Critical Success Factors in Enterprise Resource Planning (ERP) System Implementation: An Exploratory Study in Oman

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Abstract: The ERP system has been the subject of much academic discussion in recent times. The impact that a successful implementation can have on an organization cannot be overstated. The factors which are crucial to the successful implementation of an ERP system are commonly known as Critical Success Factors (hereinafter CSFs). This study investigated the CSFs that play a crucial role during the implementation process in Omani organizations. Moreover, it identified the CSFs that are most important in ensuring a successful ERP system implementation. The survey was distributed to 35 enterprises using an ERP system. The managers of those enterprises identified 10 CSFs as the most important.

Keywords: Critical Success Factors, ERP, Implementation, Oman

1 Introduction

Many successful cases of ERP system implementation have been reported, but equally, many companies have announced their ERP system as failed system. The failure of ERP system or the inappropriate usage of the system will definitely cause a huge loss for the organization and may even lead to bankruptcy (Davenport, 1998; Soh *et al*., 2000; Chen, 2001; Davenport *et al*., 2004).

There are many benefits associated with an ERP system. All can lead to increased efficiency and will give a company a more competitive advantage in the global economy. In order to achieve this, companies should consult experts during the implementation process in order to deliver the above-mentioned benefits, and avoid system failure (Ekman and Thilenius, 2011; Maditinos *et al*., 2012).

McNurlin (2001) revealed that only 34 percent of the companies were satisfied with their ERP system. 28 percent of the implemented ERP systems were failures. Further, 90 percent of the implemented ERP systems were late and more expensive than the companies had expected (Loonam & McDonagh, 2005).

Moreover, 25 percent of the money invested in ERP system was viewed as wasted and less than 75 percent of the ERP system' effectiveness was utilized (Ettlie, 1998). Many companies only used between 50 and 75% of the ERP system functionalities or modules. Betts (2001) indicated that 80 percent of the ERP system failed to achieve the business objectives that were expected from system. Notwithstanding this, many companies have implemented ERP system, but few are used effectively (Yu, 2005).

According to Kremzar & Wallace (2001) the implementation of ERP system revolutionizes the way of a business operates. Therefore, the management and stakeholders need to appreciate the magnitude of the impact that the implementation will have on the organization. They must have a full understanding of the CSFs that will help them to ensure the successful of the ERP system implementation.

The exact number of CSFs necessary to achieve successful ERP implementation has been the subject of great debate. Willcocks (1998) identified 9 CSFs. Nah and Lau (2001) concluded that there are 11 CSFs. However, this is in stark contrast to Somers and Nelsons (2001) who identified 22. Holand and Light (1999) adopted a different approach. They classified CSFs into 2 categories; Strategic Factors and Tactical Factors. The former includes The Legacy System, ERP Strategy, Business Vision, Project Plan, and Top Management Support. The latter, is comprised of Personnel, Consultation, Business Process Change, Software Configuration, and Client Acceptance. This study focuses on the top 10 CSFs within the Omani context. It's intended to help reduce or eliminate the likelihood of system failure.

This research considers the following research question:

What are the CSFs that firms should consider during the ERP implementation?

The research is expected to contribute towards identifying the CSFs that reduce the likelihood of ERP system failure in order to encourage many firms to consider these factors in the ERP implementation which can help them to avoid system failure and to achieve effective usage of the ERP system. This study will also contribute in technology diffusion through motivating other companies to implement an ERP system and will provide them with the needed CSFs for ERP implementation.

2 Literature review

2.1 ERP system

An ERP system is a technology infrastructure that can assist a company in integrating information from all internal departments with suppliers and customers. It links all areas of a company's internal functions and processes with the external ones in order to create a close relationship between customers and suppliers. ERP also allows information to be shared between different partners, supports the effectiveness of the supply chain management, and improves the flow of information. These should enable managers to make better decisions based on more accurate and up-to-date information (Al-Mashari & Zairi, 2000).

The ERP system was introduced by ERP providers, such as SAP (Systeme, Anwendungen, Produkt in der Datenverarbeitung) (Systems, Applications, & Products in Data Processing), Oracle, PeopleSoft, and others to eradicate legacy system problems, provide single and integrated technological platform, and thereby assist companies in gaining a competitive advantage and thus competing globally. However, implementing ERP system requires changes in the organizational culture as a whole, takes a long time to implement, and consumes a considerable amount of money. Therefore, companies need to know clearly what ERP system is and in what ways the system could affect the company before thinking of implementing the system (Loonam & McDonagh, 2005).

Al-Mashari (2003) noted that, since the 1990s ERP system have been considered by many researchers and practitioners as one of the most innovative developments in Information Technology and one of the most well-known IT solutions for this decade, and this is in fact because ERP system has become one of the main prerequisites and the backbone of e-business era.

Companies are beginning to realize that in order to survive in the global business environment they must improve not only their organizational efficiency, but also their whole supply chain. This is because competition today is not limited between companies only, but it has extended to be among their supply chains as well. These reasons force many companies to keep up to date and make large investments in developing and implementing better technologies and system such as ERP system (Davenport & Brooks, 2004).

ERP system can be a useful tool for companies to build a strong information systems infrastructure and to enable the management to undertake better decision-making based on accurate and on-time information. ERP system can improve product quality and customer responsiveness and also enhance information sharing and information quality among different departments inside the company, as well as extend beyond the company's boundaries to suppliers, customers, and other partners in the supply chain. Ultimately, this should enhance overall business performance to help achieve competitive advantage in the global economy and improve long term profitability (Klaus et al., 2000; Akkermans et al., 2000; Hsu & Chen, 2004).

2.2 ERP system implementation

Many companies around the world began implementing ERP system in 1990s. The main reason behind the implementation of ERP system is to re-engineer business processes through a uniform information system (Rajagopal, 2002). During the mid to late 1990s, around 30,000 companies worldwide implemented ERP system (Mabert et al., 2003). Companies worldwide have spent $10 billion per annum on ERP systems (Yusuf et al., 2004). Between 1996 and 2003 there was a tremendous upward growth in the number of ERP systems. However, in the last few years, ERP systems seem to have been forgotten and this has led to a significant decline in the ERP market.

Many leading international companies have successfully implemented ERP systems. These companies have experienced the expected benefits of ERP system. An order with Autodesk Software Company that used to take two weeks is now completed within four hours. Cisco's ERP system enabled it to cut costs and substantially increase its revenue. ChevronTexaco improved its supply chain management through the implementation of an ERP system. It achieves an annual net profit of $100 million. IBM's R/3 implementation was one of the most successful implementation (Chen, 2001; Davenport, 1998; Turban et al., 2008; Sheikh, 2003).

However, there have been some significant failures. Dell felt that ERP system would fail to cope with their sales volume. Thus it cancelled the ERP project and lost $115 million. Another case in point was FoxMeyer. The pharmaceutical giant suffered a loss of $100 million and made bankrupt after unsuccessful implementation (Chen, 2001; Davenport, 1998).

Implementation of ERP system is very costly and takes a long time to be implemented. This reason prevents many companies from implementing ERP system and limits the market share of ERP systems. However, in order to solve this problem, top ERP vendors need to develop special ERP packages to meet the need of small size companies to increase the market share of ERP systems. With this solution, small and medium sized companies can also benefit from ERP system. This solution also enables the global proliferation of ERP systems (Zheng et al., 2000; Rashid et al., 2002).

Implementing technological solutions and techniques such as ERP system could improve and integrate the internal and external flow of information within an organization. Such innovations would also improve SCM performance, enhance decision-making based on accurate information and improve the relationship, collaboration, and exchange of information. It would improve the movement of goods and services to outsource suppliers, customers, and other partners in the supply chain and finally achieve a competitive advantage and increase profitability (Wieder et al., 2006; Kremzar & Wallace, 2001).

2.3 ERP system implementation in Oman

ERP is growing in Oman and the implementation of ERP systems are increasing rapidly in many sectors, particularly the Manufacturing Sector. Many different systems have been introduced and implemented in Omani companies. However, the ERP system is one of the most popular systems among Omani firms. Omani companies need to be prepared before initiating any ERP project in order to achieve optimum use of the system and thus gain better business performance and successful ERP system project (OIT Report, 2013; Al Hinai, Edwards, & LHumphries, 2013).

In fact, the increasing number of manufacturing companies and the competitive environment among many firms in Oman provides a significant opportunity for ERP vendors to penetrate the Omani market. The information systems market in Oman is constantly growing and it is a promising marketplace, particularly with the constant implementation of ERP systems in companies of all sizes. Yet, it requires more attention from researchers and professionals (OIT Report, 2013).

The Omani market is still virtually untapped by both domestic and international ERP vendors. It is still at the developmental stage. Therefore, now is the ideal opportunity for foreign ERP vendors to penetrate the Omani market. It's an open market. In fact, the implementation of ERP systems in Oman has increased the number of job opportunity. It has also helped to increase income for many individuals and entities in the country which will then contribute to the overall development of the country (OIT Report, 2013).

In fact, there are quite a reasonable number of Omani companies that have implemented and are using ERP system. On the other hand there are also many other companies that are reluctant to adopt an ERP system. This is may be due to the failures of ERP systems in many international and local companies (SAP Forum, 2013).

A case study conducted on Omantel examined seven CSFs for ERP system implementation namely; Stakeholder Consultation, Vendor Selection, Project Management, Stakeholder Management & Communication, Training, Risk Management, and System Re-Engineering & Software Customization. The findings of the study show a

positive impact of the ERP system on Omantel. It made significant changes to the way the company does business (Maguire et al., 2010).

2.4 CSFs in ERP system implementation

According to Yu (2005) most of the literature on ERP system focused on two main domains. The first one evaluates the suitability of ERP systems' software, vendors, and consultants. The second domain looked at the CSFs that affect ERP system's implementation success, such as ERP Teamwork & Composition, Top Management Support, Business Plan & Vision, Effective Communication, Project Management, Project Champion, Appropriate Business, and Legacy Systems.

An ERP implementation is typically a large new project, the likes of which companies will have never experience before. Consequently, prior to ERP implementation, companies need to understand their own competency such as their ability to use the system effectively, provide maintenance, and to take advantage of system opportunities in terms of development and innovation (Bendoly & Schoenherr, 2005).

Therefore, companies need to start with necessary changes in their own business processes required in the implementation of ERP processes, and may eventually improve the entire supply chain, thus, gaining a competitive advantage in the marketplace. Implementation was one of the most critical issues for industrial companies in literature (Moon, 2007).

According to Nah and Lau (2001) critical factors for successful implementation of ERP system include ERP Teamwork & Composition, Top Management Support, Business Plan & Vision, Effective Communication, Project Management, Project Champion, Appropriate Business & Legacy Systems, Change Management Program & Culture, Business Process Reengineering (BPR) & Minimum Customization, Software Development, Testing & Troubleshooting, and Monitoring & Evaluation of Performance.

Loonam and McDonagh (2005) stated that, when companies plan to implement ERP systems, they have to pass through three stages:-

1. Pre-implementation stage: where companies need to decide why they want to implement ERP systems, what they hope for from this system, what they need to prepare before initiate ERP implementation, and what are the CSFs (such as top management support) that could assist them to achieve successful implementation.
2. Implementation stage: which requires the company to anticipate and be prepared for the coming challenges and problems expected during the implementation stage. Organizational and technical issues usually arise during implementation.
3. Post-implementation stage: at this stage companies need to keep abreast of the latest technology in order to be able to deal with any new technology.

Switching from a traditional business process to a new way of conducting business through implementing a new information system such as an ERP system and therefore abandoning the legacy system in order to run the new business processes, is considered a difficult task and may cause a system failure, which in turn may lead to insolvency. Although, there are success stories with ERP systems, there are also cases of failure for some companies (Farmer *et al.*, 2001; Chen, 2001).

Owing to these failures, many companies are still indecisive on making an enormous investment, paying a large sum of money, and investing in a lengthy period for implementing such new system. In fact, these cases of failure deter many companies from implementing ERP system because they are frightened of having the same experience of prospect of bankruptcy (Huang & Palvia, 2001; Zhang *et al.,* 2002; Rajapakse & Seddon, 2006).

As a result, Enterprise Systems seem to have been forgotten and becoming redundant. Consequently, technology diffusion between companies may be decreasing which may adversely affect the growth of new technology innovations. These were a result of reluctance from many companies to invest huge amounts of time and money in the implementation of an ERP system which could potentially fail or cause undesirable outcomes.

In fact, many companies have been dissatisfied with their ERP system, and in some cases the system has failed. Trunick (1999) pointed out that, only 40 percent of the implemented ERP systems show just some of its full effectiveness, and 20 percent of the implemented ERP systems were considered a complete failure. The rate of ERP systems failure may exceed 50 percent. 60 to 90 percent of the implemented ERP systems were not as effective as the companies had anticipated.

Through an extensive literature review and analysis, several CSFs have been identified. However, there is a consensus among researchers that classify the CSFs into three main categories. Table 1 presents the main factors and the degree of citation for each factor in literature.

Table 1: CSFs Studies

CSFs in literature	Degree of citation in literature	References
Top Management Support	High	Ang et al.(2002); Al-Mashari et al. (2003); Yusuf et al.(2004)
Project Management	High	Umble et al. (2003); Yusuf et al.(2004); Al-Mashari et al. (2003)
Business Process Reengineering	High	Hong and Kim (2002); Malbert et al.(2003); Yusuf et al.(2004)
User Training & Education	High	Mandal and Gunasekaran (2002); Umble et al. (2003); Sum et al. (1997)
User Involvement	High	Bingi et al. (1999); Burns and Turnipseed (1991); Cox and Clark (1984); Zhang et al., (2002)
Business Plan & Vision	Medium	Loh and Koh (2004); Somers and Nelson (2004)
Careful Package Selection	Medium	Wei and Wang (2004); Shehab et al., (2004)
Change Readiness & Culture	Medium	Hong and Kim (2002)
Clear Goals & Objectives	Medium	Umble et al. (2003); Yusuf et al. (2004)
Learning Competency	Medium	Zhang et al., (2002)
Minimal Customization	Medium	Somers and Nelsons (2001)
Monitoring & Evaluation Of Performance	Medium	Holland et al. (1999)
Project Champion	Medium	Akkermans et al., (2000)
Strategic IT Planning	Medium	Somers and Nelson (2004);
Teamwork & Composition	Medium	Loh and Koh (2004); Remus (2006)
Vendor Support	Medium	Motwani et al. (2002); Yusuf et al. (2004)
Appropriate Business & IT Legacy Systems	Low	Holland et al. (1999)
Data Analysis & Conversion	Low	Zhang et al., (2002)
Education on new Business Processes	Low	Woo (2007)
Partnership with Vendor	Low	Somers and Nelsons (2001)

3 Methodology

The design of the questionnaire for this research required a variety of measures and items. The items have been collected and adapted from different sources. The study used a variety of measurements to measure each variable hypothesized the CSFs in ERP implementation. The CSFs measure contained 30 items that were distributed across the 10 CSFs. On the other hand, the measure of ERP implementation included 9 items. A five-point Likert-type scale rating from 1=strongly disagree to 5= strongly agree was used for all of the above mentioned items. The survey was distributed to 35 enterprises using an ERP system. Only 19 usable

questionnaires were returned. Table 2 summarizes the profile of the 19 companies that responded to the questionnaire.

Table 2: Summary of Demographic Profile of Respondents

Variables	Category	Frequency	Percentage
Company Ownership	Local	15	78.9
	Foreign	4	21.1
Company Type	Manufacturing	6	31.6
	Services	5	26.3
	Construction	1	5.3
	Education	6	31.6
	Other	1	5.3
Company size in term of Employees	5-50 Employees	3	15.8
	51-150 Employees	2	10.5
	More than 150 Employees	14	73.7
Geographic Scope	Local	12	63.1
	Regional	4	21.1
	Worldwide	3	15.8
Implemented ERP System since	< 1 Year	2	10.5
	1 Year – 3 Years	6	31.6
	3 Years - 5 Years	5	26.3
	> 5 Years	6	31.6
Delay of ERP System Implementation	Yes	9	47.4
	No	10	52.6
ERP Provider	SAP	8	42.1
	Oracle	6	31.6
	J.D. Edwards	1	5.3
	Others	4	21.1

The respondents' profile indicates that most of the companies had good experience of their ERP system, not least because many of the firms implemented ERP system three years prior to the study. Hence these are surviving companies.

4 Analysis

Table 3: *CSFs Rank*

CSFs in this study	Mean
Monitoring & Evaluation Of Performance	4.02
Project Champion	4.02
Top Management Support	3.94
Clear Goals & Objectives	3.93
User Involvement	3.82
Strategic IT Planning	3.81
User Training & Education	3.77
Teamwork & Composition	3.74
Vendor Support	3.67
Education on new Business Processes	3.67

Note: *A five-point Likert-type scale rating from 1=strongly disagree to 5= strongly agree was used to measure all items of CSFs in this study.*

Table 3 indicates the top ten CSFs ranked by managers as most important from the 20 factors identified by the literature. The 19 managers agreed on these 10 factors as the top 10 critical factors that helped them to achieve successful implementation of the ERP system within their organizations.

This study sets out the following framework to test the relationship between the independent variables (CSFs) and the dependent variable (ERP implementation). The following Figure shows the relationships between the variables.

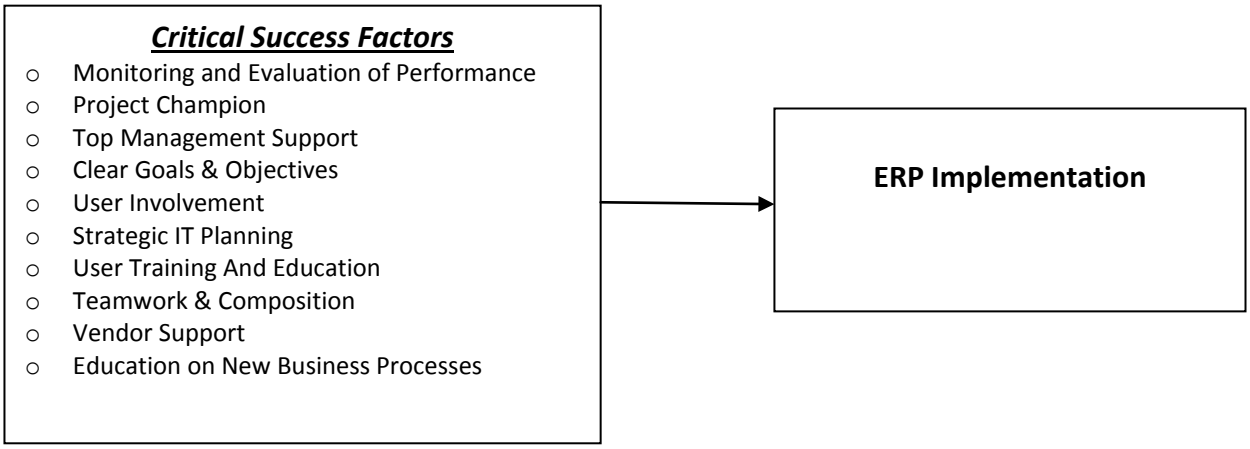

Figure 1: Theoretical Framework

Table 4: Summary of Correlation Analysis

Measures	TMS	UTE	UI	CGO	MEP	PC	SP	TC	VS	EBP	ERP
Top Management Support (TMS)	1										
User Training & Education (UTE)	.305	1									
User Involvement (UI)	.461*	.839**	1								
Clear Goals & Objectives (CGO)	.520*	.447	.598**	1							
Monitoring & Evaluation of Performance (MEP)	.484*	.734**	.656**	.632**	1						
Project Champion (PC)	.549*	.432	.548*	.765**	.549*	1					
Strategic IT Planning (SP)	.434	.737**	.835**	.631**	.704**	.759**	1				
Teamwork & Composition (TC)	.558*	.750**	.832**	.799**	.716**	.721**	.845**	1			
Vendor Support (VS)	.468*	.537*	.646**	.528*	.492*	.661**	.708**	.522*	1		
Education on new Business Processes (EBP)	.266	.902**	.840**	.494*	.774**	.524*	.732**	.719**	.553*	1	
ERP Implementation (ERP)	.004	.481*	.513*	.138	.139	.125	.393	.259	.175	.430	1

* Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

Table 4 indicates significant correlations between the CSFs and ERP implementation; overall the CSFs are significantly correlated. Only two factors had positive and significant correlation with the ERP implementation i.e. User Training & Education ($r = 0.48$, $p<.05$), and User Involvement ($r = 0.51$, $p<.05$), while the other eight factors are only positively correlated with the dependent variable. Top Management Support is the only factor that shows negative correlation with ERP implementation. The above table illustrate the importance of the User Involvement factor r = .51 (.51 x .51 = .26 x 100 = 26%). It accounts for 26% of the variance in ERP implementation.

The results in table 5 show the contribution of each independent variable and determine the variance of ERP implementation explained by the 10 CSFs. Overall the CSFs explain 67% of the variance in the ERP implementation ($R^2 = 0.67$). The F-value is 1.64 which indicates no significant linear model at Alpha = 0.01 or 0.05 or 0.1. However, there is no unique significant contribution of any of the CSFs in ERP implementation.

On the other hand, both the Strategic IT Planning factor and Teamwork & Composition factor make a major contribution to the ERP implementation as they have the largest beta coefficient among the CSFs, β = 1.33 and β = 1.83 respectively. Whereas the Project Champion factor and Education on new Business Processes factor make minor contributions in the ERP implementation as they have the lowest beta coefficient among the CSFs, β = 0.24 and β = 0.31 respectively.

Table 5: Summary of the relationship between CSFs and ERP Implementation

Independents Variables (*CSFs*)	**Dependent Variable (ERP Implementation)** ***Std. Beta Coefficients and Significant Level***
Top Management Support	.34
User Training & Education	.94
User Involvement	.40
Clear Goals & Objectives	.96
Monitoring and Evaluation of Performance	.93
Project Champion	.24
Strategic IT Planning	1.33
Teamwork & Composition	1.83
Vendor Support	.80
Education on new Business Processes	.31
R R^2 Adjust R^2 F	.82 .67 .26 1.64

Note: Significant levels: ***p<0.01 **p<0.05 *p<0.1

5 Conclusion

The journey of ERP system begins with the implementation of the system, and continues post-implementation. However, continued effort is needed after the "go-live" of ERP system in order to reap the full benefits of the system. In fact, the journey of ERP system starts after the implementation stage. "*Yes, there is life after go-live*" (Deloitte, 1999).

Therefore, the CSFs should ensure the continued success of ERP system as well as reduce the likelihood of the system failure during the three stages of an ERP system's life cycle. The sustained commitment and support of the main CSFs from the beginning to the end of ERP system project is very important for the success of the system and for its effective impact on business performance (Loonam & McDonagh, 2005; Beheshti, 2006).
In order to facilitate the continuous success of ERP system and to ensure a better impact on the business performance, CSFs should be involved with the ERP system during the implementation of ERP system. ERP system passes through three main implementation stages of system life cycle and that includes pre-implementation stage, implementation stage, and post-implementation stage.

This study concludes that 10 CSFs should be considered during the ERP implementation as the most important factors from the 20 factors identified by the literature. These factors are Top Management Support, User Involvement, Clear Goals & Objectives, Strategic IT Planning, User Training & Education, Vendor Support, Teamwork & Composition, Project Champion, Monitoring & Evaluation of Performance, and Education on new Business Processes. These top 10 critical factors can help companies to achieve successful implementation of ERP system.

References:

Akkermans, H. A., Bogerd, P., Insead, E.Y., and Insead L. W. (2000), The impact of ERP Systems on Supply Chain Management. *Exploratory Findings from a European Delphi Study.*

Al Hinai, H. S., Edwards, H. M., & LHumphries, L. (2013). The Changing Importance of CSFsduring ERP Implementation: An Empirical Study from Oman. *International Journal of Enterprise Information Systems, 9*(3), in press.

Al-Mashari, M. (2003), Enterprise resource planning (ERP) systems: a Research agenda, *Industrial Management and Data Systems*, Vol. 103 No. 3, pp. 22-27.

Al-Mashari, M., Al-Mudimigh, A., Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. European Journal of Operational Research 146, 352–364.

Al-Mashari, M., and Zairi, M. (2000), Supply-chain re-engineering using enterprise resource planning (ERP) systems: an analysis of a SAP R/3 implementation case. *International Journal of Physical Distribution & Logistics Management*, Vol. 30, No.3-4, pp. 296-313.

Ang, J.S.K., Sum, C.C., Yeo, L.N. (2002). A multiple-case design methodologyfor studying MRP success and CSFs. Information and Management 39, 271–281.

Beheshti, H. M. (2006). What managers should know about ERP/ERP II. *Management Research News,* Vol. 29, No. 4, pp. 184-193.

Bendoly, E., and Schoenherr, T. (2005). ERP system and implementation -process benefits Implications for B2B e-procurement. *International Journal of Operations & Production Management,* Vol. 25, No. 4, pp. 304-319.

Betts, M. (2001), Why ERP projects cause panic attacks. *Computerworld*, Vol. 1, No. 4, pp. 8.

Chen, I. J. (2001), Planning for ERP systems: analysis and future trend. *Business Process Management Journal,* Vol. 7, No. 5, pp. 374-386.

Bingi, P., Sharma, M.K., Godla, J.K. (1999). Critical issues affecting an ERP implementation Information Systems Management 16, 7–14.

Burns, O.M., Turnipseed, D. (1991). CSFsin manufacturing resource planning implementation. International Journal of Operations and Production Management 11, 5–19.

Cox, J.F., Clark, S.J. (1984). Problems in implementing and operating a manufacturing resource planning information system. Journal of Management Information Systems 1, 81–101.

Davenport, T.H. (1998), 'Putting the enterprise into the enterprise system', Harvard Business Review, July–August, Vol. 76, No. 75, pp.121–131.

Davenport, T. H., and Brooks, J. D. (2004), Enterprise systems and the supply chain. *Journal of Enterprise Information Management,* Vol. 17, No. 1, pp. 8-19.

Davenport, T. H., Harris, J. G., and Cantrell, S. (2004). Enterprise system and ongoing process change. Business Process Management Journal, Vol. 10, No. 1, pp. 16-25.

Deloitte (1999), ERP's second wave-maximizing the value of ERP- enabled processes, Deloitte Consultant. *Makin ERP spell ROI*. Available at: http://www.ctiforum.com/technology/CRM/wp01/download/erp2w.pdf. *Retrieved July 15, 2007.*

Ekman, P. and Thilenius, P. (2011) 'ERP selection through business relationships – adaptations or connections', *Int. J. of Entrepreneurial Venturing*, Vol. 3, No. 1, pp.63–83.

Ettlie, J.E. (1998), The ERP challenge. *Automotive Design & Production*, Vol. 110, No. 6, pp.16.

Farmer, M.A., and Luening, E. (2001), i2-Nike fallout: a cautionary tale. *CNET News.com, 9 March,* available at: http://news.cnet.com/news/0-1007-200-5070729.html?tag¼prntfr.

Feeny, D. and Willcocks, L. (1998). Core IS Capabilities For Exploiting Information Technology. Sloan Management Review, 39, 3, 9-21.

Holland C.P. and Light B. (1999) "Global Enterprise Resource Planning Implementation", 32nd Hawaii International Conference On System Sciences. Hawaii.

Hong, K.K., Kim, Y.G. (2002). The CSFsfor ERP implementation: An organizational fit perspective. Information and Management 40, 25–40.

Hsu, L.L., and Chen, M. (2004), Impacts of ERP system on the integrated –interaction performance of manufacturing and marketing. *Journal of Industrial Management & Data Systems,* Vol. 104, No. 1, pp.42-55.

Huang, Z., and Palvia, P. (2001), ERP implementation issues in advanced and developing countries. *Business Process Management Journal,* Vol. 7, No. 3, pp. 276-284.

Klaus, H., Roseman, M., and Gable, G. G. (2000), What is ERP?. *Information Systems Frontiers (special issue of The Future of Enterprise Resource Planning Systems)*, Vol. 2, No. 2, pp. 141-162.

Kremzar, M. H., and Wallace, T. F. (2001), *ERP: Making It Happen: The Implementers' Guide to Success with Enterprise Resource Planning.* New York: John Wiley & Sons, Inc.

Loh T. C. and Koh S. C. (2004). 'Critical elements for a successful enterprise resource planning implementation in small- and medium-sized enterprises', *International Journal of Production Research,* 42(17) 3433–3455.

Loonam, J., and McDonagh, J. (2005), *Principles, Foundations, & Issues in Enterprise Systems.* Ideal Group Inc., Ireland.

Mabert, V. A., Soni, A., and Venkataramanan, M. A. (2003), The impact of organization size on enterprise resource planning (ERP) implementations in the US manufacturing. *The International Journal of Management Science*, *Omega,* Vol. 31, No. 3, pp.235-246.

Maditinos, D., Chatzoudes, D. and Tsairidis, C. (2012), "Factors affecting ERP system implementation effectiveness", Journal of Enterprise Information Management, Vol. 25 No. 1, pp. 60-78.

Maguire, S., Ojiako, U. and Alsadi (2007), "ERP implementation in Omantel: a case study", *Industrial Management and Data System*, Vol. 110 No. 1, pp. 78-92.

McNurlin, B. (2001). Will users of ERP stay satisfied?. MIT Sloan Management Review, Vol. 42, No. 2, pp. 14-21.

Malbert, V.A., Soni, A., Venkataramanan, M.A. (2003). Enterprise resource planning: Managing the implementation process. European Journal of Operational Research 146, 302–314.

Mandal, P., Gunasekaran, A. (2002). Application of SAP R/3 in on-line inventory control. International Journal of Production Economics 75, 47–55.

Moon, Y. B. (2007). Enterprise Resource Planning (ERP): a review of the literature. *Int. J. Management and Enterprise Development*, Vol. 4, No. 3.

Motwani, J., Mirchandani, D., Madan, M., Gunasekaran, A. (2002). Successful implementation of ERP projects: Evidence from two case studies. International Journal of Production Economics 75, 83–96.

Nah, F. F., and Lau, J. L. (2001). Critical factors for successful implementation of enterprise systems. *Business Process Management Journal*, Vol. 7, No. 3, pp. 285-296.

OIT Report (2013), *Oman Information technology report*, available at: http://oneoman.com/2013/02/17/oman-information-technology-report-2013/ (accessed 27April 2013).

Rajagopal, P. (2002). An innovation-diffusion view of implementation of enterprise resource planning (ERP) systems and development of a research model. *Information & Management,* Vol. 40, pp. 87–114.

Rajapakse, J., and Seddon, P. (2006). ERP Adoption in Developing Countries in Asia: A Cultural Misfit. *Working paper, Department of Information Systems,* The University of Melbourne, Australia.

Rashid, M. A., Hossain, L., and Patrick, J. D. (2002). *The Evolution of ERP Systems: A Historical Perspective.* Idea Group Publishing.

Remus U. (2006). 'CSFsof Implementing Enterprise Portals'. *Proceedings of the 39th Hawaii International Conference on System Sciences*

SAP Forum (2013). SAP Forum in Oman. March 6, 2013-Muscat, Oman.

Shehab, E., Sharp, M., Supramaniam, L. and Spedding, T. (2004). 'Enterprise resource planning: An integrative review'. *Business Process Management Journal*, 10 (4): 359-386.

Sheikh, K. (2003). *Manufacturing Resource Planning (MRP II) with introduction to ERP, SCM, and CRM*. New York: McGraw-Hill.

Soh, C., S. K. Sia, *et al*. (2003). Misalignments in ERP Implementations: A Dilative Perspective. *International Journal of Human-Computer Interaction*, Vol. 16, No. 1, pp. 81-100.

Somers, T.M., Nelson, K. (2001) "The Impact of CSFsacross the Stages of Enterprise Resource Planning Implementations", In Proc of the 34th Hawaii International Conference on Systems Sciences, Vol.8, 8016, IEEE Computer Society, Washington, DC, USA.

Somers T.M. and Nelson K.G. (2004). 'A taxonomy of players and activities across the ERP project life cycle', *Information and Management*, 41(3):257–278.

Sum, C.C., Ang, J.S.K., Yeo, L.N. (1997). Contextual elements of CSFsin MRP implementation. Production and Inventory Management Journal 38, 77–83.

Trunick, P. A. (1999). ERP: promise or pipe dream?. *Transportation & Distribution*, Vol. 40, No. 1, pp. 23-6.

Turban, E., Leidner, D., McLean, E., and Wetherbe, J. (2008). *Information Technology for Management. Transforming Organizations in the Digital Economy.* Wiley Sixth Edition.

Umble, E.J., Haft, R.R., Umble, M.M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. European Journal of Operational Research 146, 241–257.

Wei, C. and Wang, M. (2004). 'A comprehensive framework for selecting an ERP system'. International Journal of Project Management, 22: 161–169.

Wieder, B. Booth, P., Matolcsy, Z. P., and Ossimitz, M. L. (2006). The impact of ERP systems on firm and business process performance. Journal of Enterprise Information Management, Vol. 19, No. 1, pp. 13-29.

Woo H. (2007). 'CSFsfor implementing ERP: the case of a Chinese electronics' manufacturer Journal of Manufacturing Technology Management 18 (4), 431-442.

Yu, C. S. (2005). Causes influencing the effectiveness of the post-implementation ERP system. Industrial Management & Data Systems, Vol. 105, No. 1, pp. 115-132.

Yusuf, Y., Gunasekaran, A., and Abthorpe, M. S. (2004). Enterprise information systems project implementation: A case study of ERP in Rolls-Royce. International Journal of Production Economics, Vol. 87, pp. 251–266.

Zhang, L., Lee, M. K.O., Zhang, Z., and Banerjee, P. (2002). CSFsof Enterprise Resource Planning Systems Implementation Success in China. Proceedings of the 36th Hawaii International Conference on System Sciences, Vol.5, No.3, pp. 7695-1874, IEEE.

Zheng S., Yen, D. C., and Tarn, J. M. (2000). ERP and SCM. Journal of Computer Information Systems, Vol. 41, No. 1, pp. 10-84.