mine, who was the managing director of the Greater China consulting division of a prestigious global ERP vendor, asked me to help him find some resources experienced in his ERP products. Ironically, this was the same person who visited my office frequently to sell me ERP consulting services when I was the CIO of the Asia Pacific operations of a multi-national firm. It is obvious that no one can afford to have blind faith in any of the ERP vendors and fortunately I learned this early in my IT career. Clients will suffer unless they have the ability to manage their own requirements, vendors, and service providers.

In general, incompetent, but ironically expensive, consultants would do more harm than good to their clients. Again, please be reminded that the objectives of the ERP vendors and consultancies are to maximise their consulting hours and revenues. This is especially true in time and material engagements. That is why I repeatedly stress that client organizations must make the efforts to negotiate for favourable terms of engagement, and manage consultant performance to safeguard their own interests. Many consultants are professionally outstanding, but still no one should have blind faith in them and leave the management of the projects entirely in their hands.

Consequences of inappropriate training practices

Training is often another poorly handled element in ERP projects. Most business and project managers would agree that training should be treated as an important item in ERP project plans. Paradoxically, ERP failures have often been attributed to poor training. It appears that training has ubiquitously been misunderstood, and mismanaged in terms of its targeted audience, scope, and timing (Rutherford 2001; Stedman 1999b). In recent years, business and project leaders began to have a better understanding on the importance and nature of training required by the various categories of stakeholders affected by ERP deployment. This is a positive development in the ERP phenomenon. As a result, many mistakes made by others in the past are avoided. However, some companies, lacking in ERP experience, still fall into the same trap as indicated by the Tradeco case study that I shall discuss below.

Poor training is identified as a major contributor to ERP failures. According to the ERP literature, inappropriate ERP training failed again and again to help project personnel in implementing, and to prepare end users to effectively use their ERP systems. Several common mistakes in ERP training can be identified from the reported ERP disasters. In the first place, some companies did not allocate enough time and resources to training. If they did include training in the project plan, it was often scheduled as the last set of tasks in the project and there was not enough time for proper execution before the "go-live" date.

In recent years, the importance of training to ERP success is gaining more attention and consequently more funding is allocated to it. According to CIO magazine, the industry average of training expenditure is around eight percent of budgeted project cost (Wheatley 2000). This is a positive sign.

The next question to ask is about the types of training that are offered with the funding. One of the common mistakes in ERP training was the mismatch between the content of training and the needs of the audience. Apparently, some companies had devoted their training budgets to the wrong types of training for the wrong types of personnel. When these companies spent generously on technical and standard courses about the ERP products with no reference to company-specific business practices and processes, it yielded very limited benefits for end users. These users would still find it difficult to adapt to the new ERP system environment in spite of the training they went through (Wheatley 2000). Although the standard courses designed by ERP vendors for their products are usually of good quality, they do not serve the needs of the ultimate system users. Instructors from vendor's training organization or other consultancies may be highly knowledgeable about the features of the ERP products, and skilled in delivering such courses. However, if they do not know the business processes of a company, they will be unable to explain to the participants the information flows behind the job steps to be performed by the users of the ERP system. As a result, the users may only get themselves familiarized with the standard buttons, menus and other native functionality of the ERP products when they leave the vendors' training centres. Unfortunately, the knowledge and skills they have acquired from standard training do not help them in performing their daily jobs using the ERP systems of their own companies.

Tradeco learned a good lesson from mismanaged ERP training which had costed it dearly. According to an application team leader participated in the interviews, the company allocated twelve percent of the budget (i.e. approximately US$160,000) to ERP training. When the managing director signed the deal for the ERP software licenses, the vendor also recommended a series of standard courses for the ERP modules selected by Tradeco. With the purchase, the company was entitled to units of training services over a period of time (around twenty-four months).

The first mistake identified in this case study is the nature of training the company bought from the vendor. The vendor's courses were designed to cover primarily the standard features of the ERP modules based on generic business models. The instructors never worked on the ERP project and therefore were totally unknowledgeable in Tradeco's business practices and ERP configurations. Worse still, training was also poorly organized and scheduled. The training sessions were not aligned to the timing of the critical activities of the ERP lifecycle. In order to use up all the units of training entitlement, training was carried on in site as well as in the vendor's training centre well after system cut-off. The vendor made

special arrangements for after-work training sessions in Tradeco's offices. Such brief training sessions lasted about three hours per evening.

Unlike many other Asia-based firms, Tradeco was generous in ERP training. However, the funding was by and large misused. At the end, users were still unprepared for the ERP system. They were distressed and frustrated with the whole ERP environment. Tradeco's mistakes in training were, to a large degree, representative of the experience of many firms which suffered badly from poorly managed ERP projects. Lacking experience in ERP systems, Tradeco never understood its ERP training needs. No assessment and planning for training were made in-house before the managing director bought the training services. Unfortunately, the purchase decision was strictly based on the recommendation of the ERP vendor.

The standard ERP courses might help ERP project team members understand the modules selected by Tradeco if offered in the right time in the project lifecycle. Definitely, these courses had no effect on the users' ability to operate the system to execute their actual business processes. At the end, training activities became a series of short evening meetings that were organized when the company rushed to use up the units of services entitlement before the expiry date. It is not hard to imagine how ineffective these brief after-work training sessions would be when the participants were already exhausted after a long workday. In general, many technical staff and end users were still disgruntled, and talked negatively about the training arrangements during the interviews with me.

A holistic approach for managing ERP expertise

It is obvious that companies would have to find better strategies to fulfil their on-going needs in ERP expertise if they understand the aforesaid problems and challenges. Faithfully and superstitiously relying entirely on the vendor or a single consultancy may not be in the best interests of the clients. In this book, a holistic approach is suggested. It is a more balanced and multi-pronged approach, by which companies would take multiple sources of expertise into consideration when they handle the skill requirements of the ERP lifecycle.

Doubtlessly, it is a good practice for companies to establish long-term relationship with their ERP vendors and consulting partners. However, in order to safeguard their own interests and enhance their bargaining positions, companies should not depend only on these parties, and rule out the expertise of other consulting firms, unless they are satisfied with their services. In the meantime, companies must develop and retain internal

capabilities to manage the ERP systems and service providers through formal and informal training. They should review their own knowledge management culture and practices to decide how the members of their organizations, including both technical as well as business personnel, can be encouraged to engage in knowledge development and sharing throughout the ERP lifecycle. We shall discuss the elements of this holistic approach in the following paragraphs.

ERP-related requirements and workforce planning

Together with ERP planning, workforce planning should be performed to determine the different types of resources required to fulfil the requirements of the various phases of the ERP lifecycle, including the post-implementation stage. Resource requirements in this sense are not limited to only technical ERP resources hired by the MIS department. These requirements should include all types of resources, such as key users, and functional specialists who understand the business processes and ERP features.

When an ERP adopting organization does not have sufficient internal resources, it could recruit such resources from the job market on a permanent or contract basis, or source the expertise from the ERP vendor's consulting division and consulting partners, and other consultancies. Therefore, a proper way to tackle the human resource challenge is to begin with a workforce planning exercise to define the timing for, and the amount of the various types of expertise (or headcounts) required. The information resulting from this exercise will be useful input for the budgeting process.

The multi-pronged approach emphasized in this book is to avoid being overly dependent on any single service provider in order to expand one's options. Avoid putting yourselves in a situation in which you can be easily exploited by a single service provider as a result of your over-reliance on its consultants. In the following paragraphs, you shall understand the rationale behind this approach which many ERP adopting organizations have learned the hard way.

Management of service providers

We already know that ERP vendors and consultancies have their own objectives, the most important of which is revenue and profit maximization. Much to the dismay of the clients, their business and systems requirements may not be rated as the highest in the consultants'

list of priorities. It would be unwise for the clients to rely entirely on their service providers. Doubtlessly, companies need the knowledge and skills of external experts. However, they must also try to acquire the ability to manage them. The ERP consultants and various categories of services providers should be treated only as the elements hired and controlled by the clients to realize the overall ERP strategies and plans.

Inappropriate behaviour is more likely to occur when consultants are placed in project leadership roles, and free of monitoring by their internal counterparts as shown in the CookieCo and PumpCo cases (Haines and Goodhue 2003). Tradeco's being misled to invest generously in the vendor's standard courses about ERP product features is another example of how a company can be exploited by the ERP vendors and consultancies if it does not have the fundamental understanding and ability to make decisions about ERP requirements. Therefore, companies must review their internal competencies in various ERP roles as soon as they start planning for their ERP initiatives. Committing the efforts to compile an inventory list of internal competencies up front is worth the trouble. On the basis of such an assessment, the companies then decide their skill deficiencies to be remedied by external sources.

Starting from the top of the project organization chart, a company lacking competence in ERP project leadership should hire an experienced project manager as permanent staff or on contractual basis. If the right person is not available within the company, it is advisable to second a qualified person from affiliated organizations (for example, subsidiaries of the company) or from a consultancy other than the ERP vendor and its implementation partners.

Hiring a project manager from one more external organization may make project management and co-ordination more complicated. Most importantly, this incumbent will be more likely to provide unbiased advice, and to safeguard the company's interests from the inappropriate behaviour of other consultants. The enhanced ability to manage the ERP vendor and implementation consultants will more than justify the trouble.

Many companies complained that the consultants they hired to implement their ERP had questionable skills. You should not be surprised when the ERP vendor or consulting partners send very junior staff to your site (Koch 2002). In reality, there are not enough well qualified consultants in these organizations to meet the needs of all of their clients regardless of what their marketing teams say. Even ERP vendors have to struggle with the same problems of staff shortage and turnover faced by their clients. In general, the most qualified consultants are assigned to the most profitable large project sites, or those whose project managers are

more knowledgeable and thus have stringent consultant screening standards.

Consequently, it becomes a normal practice for them to train their own junior staff in clients' projects while charging a very high consulting rate. Clients must protect themselves by screening the consultants carefully, checking references of consultant performance with former clients, and rejecting those who fail to meet the experience requirements. Preferences should be given to the consultants, who have project experience in one's business sector, and thus are well-versed in similar business practices and processes. Interview the consultants instead of talking to their sales and marketing people, and list the specific consultants in contract if you have found candidates who fit your requirements. Always insist on your standards, and reserve the rights to reject consultants who are unfit. Moreover, client firms must discuss the arrangements for consultant turnover with the consultancies before signing any contract. Consultancies must guarantee a suitable replacement when consultant turnover occurs.

Managing the consultants is an on-going challenge once they are hired. Clients should monitor their performance and review the quantity and quality of their deliverables on a regular basis. In a time-and-material arrangement, consultants would have less incentive to complete assignments efficiently (i.e. in the shortest time and least expensive manner). Their objective is to maximize their duration of engagement for increased revenue. If their work is not monitored and reviewed on an on-going basis, they may rip the clients off by over-charging or reporting in the timesheets tasks that they never perform, as discovered by a Retailco manager (Haines and Goodhue 2003). In studying Tradeco's ERP project, I found similar mistakes that resulted in disputes later. Tradeco's MIS manager was inexperienced in managing enterprise system projects and consultants. He tried to be on good terms with the consultants and failed to control them. He signed all the timesheets they submitted without reviewing and questioning them. At the end, the ERP project turned out to be a disaster, and business was impeded by a system full of bugs, and inefficient ERP processes requiring excessive manual intervention. The relationship between the ERP consultancy and Tradeco went sour. The consulting bill was as high as US$ 1.25 million which Tradeco refused to pay. Finally, the consultancy threatened to file a lawsuit against Tradeco which eventually decided to pay half of this amount to settle the dispute.

Like Tradeco, many disgruntled clients were negligent in managing their consultants. The likelihood of client-consultant dispute can be mitigated if internal project leaders take project and consultant management into their own hands. Assignments should be clearly defined

with objectives, scope, specific deliverables, and deadlines before they are given to consultants. The latter should be asked to review the scope and objectives of assignments to provide an estimate of hours and counter-suggestions. The process of defining the scope and estimates of work can be a joint exercise which eventually results in mutually agreed requirements. In the future, when the number of actual work hours reported by the consultants significantly exceeds the estimates, they should explain and justify the outcomes. Timesheets and deliverables are reviewed carefully on a timely manner. This practice also creates on-going opportunities for project leader-consultant dialogue to eliminate misunderstanding, to rectify mistakes as soon as they occur, and to deter opportunistic behaviour.

Another type of consulting engagement is fixed priced contract which requires the service provider to assume the responsibility to complete and deliver the system for a lump sum at a specified date. Some client firms and ERP project managers tend to think that it is more difficult for them to manage the behaviour of the consultants in this type of outsourcing arrangements while consultancies may like time-and-material contracts better than fixed priced engagements. This concern may be valid to some degree but there is some misunderstanding that I shall clarify later.

According to some client firms, service providers in a fixed price contract may be more reluctant to interact with their clients as they are driven by project deadlines. The engagements of this type are often characterized by arguments between consultants and clients. Disputes may increase after a brief honeymoon period, and then both parties start pointing fingers at each other. This is especially true when the number of change requests grows in the later stages of the project lifecycle. The clients' requests may be used as excuses by the consultants for the failures to deliver their promises on time and on budget.

However, it must be pointed out that good consultants know too well that they must work closely with the clients to understand their requirements. Through frequent interactions, both parties can discover misunderstandings and mistakes, and rectify them as soon as they occur. That is, the fixed price arrangement should not be allowed to adversely affect such a co-operative relationship between the clients and their service providers. Both parties should always act fairly and professionally. Of course, change control must also be enforced so that the project scope is appropriately controlled. Furthermore, the contract should clearly specify checkpoints which provide opportunities for both parties to review their interim and final deliverables, and to conduct joint walk-throughs together. There should be mechanisms in place for both parties to sort out their

differences and to eventually come to an agreement with each other on project requirements, and the approaches of fulfilling the requirements.

On the other hand, a phased approach can be used to mitigate risks, and enhance the clients' control over their projects. To reduce the likelihood of disputes and delays in project completion, a client firm may divide the scope of a large-scale ERP project into clearly defined smaller chunks (modules) that eventually fit together to form the final system. The consultancy will be appraised for its performance in each piece of these subprojects, and given more work for the next phase only if it fulfils the requirements of earlier phases. This approach of outsourcing will give client firms more control over the performance of consultancies in large-scale projects.

Clearly defining project requirements, and continuously monitoring the performance and deliverables of the consultants by the clients are necessary measures in project management. However, adopting these practices does not mean that the consultants and clients are adversaries. Instead, they should be partners, who maintain a positive relationship and engage in frank and open communication with each other. On-going monitoring, in the best scenario, can be regarded as preventive in nature and is a means to discover and rectify misunderstanding before harm is done. Being frank but insistent on one's project and skill requirements, and keeping the unqualified consultants away as early in the project lifecycle as possible is less costly and painful than allowing errors and disputes to occur later.

The vendor's consulting division and partners are important but expensive sources of qualified consultants. They are in possession of a vast pool of expertise, for which client organizations are competing. Unfortunately, there is often not enough expertise for every client. Thus, it is not unlikely that you would be assigned inexperienced ones if you are not careful. That is why I have to re-iterate that no client organization should limit itself to just a single source of expertise. By shopping around, you may find good consultants from other sources, such as those from smaller consulting firms and independent practitioners. Some of them specialize in a very limited number of ERP modules and often charge a lower hourly rate for their consulting services. Try to establish a long-term relationship to retain such consultants as Controlco did in its second ERP project. In order to tackle the problem of limited supply of qualified ERP expertise, it is wise to expand the supply bases.

Moreover, for any company to adopt the practices discussed above, it must possess some internal competencies in consultant and ERP

management. These are the pre-requisites for taking ERP projects into one's own hands.

Management of internal human resources

We need to bear in mind that managing internal expertise is not any easier than managing external consultants. It is a challenge to develop in-house expertise, but it is equally challenging to retain it. ERP-related skills are precious and highly sought after. To many ERP adopting organizations, developing their own internal staff sounds like an uphill battle. If it is so difficult to develop and retain in-house ERP expertise, why don't they just rely on the ERP vendor or other consultancies? Experience tells us that it is unwise to rely solely on external consultants given the previously discussed reasons. On the other hand, consultants while in possession of a great deal of ERP experience would not understand your business practices and processes as much as your internal staff, although they do bring into your organizations new skills and insights. In fact, there is no incentive for external consultants to become experts of your business practices since they keep moving on from client to client. Thus, the very important task of understanding and continually improving business practices and processes falls on the shoulder of internal staff.

Many ERP projects suffered from the turnover of qualified team members, and doubtlessly, it is frustrating for the business and project leaders. As soon as they have acquired a considerable amount of experience with certain ERP modules, many of them would be poached by other firms or consultancies. That happens to many companies, including mine. However, ERP staff turnover should not be an excuse for refusing to invest in development and training activities. Turnover is natural and it is understandable for competent staff to pursue better career opportunities. I often gave these top performing staff excellent references and was happy to see them move on while at least some of those trained by my budget would stay with my department for a longer period of time. Some of them came back to help my projects as independent consultants years later.

Staff retention and competitive compensation

ERP adopting organizations can do a few things to improve their ERP human resources situations although there is no way to stop turnover entirely. For instance, such organizations may attract and retain qualified employees by:

- offering competitive salaries and fringe benefits;
- providing project-related bonuses;
- adopting a generous training policy;
- creating opportunities for employees to acquire experience from, and apply their skills in a high profile project; and
- offering good career paths.

Project-related bonuses include retention bonus, spot award bonus, holiday bonus and non-cash award. For staff with critical skills (i.e. hot skills), retention bonus will be a useful means to reduce turnover and incentivize them to stay with the project. Upon completion of a critical milestone (for instance, the commissioning of the ERP system), such critical staff will be paid a significant amount of money, and thus they are discouraged to accept job offers from other firms before the milestone is reached (Law 2016).

Spot award bonus and holiday bonus involve much smaller amount of money. Top performing project team members and user participants would be selected and presented a spot award as a token of appreciation. The award usually would be in the amount of US$50 or more. In one of my projects for the Asia Pacific region of an American multinational, each spot award included a cheque in the amount of HK$500 and a certificate of appreciation. Holiday bonus is usually offered in the form of vacation time together with an amount of money to subsidize the staff (and his/her spouse) for a vacation trip. In some occasions, a non-cash award in the form of a certificate of appreciation also helps contribute to the morale and motivation of team members (Law 2016).

ERP consultants and project managers engaging in international project assignments need to take note of the customs and business practices in other cultures. Different bonuses may be used in some countries, and they may have an impact on the retention, and the timing of the turnover of critical staff. For instance, it is a common practice for companies in Greater China, and Chinese family controlled firms in Southeast Asia to give their employees year-end bonus. This is the thirteenth-month pay awarded before the Chinese New Year. Some companies may be more generous and offer year-end bonus that is worth more than one month's salary. As a result, turnover may slow down as Chinese New Year is approaching. Employees usually want to wait and won't resign until after receiving this bonus. In a situation in which a project manager has identified a highly qualified candidate and wants him or her to join the project as soon as possible near the end of the year, be

ready to offer compensation for the candidate's financial loss through appropriate means, for instance, by including a sign-on bonus equivalent to the year-end bonus in the terms of employment (Law 2016).

Motivation and project assignments

Compensation, bonuses, and penalty are extrinsic motivation measures. They are employed to encourage employees to work harder to receive financial rewards, or to avoid penalty. However, they may not be effective in some circumstances.

Let us briefly examine a few fundamental motivation theories and understand how intrinsic motivation measures can be relevant to performance management in an ERP project setting. Abraham Maslow described a hierarchy of individual needs, ranging from physiological needs and safety needs at the lower levels to social needs, esteem needs and self-actualization needs at the top. Likewise, David McClelland, in discussing acquired needs, also pointed out that people have different needs for achievement, affiliation, and power. That means, some employees may be more inclined to seek career challenges and achievement, or the fulfilment of basic needs and safety than others, according to their own personality traits and situations.

Frederick Herzberg, in his motivation-hygiene theory, identified two categories of factors, intrinsic and extrinsic, that need to be considered in managing staff motivation. Intrinsic factors (or motivators) are believed to relate to job satisfaction and may include challenging job assignments, achievement, performance recognition, and career growth opportunities. Examples of extrinsic factors (or hygiene factors) may refer to working conditions, and compensation. The existence of such extrinsic conditions alone may not motivate employees over time, but it may result in dissatisfaction if they feel that these conditions are below their expectation.

Another relevant theory is the reinforcement theory. B. F. Skinner posited that employees could be influenced to engage in desirable behaviour by positive reinforcers such as recognition, and awards (Skinner 1965). Good performance would likely repeat in future assignments if it is recognized and rewarded. It is natural for staff to look for positive feedback and confirmation from their project leaders. They would likely be motivated to continue, or even enhance, their good performance when they receive such confirming signals.

The theories discussed above are supported, to a certain degree, by the findings of the 2014 Global Workforce Study, conducted by Towers

Watson consultants. The survey found that competitive salary, challenging work content, career development opportunities, and job security were the primary factors to attract and retain employees. Respondents to the survey also highlighted an important point that a worker's relationship with their manager was an important factor for retention (Towers Watson 2014).

It is necessary for employers to offer generous compensation packages, which may include a basic salary, a sign-on or retention bonus, and fringe benefits, to compete for talents with other firms. Without sufficiently attractive compensation, employees would be less likely to accept a job offer. However, compensation alone is considered a hygiene factor because an employee may not feel satisfied or be motivated over time if the job pays adequately but is not offering career development opportunities. Therefore, employers need to provide challenging work content and a good career path to employees to keep them motivated over time.

Other awards and bonuses, which do not involve a great deal of money, for instance, spot award, holiday bonus and non-cash award, may still be useful at least for their short-term effects. Imagine that team members are so exhausted in a highly stressful ERP project. When some top performers are selected for any of these awards by the manager as a token of appreciation, it would send out a positively reinforcing message to show that their hard work is appreciated by the project leadership. This kind of positive confirmation from the leader not only motivates the award recipients, but also would enhance the morale of the whole team. Such reassuring signals may be considered by award recipients as an indication of positive relationship with the leader, and job security. These are tools that can be used by project managers in conjunction with other human resources management practices, such as career development, job enlargement, and job enrichment in order to motivate and enhance the loyalty of team members (Law 2016).

In short, it makes sense for project managers to adopt a balanced approach in managing project human resources to consider both the intrinsic and extrinsic needs of team members. That means, in addition to offering competitive compensation packages, project managers should align work assignments with team members' personality traits and professional interests as much as possible. Focusing only on financial rewards and penalty alone may not be the best approach to project human resources management.

Senior management support, performance appraisal, and team morale

ERP projects are stressful situations in which project leaders, team members and users have to work within tight schedules and budgets. The diversity of stakeholders, and their competing interests often exacerbate the situations. Some of them, such as the process owners and key users have to handle not only the normal daily job requirements but also project activities. The cross-functional requirements of ERP projects call for a matrix reporting structure by which key users report to their business or functional manager for daily job activities, and the project leadership for project activities. Conflicts often occur between the two kinds of requirements which compete for the limited time of the staff. It may put the staff in very stressful and demoralizing situations.

It is of paramount importance for both business and project leaders to collaborate and to iron out the responsibilities of employees carrying project assignments. Both types of leaders and the staff must engage in open communication all the time throughout the duration of project involvement. As a senior practitioner, I have instead seen political struggles between leaders in many circumstances. Employees were trapped in difficult situations, stressed, and demoralized. As a result, some of them resigned. To prevent this problem, it is necessary to have managers of various units to support and commit to the project. That explains why it is critical to get the support from, and the consensus among company executives, before initiating any ERP project.

Another mistake I have seen concerns the performance appraisal of staff assigned to multiple roles in a matrix reporting situation. While performance is assessed, in semi-annual or annual performance reviews, only by the supervisor of the business or functional unit to which an employee belongs, project activities completed are usually not considered. Even when project responsibilities are listed as appraisal items, project tasks are not given sufficient weights relative to daily business or functional requirements. It may create an unfair situation for the employee since his involvement in project activities may affect the amount of time available for carrying out his normal business responsibilities. If not rectified, this situation would discourage whole-hearted involvement in project assignments. This is detrimental to the morale of the project team. Therefore, it is important for project and business managers to agree to include project-related performance as part of staff performance appraisal.

ERP projects usually are endeavours that extend over years. From planning to implementing and operations, it takes a long time before

anyone sees any benefit of an ERP system. Then come more challenges in the long post-implementation phase during which difficulties may arise concerning using the system productively, and enhancing it to keep it aligned with changing business needs over time. After a while, for instance in the midst of the implementation or operations phases, morale may subside and cynicism may surface in front of difficult situations. It is important to maintain morale and motivation at a high level throughout the ERP lifecycle. The cash and non-cash awards discussed above are some of the means to motivate participants in ERP projects. These are the ways to tell team members that their hard work is appreciated.

Knowledge management for the ERP environment

Following what is discussed above, I would like to stress the need to take a holistic and proactive approach for developing the required knowledge and expertise for an organization's ERP environment over the long run, starting from ERP planning and product evaluation, and throughout the rest of the ERP lifecycle. Any attempt to handle knowledge and expertise development in a piecemeal manner may fail to yield long lasting effects to satisfy a company's diverse needs. Having said that, I would like to emphasize that a proactive and carefully planned approach encourages individual and organizational learning in terms of generating, and sharing business and ERP knowledge in a more systemic and comprehensive manner. In this sense, learning is a process of continuous attempts by the members of an organization to explore and share new knowledge for addressing problems and evolving requirements arising from the business and ERP environments (Argyris 1991).

There are two aspects of knowledge management that require our understanding and actions. On one hand, the business and functional units, including the MIS function, engage in continuous exploration of new knowledge and opportunities to drastically transform business practices utilising the ERP and IT infrastructure. In this explorative perspective, the ERP, and IT infrastructure, being the core elements of the foundation of business execution (Ross, Weill and Robertson 2006), are enablers of business strategies and innovative practices. Employees may explore opportunities for doing business in different ways, such as engaging in electronic business. Additional ERP modules are adopted to realize new business strategies. On the other hand, these organizational units also engage in exploitative learning which involves incremental improvement and refinement of business practices and processes. Employees strive to develop, and share the knowledge and skills among themselves, and in

some situations with external consultants, to support and upgrade the ERP systems and related business practices to enhance process efficiency.

The success of an ERP system largely hinges on the knowledge and know-how possessed by the ERP project team, consultants, and the organizational units affected. It also depends on how effectively such knowledge and know-how are shared among these parties.

ERP initiatives are particularly complex. The process-oriented, rather than function-oriented, nature of ERP systems usually requires ERP project team members and business users to have a broader understanding, beyond their own functional areas, of how a company's business is run. This is very much unlike the requirements of stand-alone non-ERP systems in the past (Vadaie 2008). ERP projects also require a lot more knowledge sharing among project team members and business users than many other application systems during implementation and operational phases. Intensive knowledge management begins when a company evaluates and selects a suitable ERP, and it continues throughout the other lifecycle stages when the project team conducts gap/fit analysis, documents and analyses its "As-Is" processes, identifies opportunities for improvement (OFIs), designs the "To-Be" processes, configures the systems, and operates the installed ERP system.

Knowledge management plays an important role in the operations phase when the company continues to analyse upgrade requirements, and to discover continuous improvement opportunities for the ERP installations. It is critical for the company to establish a continuous learning and knowledge sharing tradition that is conducive to process improvement and organizational innovation (Law and Ngai 2008).

To realize such an approach of ERP knowledge management, it is necessary to develop an organization learning culture, and a set of more concrete practices in ERP-using organizations to facilitate and energize continuous learning and knowledge sharing. This must be supported by planning and establishing a well-thought-out strategy for knowledge sharing, and training. Knowledge management and training should not be handled haphazardly. The leaders of such organizations should purposefully develop a culture to value and reward the various ERP and process management-related roles assumed by employees. In such a work environment, employees will be incentivised to engage in proper voluntary learning behaviour when they recognise that learning is not a manager-imposed requirement, but a means of earning respect and enhancing their own career prospects in the organization.

Learning is not limited to formal company-funded off-the-job training. There are other complementary means and opportunities to enhance

knowledge and skills of the members of any organization. For instance, learning often occurs in on-the-job training and through interacting with individuals within and outside an organization (Heraty 2004). On-the-job training, when supported with adequate mentoring by more experienced personnel, can be very effective for context-specific learning. An example of on-the-job training is knowledge transfer between external consultants and internal staff, and between internal experienced and junior personnel of a company.

Needless to say, organizations should establish the facilities to enhance the capture, storage, management and sharing of knowledge. For example, it is a good practice to make it a standard requirement to generate and manage documentation pertaining to business processes and ERP systems. In addition to dedicating resources to information and document management in the traditional way, automated systems and intranets are useful tools to capture and share general knowledge, problems, and solutions about the business and ERP environments. For instance, Computer Science Corporation, one of the largest IT services providers in the United States, shared best practices and project documents among their employees across locations using an intranet system.

Active participation in ERP-related tasks by stakeholders is an important contributing factor for knowledge generation and sharing. It may also lead to an elevated sense of ownership of the responsibilities for learning the ERP, and the concomitant organizational and process-level changes. Thus, it is necessary to create venues and means not only for intra-team or intra-function interactions, but also for cross-functional collaborations in the forms of informal forums or formal committees throughout an ERP lifecycle. Companies should encourage knowledge sharing and team work through setting up formal or informal participatory organizational structures. Cross-functional teams, forums and committees drawing membership from diverse groups of stakeholders, and business and technical experts would stimulate the sharing of explicit and tacit knowledge, and the generation of new knowledge and competencies (Senge 1990). Controlco's user request prioritization committee not only handled user requests but also provided a participatory structure that promoted on-going interactions and learning (refer to the Controlco case study in Chapter 10).

Knowledge transfer

Some ERP problems reported by the practitioner and academic literature in the last two decades were allegedly attributable to a lack of, or

inappropriately executed, knowledge transfer from ERP consultants to internal human resources. As soon as the external experts left, the staff of the client organizations found themselves unprepared for the challenges of maintaining their ERP systems and supporting users. Unfortunately, while it is widely recognised that knowledge transfer is important to ERP adoption, we can still hear about the consequences of poorly handled knowledge transfer today. Thus, company and project leadership should give knowledge transfer arrangements more attention and make it a high-priority item of their project agendas.

The normal practice of knowledge transfer is to pair external specialists with internal staff in project assignments. The "joint team" arrangement requires experienced consultants to work side-by-side with inexperienced staff (King 2005). Assigning internal staff to share actual project responsibilities with consultants is a widely accepted solution to the challenge of training up a company's own human resources for system "go-live", and post-implementation system maintenance and support requirements. As the project manager of Lightco (Haines and Goodhue 2003) put it, the best approach for knowledge transfer is to make the internal employees, but not the consultants, do the actual work. It is no secret to most IT managers that knowledge transfer is very important, but unfortunately some companies may still find themselves unprepared to take over their ERP systems when the expensive consultants leave their projects. It is necessary to remember that knowledge transfer will not occur as expected unless a company plans for it, and is committed to enforce and monitor the plan. Companies should take a proactive role in managing knowledge transfer for their own ERP initiatives. Bear in mind that the less knowledgeable internal employees are in ERP systems, the more important the consultants will be. Moreover, do not forget that the foremost objective of the latter is to maximise their consulting hours and revenue. Thus, it is critical for client companies to assume the responsibility to get their own staff up to speed, and to contain consulting expenses within a reasonable range.

The first step to successful knowledge transfer is to establish a strategy and a plan. The knowledge transfer plan should be treated as an integral element of the overall ERP project plan. Knowledge transfer should be planned early in the ERP project lifecycle, and the plan should be executed, monitored and updated as the ERP project progresses through its lifecycle stages. In this sense, knowledge transfer is not only a once-off event or a series of milestones in the project plan, but also encompasses a broad set of activities involving on-the-job learning, formal training

events, and on-going interactions with external consultants and among key internal employees.

By working with ERP consultants, the internal project team should be able to define the tasks and outcomes of knowledge transfer, and the roles and responsibilities for the external and internal actors involved in ERP project activities. For example, among the tasks to be accomplished are setting up purchase requisition functionality and workflows, and training the end users to use this system feature. The knowledge transfer plan should explicitly list these task items, and describe the criteria used to validate the outcomes. If knowledge transfer works as planned, internal project team members (or functional specialists) responsible for these tasks should master the skills to configure the functionality for purchase requisition by a predefined point of time, and the end users should be adequately trained to use the functionality effectively on their jobs.

The key to successful knowledge transfer is to gradually shift the responsibilities of configuring and supporting the ERP to internal staff. While consultants need to fulfil the responsibilities spelled out on their contracts, this should not become the excuse for not getting internal staff involved in actual work. In the beginning, consultants may do most of the work, and at the same time engage in training and mentoring the internal team members. As the latter become more knowledgeable, their responsibilities for doing the actual ERP-tasks should gradually increase while the consultants would spend more time in mentoring and quality assurance.

Knowledge transfer-related issues and milestones must be monitored on an on-going basis by project leaders and the steering committee, just like other critical issues and milestones. Simply put, what is not monitored often may not be done. These issues must be included in project team and steering committee meeting agendas, and they deserve an adequate amount of time for review and discussion by key actors of the ERP project team, and executive steering committee members.

Project leaders should allocate their precious time to review knowledge transfer issues with team members to resolve obstacles as early as possible, and to motivate proactive learning. In some situations, some employees are not motivated to learn and master the new competencies required if they worry about their own jobs and fail to see career opportunities in the new system environment. Like any major change management project, proper human resources management plays an important role in ERP projects. We have already discussed in the preceding paragraphs the issues pertaining to the retention of critical project and business staff. Here I would like to add that it is necessary to

impart a clear and unambiguous message to employees that acquiring such new skills is critical for their jobs and the organization. It is necessary to stress their responsibilities for successful knowledge transfer, and to support this message with relevant work assignments. For instance, as I have mentioned earlier, internal project team members will shoulder more and more responsibilities as an ERP project progresses through the lifecycle stages.

It also needs to be explicit that key internal project team members (including MIS staff and functional specialists) will be responsible for training end users, and developing and updating the documentation for the new ERP environment. When they realize what they are learning is useful in daily business operations, and to their careers, they will be more motivated to engage in proactive learning behaviour. Never allow internal employees to become passive recipients in consultant-employee interactions. Explicit responsibility allocations are the best tests for the outcomes of knowledge transfer. Successful completion of such tasks independently or as a joint-effort with the consultants should be considered in staff performance appraisal and compensation, while the contracts with consultants may stipulate that they get paid only if these knowledge transfer items are also completed satisfactorily.

So far, I have spent a considerable amount of efforts in discussing consultant-staff knowledge transfer. Similar arrangements should be made between the experienced and inexperienced internal staff. Be reminded that consultants will eventually leave for other assignments. Internal experts should eventually shoulder the responsibilities for managing the ERP system, business processes and training, although many organizations continue to rely on some external expertise. Developing and retaining internal experts is valuable to ERP adopting organizations as they will be responsible for continuously seeking opportunities for improvement, and training up new staff.

Training

Training is a critical success factor for ERP initiatives. An appropriately focused and managed training program can contribute remarkably to the development of precious human resources to fulfil ERP-related requirements, and to realize an organization's very important goals of continuous improvement and innovative business practices. When adequate training is offered at the right time to the right groups of recipients, it will enhance the organization's capability and likelihood to survive or excel in its ERP endeavour. In order not to repeat the ERP-

related mistakes reported by practitioners and researchers, it is necessary to have the proper understanding about training, and to treat it as an integral element of the overall knowledge and human resources management plans. Training is not a once-off event, but should be regarded as a continual requirement for developing competencies for the implementation, and on-going improvement of the ERP and business processes.

Identifying training needs and planning

The prerequisite for implementing appropriate and effective training in an organization is a basic understanding of fundamental needs of various groups of stakeholders. Then, it is necessary to establish a strategy and a plan to cater to such needs. Advice and services offered by ERP vendors and consultants are useful in many situations. However, an organization must take a proactive stance to understand its own needs, develop a strategy, and acquire the means to support a systematically managed training programme whose lifespan extends from the very first stage of the ERP project well into the operations period. The lesson learned by Tradeco (Chapter 9) suggests that a company cannot afford to treat training lightly and to relegate the training plan to the ERP vendor and consultancy implementing the system. Likewise, the content of training, and the audience to be trained deserve a closer analysis. These are the responsibilities of the ERP project and MIS leadership, but not those of the external parties. The advice and activities of ERP vendors, consultants and training providers are only some building blocks of the overall training programme.

Matching training to the right types of stakeholders at the right time

Despite that some organizations, as reported in the trade press and research literature, spent generously in training, their mistakes to focus primarily on familiarizing MIS staff with the technical aspects of the ERP packages, and end users with standard system features and user interfaces often rendered such training ineffective. ERP training would be effective only if it also includes the actual business practices and processes as part of its content (Wheatley 2000; Rutherford 2001; Robey, Ross, and Boudreau 2002; Legare 2002). Technical training is often offered to MIS staff up front, and user training takes place near the user acceptance milestone. While the timing and the audience for these two types of

training may usually be handled adequately, it would be too simplistic to assume that they are sufficient for the ERP project. I cannot emphasize enough that different types of training should also be provided to various segments of the audience, ranging from senior management, functional specialists, operations managers, MIS staff and end users. Successful ERP planning should align various types of training appropriately with the requirements of the ERP lifecycle phases.

In the early stage of the project, a brief overview for the senior executives would help them a great deal in understanding the ERP package, communicating with their employees, and very importantly in making proper decisions concerning ERP issues. In-depth functionality training, on the other hand, primarily deals with the functionality of the ERP modules, and helps the participants take advantage of specific system features to reshape their business practice and processes. This type of training would be pivotal to prepare MIS analysts, functional experts, and process owners for detailed gap analysis, and to decide on new workflows to be implemented.

As an essential component of a well-managed training programme, the training of functional specialists and other end users is not a once-off event, but should be offered on a more regular basis during and after the implementation phase. Many organizations are mistaken that training is a project activity, which ends when the system becomes operational. On the contrary, training should have a place throughout the lifespan of the system, as the expertise for effectively using the systems and continuous process improvement is a strategic resource any organization needs to develop and retain (Pereira 1999) in the long run.

It should be pointed out that training does not have to be conducted by expensive external consultants or professional trainers alone. Instead, it could be a joint effort between the consultants, MIS, and the functional specialists or process owners. The major benefits are not only reduction in expensive consulting hours but also improvement in the quality of training. External consultants and trainers may be very knowledgeable in the standard features of some ERP packages, but, as observed in many circumstances, may not be so in the business practices and processes of client organizations. Internal systems analysts and business process owners participate in process redesign and system deployment, and therefore should be able to design training to match the requirements of their organizations (Wheatley 2000) better than consultants. Organizations can adopt the train-the-trainer approach by which process owners assume the responsibilities not only of managing the business processes, but also training new users throughout the system lifecycle.

Concluding remarks

We have examined in this chapter many issues regarding sourcing and managing ERP-related expertise and training. It stresses a multi-pronged approach in sourcing external expertise from not only ERP vendors and consulting partners, but also from other smaller consulting firms and independent practitioners. In addition, it is important for firms to develop and retain some in-house expertise such that they do not have to over-rely on external consultants. For the same reason, they should aim at acquiring the capabilities for properly controlling and managing consultants in order to safeguard their own interests.

This chapter also re-iterates the importance of knowledge transfer from external consultants to internal staff to eventually build up an organization's capabilities in managing the installed ERP, and in developing process-specific training to fit the business needs of the organization.

Table 5-1 Key Skills Recommended for Graduates of University ERP Programs

Primary Categories and Items of ERP Skills *Adapted from Figure 1 of Boyle and Strong (2006)*	
ERP Technical Knowledge:	*Interpersonal Skills:*
• Supporting end user system needs and existing applications • Systems analysis and business processes modelling • Systems design and integration • Systems life cycle management • Design and administration of relational databases • ERP related programming languages (e.g., ABAP, Java, SAPscript) • Data management (e.g., data modeling) • ERP security • Systems testing • Requests for proposals (RFP)	• Ability to communicate with and teach others • Being able to deliver effective presentations • Being proactive and sensitive to organizational, regional and national culture • Ability to work with difficult people • Good listening skills • Time management skills • Eagerness to engage in learning • Ability to deal with uncertainty and complete

Primary Categories and Items of ERP Skills
Adapted from Figure 1 of Boyle and Strong (2006)

development

Business Functional Knowledge:

- Knowledge about specific functional area
- Ability to quickly understand the business environment and customers' needs
- Ability to understand business problems and provide appropriate technical solutions

Team Skills and Knowledge:

- Being able to understand group dynamics and work collaboratively in a team environment
- Ability to plan and lead projects
- Ability to work with consultants

tasks

Technology Management Knowledge:

- Knowledge of ERP concepts and products
- Being able to understand technological trends and learn new technologies
- Ability to focus on technology as a means, not an end
- Ability to identify and assess strategic impacts of ERP systems

Note: The "Industry Exposure to ERP" category of skills of Boyle and Strong's (2006) model has been omitted from this table.

Table 5-2 Knowledge and Skills Required of ERP Project Leaders and Managers

ERP Knowledge & Skills	PMBOK Knowledge Areas
Change management (Al-Mashari and Al-Mudimigh 2003)	Integration management*
Project management competence (Kraemmergaard and Rose 2002)*	
Managing project scope (Al-Mashari et al. 2003)	Scope management
Managing implementation timeline (Bingi et al. 1999)	Time management
Managing implementation cost (Bingi et al. 1999)	Cost management
Human resource competence (Kraemmergaard et al. 2002)	Human resource management
Communication competence (Kraemmergaard et al. 2002)	Communication management
Managing ERP consultants (Bingi et al. 1999)	Procurement management
Other ERP-related skills:	*Notes: 1. *PMBOK integration management includes project planning, stakeholder management, and change control. It overlaps with project management competence of Kraemmergaard et al. (2002) in many ways.* 2. *PMBOK stresses change control while "change management" listed in the left column concerns motivating and leading organizational and business changes.*
Business process competence (Kraemmergaard et al. 2002)	
Business function knowledge (Furumo and Melcher 2003)	
ERP specific knowledge (Furumo et al. 2003); ERP system competence (Kraemmergaard et al. 2002)	
Organizational competence (Kraemmergaard et al. 2002)	
Strategic competence (Kraemmergaard et al. 2002)	
Leadership competence (Kraemmergaard et al. 2002)	
Technology competence (Kraemmergaard et al. 2002)	

CHAPTER SIX

CHANGE MANAGEMENT THEORIES AND PRINCIPLES

Abstract

This chapter addresses change management theories and issues that are relevant to an ERP adoption context. The author first examines some change models and theories, and then discusses the reasons of failures for many change management endeavours in the past decades. Finally, a set of guidelines, for improving change management practices, is proposed and discussed. In this chapter, the author draws upon practical experience and observations from real-world situations to support theoretical discussions.

Introduction

Enterprise resource planning (ERP) system implementation is not only a technological but also a business endeavour. Inevitably, ERP project management is an exercise of leading, managing and implementing changes at business process and organizational levels. Transformations implemented in the context of ERP adoption is described as ERP-enabled process changes.

We are reminded time and again by scholars and consultants that many IT and ERP projects ended in failures not because of technical, but business reasons. ERP projects are tremendous challenges for most companies since they sometimes require drastic and complicated changes at various levels of the organizations, and involve very diverse stakeholders scattered across functional and divisional boundaries. The common recognition among management practitioners and scholars that getting stakeholders to support, and participate in such changes is never

easy has ushered change management to the centre of attention in recent years.

Change management is important to IT and management practitioners. Although practitioners and academics would like to add more rigor to change management, in terms of techniques and methodologies, change management lacks what traditional engineering disciplines (such as electrical and civil engineering) possess. Change management is not based on quantitative methods and formulae. However, it is still beneficial to enrich the practice of change management with guidelines and principles contributed by those involved. Over time we have accumulated a considerable amount of practical experience in managing changes from which principles and methodologies are developed. In this chapter, we shall review and discuss such principles and methods derived from practical experience, and theories developed in academia. Such theories would help explain and justify some of the current practices in change management. Change management is an enormous challenge and probably cannot be taught easily in classroom or by a single book. However, a practitioner trained in change management methods and theories prior to an assignment may be better prepared to take the challenge.

Fundamental change management concepts

What is change management? We shall see what others say about it:

> Management and change are synonymous, it is impossible to undertake a journey, for in many respects that is what change is, without first addressing the purpose of the trip, the route you wish to travel and with whom. Managing change is about handling the complexities of travel. It is about evaluating, planning, and implementing operational, tactical, and strategic "journeys" (Paton and McCalman 2008, 3).

> Change management is a term used to describe any action taken to smoothly transition a business process encompassing an individual or group from a current state to a future desired state of being (Varkey, and Antonio 2010, 268).

Change management, in my words, refers to the practice and process of planning, leading and implementing changes, and managing the transition process to avoid or minimize disruptions to the on-going well-being of an organization. We would like to bring about innovative solutions to the organization to replace the current practices. As discussed in the next chapter (Chapter 7), we sometimes need to adopt a revolutionary approach

to transform an organization by obliterating outdated practices. In other situations, we may take a less drastic approach to make incremental modifications or improvements to existing business practices and processes. In any case, the process of managing the transition from the old state to the new state is an essential part of change management.

Central to the success of change management is managing people. According to our experience, managing technological changes is relatively straight forward, but managing the stakeholders of diverse needs and interests is often a challenge which can frustrate any carefully defined project plan if they are not managed properly. We shall delve deeper into the people-related issues in this chapter.

Before we move on, I would like to remind readers not to lose sight of the importance of "leading" changes. Any organizational change requires leadership and management skills. Doubtlessly, managing is an important task, but leading changes is critical to inspiring and implementing innovative solutions, and bringing the organization to a new state by breaking away from existing practices and constraints. "Management" implies repetitive tasks with an inward focus as John Kotter pointed out in his popular book, "Leading Change". Focusing on managing, but not leading may spawn complacency and inertia towards changes (Kotter 1996).

Change models and theories

Over the last decades, quite a number of change models emerged. We shall examine several models well-known to practitioners and academics, namely, Kurt Lewin's (1947) three-step model, John Kotter's (1996) eight-stage model, and the Prosci ADKAR model (Hiatt 2006).

Lewin's three-step change model

Lewin's (1947) model comprises the following three steps, namely "unfreeze", "change", and "refreeze", and was proposed as part of his Planned Change approach. It recognizes the need to create the awareness and motivation to change before a person would embark on change behaviour. This would be a challenging moment during which one needs to unfreeze or loosen up his beliefs and adherence to the existing, often hardened, organizational culture and work processes. The first step is difficult since an employee has to overcome many psychological and emotional obstacles to changing an existing system or practices that have

taken him and colleagues a great deal of intellectual and physical efforts to develop.

When there is an implicit or explicit recognition of the need for adopting the changes, it also means that the staff involved may have realized that the proposed practices or systems would be better than the existing ones. Such an awareness or recognition is critical for successful changes since proposed solutions without the "felt need" would not lead to successful implementation, and any change implemented would not stick. At this point the staff is ready for the second step ("Change") that creates the changes.

The third step labelled "refreeze" calls for reinforcing the implemented changes to prevent regressing back to previous practices and systems. That means, it is necessary to establish the changes as the new routine of daily work life. Accompanying the new practices and systems should be changes in organizational culture, work-related behaviour and supporting infrastructure, including, for instance, new or updated human resources policies, and interpersonal and team relationships.

Kotter's eight-stage change model

John Kotter (1996) described a change model with eight stages in his book *Leading Change*. Readers shall find more details about the eight stages in Table 6-1. The boldfaced sentences are Kotter's words, and I provide each of the stages my own explanations.

Any change initiative begins with developing a sense of urgency, assembling a guiding coalition, and defining a clear vision and a change strategy which need to be communicated to all stakeholders of the organization. Kotter (1996) reminded his readers that the sequence of these steps must be observed. Although some steps of his model may be performed concurrently, omission of one or more of the aforesaid steps may lead to disastrous results. Before the existence of an awareness for change, an organization may still be immersed in complacency and inertia which precludes any possibility for changes. Thus, the first four steps should occur before steps 5 to 8.

Once there is a sense of urgency for change, a powerful coalition should be assembled to guide, and inspire the members of the organization towards achieving the vision. The change vision and strategy should be developed and communicated to all stakeholders. The systemic promotion of change initiatives should be conducted following a clear communication strategy and planning, and supported by the consistent role-modelling behaviour of senior leaders. These preparations would

build a solid foundation for change, without which resistance may arise against change later down the road.

In order to break away from stubbornly entrenched organizational culture, behaviour and business practices, people in the organization need to be empowered for broad-based actions. That should involve a large number of stakeholders who must be inspired, energized and empowered to confront legacy issues, and obstacles to innovative solutions. Be reminded of the difficulty in sustaining the interests and energy over a long period of time for large-scale projects. Momentum may decline over time when stakeholders do not see any benefit or receive any reward after a lengthy period of hard work. The risk of cynicism and resistance may grow. Senior leaders must plan for achievable short-term goals within the overall project timeline. Achieving and celebrating "short-term wins" is a valuable opportunity to motivate on-going support of the change initiative.

Stage 7 calls for consolidating various accomplishments, and looks for new opportunities for changes. At this stage, the organization should expend more efforts to pursue the changes, and to eliminate whatever does not fit the change vision. This needs to be supported by appropriate human resources and policies. Moreover, identifying new opportunities for further improvement may re-energize the change initiative. The final stage, "anchoring new approach in the culture", has its emphasis on sustaining the implemented changes. Retaining and reinforcing the changes is always an enormous challenge in change management. In fact, the last decades have seen many failures in change initiatives when implemented changes gradually evaporated and were replaced by old practices. Anchoring the changes and new approaches in an organization requires leadership, and the support of cultural and behavioural changes.

The Prosci ADKAR model

The Prosci ADKAR model provides a framework for personal changes which encompasses five elements: awareness, desire, knowledge, ability and reinforcement (Hiatt 2006). Like the models discussed above, the ADKAR model begins with the creation of awareness for change. Awareness or a sense of urgency for change precedes the other elements. As Jeffrey Hiatt pointed out, the sequence of the five elements is important (Hiatt 2006).

Desire for change occurs once a person feels the need for change and believes that changing will bring about improvement but keeping the status quo may be detrimental. Knowledge to change refers to information about how to make changes. That may include information for changing

the practices and processes, and using systems and tools. It also includes training for developing skills relevant to a person's change endeavours. Ability refers to the capability to make the change. According to Hiatt (2006), ability differs from knowledge in that it refers to a person's actual capability to complete a task while knowledge only refers to a person's general knowledge about the task. That a person possesses some knowledge about a certain task is not equivalent to having the ability to accomplish the task.

We have seen in the discussion of the first two models that many change endeavours failed because of backward slippages to pre-change systems and practices. Reinforcement here deals with sustaining the achieved change as the normal behaviour in lieu of previous practices. Changes can be reinforced through manipulating internal and external factors. The former refer to an individual's feeling and satisfaction about the changes while the latter include many methods and measures such as rewards, recognition, and promotion.

The emergent change management theories

I have examined only three well-known change models so far. In fact, there are many more theories and models that are useful in guiding our thinking about change management. I shall briefly discuss a few more approaches here to prepare for the discussion of the guidelines and methodological issues later. One school of such theories is called "emergent change management" which propounds that the leadership, strategy, and decisions of change must be consistent with organizational factors. Such factors are intertwined with the change process and would ultimately affect the success of the change initiatives (Mintzberg 2003).

The theorists of the processual school are opposed to the "simplistic prescriptive" approach of change (Pettegrew 1990). Instead, they espouse that the process of change is dynamic, complex and affected by interactions among individuals, groups, organizations, and society. Needless to say, the change process is filled with rational decision-making processes, power struggle, and political manoeuvring (Dawson 1994; Buchanan and Storey 1997). Therefore, the processual framework of change takes a more holistic view that recognizes the inter-relatedness between the change process and organizational factors, and emphasizes the importance of understanding the politics of managing changes within the organizational context.

The incremental approach to change, which deals with problems separately and incrementally one at a time, was popular up to the late

1970's (Burnes 2004). The 1980's saw the emergence of the "continuous transformation" approach which considers change in an organization as a continuous process intermingled with cultural, and political factors of the organization (Burnes 2004; Dawson 1994; Kanter et al. 1992). The organization is viewed by the proponents in this school as something complex and changing continuously in order to survive. It never settles in a genuinely stable equilibrium (Brown and Eisenhardt 1997).

In my opinion, an equilibrium may indeed last only for a short period of time in the modern dynamic business world in which enterprises would usually seek opportunities for continuous improvement. However, in many situations, there would exist at least a brief period of stability. It would be unrealistic to assume that an organization engages nonstop in change endeavours and immediately drops the newly adopted changes for more uncertainty. Rather it is more realistic to envisage that the organization would continue to monitor and analyse its business for new opportunities all the time. Further changes would be pursued only after careful analysis, assessment, and planning. Before the organization sees the benefits and feels confident about moving on again, it needs to make sure the results of the recent improvement efforts are retained and adhered to.

Many scholars espousing the aforementioned perspectives criticized Lewin's (1947) model as linear, static, overly prescriptive, and failing to represent the iterative nature of change processes in reality. Some also criticized Lewin's model as a "top-down, management-driven" approach which has ignored "bottom up" changes (Dawson 1994; Kanter et al. 1992). To what degree are these criticisms valid in light of Lewin's three-step model, the eight-stage model proposed by Kotter (1996) and the AKDAR model of Hiatt (2006)? We shall revisit this question when Tradeco's experience is discussed later in this chapter.

Table 6-1. A Summary of Selected Change Models

Lewin's (1947) Three-Step Change Model
Steps and Descriptions
1. **Unfreeze**: Loosen up people's belief and adherence to the existing practices and system to create the "felt need" to change. Gradually create a recognition that the proposed solution is superior to the existing one.
2. **Change**: Implement the changes.
3. **Refreeze**: Strive to make the change last. By now the new system and practices become the normal part of people's daily routine in workplace.

Kotter's (1996) Eight-Stage Change Model

Stages and Descriptions

1. **Establish a sense of urgency**. Create an awareness for the need to change by examining the strengths, weaknesses, opportunities, and threats of, and the competitive forces surrounding the organization. That is to break the inertia, and engender a "felt need" to change.
2. **Creating the guiding coalition**. Form a powerful team of people who share the consensus and are willing to work closely to guide and achieve change.
3. **Developing a vision and strategy**. Establish a clear vision for what to achieve, and a strategy to implement the change initiative.
4. **Communicating the change vision**. Clearly explain the change vision, strategy and plan to all stakeholders by multiple means and channels. People involved, especially leaders, must behave consistently to support and promote the change too.
5. **Empowering broad-based Action**. Empower all stakeholders of diverse background to confront and remove obstacles, explore innovative solutions, and take proper actions to accomplish the change vision.
6. **Generating short-term wins**. Define achievable interim goals within a large project which are visible to stakeholders. Visible interim results, which mean benefits and rewards to stakeholders, can be used to maintain momentum with a prolonged large project.
7. **Consolidating gains and producing more change**. Integrate the results of various segments of the initiative, and remove structures, processes, practices, and policies that are incongruent to the change vision. Often seek opportunities for further improvement, and take measures to reenergize the team.
8. **Anchoring new approaches in the culture**. Try to keep the changes and avoid slipping back to legacy systems and practices. This step must be supported by a set of new or revised culture, mindsets, policies, and behavior among all members of the organization.

Prosci's ADKAR Model (Hiatt 2006)

Elements and Descriptions

1. **Awareness**: That is an understanding of the current situation a person is facing, the reason for changes, and the risks and undesirable consequences for maintaining the status quo. The first step to change is to develop the "felt need" for change, and understand how it affects "me".
2. **Desire**: That is the willingness to adopt the change. Once there is an awareness for change, a person needs to consider his or her personal choice which is influenced by his or her own situation and intrinsic personal factors.
3. **Knowledge**: Knowledge refers to the information of how to execute the changes. That includes information about how to implement and use the systems, processes and tools, and an understanding about the roles and responsibilities of a person involved in the change initiative. It also refers to the training for developing skills necessary for implementing and supporting the change solutions.
4. **Ability**: That is the capability to implement solutions to fulfill the change vision and plan, drawing upon the knowledge possessed by a person.
5. **Reinforcement**: It represents all the internal and external factors and measures exploited to sustain the implemented change solution, and to prevent slipping back to old systems and practices. External measures taken may include ongoing education, recognition, and rewards while internal factors may include personal feeling and internal satisfaction about the changes implemented.

Mistakes and obstacles of change management

Executives and consultants can tell you that organizational change is challenging and the success rate of business change projects is alarmingly low. About fifty to seventy percent of such projects failed (Strebel 1996; Griffith 2002) although we have also seen many successful organizational transformation cases over the years.

We realize that many mistakes are made repeatedly in business transformation and process redesign projects although these are common mistakes well-known to academics and change consultants. Change projects are likely to fail if they lack the following: (1) a sense of urgency;

(2) a clear vision; (3) leadership; (4) effective communication strategy and planning; (5) mobilization of change champions; (6) stakeholder consultation; (7) employee participation; and (8) effective coordination of activities (Lucey 2008).

Projects involving business transformation or process changes are complicated and many failed for various reasons, including unanticipated events, and mistakes on the part of the senior executives and other members of the organizations. Just as Lucey (2008) did, many consultants and academics can list many more reasons that at least partly account for unfavourable outcomes in change management. The lack of whole-hearted commitment of executives and middle management, and poorly defined scope of change are said to be culprits for some failures. Some projects failed because they took too long to complete. These situations occur as a result of poorly defined, or overly ambitious, project scope. Large projects taking long time to complete need to face the challenges of sustaining employees' support and momentum over a prolonged period of time. Momentum may gradually subside if participants do not see any benefit from their efforts over time. Instead, cynicism may grow, while the confidence and propensity to participate in the project may decline. Kotter (1996) identified "failing to create short-term wins" for large-scale projects as one of the eight major errors in change management.

In organizations whose senior leaders are not willing to commit wholeheartedly to allocate time and efforts to change projects, we can expect problems to occur sooner or later in the journey of change. Accompanying this half-heartedness usually is the reluctance on the part of the cost-conscious executives to dedicate resources to the project. I have seen in my consulting and research endeavours many types of problematic behaviour at the top management level. In some cases, senior leaders were not able to reach a consensus among themselves concerning the vision and strategy for change. In Kotter's words (1996), they failed to form a 'guiding coalition."

In other occasions, senior leaders refused to take on an explicit visible role, and tended to delegate all responsibilities to managers or external change consultants (Kiely 1995). Generally speaking, senior leaders behaving this way are courting trouble when they do not act as role models for employees. The inconsistent behaviour of senior leaders would only create distrust and cynicism among their subordinates. The future of such projects looks bleak as long as managers and employees are unwilling to participate and commit in change endeavours. As reported by many change consultants, resistance is a major obstacle to change initiatives (Waddell and Sohal 1998).

I have found many types of undesirable behaviour in Tradeco's poorly managed enterprise resource planning project (Chapter 7 and Chapter 9). Not only senior managers were divided about ERP project and business transformation issues, many of them refused to assume explicit roles. Employees therefore lacked a sense of direction, and did not see the needs for adopting changes proposed by external consultants. Consequently, the ERP project failed despite the firm had incurred a substantial amount of consulting fees.

Therefore, I would like to stress that an enterprise is ready for changes only if there exists an awareness for change among its management and staff. Tradeco's experience supports Lewin, Hiatt and Kotter's proposals that some of the steps need to occur before others to prepare an enterprise for changes. Although some critics denigrated their models as linear, prescriptive and top-down in nature, I can find some merits in what they have insisted upon (i.e. awareness and readiness development as a pre-requisite for change adoption). Moreover, it would be unfair for critics to assume that Lewin, Hiatt and Kotter wanted any organization to follow the steps of their proposed models in an overly rigid and prescriptive manner to preclude interactions among the various stakeholders, and levels of the organization. Instead, these models permit sufficient flexibility for adopting organizations to make adjustments to their actual change practices accordingly. Put simply, I believe that if there exists an awareness and readiness for change in an organization, there would be opportunities for innovative behaviour to occur. Innovative ideas may flow top-down, as well as bottom-up although leaders are always expected to play a leading and role-modelling role. In the Tradeco example, most workers and managers did not see the need for changes, and senior executives failed to reach a consensus about change directions, and their roles. Although external ERP consultants and a few professionals in MIS and the supply chain area had made reasonable suggestions for changes to the business practices and processes, their ideas were disregarded by the senior leaders and the rest of the organization. In this case, innovative ideas indeed arose at the working and middle management levels, but were ignored because of the aforesaid reasons.

Resistance explained

Resistance is an undesirable behaviour countering organizational changes. It is "any conduct that serves to maintain the status quo in face of pressure to alter the status quo" (Zaltman and Duncan 1977, 63) or the avoidance behaviour resulting from the inertia of the employees in coping

with changes (Rumelt 1995). Generally speaking, employees may become complacent and inert to change. People often get themselves locked in a situation which has worked well for, and provided some degree of comfort to them for a while. They may resist any threat to the status quo (Specter 1998).

Edgar Schein explained, in one of his articles, the process that an individual may go through before he feels the need to change (Schein 1996). He may see the need to change when he is dissatisfied with the information received, which consequently disconfirms his beliefs and assumptions (Schein 1996). Such disconfirmation arouses a feeling in the person, called "survival anxiety", that it is necessary to change for fear of failing to achieve his goals if the status quo is maintained.

However, it is also likely that he would brush aside the information as invalid or irrelevant, rather than accepting it immediately. It is commonplace for human beings to reject the disconfirming information upon receiving it since recognizing the problem is tantamount to admitting mistakes which may harm their self-esteem and even destroy their identity. According to the cognitive dissonance theory, some managers may accept information that confirms their beliefs and decisions while ignoring information that is inconsistent to their beliefs (Jones, Mills, Weatherbee and Mills 2006). Consequently, the problems that the organization is facing and the urgent need for adopting changes may be ignored until it is too late.

Schein (1996) identified another type of anxiety called "learning anxiety" that may arise when an individual engaging in a learning or change process has to admit his imperfections, or limitations. "Learning anxiety" would cause defensive or resistance behaviour against changes unless it is countered by a stronger level of "survival anxiety".

In some cases, resistance arises because of some undesirable conditions existing in an organization. For instance, the organization may not be ready for change, and the change initiative is perceived negatively as something imposed by senior management on employees. In any situation when the awareness of the need to change, or a sense of urgency does not exist, people may push back change plans proposed by top management. In an organization whose readiness level for change is low, people may lack the confidence and ability to carry out the change plans. Anxiety level grows if an individual perceives his own ability as insufficient for what the change plan requires. Any move challenging the status quo would be perceived as a chance for failure, or a threat to one's future and status in the organization. Moreover, these negative conditions can be exacerbated by improper leadership behaviour (as discussed earlier

in this chapter) that is not conducive to establishing trustful relationships with employees and other stakeholders. If proper actions are not taken to mitigate the negative conditions and to enhance organizational readiness, the situation would very likely take a downward spiral. The uncertainty about the future and the distrust among employees and management would generate more anxiety, stress, and resistance behaviour (Bruckman 2008).

Resistance behaviour discussed above may also be explained by the Conservation of Resources (COR) Theory. According to this theory, people strive to maintain and accumulate personal and social resources. Resources in this context may include objects (such as a car, a house, and other types of physical assets), conditions (such as job security, and career growth opportunities), energies (such as financial resources, and knowledge), and personal characteristics (such as emotional stability and self-confidence). Stress would ensue when a person perceives a threat to his resources, suffers an actual loss of resources, or lacks the opportunity to realize gains in resources (Hobfoll, Freedy, Lane, and Geller 1990). Employees may perceive organizational change as a potential loss. Such a perception may result in anxiety and emotional exhaustion, and negatively affect their attitudes towards changes, especially in a situation in which there is very limited social support from management to help them weather the difficult times (Hobfoll et al. 1990; Dubois, Bentein, Mansour, Gilbert, and Bédard 2013). The affected employees may become more defensive, and in a worse case, they may resist all the changes. In this sense, social support is a type of resources which may be manipulated by management to mitigate stress and to secure positive behavioural outcomes from employees.

In any organization that is not change-ready, the leadership should either suspend the change initiative, or take proper actions to secure support from employees and to improve the chance of success. There is no other alternative.

The negative and positive sides of resistance

External change agents (consultants) often indiscriminately describe the refusal by employees (change recipients) to do exactly what is prescribed as resistance, and attribute haphazardly their own failures to the latter. Nicholas, managing director of a global logistics firm, once told me that he was sick and tired of the "resistance" word which has been overused by external change agents as an excuse for explaining away the problems for which they should be held at least partly responsible. I need to reiterate that we must not brush off all dissenting opinions as symptoms

of resistance although resistance behaviour is genuine and harmful in some situations. Instead we should look deeper into the dissenting opinions and resisting behaviour to understand the underlying reasons. In some situations, people displaying such symptoms may have valid reasons to do so. Understanding the causes of resistance gives the change agents and the organization as a whole an opportunity to discover better business practices, and potential mistakes to avoid disasters (Ford, Ford, and D'Amelio 2008). Experience tells us eloquently that listening to and winning the resisters over is better than alienating them.

Personal factors for changes

Change is often negatively perceived by many people who react in ways that may adversely affect the change initiative. An individual's perception, attitude and reaction towards change are subject to the influence of many personal factors such as past experience, and personality traits. Change means uncertainty, and drastic organizational changes may be disruptive to an individual's status quo, forcing him to step out of the comfort zone. However such personal perceptions and attitudes towards change may likely be conditioned to mitigate resistance and to encourage co-operative behaviour through appropriate measures taken by change agents and the senior leaders of organizations.

Let us first understand how an individual perceives and reacts to traumatic news. Dr. Elizabeth Kubler-Ross described in her book, *On Death and Dying*, five stages a terminally ill patient (for instance, of cancer) typically goes through in reaction to doctor's prognosis, as shown in Table 6-2 below (Kubler-Ross 1969). A patient may first refuse to face the prognosis (denial), then feels angry, and asks why it happens to him (anger). He tries to seek ways to get out of the inevitable or to reduce the severity of the illness and live longer (bargain). Unfortunately, he eventually realizes that the prognosis is correct and the worst is looming. As a result, he naturally feels depressed (depression). While he knows that he cannot avert the inevitable outcome that he is dying of cancer, he gradually accepts the situation and tries to cope with it (acceptance).

Table 6-2 Kubler-Ross Grief Cycle

Stages	Descriptions and Behavioural Examples
	Adapted from Kubler-Ross (1969)
Denial	Patient refuses to admit the inevitable. "No, it isn't true." "It must be a mistake!"
Anger	Patient gets frustrated and angry, displaying a lot of emotions. "Why it is me?" "What did I do to deserve this?" "I have physical checkup every year. Why didn't the doctor find it earlier?"
Bargaining	Patient tries to find a way out of the prognosis, but in vain. "If I quit all bad habits, I should be able to win the fight." "I shall live a better lifestyle, I promise. It will improve my immune system." "I shall be happy if I can just live another four years to see my son completing his study in engineering school."
Depression	Patient begins to understand that the prognosis is inevitable and cannot be averted. He grieves the looming loss of life and everything. "What do I get by working so hard?" "At the end, you can't take anything with you."
Acceptance	Patient accepts and faces reality, and finds a way to cope with the outcome. "I just hope I don't suffer too much and leave comfortably." "I hope my wife and son are stronger, and continue to live a good life after me."

This model is considered applicable to situations involving organizational change and has been widely cited by consultants and academics. Though I think the model has been over-used by the change management literature given the enormous dissimilarities between the situations of personal health and organizational change, it still offers change agents some psychoanalytic insight into the evolving psychology of individuals affected by change (i.e. change recipients).

Since the 1990's, many middle-aged men and women have gone through the traumatic experiences of business restructuring. Organizational change is not new to mankind, but it has been employed as a popular tool to cure

corporate ills, and to seek extra profits and strategic opportunities in the last two decades and onwards. The early 1990's were bad years for both Canada and the United States, and news reports about restructuring and downsizing, and the resultant negative impacts on employees and their families filled the media. Many people who were used to the job security offered by large employers were shaken to find that even oil giants (such as Mobile, Syncrude, Suncor, and PetroCanada) and government departments followed the trend.

John, a retired warehouse supervisor of an automotive parts manufacturer in Mississauga, Ontario, recollected his ordeal that occurred in the early 1990's. When he and his co-workers heard of the CEO's restructuring plan, he couldn't believe it. When the plan was announced, there was not enough information to address employees' concerns, and thus rumours drifted around. The CEO planned to focus on the core production activities, re-engineer business processes, and seek opportunities to outsource some non-core functional units of his company. Logistics and warehouse, MIS, and some accounting units were to be affected. Inevitably, some jobs would be eliminated while some staff might join the service providers.

John was shocked when he first heard of the proposal. He worried about his job. At his late forties and possessing only a two-year diploma, he thought his chance of staying or joining the service provider was slim. His chance of finding career opportunities in other companies also looked bleak when so many underperforming firms in Canada were affected by the competition from south of the border after the North American Free Trade Agreement (NAFTA) was implemented. He needed to keep his job badly, to make mortgage payments for his new bungalow, and to support his son and daughter who were still in universities in Toronto and Vancouver. He was angry and frustrated. What good was it to work so hard for the same employer for 20 years? It would be unfair for the company to lay off experienced staff such as himself in favour of younger lower-waged employees. He blamed himself for not improving his opportunity in the company, and the job market, by completing his management degree in the evening. His worries were exacerbated by a lack of information from the top until later stages in the outsourcing endeavour.

An employee's own situational factors and ability, like John's, may exacerbate his anxiety and prompt negative reactions. Bad prior experience with organizational change may also account for a certain degree of discomfort in some individuals. Likewise, employees' distrust towards senior management would cause change initiatives to be viewed

with cynicism (Bruckman 2008). Such negative feeling would spawn lukewarm reaction, cynicism, and even resistance towards change if it is not averted.

A change recipient's psychological journey and coping behaviour may also be shaped by his personality traits. Dr. Michael Kirton discussed in his book, *Adaption-Innovation*, the distinct attitudes and behaviour towards changes of two types of managers, who differ in cognitive styles (Kirton 2003). Managers in one category are more adaptive and tend to focus on internal threats and incremental improvement, while managers in the other category are more innovative and tend to be more cognizant of external drivers of change and transformative opportunities. Individuals are not equal in personality characteristics. Those with a proactive personality may incline more towards challenging the status quo and engaging in innovative behaviour than others (Park, Williams and Turner 2006). Employees with a positive self-concept, that is, those who are strong in self-esteem and perceive their own capabilities favourably, may tend to engage in self-starting change behaviour while those who perceive themselves negatively may display tendencies to avoid complex tasks (Judge and Larsen 2001).

Employees affected by organizational change are psychologically vulnerable and unstable when they are anxiously coping with uncertainty. Suppose you are one of the senior leaders of John's company, what would you do? In the abovementioned example, what if the company's change vision and strategy were clearly established, and communicated upfront to the employees? It would help minimize the discomfort and anxiety felt by John and his colleagues if they could see their roles, career future, and benefits during and after the change.

Generally speaking, looming organizational changes in a company may create a period of uncertainty for all members. Such a vulnerable moment offers a window for the senior leaders of the company to take appropriate actions to win the employees over, and to turn them into proactive supporters of changes. From a behavioural perspective, the leaders may intervene into such situations by instituting appropriate measures (such as rewards, bonuses, and appraisal criteria), and offering career opportunities to encourage support from employees. Inevitably, there will be some layoffs in most restructuring initiatives. The leaders need to be frank and sincere in keeping employees informed, and to offer those affected adequate compensation and assistance (such as in re-training and job search) as early as possible. Social support offered by the leaders (and co-workers) would help improve employees' attitudes towards looming changes, turning those affected (i.e. those selected for severance, as well

as those selected to stay or to join the outsourcing services providers) into positive participants of changes (Hobfoll et al. 1990; Dubois, et al. 2013). Being frank and supportive to employees would be much better than being perceived as cagey and unfair. It is necessary to avoid damaging the trustful relationships between senior management and employees. The aforementioned practices may not be a panacea, but would surely help the affected employees to ride the psychological roller-coaster, and to cope with challenges more proactively.

In comparison to twenty years ago, we have already accumulated a great deal of understanding about organizational changes. Today we know better about what to do to improve the outcomes of organizational change initiatives.

Guidelines for change management

On the basis of the discussion in preceding paragraphs, I would like to present a list of guidelines for managing changes:

1. Get the whole organization ready for change.
2. Clearly define and communicate the vision and goals of change.
3. Clearly define roles and responsibilities.
4. Frankly and frequently communicate the messages and progress about change.
5. Make it known that change impacts will be handled fairly and professionally.
6. Appropriately use both external and internal resources (e.g. as change agents).
7. Use cross-functional teams.
8. Encourage new ideas from all levels of the organization, and remove the fear of penalty because of failure.

Recall the criticisms of Lewin's three-step change model, made by the emergent theorists, regarding its static and linear nature. I agree to some degree with the critics that the process of change management is very dynamic, involving intensive interaction of many players and contextual factors. However, Lewin, Kotter and Hiatt are correct that some steps must be performed first to build up the awareness and to mobilize the organization before actual changes can be attempted. Many projects in the past failed because the organizations attempting changes were not ready both psychologically and in terms of capabilities. Therefore, my guidelines

begin with those for building organizational readiness and consensus for change. My thoughts relevant to the abovementioned change management guidelines are explained further below.

Organizational readiness, visions & communications

Starting from the senior executives, all levels of the organization need to create a consensus for the need to change. This can be accomplished by the executives taking explicit roles in communicating and educating the members of the organization about the need to change and the negative consequences of not changing.

The vision and goals for organizational change must be established clearly. These will serve as the broad guidelines for the direction of change. Such visions and goals must be communicated clearly to the whole organization as early as possible.

Open communication among all levels of the organization throughout the stages of a change management project would help mitigate anxiety and fear arising from uncertainty. It promotes support from the stakeholders affected by changes.

Leadership

Leadership is a critical success factor in organizational change and enterprise system adoption initiatives. Readers should have no problem in understanding the importance of leadership while reading Kotter (1996) and Hiatt (2006). Kotter (1996) emphasized that a "guiding coalition" must be assembled, and a clear vision and strategy must be established and communicated to stakeholders. Senior leaders must also behave consistently as role models to promote supportive behaviour, at all levels of the organization, contributing towards the change initiatives. They have a visible and explicit role to play in sponsoring and leading change initiatives, and inspiring proper behaviour conducive to achieving the overall change vision. For such reasons, some members of the top management team should assume the critical roles of executive sponsors and champions. Their contribution at the vision and strategy level is indispensable to the health of the change initiative. Without a clearly defined vision and strategy to steer participants towards the right direction, the change efforts by various organizational units may become incompatible fragments that cannot be integrated.

The support and commitment from the top management team (TMT) are critical to many enterprise-wide initiatives as observed by consultants

and researchers. By contrast, initiatives lacking explicit and persistent commitment of the TMT are often found fraught with trouble (Law and Ngai 2007; Bruckman 2008).

Roles & responsibilities

Starting from senior executives, identify the roles to be played by key personnel at all levels of the organization. They will play pivotal roles as change agents, for instance, as champions of change. Senior leaders set the directions for change, but it is critical to get the people who are doing the work daily involved in finding the solutions. Delegate authority to empower middle managers and operational personnel.

Change agents are pivotal to the success of change projects. Some people often think of change agents as external consultants. In fact, change agents can be appointed from external and internal sources. Both types of agents have merits and demerits. External consultants are politically neutral or are at least perceived as so by stakeholders. They can stay aloof of the potential conflicts of interests within an organization. With extensive exposure to changes in many client organizations, they can contribute to an organization the best practices of a business sector. However, they may lack thorough understanding of the business practices and processes of their clients. Their ideas and proposals of changes may be criticized as infeasible and greeted with resistance from internal employees who are experts in their own jobs.

Internal change agents may help to address such a problem. Internal agents come from many sources and may carry the titles of champions, functional specialists, or process owners. External consultants and internal business specialists can complement each other in joint-teams. It creates learning opportunities for both types of personnel when they interact. External consultants' proposals can be reviewed and modified according to the business needs of an organization to minimize the likelihood of resistance from employees. Moreover, employees are more willing to accept the outcomes of change over time, which are perceived not as something being imposed on them by outsiders, but as their own contribution.

Use of cross-functional work teams

Cross-functional work teams are useful for bringing ideas and expertise together from people of different backgrounds. Teams can be formed by drawing members from external consultants, and internal

business specialists or process owners in various departments. It is not only an arena for facilitating cross-functional communication and exchange of expertise, but also a mechanism to improve the sense of ownership of the project and project outcomes.

In Controlco (refer to Chapter 10), a cross-functional team (called prioritization committee) was formed of managers, and business specialists from multiple departments. They worked together to investigate into ERP and business process problems and opportunities for improvement. As a result, not only information and skills were shared in the committee, but also the participants proactively assumed responsibilities for seeking improvement opportunities. They were more supportive of the decisions and outcomes resulted from the process.

Concluding remarks

We have reviewed the theories and principles concerning change management and discussed a set of guidelines for leading and managing changes. The practical experience and observations from the real-world discussed here would be helpful for organizations to distinguish good practices from bad ones.

In the next chapter, we shall examine the principles and techniques for business process improvement or re-engineering.

CHAPTER SEVEN

MANAGING BUSINESS PROCESSES CHANGES

Abstract

This chapter begins with an explanation of the approaches and levels of business process changes. The author clarifies the misconception about evolutionary and revolutionary process change approaches, which are termed business process improvement (BPI) and business process re-engineering (BPR) respectively. Contradictory to common beliefs, he points out that revolutionary BPR is not necessarily better than evolutionary BPI. He reiterates that organizations should adopt an approach which suits their needs, and the scope and context of their projects. In this chapter, he also discusses several guidelines for business process changes, especially those relevant to process changes in an ERP context.

Introduction

Information technology and system (IT/S) initiatives often require changes to business processes. Inevitably, business process change is both a critical requirement and an enormous challenge for enterprise resource planning (ERP) adoption. Nevertheless, ERP projects offer a precious opportunity and window of time for firms to review and transform their business practices and processes. Firms should think long and hard on how they would conduct business to enhance efficiency and effectiveness, taking advantage of ERP systems, and other enabling technologies that are to be implemented to support the ERP systems.

Business process improvement (BPI) and re-engineering (BPR) have become over-used phrases that both IS practitioners and laymen repeat all the time. However, the repetitive use of these terms often generates more

confusion than anything that is meaningful to the audience. In many circumstances, the meaning of such terms is not well understood by the parties involved in communication. There is also much hype associated with the acronym BPR, as many scholars and practitioners involved in information systems or change management tend to favour the revolutionary approach to process change.

In this chapter, I would like to clarify these terms in light of the reality, and to illustrate the various levels of business process changes that may be engaged by ERP-adopting organizations. This type of process changes is often termed "ERP-enabled business process changes" when we consider the context of such changes. Principles and techniques for business process changes are also discussed in this chapter.

Business process change approaches

Business process re-engineering (BPR) refers to the revolutionary approach of process changes, which often requires "rethinking" about, and drastically transforming the current business practices and processes of change-seeking organizations (Earl & Khan 1994; Hammer 1990). The advocates of this approach focus primarily on "obliterating" legacy practices and processes to avoid being straitjacketed by the constraints that exist in organizations (Hammer 1990). In other words, this is an approach that ambitiously pursues innovative business practices and process changes with little regard to existing practices. In fact, they consider existing practices obstacles in the path of seeking breakthroughs or quantum leap improvement for their business practices and processes.

Academic studies have also found that many firms have successfully made use of a "milder" evolutionary approach, which is referred to as business process improvement (BPI) (Harkness, Kettinger, & Segars 1996; Stoddard & Jarvenpaa 1995). This latter approach calls for less drastic changes to existing practices and processes. It is an incremental and evolutionary path a firm may follow to achieve improvement in business effectiveness and efficiency. By building on the existing foundation and making changes a step at a time, BPI is less risky than BPR.

Regardless of the approach adopted, business process changes aim at the betterment and simplification of current practices and processes, and are often considered critical for the deployment of IT and systems in many circumstances. Therefore, many practitioners and scholars consider business process changes an important organizational practice with the potential to affect the outcomes of IT/S adoption (Grover et al. 1998; Law and Ngai 2007).

The hype and reality

In the late 1980's and early 1990's, BPR, the revolutionary transformative approach, was favoured by many scholars and practitioners (Hammer 1990). They regarded it as the panacea for many problems existing in the bureaucratic systems of large enterprises, while paying little attention to the costs, and risks associated with drastic organizational changes. A radical revolutionary approach to business process changes may sound attractive to many. It legitimizes an organization's intention to eliminate the existing business practices and structures, and to start everything from scratch with all the freedom and flexibility one wants.

However, such freedom inevitably comes with a higher level of uncertainty and risk. As many have observed in the last 2 decades, leaders and consultants alike were often overly ambitious, and tended to set their idealistic BPR objectives too high. They were also too eager to drop the current business practices, and proven experience accumulated by the organizations as if they had no merits. Though successful cases have been reported, for instance, CIGNA Corporation's BPR initiative which resulted in a saving of $100 million (Caron, Jarvenpaa and Stoddard 1994), many BPR projects, unfortunately, did not realize what was initially anticipated. Failure rates of BPR projects were high, estimated at approximately 70 percent (Hammer and Champy 1993), or even 85 percent by a survey conducted in 1994 by Arthur D. Little, Inc. (Özcelik 2010).

As experience, both positive and negative, accumulates over time, business practitioners, and scholars become more sober in their choice of business process change approaches. Many of us begin to realize that the revolutionary approach is not always the best approach, and in many circumstances, the milder approach is more suitable. It is important to choose the approach or a combination of approaches that fits the situations of an organization (Stoddard & Jarvenpaa 1995) instead of superstitiously and faithfully following the revolutionary approach.

I have conducted a survey of large multinational enterprises operating in Hong Kong (and the Asia Pacific region) regarding the approaches that these firms used in their process change initiatives (Law and Ngai 2007). Ninety-six firms responded with complete data. Only fifteen of the ninety-six firms claimed to have used the drastic revolutionary approach (BPR) for business process changes in their recent ERP projects. Seventy-four firms reportedly used the incremental evolutionary approach (BPI).

This finding is interesting if we consider the diverse profiles of the responding firms. Among the ninety-six respondents are twenty-three Hong Kong firms (23.96 percent), thirty European (31.25 percent),

eighteen North American (18.75 percent), nineteen Asian (excluding Hong Kong firms) (19.79 percent), and six firms of unspecified origin (6.25 percent). Most of the responding firms are from the business sectors of wholesale, retail and import/export (29 firms, 30.21 percent), manufacturing (17 firms, 17.71 percent), finance (12 firms, 12.50 percent), and services (12 firms, 12.50 percent). We also have twelve firms reportedly engaged in multiple sectors, four in construction, two in property development, two in utilities, and one in hotel, restaurant and tourism, and 1 in unspecified sector. This is a sample of firms of very diverse backgrounds.

The finding implies that business practitioners are generally more pragmatic and cautious in their choice of business process change approach regardless of their background and business sectors. Instead of superstitiously pursuing radical transformation of their business processes, they prefer a practical approach which suits their situations. In fact, as briefly discussed in the previous paragraph, BPI would be less risky and easier to manage than BPR. The finding of this survey coincides with my observations in many ERP projects.

In order to determine the approach to be used, it is necessary to take note of the objectives and contexts for process changes. The experience collected from the ninety-six surveyed firms is primarily about ERP-based process changes. The main theme of this book is on ERP project management, and therefore, the reported research finding is highly relevant to us. Conversely, radical BPR may be more suitable for some situations, for instance, when an organization makes an informed decision to radically transform its business processes knowing that any improvement is impossible without eliminating its legacy organizational and business constraints, and the resulting benefits would more than offset the costs and risks of drastic changes. Other situations that may call for a radical approach include business restructuring, mergers and acquisitions, in which business units and product lines may be created, or eliminated.

The different types of changes are discussed further in the following section.

Circumstances and types of business changes

There is no precise definition to help determine what should be described as revolutionary BPR, or evolutionary BPI. In many situations, it is hard to draw a line between them. However, we can further examine the models, theories, and examples espoused by scholars to acquire a better understanding about both types of business changes.

Levels of business transformation

We shall begin our discussion using Venkatraman's 5-level model of business transformation (Venkatraman 1994). The phrase "business transformation" as used here has a generic meaning and does not imply only radical changes.

As shown in Figure 7-1, the lowest level of transformation, labelled "Localized Exploitation", refers to the improvement to business processes in some individual organizational units (i.e. at the team, functional, or department level), often with the exploitation of information technology and systems. Such improvements and automation are often achieved without considering the process and information needs beyond the unit's immediate organizational boundary. For instance, a human resources (HR) department implements a document management system to improve its processes of managing employee records and credentials. In this case, the scope of process changes is strictly a local phenomenon, and the implemented document system is only a localized functional system. Such a functional or departmental system is a disjoint stand-alone system which may be described as an information silo since there is no integration with systems in other departments.

Level 2 is labelled "Internal Integration" which represents a significant step above local exploitation. Business process changes are made to integrate business processes across the organizational units of a firm to enhance process efficiency. In order to transform functional processes into a set of integrated cross-functional processes, integrated information systems are implemented. More often, firms would adopt a commercial off-the-shelf enterprise resource planning (ERP) system instead of creating their own integrated systems today.

Generally speaking, there are 2 aspects to this level of integration, namely technical and business process integration. In Venkatraman's terms, they are technical interconnectivity, and business process interdependence. Implementing a technical means to connect the various internal functions is not sufficient. In addition to adopting an IT/S platform to realize technical interconnectivity, the business processes must be changed to realize an acceptable degree of integration. That is why I said earlier that an ERP project is a business project, rather than purely an IT project. Moreover, there must be an acceptable degree of mutual fit between the systems (e.g. an ERP) and the business processes in order to successfully exploit the system to support or to enable efficient business operations.

At the second level of transformation, firms may choose to revise their business processes, taking an incremental evolutionary approach, to integrate their internal processes within the existing framework of business routines. In some cases, limited changes may be made for improving the interfaces among the business processes of the various functions, just enough to link the processes of the functions. While an approach of minimal changes aiming primarily to connect the process segments to support an ERP may mean less work and lower cost, it is necessary to note the limitations and demerits of doing process improvement in a piecemeal manner. There exists a risk that the resulting processes of such an approach may not be seamlessly efficient. Indeed, less than desirable process outcomes have been observed in some projects. As it was pointed out by some scholars, such as Hammer and Champy (1993), there would be a limit to the benefits that an evolutionary approach can bring to an organization. Eventually, the incremental improvement or refinement of the existing processes may exhaust all the possibilities of changes. Further change efforts may become impossible or too costly without eliminating the legacy constraints that exist in the organization, after rounds of incremental continual improvement in the past. On the other hand, when the functionality of an integrated information system (such as an ERP) is super-imposed on the existing business practices and processes, it may be impossible to fully utilize its potential to maximize process benefits. Therefore, a revolutionary or radical approach to process changes, discussed below, has merits for such situations.

The third level, labelled "Business Process Redesign" in the model, calls for a re-examination and even obliteration of the existing business paradigm and processes in the course of maximizing the process capabilities of a firm and finding innovative ways of doing business. This is a revolutionary approach, also termed business process re-engineering (BPR), to break away from the existing (or legacy) organizational constraints, routines, and assumptions. Often, it may also result in organizational restructuring that would involve the redefinition of roles and responsibilities, and the creation or deletion of organizational units.

The fourth level of transformation, "Business Network Redesign", carries the concept further beyond the boundary of an organization. The first three levels of transformation have an inward focus, seeking to implement changes without considering business partners while the fourth level tries to bring changes to the collaborative business processes in the extended enterprises.

However, it must be emphasized that the focus of this level of transformation is not only on technical interconnectivity among business

partners but also on business process integration. Establishing an information linkage through electronic data interchange (EDI) or other forms of inter-organizational systems (IOS) is not sufficient by itself although such a technical capability enhances information exchange and transaction processing. Using this foundation of information sharing, firms participating in a collaborative relationship would eventually redefine their roles and responsibilities to maximize the benefits of being partners in the value chain. For instance, buyers and suppliers may redistribute their work responsibilities by a contractual agreement to put just-in-time (JIT) and vendor-managed inventory (VMI) practices in place. Through contractual agreements, firms can thus take advantage of the production and supply management competencies of suppliers, liberate themselves from non-core activities, and reposition themselves to focus on more critical tasks that they are good at. Thus, non-equity alliances between firms and business partners reduce the need for vertical integration. By doing so, firms eliminate the need to invest heavily to own the upstream or downstream players (as subsidiaries) of a value chain.

Collaborative business processes are usually supported or facilitated by an inter-organizational information system or an IT platform developed by the dominant firm(s) in these relationships. Business partners in such a supply network are interconnected by the IT platform, while business processes are designed or structured according to the responsibilities of the participants. For example, with its Retailink platform bringing together a complex network of suppliers, Walmart manages its global sourcing and supply chain activities efficiently and effectively. It must be noted that process changes and the associated benefits are not limited to transactional processing. Such technical interconnectivity and collaborative relationships among business partners would also enhance knowledge leverage among partners, as demonstrated in the joint product design practices of some firms and supply partners.

These developments in IT and systems capabilities, and in the roles and responsibilities in the global value chain often result in finer specialization as exemplified by collaborative manufacturing, and, at the farther end of the continuum of business transformation, the redefinition of business scope in some firms. That is "Business Scope Redefinition" at the fifth level of Venkatraman's business transformation model. Today, interconnectivity among firms, realized through the use of information systems and the Internet, enables firms to co-ordinate and control the design and production of goods by their international partners. Collaboration among firms and business partners in the global value chains begins from the

early product design stage and extends to the production, and, later, distribution of finished products.

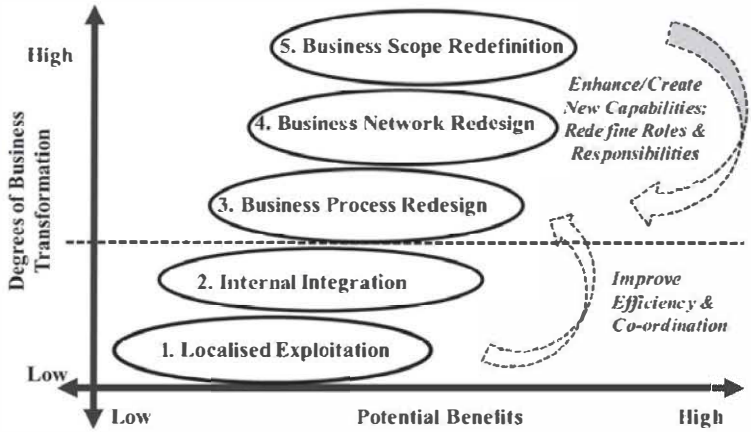
As it can be seen in various industries, profound transformative impacts have extended well beyond the transactional processes. Innovative practices are also observed in the processes of knowledge sharing, and product research and development among value chain partners. Thus, transformation goes well beyond the enhancement of business efficiency and effectiveness, to eventually affect the structure of some industries. For instance, Apple, Qualcomm, Broadcom, AMD, Mediatek, and Nvidia are fabless (or factory-less) goods producers (FGP) whose focuses are primarily on innovation and product design while they rely on manufacturing service providers (MSP) in Asia, for example China, for producing the goods. Apple conceptualizes and designs its iPhones, and Foxconn in China manufactures the products according to specifications. The same can be observed in the garment and shoe-making industries. Nike focuses on product conceptualization and design, while manufacturing tasks are outsourced to factories in China and Indonesia. The advent of information systems, and the Internet have triggered innovative ways of managing business, finer specialization in the global value chain, and more business restructuring through business scope redefinition, divesting, and mergers and acquisitions.

It is not surprising that a solid IT foundation enables firms to redefine their business scope and the ways business would be carried out. With such capabilities in place, firms can enjoy more flexibility, and find more choices to define or redefine their business strategies. Reitmans Ltd., a Canadian retailer specializing in women clothing, and Staples, one of the largest office supplies retailers in North America, took a very bold step to close hundreds of stores in 2013 and 2014, and to re-allocate their resources to the development of online sales channels. Their business strategies are to reduce operational costs, and to take advantage of the rapid growth in e-commerce. e-Bay and Amazon not only excel in what they do in their original business scope, that's C2C auctions, and online sales of books and CDs respectively. Both expand into other revenue models in recent years. Innovative firms such as Google and Amazon launched their online grocery business with same-day delivery services in 2013.

In short, I prefer to group the abovementioned changes into two major categories, namely process-level changes, and business strategy-level changes. The first type of changes primarily concerns with detailed business practices and workflows, while those in the second category have

very profound impacts on the types of businesses engaged, and product and service mixes offered by a firm.

Figure 7-1: Five Levels of IT-Enabled Business Transformation



Legend:
(a) Types of changes: Ovals 1 & 2: Milder evolutionary incremental changes; Ovals 3, 4, & 5: Revolutionary radical changes. **(b) Focus of changes:** Ovals 1, 2, & 3: Primarily inwardly focused on changes within organization; Ovals 4 & 5: Broader focus involving changes within organization and in value chain partners.

(Diagram adapted from Venkatraman (1994))

Information systems and business process changes

Theoretically, business process changes (i.e. BPI and BPR) do not have to be associated with information technology, and systems (IT/S). Organizations may (and should) analyse and improve their processes continually with or without the use of IT/S, often as a sound practice of total quality management (TQM). In the example given above for "localized exploitation", the HR team may streamline and improve its processes of distributing, and filing HR-related documents without using some forms of computer-based information systems. It would still be considered a valid form of business process improvement, though implementing process changes without exploiting technologies and systems is rare nowadays. In this respect, I agree with Venkatraman on the enormous potential contribution of IT and systems to business management at both operational process and business strategy levels.

In many situations, new technologies and systems can be used as pivotal enablers for innovative business practices and processes which may otherwise be infeasible under the constraints of outdated legacy systems. Google and Amazon's online grocery services in North America, and Tesco's Home Plus grocery services launched in South Korea are interesting examples for using IT as business enabler. IT enables business strategies and creates new business opportunities.

Here, I shall illustrate Orbis Group's experience (Turban, King, Viehland and Lee 2006) to show how IT and systems contribute to innovative work process in Australia's advertising sector. Traditionally, when a retailer wanted to print an advertising brochure or product catalogue, it would contact the manufacturer to request product photographs to be sent to the designated advertising agency by courier service. After selecting the photographs among those received, the agency would send them back to the retailer for approval. In situations that the retailer refused to approve the photographs, they would be sent back to the advertising agency for redesign. It might take rounds of couriering before design was finalized and accepted by the retailer. Then, the agency would send the approved photographs out for scanning and conversion to digital images. After digitization, the photograph files would be sent to a print shop to produce the brochure or catalogue. This was a time-consuming and costly linear process. It roughly took four to six weeks and one hundred and fifty Australian dollars to prepare a product photograph for brochure printing.

Orbis, an Australian Internet and e-commerce services provider (which became a unit of Infor in 2012), implemented a hub solution to radically transform the work processes for brochure production. It created a product database (productbank.com.au) to store digitized product images supplied by manufacturers. The above-mentioned players can now access the product bank directly. A retailer views and selects product images to include in brochures and catalogues, and communicates its choice electronically with the advertising agency. Upon receiving such information, the agency can download the digitized images, complete the required designs, and upload them back to the database for online viewing and approval by the retailer. After retailer's approval, the printer downloads the photographs required for printing.

I consider this kind of process changes "re-engineering" because of the radical transformation of work practices brought about by Orbis' hub solution. The work process was transformed from a sequential one to a parallel one, in which the way of interaction among players is entirely different from that required by the traditional processes. This solution

simplified the communication among the players, eliminated the logistics chore of couriering photographs and design packages back and forth, and reduced the cycle time of production by fifty to seventy percent, and transaction cost by thirty to forty percent (Turban et al. 2006).

The symbiotic relationship between process changes and ERP implementation

In ERP adoption, organizations often choose to improve or redesign their business processes to narrow the gap, or improve the fit, between the native ERP functionality and their business requirements. By doing so, the need to customize (or modify) the ERP package is greatly reduced. This is important because it would be too costly and risky to maintain and support a highly customized ERP system in the long run. When the symbiotic relationship between deploying ERP systems (or other types of information systems), and business processes improvement is examined from a different perspective, it is obvious that business processes must be improved before implementing the systems in order to maximize the benefits of system investment. Implementing information systems without attempting to find a better way to do business is analogous to throwing money at a problem, with the expectation to address it by brute force. Thus, information systems adoption and business process changes are often pursued together in quality management initiatives.

Unlike the examples of IT-enabled transformation discussed by Venkatraman, it is true that the world has also seen many business restructuring decisions, such as divestures, and mergers and acquisitions, driven entirely by profit seeking and cost reduction goals, rather than IT-related objectives. However, many such cases of mergers and acquisitions have eventually resulted in the needs of deploying and utilizing information systems to help co-ordinate, and manage the restructured business organizations. It shows how closely business changes and information systems are related.

Choosing business process change approaches

We have discussed the levels of business process changes, and the evolutionary (i.e. BPI) and revolutionary (i.e. BPR) approaches of changes in preceding paragraphs. At least two relevant questions may be asked at this point of time:

- Is it possible to clearly define what evolutionary and revolutionary changes mean?

- Under what circumstances should we choose the evolutionary or the revolutionary approach for our business process endeavours?

These are good questions. Unfortunately, I do not have a perfect and unambiguous answer for them. However, I shall try to share my thinking and experience with readers. Indeed, there is not an objective and hard-and-fast rule to define what evolutionary changes and revolutionary changes are. Likewise, it would be difficult to define how radical a change has to be in order to be considered revolutionary.

Let's look at what I think radical revolutionary transformation is. In my opinion, a radical approach in an IT-based business process change project calls for eliminating entirely the existing legacy processes or at least the "majority" of such processes, and replacing them with innovative practices. This approach often results in drastic redefinition of job roles, and possibly in the elimination or creation of organizational units. By contrast, the evolutionary approach calls for making changes in smaller steps, which could also be described as a gradual refinement of processes. In a BPI initiative, we make improvement to existing practices and processes with the intention of keeping the current organization and process framework as much as possible. Although evolutionary changes may also lead to changes in the responsibilities of some staff, the extent of change is often limited. When it is viewed from the perspective of time, the scope of change for a BPI project is milder, while a BPR project is more intense, trying to accomplish much more in a similar timeframe.

The changes described above for an ERP adoption setting are most likely process-level changes. On the other hand, business strategy-level changes, that is, business scope redefinition or re-structuring as in the cases of divestures, and mergers and acquisitions, would result in drastic changes at the organizational level, and eventually, in the operations of the organization. Thus, business strategy-level transformation would be more likely than not radical revolutionary transformations.

We have looked at the characteristics of two broad types of changes, i.e. business process-level, and strategy-level changes, in the above discussion. It is important for organizations to determine the context, objectives, scope, and risks of changes in order to decide which approach of change is adequate for their business change projects. In the case of IT or ERP-based process changes, the context, and objectives are (1) to take advantage of system features to improve business processes, and (2) to

achieve the required level of system-process fit. If it is feasible to achieve these two objectives without obliterating the entire existing framework of organizational structure and business processes, an incremental evolutionary approach (i.e. BPI) may be adequate. In such a situation, why should a firm engage in risky and costly radical business process re-engineering? Of course, I have seen situations that call for very drastic changes because the legacy practices and processes were too outdated and poorly managed. In such cases, it was unwise to do incremental changes as patchwork would not address the legacy problems but would certainly hamper ERP utilization.

In summary, I would urge project managers to consider the needs of their projects, and not to over-aggressively pursue radical re-engineering unless the costs, and risks can be justified by potential benefits.

Business process analysis and process models

Business process analysis may occur in an organization regardless of whether it has the intention to deploy an ERP or not. Organizations should map and document business processes as an on-going means for managing the processes, training operations personnel, and sharing processes-related knowledge with internal and external stakeholders.

Business process analysis is also termed process mapping, and is regarded nowadays as a kind of activities essential to sound business management. It is an activity often performed as part of total quality management (TQM), and knowledge management practices. In an exercise of business process mapping, an end-to-end business process is decomposed into a set of related activities, to identify the value adding and non-value adding activities. Processes can be improved when their non-value adding activities are reduced or eliminated.

ERP adoption is one of the most important and expensive investment initiatives of modern organizations. As in many IT/S initiatives, ERP adoption requires a thorough understanding of, and in many situations, changes to an organization's business processes as pre-requisites. Given the nature of ERP systems, there exists a very close relationship between the business processes and the adopted ERP of the organization. For this reason, scholars and practitioners are convinced that ERP deployment should be viewed as a business project rather than a technical one. The business processes of a firm must be documented and analysed during the planning, and subsequent stages of an ERP lifecycle. Process analysis occurs early in the full ERP lifecycle, although it may be performed at a high level, rather than at a detailed level, to prepare the organization to

solicit proposals from ERP vendors. As discussed in Chapter 3, the first step an organization would take is to generate a request for proposal (RFP) to solicit vendors' responses. The high level business processes, if detailed process information is not yet available, of the organization need to be presented to the vendors at this time. Such an RFP initiates subsequent rounds of communications between the organization and prospective vendors. As mentioned before, gap analyses (or fit/gap analyses) may occur many times during ERP evaluation and selection processes. These exercises aim at identifying the discrepancies between the organization's process needs and ERP product features, and discovering opportunities for rectifying such gaps and improving the business practices and processes.

The ERP selected would be implemented (configured) only after business process changes have been identified, fully understood, and justified. It may go through rounds of business process improvement (or re-engineering) sessions, resulting in various versions of current and future business processes models. "As-Is" process models are those that document how business is performed currently, along with the strengths, weaknesses and constraints identified. On the other hand, "To-Be" process models document the desirable (or optimal) processes to be implemented in the organization. Comparing the current states of processes with the desired states leads to the generation of opportunities for improvement (OFIs). For instance, the current legacy system may provide functionality of creating quotations (or internal purchase requisitions) but it does not provide a means for converting the information to sales orders (or purchase orders). If a system permits automatic generation of such documents from quotations and purchase requisitions, it may improve the business processes and save time. Another example of OFI is the identified need for regional inventory visibility in a multinational firm operating in the Asia Pacific region. The current inventory practices and systems only maintain inventory information of the firm by country and do not support the sharing of such information across countries. Inventory visibility across the operations of many countries in the region, enabled by an information system or web-based solution, would help reduce obsolete inventory and backorders, and improve on-time delivery to customers by the promised dates through sharing inventory between operations in adjacent countries. These are all legitimate opportunities for improvement.

In this chapter, our discussion primarily focuses on business process changes in an ERP context (i.e. ERP-enabled business process changes). In order to identify OFIs, the business process models also need to be compared to the native features of the ERP product selected by the organization. Discrepancies are identified, followed by strategic decisions

on the approach taken to address such discrepancies (i.e. through business process adaptation, or ERP adaptation). The former requires process changes, while the latter refers to modifications (or customizations) to be made to the ERP.

In the context of an ERP project, native ERP features are enablers as well as constraints since the organization cannot have all the freedom to do whatever it desires other than configuring the features of the purchased system to fulfil its process needs. Consequently, the resulting "To-Be" process model is often a product of compromise balancing the risks, costs, constraints and benefits, rather than one adhering to idealistic thoughts.

Opportunities for improvement

The exercise of identifying opportunities for improvement (●FIs) conducted by an organization helps it to resolve and justify many issues, namely, the investment in an ERP, the selection of an ERP product, and the business-level and process-level improvements to be realized for the organization. Thus, ●FI identification is an important element of business process and ERP projects. Business processes are examined throughout the various lifecycle stages, including the post-implementation stage to pinpoint new opportunities for changes.

●f course, the identification and management of ●FIs are not limited to ERP implementation projects. ●FIs may arise from many sources, for instance, to name just a few:

- internal and external audits,
- quality management, or process improvement reviews;
- errors reported by business staff, or system users; or,
- suggestions made by employees, customers, and other stakeholders.

●rganizations will find it beneficial to establish a practice for managing ●FIs as a critical means for continuous improvement. Regardless of the mechanisms used, automatic or manual, the following information elements need to be captured:

- Initiator of ●FI, and organization unit;
- Date ●FI is submitted;
- Control number assigned to ●FI;
- Problem identified;
- Description of opportunity;

- Priority; and
- Investigator/analyst assigned to handle the ●FI.

Note that in an ERP environment, the ●FI identification process should be managed consistently with the ERP maintenance and support process. Please refer to Chapter 8 for more discussions on ERP post-implementation issues.

Roles in business process exercises

As discussed in the previous chapter about change management, external consultants are an important source of experience in business process changes. They often bring the experience and knowledge of best practices from other organizations in the same or different business sectors. They are also trainers and coaches for business process change methodologies and techniques. Because they are perceived as more politically neutral than the employees of client organizations, they can often facilitate process changes more effectively.

However, organizations should not rely on external consultants alone. The involvement of internal staff is an essential element for successful process changes since they are the people who know about their own business operations better than outsiders. Moreover, getting employees involved would increase their sense of ownership of the proposed changes. This would make sure that they would support, rather than resist the changes. As discussed before, key business users or process owners should carry very important responsibilities in process changes.

In addition to key business users and managers, systems analysts and business analysts of the MIS organization should develop the business knowledge, and skills for managing and facilitating process changes. Internal expertise in project and change management would enhance an organization's capabilities in continuous improvement, without relying heavily on external consultants. Internal experts and managers should also shoulder the critical roles of educating business leaders on the importance of on-going business process management, and seeking their unswerving support for potential opportunities of improvement.

Guidelines of business process changes

Much experience has been accumulated over the years for business process changes. Below is a set of guidelines that are applicable to process changes in ERP, and non-ERP contexts. These are specific guidelines for

making process changes, while I consider the change management guidelines discussed in the previous chapter general guidelines to establish the conditions for successful changes. For instance, I often stress that it is necessary for senior management to reach consensus for the goals and directions of changes. Moreover, leaders and staff need to be supportive of, and be willing to participate in business process changes. When these conditions do not exist in an organization, the specific process change guidelines and efforts would likely be futile.

1. *Simplify and standardize processes and eliminate non-value adding activities.*
   Decompose a business process into activities. Non-value adding activities are eliminated to simplify the process, and to shorten the cycle time taken to perform the process. The steps or activities of the process are standardized after redundant steps are eliminated, and only those essential steps that add value are included in the process. As a result, the "To-Be" process, requiring a set of consistent and essential work behaviour, becomes more efficient and effective. This is an important factor for quality improvement.

2. *Digitize and leverage accurate information as early as possible and as much as possible.*
   Efficient and effective business processes require consistent, accurate and timely information. Digitize or enter data into the system to enable sharing among various actors without delay. It should be completed as early as possible to eliminate the duplication of such efforts later along the process. Having one point of digitizing and entering data as soon as it arises also minimizes opportunities for error. Data should be entered into the system by the actors who originate the data. For instance, whenever possible, let customers enter sales orders into the system.

3. *Parallelize tasks whenever feasible.*
   Some activities in a process must be executed sequentially. In such circumstances, activity 1 must be completed before activity 2 because the latter depends on the results (output) of the former. Identify activities that are not constrained by such inter-dependence, and perform them in parallel to expedite the process.

4. *Simplify interfaces (hand-offs) between activities or sub-processes of a process to achieve seamless integration.*
   Poorly handled interfaces between activities/sub-processes often slow down a process. Improve and simplify the interfaces to expedite the process.

5. *Maximize benefits from cross-boundary integration.*
   Take a process-oriented, rather than a function-oriented, perspective in redesigning processes which span across the departmental boundaries of an organization. Moreover, this approach is also applicable for improving the collaboration across organizations.

6. *Clearly define roles, responsibilities and authority of actors.*
   The roles, responsibilities and authority of actors involved in the activities of a process must be clearly defined. Ambiguity spawns conflicts, and causes delays in executing the process.

7. *Change organizational structure if necessary.*
   Merge, create or eliminate organizational structures to support the needs of the "To-Be" process. Eliminate ambiguity in responsibilities, and authority by merging or eliminating redundant organizational units. Simplifying organizational structure not only would reduce process-related costs, but also improve efficiency and cycle time.

8. *Leverage information technology and systems as enablers of changes.*
   Always consider using information technology and systems, and any technology that may enhance process efficiency and effectiveness, and enable innovative business practices. Technologies and systems are important elements in process improvement or re-engineering.

A process change example

Tradeco's sales order fulfilment process

In this section, we shall analyse the sales order fulfilment process of Tradeco following the guidelines discussed above, identify the problems of the current ("As-Is") process, and propose changes to it.

Tradeco's business divisions and order fulfilment process are described below. Please also refer to Chapter 9 for more information about this firm.

The company has three divisions offering different kinds of products and services, namely, (1) reselling of computing software and hardware, (2) hardware installation and repair services, and (3) total solutions, serving corporate and government customers. Each of these divisions was headed by a general manager (GM) who reported to the Managing Director (MD) of the company.

This company used a highly customized legacy system, named Trading Information System (TIS), which consisted of a full set of financial and sales modules, including general ledger, accounts payable, accounts receivable, and sales order management. Procurement and inventory management were stand-alone systems separate from TIS.

The procurement, and logistics and warehouse teams, each of which was under a team manager, reported to the Senior Manager of Logistics and Procurement who, in tum, reported to the Executive Director and Financial Controller. The logistics and warehouse team assumed the responsibilities of dealing with customers, making delivery arrangements, and managing the warehouse. Moreover, it was the contact point between the Department of Logistics and Procurement, the salespersons, and the Customer Services Department (CSD). CSD reported directly to the Managing Director, but not to any of the sales general managers or the financial controller. It was supposedly the company's primary customer service unit. On the sales order form was printed the CSD hotline number for customers to call for matters concerning sales orders, such as order status enquiry and delivery arrangements. However, as you would see later, its responsibilities overlapped with those of other teams.

To keep this discussion simple, we shall focus on the sales order fulfilment process of the reselling business. Tradeco began to source the required hardware and software from suppliers after a sales order was raised. The procured products were marked up on top of the costs charged by suppliers. The company's policy was to avoid keeping inventory since computing technology could become obsolete rapidly, and the prices of computing products might change too fast. The company tracked actual costs for each sales order. In some circumstances, it might have inventory on hand for some items because of the following reasons, namely (a) cancellation of customer orders, and (b) items purchased in larger quantities to qualify for quantity discounts.

When a salesperson in the reselling division received a request from a customer, he first checked pricing and other product information, such as the quantities on hand (QOH) for the relevant products, and issued a quotation for the customer.

Upon receiving confirmation from the customer, the salesperson (or sales assistant) generated the sales order, and entered it into the sales order management system. He then printed four copies of the order using a standard form. One copy would be sent to the customer, and the rest would be for filing by the sales team, CSD, and the logistics team. He also issued an inter-office sales memo listing the sales order requirements. The memo and the sales order copies were sent as a package to CSD and the logistics team respectively by internal office mail service.

If there were insufficient quantities on hand for the order, he would state on the sales memo the quantities of products to be purchased by a certain date. If there were sufficient quantities in stock to fulfil the order and the salesperson would like to reserve the products, he needed to either state this request on the memo, or communicate with logistics staff by phone or by email. The salesperson also needed to establish the promised delivery date which would be communicated to the customer as soon as possible. He would also inform CSD, and the logistics team of the delivery date by phone or by the sales memo. The logistics team made delivery and physical transportation arrangements, according to the promised delivery schedule.

The CSD might also check the availability of the products required by the sales order, and issue an inter-office memo to the logistics team as a reminder of sales order requirements.

Regardless of the actions taken by the sales and CSD personnel, upon receiving a sales order and the associated delivery schedule from the sales team, logistics staff had to go through the steps of checking stock levels, issuing purchase requisitions, and obtaining approval from the team manager. The approved requisitions were passed to procurement staff who contacted the suppliers or their agents, negotiated with them the prices and other relevant matters, and eventually issued the purchase orders to the selected suppliers.

In most circumstances, the goods required for each sales order would be delivered to the customer in one shipment. Only in some situations, sales orders might be fulfilled by more than one shipment.

For every shipment of a sales order, the logistics team generated the delivery memo, and picking and packing slips in duplicates, and contacted the customer to confirm delivery arrangements, including customer's ship-to location, the contact person of the location, and the date and time adequate for delivery. Copies of the picking and packing documents were distributed to the sales team and CSD for reference.

In Tradeco's delivery practice, the delivery memo (and carbon copies) would be signed by the customer after the shipment was inspected and

received. One copy of the delivery memo was given to the customer. The remaining 4 copies were returned to the salesperson, CSD, and the logistics team for filing, and the accounts receivable team for recognizing revenue and invoicing.

Is there anything wrong with this sales order fulfilment process? Are there opportunities for improvement? Pause and think about it before we continue our discussion.

Problems of the "As-Is" process

Before we analyse the problems of this process, please review the guidelines that we have discussed in the previous section. It would give you some hints about the problems and opportunities for improving the process.

The "As-Is" process was depicted in a swim lane flowchart in a simplified manner to illustrate the problems (Figure 7-2). For clarity, some of the process steps were omitted from the diagram. For instance, in reality, there were normally rounds of interaction between a customer and a salesperson before a sales order was generated. The salesperson, upon receiving an indication from the customer of computing needs, checked for product information, and issued a quotation (in this case, offline using PC software tools). After the quotation was accepted by the customer, a sales order was generated and entered into the sales order management system. Then credit analysis and approval was usually performed. These steps were not included in the diagram. Neither were the steps concerning invoicing and accounts receivable performed by the finance teams. Although a good practice for flowcharting is to represent each activity by a separate activity symbol, some activities were combined in the diagram. Thus, in a few situations two activities were described by a single activity symbol in the diagram. We shall follow the same simplified approach in depicting the "To-Be" process later (Figure 7-3).

The current process had several major flaws. Firstly, the sales order fulfilment process was not supported by an integrated system. The information needed by the staff in various organization units to complete the sales order was stored in different systems. Much of the communication across teams was implemented using inter-office memos and other paper documents.

Secondly, there was a great deal of duplication of efforts across functions. The sales team raised sales orders, checked [illegible]H, defined delivery schedules, and set promised delivery dates. Sales staff also communicated the delivery schedules with customers. Much effort was

repeated by CSD and the logistics team. For instance, both teams checked ●●H regardless of what other teams did or would do. The logistics team always communicated directly with customers to confirm finalized delivery arrangements. This duplication of efforts not only resulted in wasted time and resources, but it was also not conducive to co-ordination and order fulfilment cycle time improvement.

The third problem was related to the organizational structure of the firm. As discussed above, there was a severe duplication of efforts by teams involved in sales order fulfilment. If we look deeper into the problem, such duplication of efforts was a result of poorly defined responsibilities.

The most notorious example was CSD. How much of CSD's work concerning order fulfilment was uniquely performed by the department, and not by other organizational units? Did CSD produce much original information in carrying out its activities?

CSD received sales order information and tentative delivery schedule from the sales team. Upon receiving enquiries from customers regarding order status, CSD staff needed to talk to the logistics team for updates about the sourcing of the required goods, and for actual delivery arrangements. CSD did not generate much original information but only answered customer enquiries by relaying information gathered from other teams. It is questionable whether Tradeco needed the CSD if most of its activities were redundant. We shall discuss this issue further when we examine the opportunities for improvement.

Logistics and procurement staff interviewed in this study told me that they had to perform the tasks of checking inventory, reviewing sales order requirements, and issuing purchase requisitions and orders regardless of the actions taken by the other teams. They carried the ultimate responsibilities for delivering the sales orders. Even if the sales team and CSD did not check ●●H and issue memos concerning sourcing requirements, they would not be blamed for any customer complaint. The buck was always passed to the logistics and procurement teams.

CSD attempted to help co-ordinate delivery by going between customers and the sales and logistics teams. However, as mentioned earlier, it simply relayed information, and could not confirm anything regarding delivery arrangements without consulting the logistics team. According to logistics staff, they preferred to contact customers directly to confirm delivery arrangements to prevent miscommunication through a middleman (i.e. CSD), because they knew too well that they would bear the ultimate responsibilities for order delivery.

Not every general manager (GM) agreed with the roles played by CSD. One of the divisional general managers expressed his criticism of CSD in the interview. He considered CSD's contribution too low to justify the cost of maintaining six to seven extra headcounts who "primarily repeat[ed] the information they gathered from other teams." CSD was initially created by the previous managing director (MD) who thought that it was important to have a centralized CSD to handle all customer complaints and sales order-related matters. Even more important was that CSD was under his control. The current MD was a supporter of the former MD, and when the latter retired, he was promoted from the position of divisional GM to the current position. CSD was headed by a woman who was a member of his in-group. He continued to support the CSD, and also wanted to enhance his ability to monitor and control other divisions. Thus to him, CSD served a political purpose in addition to customer satisfaction.

The "To-Be" process model and opportunities for improvement

Consultants had proposed several process redesign options for Tradeco. The "To-Be" process model of Figure 7-3 was developed by me on the basis of the ideas that were discussed in the interviews with Tradeco managers and staff who recollected the suggestions made by consultants. Like the "As-Is" process diagram, some details were omitted from this diagram for the sake of simplicity.

The proposed process model represents one of the possibilities for redesigning the order fulfilment process to address the aforesaid problems. We shall also discuss other alternatives for process redesign later. This model depicts a streamlined and simplified sales order fulfilment operation. It requires restructuring the teams involved in the process and clearly defining their authority and responsibilities. CSD is to be merged with the logistics and procurements teams, with the possibilities of headcounts reduction. This new organization would be renamed Department of Customers and Supply Management (CSM), with sub-teams for customer services (CSM-CS), procurement (CSM-Procure), and Logistics & Warehouse (CSM-Logistics & WH). This restructuring clarifies the responsibilities of every team and eliminates duplication.

Under this proposed process, there is only one team (CSM-CS) in the company dedicated to customer services and scheduling of delivery, though customers can still interact with their salespersons or account managers. After a sales order is generated by the sales team, the CSM-CS team is responsible for following up with the customers for order fulfilment requirements and scheduling. It checks the quantities on hand

(●●H) of sales order items, and issues and approves purchase requisitions which are routed to the procurement team (CSM-Procure) for handling. The separation of responsibilities is clear under this design. The CSM-CS team also co-ordinates with the CSM-Logistics & WH team to schedule shipment (Guidelines 6 and 7).

With the establishment of the CSM-CS team, the responsibilities of the CSM-Logistics & WH team are reduced to provisioning physical logistics and warehousing services. CSM-CS is responsible for coordinating with, and assisting customers.

Contribution of ERP systems

Adopting an ERP system would further improve this process since the communication between sales staff, CSM teams, and others can be enhanced. When a salesperson negotiates a sales deal with a customer, he needs to check the quantities on hand of required stock items, and other product information before issuing a sales quotation and a sales order. With an ERP, product information can be queried promptly from the centralized database of the ERP system by all the staff involved in sales order generation and fulfilment without having to log on to more than one system. Many redundant and non-value adding activities of querying for information and distributing inter-office memos and documents could be eliminated (Guidelines 1, 4, and 5). With efficient and effective information sharing, the order fulfilment process and related decisions could be handled in a better manner (Guideline 8).

Issuance of purchase requisitions by CSM-CS staff, and approval by supervisors can be accomplished online. Depending on the functionality of the selected ERP, it may be possible to simplify purchase order issuance by converting approved purchase requisitions to purchase orders. Similarly, ERP systems may be set up to convert sales quotations to sales orders (Guideline 8).

Thus, with an integrated ERP system, many previously offline activities (such as developing quotations) would be performed online. Sales orders and fulfilment-related information will be entered into the system as soon as it is created. The database is updated in real-time to enable operational visibility and co-ordination across all the teams involved (Guideline 2). There is no need to circulate inter-office memos and hard copy documents with an ERP. In fact, it is desirable to minimize the printing and circulation of hard copy documents if the ERP and its workflows have been configured properly.

Alternative process change opportunities

The above-mentioned process changes could be categorized as revolutionary changes at the third level of Venkatraman's five-level model of business transformation (Venkatraman 1994). Though the suggested changes may not be the most radical, they after all would bring about substantial changes to how sales order fulfilment would be performed in Tradeco. For instance, the inter-office memos will be eliminated while team structure and responsibilities will be redefined. Without these changes to the company's business processes, it would be impossible to implement the ERP chosen.

Of course this was not the only design the company might consider. Consultants had proposed other alternatives for business process changes. As an alternative design, the original CSD may retain its independent and centralized customer management role. The CSD and its reporting relationship would be kept intact in this design. After all, it makes a great deal of sense for Tradeco to have a centralized CSD, which would be a critical contributor to service quality and customer satisfaction if it is used properly. If so, the responsibilities of the original logistics-related teams would be reduced to focus on procurement, delivery and warehousing services. The CSD would be responsible for coordinating between customers, sales staff, and the logistics teams, issuing purchase requisitions, and reserving products. This design would also eliminate duplicated responsibilities and simplify the "As-Is" process.

Other variations to what is depicted in the "To-Be" process model of Figure 7-3 may be worth considerations too. For instance, it was suggested by the consultants that purchase requisitions could be initiated by sales support staff and approved by sales managers. Likewise, consultants believed that these sales users could also be granted the responsibilities and system access to reserve products if there were sufficient quantities available for their sales orders. This also makes sense since it empowers them to guarantee the fulfilment of their own customers' needs. Though CSD would still have the responsibilities and system privileges to make inventory reservation, this variation in design would be unlikely to cause any serious conflicts or duplication of efforts.

The consultants also had suggested a review of Tradeco's costing system, and bill of materials practices. These ideas could result in very radical and fundamental revamping of Tradeco's business practices if they were accepted by management.

Improvement unaccomplished

These proposals would result in significant changes to Tradeco's sales order fulfilment process. Unfortunately, they were not implemented because of resistance from various teams. The elimination or restructuring of CSD was a sensitive issue and it never gained the support of the managing director, according to the general manager of the reselling division. While middle-level managers and employees had concerns about their own interests, and greeted the proposed changes with lukewarm support or even explicit resistance, the top management team did not assume a leadership role in steering the ERP and process change project towards the required goals. Senior leaders either could not reach a consensus among themselves regarding the urgency and the approach for changes, or they did not want to be involved. They left the responsibilities to the MIS department and operational managers. This case study reminds us that business process changes often involve office politics, and require the unswerving support of not only workers but also managers at all levels.

Traditionally, the company used a primitive in-house developed system for maintaining the relationships between the components of products ordered by customers. Tradeco's management believed that a full-scale bill of materials system was not necessary since they only wanted to link the sales order items and their sub-components together.

The company used actual costing as the costing standard since the first day of business operations. The consultants' preliminary suggestion of changing the accounting standard to standard costing was considered too risky as soon as it was brought up in their early meetings with Tradeco's leaders.

Because of the resistance to process changes at both staff and management levels, the consultants had presented to the top management team the problems and risks about the ERP project and asked for directions and support. They were told to replicate the functionality and processes of the "As-Is" environment. At the end, this ERP project was turned into a disaster. (More details about Tradeco's ERP project and malpractices will be available in Chapter 9.)

Concluding remarks

This chapter has examined the concepts and guidelines for business process changes, and discussed the experience of a company (i.e. Tradeco) in the real-world. Through examining the various process redesign

alternatives of the company, the guidelines of process changes are illustrated.

According to the case study, it is obvious that there exist many alternatives to address the opportunities for improvement. Surely, there would be uncertainty for implementing any of the proposed changes. Thus, it requires the knowledge and united effort of the members and leaders of the company in order to be successful in the ERP and process change project. Similarly, many organizational factors, including leadership, role modelling by leaders, and involvement by management and users as discussed in the previous chapter, are critical to the success of ERP adoption, and business process changes.

Figure 7-2. The "AS-IS" Model of Tradeco's Sales Order Fulfilment Process

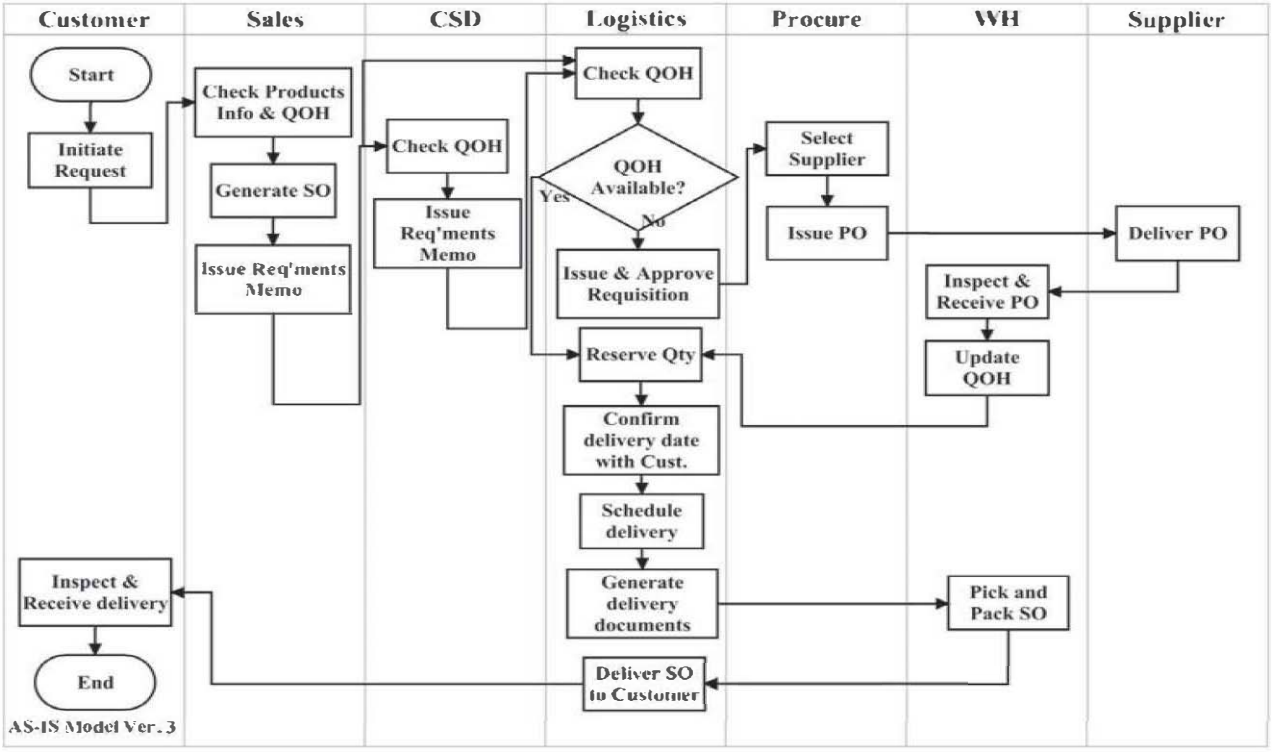
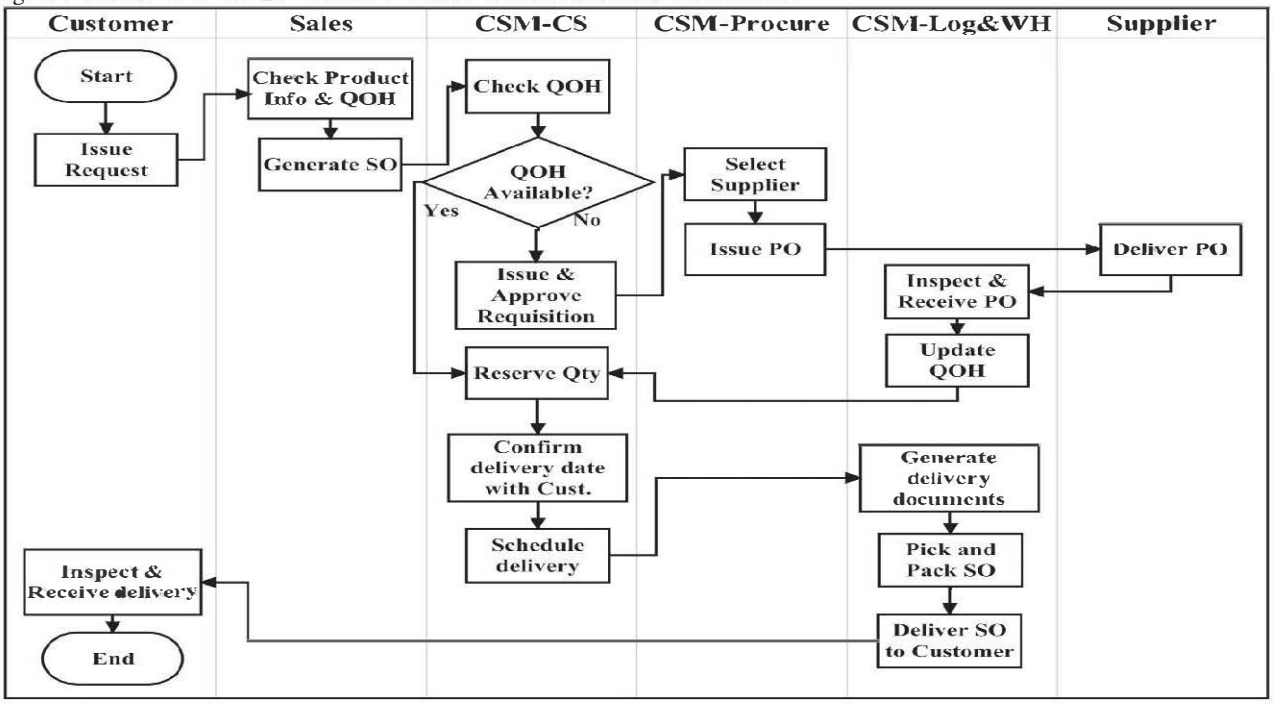


Figure 7-3 A Potential "To-Be" Model of Tradeco's Sales Order Fulfilment Process



CHAPTER EIGHT

POST-IMPLEMENTATION ISSUES

Abstract

This chapter discusses post-implementation issues of ERP projects. ERP adoption should be regarded as a continuous journey through many lifecycle phases, starting from planning and software package selection to design, implementation, and operations, during which the ERP system is maintained to fulfil changing business and user needs for the remainder of its useful life. The importance of post-implementation activities and requirements should not be understated since adequate maintenance and support is an essential means to extend the productive lifespan of such an enormous investment. Unfortunately, post-implementation requirements are often taken lightly by some organizations and ERP practitioners. Their enthusiasm withers after the "go-live" date. That is a common mistake that has costed some organizations dearly. Thus, ERP adopting organizations are urged by the author to consider maintenance and support requirements early in ERP planning, and treat them as an important element of the overall ERP strategy.

Different types of maintenance and support requests are reviewed in this chapter. Some of such maintenance activities are vendor-driven, while others are independent activities controlled internally by ERP adopting organizations. For this reason, it is unwise to sever the tie with the vendor as some organizations did to avoid the expenses of continuously subscribing to vendor's maintenance program. This chapter emphasizes the importance of maintaining a healthy relationship between the client and the ERP vendor since the former will be dependent on the vendor for its ERP expertise, bug-fixes and patches, and new software releases over the long run.

In addition, the experience of managing maintenance and support requests, and the practices of major upgrades and migration to new releases are examined in this chapter. Lastly, other activities such as post-implementation review (PIR), and continual assessment of ERP benefits and improvement opportunities are discussed.

Introduction

Many organizations and information systems (IS) practitioners tend to focus primarily on ERP implementation, but treat post-implementation activities lightly. Ignoring the latter is a mistake that would lead to adverse consequences, jeopardizing the usefulness and benefits of ERP systems (Weightman 2003).

As I have pointed out in some of my ERP articles, it is necessary to treat ERP adoption as a continuous journey that values the activities of all the phases, including those of the operations or post-implementation phase (Law, Chen and Wu 2010). We must not allow our alertness and commitment to subside after the "go-live" date because many more challenges would be looming following that critical moment. It is also advisable to consider post-implementation issues early in the ERP lifecycle. ERP maintenance and support (M&S) requirements should be considered and evaluated as part of the overall strategy of ERP adoption (Law, Chen, and Wu 2010).

In this chapter, we shall examine the various important issues and sound practices relevant to ERP M&S over the long run. Lastly, other post-implementation activities such as post-implementation review (PIR) and periodic evaluation of ERP performance are discussed as important elements of the full lifecycle approach.

Nature of ERP maintenance

Like any application system, ERP systems require on-going maintenance. Maintenance needs arise either because of changing business requirements, or software enhancements and new releases introduced by ERP vendors.

Over the years, many companies suffered as a result of underestimating the maintenance and support (M&S) efforts required by ERP systems. In reality, it is a challenging and complex task despite the fact that ERP packages are off-the-shelf products supplied by vendors. It requires

cautious planning, and management efforts by in-house personnel or consultants to balance evolving user needs, and constraints.

The task of maintaining and supporting ERP systems differs remarkably from that of proprietary in-house software systems, and apparently requires a different mind-set and approach. Therefore, I would like to stress that one needs to change his thinking when it comes to ERP maintenance.

The difference between the maintenance of these two types of systems is obvious when the relevant activities and practices are compared. Let us start this topic by first examining the nature of maintenance work for a traditional in-house developed system. Most of the time, the internal MIS group can manage M&S activities independently. Maintenance work may include routine maintenance and adaptive maintenance. The former involves such activities as correcting logical errors while the latter deals with revising or enhancing the system to satisfy evolving user requirements. The latter is somewhat more challenging (Vessey and Weber 1983) as it would involve designing new software elements for the user requirements to fit the architecture of, and the constraints imposed by the existing system. The internal MIS group has to manage many issues in order to fulfil the requirements raised by the user community. Critical issues associated with maintaining and supporting in-house developed software solutions often include functionality enhancement and extensions, resources allocation (e.g. competing demand for programmer time), quality of documentation (Lientz and Swanson 1981), preventive maintenance (Burch and Grupe 1993; Swanson 1976), business rules (Chapin 2000), and user support (Abran and Nguyenkim 1991). These activities are usually handled by MIS staff, and sometimes the MIS group has to rely on the expertise of external consultants. Generally speaking, the company has control over key decisions concerning the enhancements and the timing of producing new versions of the software solution.

Now we shall take a closer look at the types of activities required by ERP maintenance and support. ERP maintenance is not a task manageable by any client organization on its own since some maintenance activities are triggered by ERP vendor's activities. For instance, a client organization needs to react to the following vendor activities:

- distribution of software patches to correct errors in an ERP product;
- introduction of enhancements to an existing ERP release; and
- introduction of a new ERP release.

As discovered by Ng, Gable, and Chan (2002), vendors often distribute software patches to correct bugs, and sometimes to make their systems compliant with changes to certain government requirements (e.g. taxation requirements). ERP client organizations often apply these patches to stay up-to-date with vendors' standards, and to qualify for on-going vendor support. Moreover, in order to be able to apply a software patch, or to upgrade to a newer software version distributed by the ERP vendor, client organizations must install the previous releases (Ng 2001).

Obviously, ERP adopting organizations need to be aware that purchasing an ERP product does mean the beginning of a long-term relationship with the vendor. Because of the aforesaid reasons, organizations which have made customizations to native or standard features of an ERP product may find themselves in risky situations. In any customized ERP installation, the implementation of software patches and upgrade releases is no longer a simple straight forward task. Applying the vendor-supplied software changes not only may result in the risk of losing the customized codes, but also may create system incompatibility issues. Impact analysis must be conducted to assess the risks and consequences before such changes are applied to the production system.

In short, making customization to native ERP features disrupts the natural migration path from one release to the next.

Client-vendor partnership

I shall repeat, as I did in my lectures and publications, the reminder that ERP client organizations need to consider the vendors' product plans and support policies when they plan for implementation, and maintenance activities. These vendor factors have a lot of bearing on the clients' M&S practices and outcomes. Therefore, soon after it has purchased an ERP package from a vendor, an organization will quickly discover that it cannot afford to avoid the vendor during the lifespan of its ERP installation. Managers have to adjust their mind-set to recognize that the only choice a client organization has is to treat the vendor as a partner for the long run.

Maintaining a close relationship between both parties is indispensable not only to the successful implementation of the ERP, but also to the health of the system throughout its lifecycle. Co-operation with the vendor is inevitable if the client wants to have a stable and productive ERP system, over an extended period of time, to which patches and software releases from the vendor are applied from time to time as a means for bug fixes or feature upgrade. The cost of severing such a relationship is just too high. That explains why consultants value ERP vendors' abilities to

provide ongoing maintenance, upgrade, and technical support services to their products. These capabilities are included in the criteria for ERP product evaluation and selection. It is not hard to understand the rationale behind it if an ERP adopting organization examines its own capabilities in ERP deployment and maintenance, and if it asks itself why it decides to purchase an ERP package in the first place, instead of developing its own proprietary system. Without the ERP vendor's support, making incremental modifications to any ERP system is beyond the internal capability of most non-IT firms (Beard and Sumner 2004), and any thought of trying to support a highly customized ERP system alone is just too risky and mind-boggling. We shall see below the justification for the expensive technical support and maintenance programs offered by ERP vendors.

ERP vendors' policies, services, and impacts on ERP adoption

It was said earlier that we must consider vendors' abilities in several aspects as ERP selection criteria. They include vendors' on-going abilities to enhance and develop software products and tools to fulfil the changing business needs of clients, and the industries in which the clients operate. Also, vendors need to be able to provide implementation services, and on-going maintenance and support to clients' ERP systems. Before we choose an ERP package, we must understand the vendor's capabilities, policies and strategies regarding these areas.

That said, we must recognize what a vendor can contribute to ERP projects. In addition to the ERP package, a vendor may provide assistance and services in many aspects during the various phases of the ERP lifecycle. After signing the sales agreement of software licenses, the first opportunity for the ERP vendor to participate in a client's ERP project is providing consulting services. Some clients outsource their projects to the consulting division or partner(s) of the vendor. Unfortunately, the down side of total outsourcing is the tremendous consulting cost that clients have to bear. Many companies use at least some consulting services from the vendor or its partners if they decide not to take the total outsourcing route.

Noteworthy is that some smaller consulting firms may charge a lower hourly rate. Before you sign any contract for consulting services, it is necessary to shop around for a better deal. You may be unable to replace the ERP vendor's services entirely, but you may find some good expertise from third party consultancies at reasonable hourly rates. By doing so, you would expand the opportunities available to you, mitigate the risk of not

having the needed expertise for implementation and system support, and reduce the cost of being over-dependent on the vendor's consulting services. However, be cautious in dealing with consultants. You should not have blind faith in anyone from the vendor's consulting division or other consultancies. It is necessary to prudently review and verify their skills and experience before offering them a contract as I explained in the chapter about human resources and expertise (Chapter 5).

Moreover, getting internal staff involved in ERP project is a practical way of containing consulting costs. As discussed in Chapter 5 and the Controlco case study (Chapter 10), employees are often assigned to work side by side with external consultants. Assigning internal staff to work in a joint-project team not only is a means for knowledge transfer (King 2005) to prepare for maintenance and support in the operational phase, but is also a means to enhance the feasibility of reducing expensive consultant hours. Some client organizations outsource the maintenance and support of their systems to their ERP vendors and partners. Some clients are more frugal and cautious in using consulting services. They try to keep consulting hours and expenses to the minimum.

Generally speaking, many ERP clients subscribe to the vendor's costly maintenance and service programs throughout the remainder of the ERP lifecycle. They are willing to pay for it for two reasons. First, ERP expertise is rare and expensive. Subscription to the vendor's M&S services offers the clients a secure source for such expertise. Second, it entitles a client to the support services offered through the vendor's global technical support hotline, software patches, and new releases as long as the subscription is valid. It is necessary to note that ERP products are not static. Instead, they are "continuously evolving in terms of technology and functionality" (Kumar and van Hillegersberg 2000). ERP vendors will provide enhancements and new releases to the market regularly. I need to reiterate that ERP vendors' on-going contribution in many of these aspects is not entirely replaceable by a third party service provider.

We notice that ERP vendors launch new releases more frequently and the lifespan of each release is getting shorter in recent years. The interval between ERP releases was approximately three years in the 1990's, but the time gap was reduced to around one and half to two years by the mid-2000's (Beatty and Williams 2006). What are the implications of this trend for the vendors and the clients? It may mean more business opportunities for the vendors in an increasingly competitive ERP market. They produce new releases into which more advanced features are incorporated. The features may be good for the clients. But they may also be gimmicks to help the vendors to compete with their counterparts in the ERP market.

To the clients, it may mean an increase in ERP-related work and expenditure. After the launch of a new release, the older release will be delisted from support after a period of time. Clients would have no choice but to upgrade their ERP if they want to stay current with the ERP features and to continue to enjoy the support services offered by their vendors. Can you imagine the trouble of being left alone like an orphan, and ignored by the vendors' global support hotlines? Can you imagine the extra pain you would have to endure if you want to migrate to a new release from a very obsolete version of ERP after skipping quite a few in between? Obviously, shorter intervals between releases may mean that each release will have a shorter lifespan, and be removed from the list of supported products sooner than before. Clients may have to migrate to a new release sooner, incurring more expenditures and efforts.

Meanwhile, ERP vendors are very aggressive to promote their business and to pressure clients to migrate to a newer release of the software (Songini 2004). Needless to say, it is profit-driven. They aim to produce more revenue to please their shareholders. I have mentioned many times the importance of client-vendor partnership in this book. However, services from the vendor do not come cheap at all. The annual maintenance and support fee charged by ERP vendors may amount to roughly twenty percent of the initial software license purchase cost, with SAP charging about eighteen percent, and Oracle about twenty percent. Vendors' charges are also on an upward trend, rising by fifteen to twenty-two percent since the early 2000's (Songini 2004).

Note that a third party service provider is no replacement for the original ERP vendor when it comes to the knowledge of the products, and the capabilities to produce bug fixes, enhancements, and new releases. Although the cost of subscribing to vendors' maintenance and technical support program is high, most clients continue to pay for it because they know it too well that the savings resulting from severing the relationship with their vendors may not justify the risk and trouble they have to bear later on. However, they may try to reduce the costs by negotiating with the vendors for a discount for software licenses, and M&S subscription.

Perspectives and practices of ERP maintenance and support

In my career as an IS practitioner and researcher, I have seen many problematic ERP projects. Some of them were failures to begin with while others were allowed to degenerate after the implemented systems were put

into production. While deploring the trouble, and the financial, political and psychological losses these organizations suffered, I would like to re-iterate that these failures and difficulties cannot be averted without a fundamental change in the overall M&S strategy and practices. It is necessary to start with a change in our mind-set.

Systems maintenance and support is a non-glamorous job which IS staff may want to avoid. Those engaged in design and implementation of new systems are regarded as heroes and stars while M&S is something shunted by the career-ambitious members of the IS organizations. In many organizations, it is just hard to get top performing people to work patiently on M&S assignments. Neither is it easy to convince the CEO to dedicate more resources to M&S requirements. There generally exists a misconception about the importance of M&S by all levels of the organization from senior business leaders to workers. Many just do not think ERP M&S is critical to the overall contribution of the ERP toward business performance.

I believe that ERP adopting organizations need to change how they perceive and handle ERP M&S requirements, according them more importance and respect. Organizations should reposition ERP M&S as part of their overall quality management program, which is strengthened by the commitment from senior management and all stakeholders. The reactive approach, with a short-term focus towards M&S should be replaced by a proactive one with a long-term focus.

We always hear key phrases such as total quality management (TQM), continuous improvement, change management, and IT-business strategic alignment from management professionals and the media. In fact, many organizations are reportedly engaged, to some degree, in such practices. But when I asked them how they would link ERP maintenance to their quality programs, and the on-going health of business operations, most of them could not give me a clear and positive response.

I would like to emphasize that the focus of ERP maintenance should be not only on fixing bugs and keeping the status quo, but also on continually seeking opportunities for improvement. This should be considered an integral component of the TQM program (and continuous improvement practices). As it was discussed in Phase 7 Operate and Improve of the Full Lifecycle ERP Adoption Reference (FLEAR) model, and in the Controlco case (Chapter 10), organizations should continue to improve their business practices and processes, making use of ERP features. This is not a simple and mundane requirement. It takes a great deal of effort for continually analysing system functionality and potential changes to business practices that can be enabled by system features. As we know, the post-

implementation phase is the longest phase of the ERP journey, an organization will forego a lot of benefits if it does not try its best to utilize the ERP to enhance its business operations during such an extended period of time.

It is time for ERP adopting organizations to recognize the importance of, and to allocate more time and resources to ERP M&S. In my opinion, M&S practices should be supported by an appropriate set of expertise, and "infrastructure." By infrastructure, I don't mean only technical and software infrastructure such as the computer network, development and testing server platforms, and testing tools. The required infrastructure that I allude to should include a set of guidelines, procedures, and documentation to clearly spell out the methods, criteria and process for prioritizing M&S requests and assessing the risks and business impacts associated with each of them. It should also encompass a comprehensive set of supporting documents, ranging from technical and user guides of ERP features, and system administration manuals to business process models, and training materials specifically developed for the IT and ERP environments of the ERP-using organizations. Furthermore, this approach to ERP M&S should also be supported by appropriate human resources management (HRM) policies and practices established to recognize the contribution of, and compensate unbiasedly employees who engage in M&S related assignments. Only through according M&S activities positive recognition in staff appraisal, and career planning can an organization attract and retain competent staff for post-implementation activities of the ERP lifecycle.

While it is a good practice to maintain a reasonably close relationship with the ERP vendor, and other external sources of expertise such as the vendor's consulting partners and independent consultants, it is necessary to develop and retain in-house expertise. For this reason, knowledge and skill transfer from external consultants to internal staff must be managed properly. However, the focus of developing in-house expertise should not be limited to only the ERP expertise for the IS organization. It is obvious that a successful ERP experience requires the participation, and support of all stakeholders in an organization. Business knowledge and skills are highly critical to ERP success, and involving business managers and users in the process is very important. Thus, in order to be able to continuously "Operate and Improve" the ERP, it is necessary to mobilize all stakeholders in the organization.

Implications for ERP strategy

So far we have examined many issues relevant to both the implementation and on-going maintenance of an ERP system. Organizations adopting ERP systems must consider these issues when defining their ERP adoption strategies.

Consequences of customization, and full lifecycle approach for ERP adoption

First, we must be cautious in making decisions concerning customizations during implementation and post-implementation phases. Excessive customization may jeopardize the ERP system (Davenport 1988). As it was found in the Controlco case study, the company had learned its lesson the hard way. It had implemented a significant amount of customization to some of its modules in the first ERP attempt. Although it subscribed to the ERP vendor's maintenance and technical support program, the global helpdesk refused to provide assistance to customized modules. Because of the customizations, Controlco could not apply many patches for bug fixes offered by the ERP vendor, and consequently it suffered more difficulties in maintenance and support. The migration path to future releases was broken. It was painful for Controlco to have to drop all customization codes and to re-deploy a newer ERP release from scratch.

Because of the scarcity and high turnover rate of good ERP skills, in-house customizations can pose many threats to system quality, and to the success of M&S in the operations phase of the ERP lifecycle. It is too challenging and costly for any client organization to employ such a wide spectrum of ERP skills to maintain a highly customized ERP system. Remember that not only most vendors will not make the source codes available to their clients, but also ERP suites with so many modules require a very wide variety of skills. It would be an insurmountable task for any client organization to recruit, train and retain the necessary personnel for such a complicated customized system. Therefore, many organizations have intentionally kept modifications to their ERP systems to the minimum (i.e. a "vanilla" approach). They instead rely on their vendors to make the needed enhancements in future releases (Parr and Shanks 2000; Yakovlev and Anderson 2001). Controlco, having learned a lesson from the first problematic ERP installation, decided to avoid customization as much as possible when redeploying the ERP system. In the second ERP project, it became very cautious in approving requests for

customization (or bolt-on functionality). The company carefully planned its second ERP by considering not only the challenges in implementation, but also those of M&S in the long run.

ERP adopting organizations must bear in mind the problems that would result from excessive customization made to native system features. ERP implementation and M&S problems can be avoided or mitigated if vendors' product and maintenance policies are considered carefully in ERP planning and project management.

By taking a full lifecycle approach, ERP decisions such as those concerning customization should be made only after assessing the impacts of such decisions on system stability, maintenance, and upgrade issues in the future. With such an approach, the focus is not only on the implementation issues, but also on those for the entire ERP lifecycle. Planning for maintenance and support issues must not be left to the post-implementation phase but should be considered early in the ERP lifecycle. Never create a system that is not maintainable and upgradable.

A three-pronged approach to ERP expertise

In this subsection, we shall examine the strategy for acquiring the required expertise for not only the implementation but also the operational phases. By now, it is obvious that ERP vendors and their consulting partners are critical sources of ERP expertise. Given the evolving nature of ERP functionality, it is necessary for any client organization to maintain a healthy relationship with the vendor, and to subscribe to its maintenance program which permits the subscriber to receive software patches, new releases and global technical support.

The vendor's consulting division and consulting partners are important sources of qualified consultants. However, their expertise is usually highly priced. Therefore, client organizations should not limit themselves to such a source. Always shop around for qualified experts. Some smaller consulting firms or independent practitioners may offer good skills in some ERP modules at a lower charge rate. If you come across a good independent consultant, or one from a smaller firm, try to establish a long-term relationship with him as Controlco did.

Lastly, client organizations must not shirk their own share of responsibilities for recruiting, developing, and retaining in-house ERP expertise. Workforce planning must be conducted frequently to identify ERP skill requirements ahead of time, and to align recruitment, and training programs with such requirements. Needless to say, it is necessary to support staff retention efforts with competitive salaries and benefits, and

career opportunities. Even so, the turnover of qualified staff is inevitable. Therefore, succession planning must be conducted together with workforce planning. Always have backup personnel for each critical task.

By drawing the required ERP expertise from multiple sources, instead of relying on any one source, the risk and cost for on-going ERP maintenance and support could be minimized.

Managing user requests and continuous improvement

The operational (or post-implementation) phase of any ERP is not trivial. As a matter of fact, it is the longest stage in the ERP journey. Good M&S practices throughout the operational phase would likely extend the lifespan of an ERP system and maximize the return of such an enormous investment. By contrast, poor M&S practices would compromise the integrity and benefits of the system.

Given the limited resources client organizations possess, M&S requests must be evaluated carefully and prioritized according to the urgency, severity, business impacts and risks of the requests. It is infeasible to try to appease all the requestors who are constantly adding to the mountain of service requests. Organizations should put their resources on the change requests that would produce the greatest business impacts. The following are examples of some M&S requests:

Table 8-1 Types of Internal ERP-Related M&S Requests

Examples of Requests	Requestor
Correcting system bugs	User
Technical & infrastructure support on, e.g. networking, & database issues	User
Major functionality enhancements	User or MIS
Minor functionality enhancements	User or MIS
User interfaces changes; report development and modifications	User
New functionality/modules implementation	User or MIS

As it was discussed earlier in this chapter, and in the Controlco case study (Chapter 10), ERP adopting organizations need to establish the necessary infrastructure to support the execution of the M&S activities. A set of guidelines, and procedures must be established in advance to help evaluating and prioritizing the M&S requests. Some requests are urgent and if not resolved immediately, they will cause interruption to the system

and business transactions while other requests are less critical and can be rated "low priority". Let us take a look at some examples of user requests: cosmetic (user interface) changes, major functionality enhancements, and urgent bug fixes. In comparison with the other two types of requests, urgent bug fixes need to be handled as soon as possible such that the interruption to business operations is kept to the minimum. For the cases of functionality enhancement requests (raised by users or any MIS personnel), MIS has to determine the feasibility of each request by analysing the features of the existing ERP modules, reviewing features of future releases, and consulting the ERP vendor.

Guidelines and procedures for ERP M&S must be complemented by investment in a system for capturing, managing and analysing user requests. Analysing requests and solutions on a regular basis is important to successful M&S, and user satisfaction. It sheds light on the nature of the requests being handled, and the trend in M&S performance, thus contributing to the continuous improvement of the ERP platform. In addition, M&S practices must be supported by hardware and software infrastructure dedicated for testing software changes (for example, a server platform running an ERP instance set up for testing).

Moreover, ERP adopting organizations should bear in mind the following two issues when managing ERP M&S, namely, user relationship management, and on-going improvement through organizational learning. As it was discovered by Controlco, various user groups always compete for precious resources all the time. This may result in stakeholder relationship problems if the priorities for ERP enhancements are set by MIS alone without transparency. Getting user representatives and their managers involved in the prioritization process is a way to make this process more transparent. It is a mechanism for MIS and other stakeholders to hear the requirements of, and concerns about the service requests, and to enhance the mutual understanding among groups of users concerned. Involving the various parties in setting M&S request priorities also improves the sense of ownership of the decisions made in the process. Therefore, all these parties are brought together to work as one team towards maximizing the benefits of the organization, but not those of their own units. As a result, departmental orientation, or silo mentality, can be mitigated or eliminated entirely.

A cross-functional team structure would be useful for this purpose, and in the Controlco case study, such a team is called the prioritization committee. This cross-functional team is also conducive to sharing ideas for future requirements and improvement of the ERP systems and business processes. Organizational learning behaviour, triggered by discussions

within the committee, can also be carried on in other times. MIS and key users engage not only in exploitative learning to incrementally refine the current business processes and ERP configurations, but also in explorative learning to seek information about implementing new ERP modules and innovative ways of doing business in the future. In this sense, this practice serves as a pivotal element for developing ERP knowledge and skills within the organization.

Most importantly, this may lead to a change of culture regarding cross-functional collaboration and how ERP M&S should be perceived and managed. In the second Controlco project, such a cross-functional team structure was no longer used solely as a temporary mechanism for prioritizing M&S requests in the operational phase. It was established in the ERP planning phase of the second ERP project, and the company intended to use it throughout the lifecycle of the ERP system.

Other post-implementation practices

A very critical question that can be asked about an ERP project would be: Has it accomplished what is anticipated? This is a very broad question, and it may mean different things, depending on who is asking the question. For instance, senior management may want to know the return on investment (ROI) of the ERP project. Middle managers and users may focus on the efficiency brought about by the system. The sales and marketing department may be interested in determining whether the ERP improves sales turnover and customer satisfaction rating while the order fulfilment team may want to see an actual decline in order cycle time. On the other hand, the MIS department may want to know whether the project has been managed properly. The department may want to pinpoint areas for further improvement, and understand how well the system is accepted by users.

As it was discussed in Chapter 2, objectives and performance measures need to be clearly established in ERP planning. Such objectives, measures and metrics are now very useful in the post-implementation phase, serving as performance yardsticks for different aspects of the ERP project.

It is highly recommended to evaluate the system after a considerable period of time following the "go-live" date, although some organizations do not do so. A post-implementation review (PIR) would be a valuable tool to answer the many questions related to the pre-defined objectives of the system. Although it is up to each organization to decide the timing for this review, it should be conducted between six and twelve months after the system becomes operational. That is, the review should take place

when the users have sufficiently experienced the new system and can make a fair judgement on its functionality, usability and stability. A survey of user needs and satisfaction should also be conducted regularly throughout the lifespan of the ERP system. The results of such activities would not only help address any discrepancy between actual system performance, and user's requirements and expectations, but also can be used to seek opportunities for further improvement for the ERP systems and business processes.

Needless to say, the planning and development of required human resources must be carried on throughout the remainder of the system's productive years.

Concluding remarks

In summary, the full lifecycle approach for ERP adoption is emphasized in this book. It is necessary to re-iterate that all the elements that affect the later phases of an ERP should be considered early on as part of the overall ERP strategy. As it was explained above, the journey does not end at the implementation of an ERP, but there are more challenges for an ERP-adopting organization to manage after the "go-live" date.

CHAPTER NINE

THE TRADECO CASE

Abstract

This case study examines the enterprise resource planning (ERP) experience of an IT product reseller. It was found in this study that some critical ERP features were misused. Such problems might be due to some organizational-cultural reasons and a lack of understanding of the ERP product. For example, the reluctance to share information across teams and divisions led to the excessive use of security features, and resistance to business process re-engineering (BPR). Many people in this company wrongly believed that they owned the information generated by the business transactions with their own clients, but did not treat it as a company asset. The wrong concept about information ownership, together with other organizational-cultural reasons might have exacerbated the problems of departmental orientation and resistance to BPR.

In summary, it is necessary to pay more attention to organizational culture and readiness issues before embarking on an ERP project. Education tailored to the needs of not only MIS staff and operational personnel, but also to those at various levels of management may be helpful in mitigating the problems reported in this case study.

Introduction

Tradeco is a local reseller of information technology (IT) and hi-tech products listed in the Hong Kong Stock Exchange. It was founded by several local families in the 1960s. The company initially started with 5 employees, and now has around one thousand. Its recent listing in the stock exchange had also led to the acquisition of fifty-one percent of its shares by a USA-headquartered multi-national IT service provider.

Despite the change in firm ownership, the leadership and operations of Tradeco remained largely independent of its American parent in the early years of the takeover. As a result of rapid business expansion, it decided to deploy an ERP package to replace its legacy Trading Information System (TIS). The result was disastrous. According to the managers who participated in interviews, users and managers of the company almost unanimously criticized the ERP system as unusable and unreliable. The complaints raised by the interviewees include the following:

- inefficient business processes with too many redundant and manual steps;
- inability to provide reliable, accurate and timely information; and
- failure to generate sufficient business reports to support operational tasks and business decisions.

Our analysis has pinpointed several major issues that might have accounted for the failure of ERP implementation in this company, namely the lack of commitment by management at various levels, inadequate involvement by the user community, and malpractices in several areas (including ERP package selection, business process re-engineering, project management, contractor management, and user relationship and expectation management). However, we also speculate that many of Tradeco's problems were rooted in the lack of an organizational culture conducive to the sharing of information, the redesigning of business processes and, ultimately, the implementation of an ERP package. This report focuses on discussing several issues concerning organizational culture, which might have contributed to the unsatisfactory outcomes of ERP implementation. A summary of these issues and their consequences is displayed in Table 9-1.

Improper belief and malpractices concerning information ownership

Management and users alike wrongly believed that they themselves owned the information concerning their customers and business transactions. As business information was treated as a personal, rather than company asset, they were reluctant (and often refused) to share it with their fellow team members and those in other departments. In this organizational culture, everyone was very cagey about his own performance and job security. The primary concern in everyone's mind was to promote and protect his own interests, and those of his in-groups, but not those of the corporation. Such a problem was deep-rooted and its

origin could be traced back to the senior managers who started their careers with Tradeco when the company was very small, and had since then been competing fiercely among each other for career opportunities.

In many circumstances in past years, divisional leaders and managers kept some business information off-line, thus circumventing the legacy TIS system. They had a tendency to continue this practice with the ERP system. It would be very difficult, if not impossible, to change deeply engrained mentality and habits in a short time.

Resistance to business process changes

Such organizational-cultural weaknesses had spawned and exacerbated departmental orientation, under which co-operation across divisional boundaries was extremely difficult. Accountants, systems analysts, and ERP consultants found it very difficult to secure the co-operation of Tradeco employees in tasks relating to business and systems analysis. Employees and managers were reluctant to participate in business process redesign exercises, and the absentee rate at ERP meetings was very high. In the end, only very junior employees such as secretaries and sales assistants were sent to the sessions. These junior employees did not have the knowledge and the authority to recommend or endorse changes to business practices and processes. In some circumstances, when divisional and middle-level managers were present, the systems analysts and consultants often found that these managers did not participate actively, and they disclosed limited information. Needless to say, many process redesign sessions ended fruitlessly in stalemate.

With limited exposure to ERP systems, many of the business leaders and employees failed to see the opportunities and benefits that would ensue from a properly implemented enterprise system, and how their business practices and processes could be revamped to improve productivity, from a boundary-spanning perspective. Rather, they viewed the system as a threat to their own "kingdom," and job security. Therefore, they clung tightly to legacy practices with which they felt comfortable. For instance, they tended to rely on manual tasks and printed reports, even though the overall workflows could be simplified under the ERP system.

Mis-use of ERP features

The attitude of many people in the company towards information ownership unfortunately resulted in excessive user requirements concerning systems and information security, and the misuse of ERP

features, with dire consequences. The ERP package selected by Tradeco supports system constructs of operating units (OU), which mirror the divisions and subsidiaries of conglomerates in the business world. Information, sets of books, and transactions are organized based on the operating units defined within an ERP installation. Access to the transactions and information of an ERP system-level operating unit is restricted to users defined within such a unit. If used properly, this is indeed a very useful system security feature.

Unfortunately, users and managers demanded operating units to be set up in the ERP system not only for business divisions, but also for teams and projects within a division. The ERP consultants had initially refused to honour such a request, but they finally gave in to pressure from Tradeco's management and key users. Consequently, the ERP installation ended up with many more system-level operating units set up for a company with only four divisions structured along the lines of products and services. This set-up was detrimental to the implementation of seamlessly integrated workflows, and caused unnecessary work for employees and the system. For instance, if ten operating units had been created under the ERP system, a transaction concerning all of the operating units might have to be divided into ten pieces and posted individually to the accounts of the operating units.

The insistence on excessive information security requirements and the use of operating units for projects had also created excessive work for the MIS department. Projects, unlike the units of the organizational structure, must be completed within a limited period of time, and the ERP configurations had to be changed often according to the initiation and ending of projects.

In other circumstances, Tradeco had forgone opportunities to automate due to the refusal of the divisions and teams to share information and to cooperate with each other. For instance, some standard contracts involved the participation of more than one division. System features could be easily utilized to split revenues, costs, and profits among the divisions, provided that the divisional leaders could agree on a set of formulas for the various types of contracts. However, divisional leaders and middle managers were not willing to discuss and commit to such arrangements for fear of leaking to other divisions detailed information concerning costs and gross margins for the various types of jobs. Moreover, they thought that committing themselves to a standard arrangement was tantamount to the loss of flexibility and abilities to protect their own interests in the future. Since no agreement could be reached among the divisional leaders, the

automation of such basic tasks was not pursued. Divisions had to continue to negotiate with each other on a contract-by-contract basis.

Similarly, the tendency to use a large number of reports under TIS was carried over to the ERP era. Although the ERP system offered an opportunity to simplify and automate workflows, managers and staff continued to use printed reports to control and monitor transactions. This work habit created an insatiable demand for report development.

Discussions and implications

Organizational culture issues

The Tradeco case demonstrates the importance of organizational culture as a critical antecedent to the successful adoption of ERP. An organizational culture relevant to ERP projects would encompass such aspects as the beliefs concerning the ownership and sharing of information, the attitudes towards cooperative effort among divisions, and the support of corporate goals instead of divisional or personal ones. Silo mentality that prevailed in the departmental units of Tradeco undermined the opportunities to pursue seamlessly designed division-spanning business processes and, ultimately, compromised the successful use of ERP systems. When senior managers failed to reach consensus on major business and ERP issues, the problems trickled down to the middle management and working levels.

One of the primary benefits of ERP systems is the integration and coordination of processes throughout an organization, and in some situations, even with value chain partners. Seamless process execution would require the involvement and support of all units in a company. The realization of such an objective would need an adequate degree of information transparency for the personnel involved in the business processes. Furthermore, proper information sharing would enable business leaders to acquire a timely and accurate understanding of enterprise-wide business trends, which is critical to the generation of strategies. When leaders and employees place personal interests above those of the company, there will be difficulties in the sharing of information, and efforts to improve business processes across company units.

Education and training

Problems associated with business process improvement exercises, and the tendency to misuse ERP features point to the need for education and

training for all levels of the organization. Tradeco lacked experience in ERP systems, and failed to appreciate the functionality and opportunities an ERP could offer them in achieving operational efficiency and strategic business goals. The difficulties encountered by the company might have been mitigated if the various groups of stakeholders were given the appropriate types of education and training since the planning stage of the ERP project. What must be re-iterated is that training should not be perceived only as an instrument to help MIS personnel and users to acquire the skills to implement or use the systems. Education, for instance, an overview of ERP features and the impacts on business practices, for senior and middle managers may go a long way to help these decision makers to appreciate the ERP, and to understand the critical success factors for selecting the "fittest" solution, and implementing as well as using the system.

Although the findings of this single case study may not be generalizable to some companies, it would still be worthwhile for business executives and MIS practitioners to pay attention to organizational and cultural factors before embarking on an ERP project. A preliminary review of the culture and the readiness of an organization can help MIS practitioners and ERP consultants assess whether the organization is at a stage where it is ready to adopt an ERP with a fair chance of success. System adoption strategies, including the decision to adopt an ERP package and the timing for doing so, should be formulated accordingly, to mitigate the likelihood of disasters.

This case has shed light on the growing pains of some companies that are similar to Tradeco in Asia. As Tradeco has progressed from being a small company owned by a few local families to one that is listed in the Hong Kong Stock Exchange, what worked in the past may no longer work today. The company's very rapid growth in recent years has not resulted in the development of a new organizational culture and a set of business practices that are compatible to ERP adoption. Leaders of fast-growing companies must put more effort into, and allow sufficient time for, the development of an organizational culture that supports inter-divisional cooperation, and business transformation to improve or reshape its business practices and processes over time. Other authors have also emphasized the impact of organizational culture on innovative activities and changes to business processes (Schein 1994). I would like to reiterate that senior executives should play a critical leadership role in the development of such a culture, in the re-engineering of business processes, and in the implementation of ERP systems (Davenport 1998; Kumar et al. 2002; Somers and Nelson 2003).

This case study also highlights organizational factors as an important focus for academic studies on the "proper" approaches and methodologies for planning and successfully implementing ERP systems. If adopted by technical institutes and universities, case studies on ERP experience, such as what is illustrated in this chapter, would be useful tools for training business managers and MIS practitioners.

Concluding remarks

ERP adoption involves many more challenges than the implementation of other kinds of software packages. As ERP systems are becoming more popular among small and medium-sized firms throughout the world, it is critical for management as well as for MIS practitioners to understand the hurdles to, and conditions for, the successful implementation of ERP systems. The findings discussed in this chapter highlight the fact that organizational-cultural factors are critical to the outcomes of ERP projects. As the Tradeco case indicates, ERP packages may not offer a universal fit to all client organizations. This means that an organization must engage in an assessment of its own attributes and make careful preparations before embarking on an expensive ERP project.

Table 9-1. A Summary of Findings of the Tradeco Case

Organizational/ Cultural Factors	Behavioral Manifestations	Impacts and Consequences
(1) Improper belief & malpractice in information ownership	• Limited intention for, and high level of resistance to sharing information between divisions. • Have an inclination to keep "their own" information off-line, therefore, by-passing the enterprise system.	• Refusal to share information, even if sharing would benefit the company. Such an attitude created many obstacles for the ERP project.
(2) Resistance to business process changes	• Silo mentality prevailed, and co-operation across divisions was hindered. • Leaders and staff were reluctant to participate in BPR and avoid project meetings.	• Business practices and processes were not redesigned. • Many legacy practices and workflows were preserved. Managers and users relied heavily on printed reports.
(3a) Misuse of ERP security features	• Business managers insisted on setting up "operating units" (●U) in the ERP for not only the business divisions but also teams and projects.	• The ERP ended up with many more system-level ●U's. It made transaction processing highly inefficient and created excessive workload for the MIS team.
(3b) Tendency to cling to legacy habits	• The company failed to take advantage of automatic standard features since the divisions were reluctant to co-operate.	• The ERP installation, based on legacy processes, was inefficient and ineffective. Tradeco continued to rely heavily on printed reports.

CHAPTER TEN

THE CONTROLCO CASE

Abstract

This in-depth case study reports the experience of two consecutive ERP projects of the Greater China operations of an American multinational corporation (MNC), pinpoints the mistakes in the first project, and identifies the improvements in project management practices in the second, achieved through learning from mistakes. The company initially lacked understanding and experience in ERP systems when it implemented the first installation. It suffered from a low degree of senior management support and user participation. Such a project was perceived by stakeholders as "another expensive MIS project." As a result, inefficient legacy business practices and processes were not re-engineered or standardized across the operations in Taiwan, Hong Kong, and mainland China. The initially planned vanilla approach of ERP implementation was compromised. It resorted to customization to address the gaps between the native ERP features and the business processes. Such a decision eventually resulted in an unstable system that was difficult to support while the vendor's global support centre refused to address issues concerning highly customized functionality. The implementation and post-implementation phases were plagued by problems of improper scope management, contractor management, and knowledge transfer.

Having learned from these mistakes, the company made improvements in many project management practices and knowledge areas in its second ERP project, a major objective of which was to redeploy the poorly installed ERP modules of the first project. In addition, the company considered ERP maintenance and support as one of the very important factors for determining ERP implementation and post-implementation strategies in this second attempt. This emphasis on the proper management of the full ERP lifecycle contributed to a favourable outcome. The second

ERP system, replacing the first one, was perceived by managers and users interviewed in this study as stable and more usable.

Background

Controlco is one of the subsidiaries of an American multinational firm selling products and solutions for industrial process control and automation, and building and security management. With regional headquarters located in Hong Kong, the business units of the Greater China division (whose sales territory includes Hong Kong, Macao, Taiwan and the Chinese mainland) bring in an annual turnover of approximately US$ 250 million, by offering customers control systems solutions, spare parts, and consulting services through its own sales forces, joint ventures, and local distributors.

In this study, we analysed the company's experience of two ERP implementation projects, aiming to acquire an in-depth understanding of its project management, and maintenance and support practices. This company offered us a precious opportunity for a thorough examination and comparison of its practices, and learning experience in the two ERP projects. The first one was a disaster, and through learning from mistakes, it finally embarked on the journey to ERP success by re-implementing the system.

Throughout this study, we were fortunate to have the support of the company, and interviewed many key employees of the Greater China operations, including the MIS Director, Director of Supply and Customer Services, Business Applications Manager, Procurement Manager, a system analyst, a warehouse supervisor, a sales and marketing manager, and a salesperson. We were offered access to many project documents, except those containing confidential financial figures.

The first ERP project

A few years ago, the corporate and strategic business unit (SBU) headquarters in the United States realized that it was necessary to move towards a global standard for IT and business applications. The company's Asia Pacific regional management team had also recognized an urgent need to replace legacy sales and distribution systems with an ERP system for several operational and strategic reasons, among which was the objective of enhancing the visibility of its business operations in the region.

In Greater China, the MIS department was assigned the responsibility for managing the ERP implementation project following corporate IT and ERP strategies and standards. The project scope was to deploy systems (ERP instances) for the subsidiaries (i.e. legal entities) in Hong Kong, Taiwan, and mainland China in 9 to 10 months. This was the first ERP project for the company in the Asia Pacific region. The Greater China MIS department was facing two challenges for this assignment, namely (1) insufficient IT resources, and (2) limited knowledge and experience in ERP adoption. Inevitably, the MIS department needed to rely on expensive external expertise. Consequently, consultants were hired from the consulting division of the ERP vendor's Hong Kong office on a time and materials basis.

According to the firm's corporate ERP strategy, the vanilla ERP approach was preferred. If such approach was enforced properly, modifications (or customizations) to the selected ERP package would be kept to a minimum to reduce risks (Soh and Sia 2005). Inevitably, the Greater China division also decided to have a vanilla implementation, and it appeared initially to be on the right track. However, in reality, it would require rigorous discipline to realize this goal. The SBUs in USA experienced many problems in their ERP projects, and similar issues also appeared in the Greater China division later on.

Fully enforcing the vanilla strategy was politically difficult without the unswerving support of stakeholders at management and operational levels. In Controlco's United States operations, additional user requirements beyond the core standard features of the ERP caused much debate between those in favour of customization and those supporting the vanilla approach. Because the criteria and process for assessing and approving customizations were not clearly and explicitly documented, the decision-making process was often subjective and political. When corporate management eventually allowed SBUs to customize (i.e. modify) their ERP systems through adding bolt-on functionality, the projects deviated from the initial vanilla approach. For instance, SBUs in the United States contracted a consulting partner of the ERP vendor to develop two bolt-on modules to fulfil the customization requirements: (1) a back-to-back ordering system and (2) an interface for a third party project management system which had been selected as the corporate standard not long ago. The back-to-back ordering module was installed in some American SBUs which found that the module was plagued by data inconsistency issues, and integration problems with the native ERP modules. The completion of the interface for the project management system was delayed because of poor project management practices. The cost for developing this interface

also exceeded the initial estimates. In an organization of matrix structure, these requirements and problems trickled down to the international operations in other countries.

Like what happened in the company's American SBUs, the prioritization of user requests for special functionality was not well managed in the Greater China division. The criteria and process of reviewing and approving add-on features were unsystematic and only loosely defined. The Greater China MIS department soon found itself overwhelmed by an influx of requests for customization. Because of the problems experienced by the SBUs in the United States, the Greater China management team decided to suspend its installation plan for the two bolt-on modules. However, the Greater China MIS department faced another challenge involving taxation issues in Taiwan. The taxation requirements in Taiwan are significantly different from those in Hong Kong and mainland China. The native ERP taxation features were unable to fulfil such Taiwan-specific requirements. In order to tackle these mandatory requirements, it seemed logical to resort to customization. External consultants were hired to provide advice and customization solutions to address these requirements. The bolt-on taxation functionalities resulted in some structural changes to the database schema of the original ERP system. Changes to the database included the addition of new columns to some original tables and the creation of new tables in order to support the bolt-on taxation features. This was a major effort in comparison with other customization requests across Taiwan, Hong Kong and mainland China. Another burden that consumed a lot of technical resources was customizing and developing online and batch business reports across these locations.

The Greater China operations of Controlco, including the MIS team, had relatively limited experience in ERP implementation, and large-scale software projects. So unanticipated problems continued to emerge. Just like the ERP projects of the company's American SBUs, poor project management practices in Greater China spawned many undesirable issues that ultimately resulted in system problems. For instance, the ERP project received insufficient support and involvement from various levels of the business units. The steering committee of Greater China area, chaired by the MIS Director, had limited authority to decide on system requirements and business process changes. In some situations when the MIS Director needed management support, he found himself shouldering the issues alone since many senior executives of the company were reluctant to participate. Paradoxically, the MIS Director was also accused by business managers and users of monopolizing key decisions and dictating his own

opinions and departmental policies on the user community. When some senior executives refused to join the meetings, their "problem avoidance" behaviours did not help the project in any way. They often showed only lukewarm interest in project-related matters, and offered little involvement in implementation and post-implementation issues. Even worse, the ERP project was stigmatized as "just another costly MIS project". It was not perceived as a critical business project for the whole enterprise.

At the working level, lacking participation from the users of business and functional areas hindered, and adversely affected project activities. Resistance from SBUs and functional units was high. Such behaviours had dire consequences, for instance, for the business process analysis and redesign tasks. Without the co-operation of key managers and users, the business process changes required to accommodate the new ERP modules were not realized. Consequently, the company missed the opportunity for improving or re-engineering its business processes before implementing the first ERP system.

It is noteworthy that business processes across the company's business operations in Taiwan, Hong Kong and Mainland China were not standardized. Not long ago, the SBUs operating in each of these territories were divisions (i.e. companies registered under different governments) led by different management teams reporting directly to the Asia Pacific or world-wide headquarters. Only very recently did these local companies begin to operate under one integrated Greater China management team. Unfortunately, the company failed to take advantage of this time window for rethinking and redesigning its business practices and processes in the Greater China area. Therefore, all locations retained localized legacy business practices and processes.

Business process changes often require changing the mind-set of all those affected in order to improve, simplify or obliterate legacy practices. In this case, there was at best very limited effort made by the senior management team to steer the company towards the right direction. Users clinging to legacy business practices continued to rely heavily on printed reports, as in the pre-ERP era, and such a habit further aggravated the localization issue. The initial plan to replace legacy practices and processes with an ERP system and to integrate operations and information across functions and SBUs in the Greater China area was not achieved. Failing to revamp and standardize local business practices and processes had significant implications on the success of the ERP system for the years to come. Unique business processes in various locations created more challenges in system maintenance and user support. It took MIS extra time and effort to learn to support these three sets of business processes and the

ERP instances, which were configured differently to fulfil the respective requirements of Taiwan, Hong Kong, and Mainland China. Readers may have a better understanding into this problem by considering the inconvenience and challenges faced by MIS and other regional user departments, for instance, the supply chain function whose activities across Greater China locations were under the leadership of a director based in Hong Kong. In order to meet the requirements of supply management users across the three territories, the MIS team invested heavily to develop and customize three sets of ERP reports.

Customizing native ERP features is often a risky and costly endeavour. In this case, the highly customized Taiwan taxation module was very unstable. Consequently, it created a great deal of difficulty for users and support staff alike. Although the company had subscribed to the ERP vendor's global technical support program, the customization made to the native ERP features partially nullified the support contract. In this situation, the global technical support centre refused to provide any support services for the highly customized taxation module. System maintenance, including software upgrade, was a headache for such a customized ERP. When the ERP vendor released software patches for "bug fixes" or upgrades, it was difficult and risky to apply them without jeopardizing the customized functionality. Complications might arise from the incompatibility between new software releases and the customizations.

The decision made in the implementation stage to create and attach bolt-on functionality, in a significant scale, to the native taxation module sowed the seeds for the difficulties in the post-implementation stage. We shall revisit this issue later in this chapter.

Negative outcomes of the first ERP project

Managers and key users participated in this study recalled the difficulties they encountered with this system. The users in various offices were disappointed with the system in terms of both stability and usability. In their eyes, the first ERP implementation was a total failure, but the MIS department was unable to provide quick solutions to stabilize the situation. It resulted in serious resentment among various stakeholders. Amid criticisms from management and users, the MIS Director and several system analysts resigned. The departure of key MIS personnel worsened the crisis.

Nine months later, the company hired a new MIS director with more experience in ERP management to shoulder two very critical tasks: (1) to rebuild the MIS function and (2) to resolve the problems brought about by

a disastrous ERP system. It was an enormous challenge for the new director when the shortage of qualified MIS staff was taken into consideration. In response to such a problem, he established a prioritization committee to manage the large backlog of user requests. The committee, facilitated either by himself or the Business Application Manager, had the participation of MIS specialists and representatives from all functional and business units to help establish priorities for user requests. The representatives assigned to the committee were very knowledgeable and experienced in their areas of responsibilities. They were either experienced operational staff or middle managers.

The prioritization committee was an important measure to steer the company towards the right direction. First, it formally institutionalized a scope management policy to deal with user problems, and maintenance and support needs. The committee decided that some user requests with lower urgency would be resolved only when the related ERP modules were to be re-implemented. As a result, the MIS department could allocate most of its resources to address urgent requests, for instance, bug corrections or those of high business impact. These urgent requests needed to be resolved immediately for transactions to complete and business to continue. Second, the committee was not only a mechanism for allocating resources fairly, but also for facilitating communications among its stakeholders and with the MIS team. Thus, it provided an organizational structure for managing and improving the relationships between the MIS function and its diverse stakeholders. The Business Application Manager described the importance and effectiveness of the committee as follows (Chen, Law, and Yang 2009, 162):

> MIS must assume a leadership role and avoid being seen as shirking its responsibility in managing these difficult situations. We offer our clients any assistance needed as much as possible, and facilitate the process of user request prioritization and resources allocation. In this committee, the needs, difficulties and opinions of all representatives are heard.

The measures described above helped stabilize the chaotic situation after the roll-out of the ERP system. The next step of high priority was redeployment of the ERP modules. According to the MIS Director, re-implementing the ERP system was necessary since the business processes and systems were so poorly designed and implemented in the past. That means, the customizations made to the system would be abandoned. The MIS Director and the steering committee agreed to officially terminate the first ERP project, and prepared for the re-implementation.

The second ERP project

The MIS Director together with the prioritization committee defined three milestones for the second ERP project. The first milestone was to re-implement the poorly installed modules of the first project within twelve months. The taxation requirements of Taiwan particularly deserved the attention of the company since the customizations developed to fulfil such requirements in the first project had caused severe system stability and support problems. The second milestone was to implement the native project accounting module to support businesses in the region; while the third was to implement native manufacturing modules. This plan had secured the full support of the IT steering committee, which was now chaired by the Managing Director, with senior executives representing their own functional and business units. The Managing Director volunteered to be the ERP champion with the assistance of a few middle-level business managers, one for each office location of Greater China.

The MIS Director emphasized two critical strategies. First, he decided to adopt a stricter vanilla implementation approach and project scope management policy in order not to repeat the mistakes made in the first ERP installation. The system was to be deployed adhering to native ERP features as much as possible. Customizations would be permitted only in exceptional circumstances and after thorough review by the prioritization committee, and final approval by the steering committee. While taking advantage of native ERP features to the greatest extent, the company would be able to align the system with the ERP vendor's product and upgrade plans, and support services.

Second, the disparate business processes across the Greater China area needed to be revamped and redesigned. The reasons driving this emphasis included minimizing the gap and enhancing the "fit" between the business processes and the native features of the ERP package, and establishing a set of core processes common to the company's business across Hong Kong, Taiwan, and the Chinese mainland. Such objectives were no less important than seeking innovative ways of doing business using the ERP as a strategy enabler since common processes across Greater China locations would significantly improve operational efficiency, and eliminate the challenge of supporting the different versions of legacy processes. As a result, the company achieved the objective of common processes for at least 85% of the business processes of the various SBUs. Relative to the first project, it was easier for the second project to set up

and support the ERP instances for Taiwan, Hong Kong and Mainland China because of the process redesign efforts.

A strictly enforced vanilla approach had profound implications not only for the implementation but also operational phases of the system. The ERP modules implemented by this approach had only minimal customizations. Therefore, the job of applying software patches and upgrades released by the vendor would be simpler and more manageable. Software patches and upgrade releases were easily applied to the Greater China instances, tested in the development server, and then implemented in production instances. This would have profound implications on system upgrade and maintenance in the long run.

That is a positive outcome, resulting from a rigidly enforced vanilla approach and scope management. Having learned from the bitter experience of the previous ERP project, the company understood that it was very important to control the extent of customization to the ERP. User requests calling for modifications would be subject to thorough risk analysis, and assessments of business and technical impacts. They would only be approved if the ERP package lacked native functionality to support critical business requirements. On the basis of the assessments, the prioritization committee would then either reject the request or agree to submit it (with justifications) to the IT steering committee for final approval by senior executives.

How the decision process worked can be explained using the back-to-back ordering customization as example. After rounds of investigation and review, the MIS Director, with the support of the prioritization committee, finally made a recommendation to the steering committee to drop back-to-back ordering. The project management interface to the ERP system resulted in the same fate.

Another interesting issue that emerged in the midst of the project also illustrated how the vanilla approach was enforced. One of Controlco's Australian SBUs offered to share its consultant-developed project accounting system if Greater China MIS was willing to absorb part of its development cost. Note that this proprietary application system deviated from the corporate IT and ERP standards, and the strategy of Greater China MIS. Needless to say, he rejected the offer. Greater China MIS favoured the ERP vendor's native project accounting module for reasons of seamless integration and easy maintenance.

The specific taxation requirements for Taiwan were a headache for the company. Fortunately, after rounds of negotiation, the MIS Director reached an agreement with the ERP vendor's Taiwan office to develop a localized version of the native taxation module for Controlco and other

clients in Taiwan. By agreement, the company had to absorb only a portion of the development cost while the vendor retained the rights to sell this module to other companies. This arrangement had a very positive impact on the health of Controlco's ERP system. The product resulting from this agreement would be as legitimate as other products sold by the vendor who would be willing to assume the responsibilities of providing on-going software upgrades and support services for this module, as long as Controlco subscribed to the global technical support program. As discussed above, the company strove to control and minimize customization requests, with considerations given to the following issues: (1) the needs of users, and the risks associated with the ERP, and (2) the roles of the ERP vendor in on-going maintenance and support of the ERP.

Managing providers of consulting services is one of the critical tasks in ERP projects. In the first project, the performance of consultants from the ERP vendor's consulting division was less than satisfactory despite the high hourly rate the vendor charged. The interviewees of this study recollected that the consultants were quite "green" and were heard frequently calling senior colleagues working in other sites for technical advice. Therefore, the MIS Director strove to improve and control the process of selecting and managing external expertise.

In the second ERP project, the company no longer depended on a single source of external expertise, but several. Consultants were selected by matching their skills and experience against the requirements of the individual ERP modules. In addition to those from the vendor's consulting division, consultants were hired at a lower hourly rate from a smaller consulting firm. Despite it was a small firm, the MIS department was satisfied with the credentials of its key consultants and managers, some of whom were former employees of the vendor's consulting division. The MIS Department also selected a project accounting expert from the ERP vendor's Singapore division to join the project, and seconded two financial specialists from Controlco's SBUs in the United States which had recently completed their own project accounting modules.

To safeguard the company's interests, the project leaders clearly defined consultants' responsibilities, and work schedules. The estimates of project tasks and actual deliverables were compared. This is especially important for managing consultants hired on a "time and material" basis after the company had learned a lesson from the first ERP project. That means, consultants' timesheets were reviewed and questioned if any significant discrepancy was found between the estimates and actual hours for the amount of work completed.

As a formal organizational structure, the prioritization committee continued to bear the responsibilities of managing user requests for maintenance and support services for the ERP system. As the project progressed, more improvements were made to the prioritization process and management of user requests. Procedures and criteria for prioritization were clearly defined and systematized. As part of the infrastructure geared towards improving IT management, user requests could be submitted either using paper-based forms, or the web-based system. Such requests were reviewed by helpdesk staff to assign criticality levels, according to which actions were scheduled. The most urgent user requests (i.e. those at the highest level of severity/urgency) were addressed immediately in order to safeguard system and business operations from interruption. Examples in this category included bugs in the ERP system, "stuck" (or incomplete) transactions, and problems with the technical infrastructure. Other user requests were forwarded to the prioritization committee, which scheduled them within other priorities. Examples for such requests included cosmetic changes to user interfaces and messages, online and batch report development, enhancements to the system because of changing business requirements, and new module adoption. The Business Application Manager's comments epitomized the rationale of the practices implemented (Chen, Law, and Yang 2009, 163):

> We established a set of clearly defined procedures and guidelines for the prioritization committee and helpdesk activities. The documentation helps us not only to ensure that M&S activities are handled consistently, but also to educate MIS and non-MIS staff about the processes of handling customer support, and of user request prioritization and resources allocation. Doubtlessly, it is very important to carefully assess the risks and business impacts associated with user requests, and the reviews may find that some of the required activities would also call for other related activities. For example, a complaint about an ERP feature from a user may indicate that there is a need for informal or formal training for the user, or improvement to user documentation. A patch or version upgrade may result in a need to upgrade the network, operating systems, or servers.

The successful adoption and operations of ERP systems require not only employing sound practices in implementation, but also in post-implementation activities. In this case, the company treated ERP maintenance and support as key elements of daily operations and systems planning to support current business activities and future needs. These required a systematic approach in managing current performance and future requirements. For instance, the status of maintenance and support activities, and problem-solving history were tracked by the helpdesk

system, and analysed and reviewed on a regular basis by the applications team.

Training was provided on a regular basis to meet the needs of various types of personnel, namely managers, users, and IT staff involved in different phases of the project. Moreover, retaining the knowledge of the implementation team was recognized as highly critical to avoid the mistakes of the first project. For the purpose of knowledge transfer, MIS staff worked closely with external consultants to develop the ability to support the system in the operations phase. A contract was signed with the small independent consulting firm mentioned above to retain its services on an on-going basis for a minimal number of work hours per week. This provided the MIS team with external expertise during the operations phase while keeping costly consulting hours to the minimum. However, the agreement stipulated that the consulting firm would offer more consulting hours at a discounted rate when needs arose, for instance, in cases of emergency or new module implementation.

Most large-scale information system projects suffer from the turnover of key human resources. The retention of critical ERP-related MIS and business personnel is always an enormous challenge. Staff turnover in Controlco's ERP projects might be due to internal morale issues or opportunities in the job market. In the second ERP project, the MIS Director, with the support of the top management team, promised key project personnel performance and retention bonuses, and distributed "spot awards" to appreciate staff for making significant contribution to project goals. Performance in the ERP project was linked to annual staff performance objectives and appraisal.

The turnover of business personnel might have also resulted from the fear and misunderstanding concerning project objectives. For instance, the anxiety about potential lay-offs after its completion might have led to morale problems, and resistance to business process redesign while many users might perceive the ERP as a career limiting factor. Open communication among various stakeholders was vital for addressing such problems. The ERP project management team kept various stakeholders informed of the progress and difficulties of the project in regular status update meetings. Informal means of communication were employed such as coffee talks, and web-based newsletters. The Managing Director, SBU heads, and the MIS management team were active in sharing information about, and promoting the project.

Morale problems might also be a result of difficulties encountered by staff in discharging their responsibilities. Thus training was organized for MIS as well as non-MIS staff on a regular basis. The MIS Director

emphasized a process-oriented, rather than function-oriented, approach for managing the ERP and business processes. Key users were selected as "process owners" who assumed the responsibilities of training junior users, and proposing improvements to business practices and processes. They were assured that the ERP might eliminate some job types but would also create new opportunities over the long run. On one hand, this was a means used to pacify worries among users. On the other, such practices indicated that the company had recognized the need to retain key business users over the long term as a source of business knowledge and competitive capabilities for the company.

The train-the-trainer approach brought about several advantages for the company. First, it created career opportunities for knowledgeable business users for the reasons mentioned above. Second, it did produce very profound impacts on the cost and quality of training. Unlike the first ERP project which utilized expensive standard courses offered by the ERP vendor, this project made course design a joint effort between process owners, MIS specialists and external consultants. Standard courses offered by the vendor covered primarily generic information about ERP features and it proved ineffective for training Controlco's business users. By contrast, the training materials produced by the joint effort were designed to address business practice and process issues in the company's ERP environment. Besides, this approach created proactive involvement from the user community and was positively received. It enhanced the awareness that everyone in the company had the opportunity and responsibility to contribute to the success of the system.

The MIS Department strove to establish an infrastructure conducive to improving IT management practices. Investment was made in standards and procedures, and systems development and testing platforms. Quarterly performance analysis reports relating to user requests were generated for review by the users and middle managers of all functional areas. The prioritization committee in the second ERP project has also assumed an enhanced role. Its responsibilities by now included proactively identifying and managing both the operational and strategic issues concerning evolving business requirements and ERP features. This was reflected by the comments of the Director of Supply and Customer Services (Chen, Law, and Yang 2009, 163):

> We are working in a very dynamic business environment, in which changing business requirements often require new systems functionality. Our team was disconnected from MIS and other functional areas in the past and lacked an understanding of what we could and could not do. The prioritization committee provides a mechanism for critical operational and

> strategic issues to be reviewed and addressed by all stakeholders. It allows us to consider our local requirements in the light of the overall picture of the firm.

In short, the approach and practices adopted by the Greater China MIS Department since the end of the first project was a significant contributor to the positive outcomes of the second ERP installation. The company's ERP experience was summarized by the MIS Director as follows (Chen, Law, and Yang 2009, 163):

> Success in the deployment, and maintenance and support of an ERP system requires a lot of preparation in many areas. For instance, you need a new thinking and approach, ERP expertise, and supporting infrastructure. A proper infrastructure must encompass clearly defined procedures, helpdesk systems, and the methods for prioritizing user requests and allocating resources. In the second project, our success has much to do with the fact that ERP maintenance and support is viewed as an integral element of TQM (total quality management). We consider that sound change management practice is fundamental to success in maintaining the business processes and ERP system. Using the prioritization committee and the IT steering committee, we manage to make sure that our resources are not overly absorbed by mundane day-to-day support activities at the expenses of strategic requirements. It provides a means for us to look beyond our current needs and prepare for the future.

Outcomes of the Second ERP project

The second ERP seemed to have received very positive appraisal and acceptance from the users. This study occurred approximately fifteen months after the company rolled out the re-implemented ERP modules to production use. Throughout this study, we had a chance to talk to key managers and users after they had used the system for a substantial period of time. Meanwhile, the implementation of project accounting module was also in progress during the study.

According to the interviewees, this ERP system was a significant improvement over the previous installation in terms of stability and usability. They also expressed appreciation for the improvement in business processes, and the management of user requests. The quality of the installed system this time was much better than the first poorly implemented ERP system. That was reflected not only by user satisfaction but also the ease of providing system support. Supporting a stable ERP system with very limited customization is doubtlessly simpler than an unstable and highly customized ERP installation (such as the first ERP

system). Generally speaking, an ERP system would consume, in the early months of operations, a lot of time and resources of the MIS department, which has to handle a large number of maintenance and support requests until the situation gets stabilized. Some project managers and consultants estimated that user requests for maintenance and support services normally consumed 70 to 80 percent of the resources of a business applications team in the first seven to eight months of ERP operations.

In Controlco's second ERP project, user requests were reduced systematically according to severity levels and priorities. This positive outcome was indebted to the improved prioritization and scope management processes, and proper decisions made since the planning stage. This ERP installation was of better quality than the first one and thus, could be maintained and supported more easily. A strictly enforced vanilla approach led to an ERP system with only very minimal amount of customization. There was relatively little difficulty to secure help from the vendor's technical support personnel for tracing system bugs and providing solutions to system problems. The vendor's software patches and upgrade releases could be applied without worrying about undesirable consequences. Throughout the full lifecycle of the ERP, the company would benefit from the vendor's expertise and software product releases.

Discussion and implications

Maintenance and support of the ERP

First of all, it is important to note that the key decision makers of this company had gradually changed their mind-set concerning ERP customization, and maintenance and support while they struggled with the first poorly implemented system. Such a change made it easier for the MIS Director to promote his approaches and practices in the second project. Therefore, we would like to begin our discussions with ERP customization, and maintenance and support issues.

The company had learned a lesson from its first failed project and understood that their attempts to customize the ERP were costly and risky. Customizations had also created problems for on-going maintenance and support. Consequently, business and MIS leaders were convinced that a successful ERP endeavour would require not only success in the implementation, but also in the operation and use of the ERP. That means, companies planning for ERP implementation should take a full lifecycle approach (Law, Chen, and Wu 2010) by which the critical issues and challenges of all phases should be carefully assessed as early as possible.

The company's setback in the first ERP project triggered a change in the mind-set of many people at the management as well as operational levels of the organization. It made possible the adoption and improvement of several practices presented in Table 10-1. An important manifestation of such a change was the incorporation of user requests prioritization as a critical element of change management practice since the beginning of the second ERP project. Such a process was no longer one dominated by the MIS managers, but one with full participation from business and functional units. The tasks performed by the prioritization committee were no longer confined to reactive fire-fighting but covered many forward looking aspects. At this point, the scope of ERP maintenance and support was extended to include both operational and strategic perspectives. In other words, the importance of ERP maintenance and support had been recognized and repositioned to a higher status.

The critical issues and lessons that Controlco learned from the two projects are summarized in Table 10-1 below:

Table 10-1. Critical Issues Concerning ERP Maintenance and Support

Critical Issues	Important Lessons Learned
Client-Vendor Relationship	• It is critical to maintain a co-operative relationship with the vendor. The installed system needs to remain compatible to the native ERP features, and the vendor's product plans in order to benefit from the vendor's expertise and software releases. • Excessive customization to the ERP should be discouraged as it would severely hinder the migration path, and jeopardize the opportunity to utilize the assistance and software upgrades offered by the vendor on an on-going basis.
Maintenance and support strategy as a key element of the overall ERP strategy	• Maintenance and support is an integral element of the overall success of an ERP system. Thus, it is necessary to treat M&S strategy as a very critical issue from the beginning of the ERP project. • Issues concerning customizations and their impacts on M&S must be evaluated early on. Excessive amount of customization

Critical Issues	Important Lessons Learned
	would create obstacles to utilizing vendor's expertise and future software releases. Therefore, Controlco decided to enforce the vanilla approach more rigorously.
Maintenance and support practices	• As a key element in the ERP's full lifecycle, good M&S practice requires planning, skill development, and a comprehensive set of supporting infrastructure which encompasses not only hardware and software platforms but also organizational structure, and standards and procedures for managing the decision and work processes.

Improvements in project management practices

From the comparative analysis of the two ERP projects, we are able to see major improvements in project management in several areas. The lessons Controlco learned from a crisis situation had led to a better understanding of the proper practices in an ERP adoption context. For instance, in the first ERP project, the MIS department dominated project-related decisions, while user departments also regarded it as "another MIS project". Such a perception did not help the project in terms of soliciting co-operation and participation from business units. In the second project, the management team tried hard to break such a "negative" perception and promote the project as an enterprise-wide "business project" which required the support and participation of all the units of the company. This emphasis of "business ownership" had profound implications especially when the company decided to seize the opportunity to re-engineer its business practices and processes to facilitate ERP implementation, and ultimately to improve its business operations.

When project practices are examined using Project Management Body of Knowledge (PMBOK) as the framework of analysis, improvements can obviously be found in many of the knowledge areas emphasized by the Project Management Institute (PMI) (Project Management Institute 2017). The PMI emphasizes 10 knowledge areas: scope management, time management, cost management, quality management, human resources management, communications management, risk management, procurement

management, stakeholder management, and project integration management. The following discussion (as summarized in Table 10-2 below) primarily concentrates on the 9 knowledge areas supported by the analysis of the data collected. However, it does not imply that the rest is less important and can be ignored. It simply reflects the focus of the case study, and the amount of information available to the study. Cost management is not covered below because we were given limited access to detailed financial information, and such a limitation compromised our ability to comment on cost management issues.

Table 10-2. Improvements in Project Management in the Second ERP Project

Knowledge Areas	Project Management Practices (Second ERP)
Scope and Time Management	● The company became more prudent in project planning and scheduling. ERP modules were deployed in a phased approach and the schedule was more realistic than that of the first project. ● Project scope was defined more clearly and controlled (Chen, et al. 2009). ERP customization requests were subject to stricter control under such a rigorously enforced vanilla approach. Previous customizations were dropped. ● User request prioritization and system maintenance were proactively managed. Project decisions were subject to an improved IT governance process which included risk and business impact analysis, and approval by the steering committee. ● The company set a clear target for business process redesign. As a result, 85% of the business processes across Greater China were in common.
Human Resources Management	● The company demonstrated improvements in the development and retention of internal expertise, and in managing external consultants. It secured the availability of expertise from multiple sources for both the

Knowledge Areas	Project Management Practices (Second ERP)
	implementation phase and the longer term. ● Training, and knowledge transfer from external experts to in-house staff were given more attention. Key system users, called process owners, assumed the roles of trainers, and business knowledge experts responsible for identifying new business practices and process changes. ● Measures were taken to retain key project staff and enhance morale, for instance, project-related bonuses, spot awards, and inclusion of ERP responsibilities as a key element in staff performance appraisal.
Procurement Management	● The company sourced consulting expertise from more than one consultancy, and contracts were awarded to them according to the skill requirements of individual modules. Hiring decisions were based on qualifications review, and reference check. ● Assignments were made with objectives and responsibilities clearly defined. Consultants' deliverables and timesheets were reviewed against estimates before the MIS Director approved the timesheets. ● External consultants and the company's helpdesk generated monthly reports for activities planned and completed, which were monitored on a regular basis. ● A contract was signed with a small independent consulting firm to retain its services on an on-going basis for a minimal number of work hours per week. ● It improved its partnership with the ERP vendor to utilize the latter's expertise.

Knowledge Areas	Project Management Practices (Second ERP)
Communications and Stakeholder Management	● Both the business executives and MIS department had taken a proactive role to promote the ERP project as a business project for the whole enterprise. The Greater China Managing Director chaired the steering committee and volunteered as the champion for ERP. Much effort was committed in communications and stakeholder management. ● Formal project status update meetings, and informal meetings such as coffee talks with the user community were organized regularly, and status reports and web-based newsletters were produced for information sharing for all stakeholders. ● The company realized that it was necessary to get stakeholders involved in business-related decisions and quality activities. The prioritization committee was an important mechanism to facilitate the communications among, and involvement of diverse stakeholder groups.
Risk Management	● Risk assessment and business impact analysis were employed for project decisions. ● Activities or modules involving high level of risks were dropped from the project plan (i.e. back-to-back ordering, project management interface, and proprietary project accounting). ● Impacts of customizations on on-going ERP M&S were seriously evaluated.
Quality Management	● Many measures had been put in place to manage human resource development and retention, knowledge transfer, and the implementation and maintenance of the ERP.

Knowledge Areas	Project Management Practices (Second ERP)
	● The company had institutionalized many methods and practices for scope and change management, risk and business impact analysis, and maintenance and support (e.g. prioritization committee, and helpdesk management) which were considered integral elements of TQM.
Integration Management	● Expertise and practices in the above knowledge areas were enhanced to achieve the overall project objectives. ● The company placed more emphasis on the alignment of business and IT strategies. ● ERP modules and customizations were evaluated in the light of the business and technical impacts on the company and the full ERP lifecycle. Thus, on-going ERP M&S requirements and strategies were evaluated early in the ERP adoption process.

Obviously, the two consecutive ERP projects offered the case company a very precious learning opportunity to improve project management practices. It was evident that much attention and efforts had been placed on risk and quality management by the project leaders while they were trying to deliver the second ERP system to users on time. Project management improvements in individual knowledge areas were inseparable from the objectives of risks and quality management. For instance, improvements were made in the standards, and processes concerning external consultant management, business process redesign, user requests prioritization, business impact analysis, and IT governance. These were remarkable contributors to the minimization of risks, and enhancement of the quality of project deliverables.

Concluding remarks

This case study provides an in-depth analysis about the two consecutive ERP projects of Controlco. Learning from the first ERP disaster, the company finally adjusted and improved its practices required for ERP success. The company's experience in both ERP projects may

help other companies to avoid similar mistakes. This study has also demonstrated that enterprise-wide application system projects such as ERP adoption are very complex, and require competence and serious assessment of critical issues in multiple knowledge areas.

Lastly, I would like to repeat the advice that companies planning to adopt ERP systems must conduct an assessment of the requirements and readiness levels of their stakeholders before investing in such costly and risky projects.

APPENDIX A

MATURITY LEVELS OF IT GOVERNANCE

Maturity Levels and Descriptions
Level 0 (Non-existent): When no recognisable IT governance practice and process exists in the organization.
Level 1 (Initial/Ad Hoc): When IT governance is only addressed by ad hoc approaches or on a case-by-case basis.
Level 2 (Repeatable but Intuitive): When IT governance issues are recognised. IT governance processes are being developed, and measurements identified by management. However, they are not yet adopted across the whole organization.
Level 3 (Defined): The importance of and need for IT governance are understood by management and communicated to the organisation. A baseline set of IT governance indicators is developed where linkages between outcome measures and performance indicators are defined and documented. Procedures are standardised and documented. Management communicates standardised procedures, and training is established. Tools are identified to assist with overseeing IT governance. Dashboards are defined as part of the IT balanced business scorecard. However, it is left to the individual to get training, follow the standards and apply them. Processes may be monitored, but deviations, while mostly being acted upon by individual initiative, are unlikely to be detected by management.
Level 4 (Managed and Measurable): There is full understanding of IT governance issues at all levels. There is a clear understanding of who the customer is, and responsibilities are defined and monitored through SLAs. Responsibilities are clear and process ownership is established. IT processes and IT governance are aligned with and integrated into the business and the IT strategy. Improvement in IT processes is based primarily upon a quantitative

Maturity Levels and Descriptions
understanding, and it is possible to monitor and measure compliance with procedures and process metrics. All process stakeholders are aware of risks, the importance of IT and the opportunities it can offer. Management defines tolerances under which processes must operate. There is limited, primarily tactical, use of technology, based on mature techniques and enforced standard tools. IT governance has been integrated into strategic and operational planning and monitoring processes. Performance indicators over all IT governance activities are being recorded and tracked, leading to enterprise-wide improvements. Overall accountability of key process performance is clear, and management is rewarded based on key performance measures.
Level 5 (Optimised):
There is an advanced and forward-looking understanding of IT governance issues and solutions. Training and communication are supported by leading-edge concepts and techniques. Processes are refined to a level of industry good practice, based on results of continuous improvement and maturity modeling with other organisations. The implementation of IT policies leads to an organisation, people and processes that are quick to adapt and fully support IT governance requirements. All problems and deviations are root cause analysed, and efficient action is expediently identified and initiated. IT is used in an extensive, integrated and optimised manner to automate the workflow and provide tools to improve quality and effectiveness. The risks and returns of the IT processes are defined, balanced and communicated across the enterprise. External experts are leveraged and benchmarks are used for guidance. Monitoring, self-assessment and communication about governance expectations are pervasive within the organisation, and there is optimal use of technology to support measurement, analysis, communication and training. Enterprise governance and IT governance are strategically linked, leveraging technology and human and financial resources to increase the competitive advantage of the enterprise. IT governance activities are integrated with the enterprise governance process.
Source: Adapted from IT Governance Institute (2003). Reprint with ISACA Permission.

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