Assessing Large-Scale ERP Implementation Success with a Balanced Scorecard

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Abstract

This study examines large-scale enterprise resource planning (ERP) implementation success factors by looking at their impact on the balanced scorecard (BSC) indicators. Survey research was applied to collect data from large private and public companies (n=275) that have already implemented large-scale ERP (e.g. SAP, ORACLE). ERP Success factors consist of top management support, project management competence, business process engineering, user involvement, knowledge sharing, organization readiness, ERP system quality, and communication with understanding. BSC elements include the four common dimensions of BSC research, organization learning and innovation, internal process improvement, employee satisfaction, and financial benefit to the organization.

Results indicated that business process re-engineering has a significant impact on all four BSC dimensions. Other ERP success factors had an impact on some of the BSC factors. However, understanding, user involvement, and organization readiness did not show a significant impact on any of the BSC factors. Top management support showed a negative impact on organization learning and support, contrary to expectations. This paper provides a better understanding of ERP implementation success factors for large-scale ERP, assessing their impacts on the four components of the BSC. The general usefulness of BSC application to ERP is supported, but some inconsistency suggests that there is no one-size-fits-all. Rather, such applications will need to adapt to their context.

Keywords

Introduction

Enterprise resource planning (ERP) systems encompass software products that support accounting and other functional operations, and improve management decision making ability. Many organizations expect to use ERP systems to support business process growth and provide strategic information to their managers. Large-scale ERP (e.g. Oracle, SAP) implementation requires a larger budget, human resources, and time. However, high investment in large-scale ERP systems does not always guarantee benefits to the firm (Gargeya & Brady, 2005; Ram & Corkindale, 2014).

To fulfill long-term performance of an organization, large-scale ERP implementation success requires both financial and non-financial measures (e.g. employee satisfaction, process improvement, learning and innovation). The balanced scorecard (BSC) provides a comprehensive measurement framework which consists of four dimensions: financial, internal processes, customer, and innovation and learning (Kaplan & Norton 1992; Kaplan & Norton 1995; Martinsons, Davison & Tse, 1999), all issues that ERP aims to strengthen. As the field developed, the BSC could be adapted to fit the strategic objectives in specific contexts (e.g., Lawrie & Cobbold, 2004; Perkins, Grey & Remmers, 2014), although most applications continue to contain indicators within the original four-dimension approach. It is worthwhile to adapt the BSC to examine ERP implementation success factors in the Thai context because the primary objective of the BSC is to assess whether ERP investment supports organizational processes, strategies, and goals in both financial and non-financial perspectives.

There is little doubt that BSC concepts are very useful in assessing performance and providing information for planning in a very wide range of business and public policy contexts. For example, early work by Rosemann and Wiese (1999) evaluated project management effectiveness of ERP implementation with the BSC. In addition, the BSC was used to assess the performance of information security projects (Huang, Lee & Kao, 2006). Recent work shows BSC being used to assess TQM performance (Mehralian, Nazari, Nooriparto & Rasekh, 2017), non-profit incubators (Messeghem, Bakkali, Sammut & Swalhi, 2018), and public policy impact of energy investment (Dincer, Yüksel & Martinez, 2019). Most applications necessarily include adaptation of BSC to context, and in fact, there is work to uncover how ERP factors can be best measured and how the factors inter-relate to each other (e.g., Akkermans & Van Oorschot, 2018; Shen, Chen & Wang, 2016).

However, research on managerial issues in ERP implementation is not very extensive, particularly about what factors contribute to the ability to implement ERP successfully and how to measure success. Only occasionally has a BSC approach been

applied to ERP. For example, Chand et al. (2005) were among the first to investigate this, demonstrating with a qualitative case-study that ERP factors did connect to BSC performance measures. Nevertheless, a decade later, "very few studies in ERP value literature have quantitatively measured and validated ERP value across multiple dimensions" (Jain, 2016, p. 439). Jain (2016) did find quantitative measures of BSC were impacted by ERP factors. Shen et al. (2016) also said "there is a lack of an analytic framework … for ERP performance measurement in the existing literature" (p. 130), and argued that the BSC approach can be applied.

Specifically to this study, then, a careful review finds that very few studies have included an assessment of ERP implementation success on large-scale information technology investment and implementation with the integrated framework of the balanced scorecard. Thus, the objective of this research is to assess the relationship of large-scale ERP implementation success factors with the BSC indicators. The results can enhance the understanding and implication of large-scale ERP implementation success factors which can significantly improve organizational performance when the balanced scorecard is used.

Literature Review

Balanced Scorecard

BSC started as essentially accounting measures of performance, but early on Kaplan and Norton (2001) suggested that financial measures should be complemented by adding measurements that reflect customer satisfaction, internal process improvement, and learning. This broader perspective was generally accepted, and BSC was also extended to new types of businesses and contexts. For example, Hasan and Tibbits (2000) used the BSC framework to determine strategic management of electronic commerce. Martinsons et al. (1999) applied the BSC to evaluate information technology investments in an organization..

In addition, it was recognized that use across a range of applications required some adaptation to context. In the case of information systems, Martinsons et al. (1999) contributed a more in-depth theoretical view of applying BSC in the information system scorecard (IS scorecard). For instance, the IS scorecard adapted the customer satisfaction view to the end-user within the organization. Moreover, the IS scorecard measures business value instead of financial perspective, because an information system is an internal service for the organization's users, not explicitly a revenue generating unit. As noted above, BSC is flexible enough to be useful in a wide variety of contexts (Lawrie & Cobbold, 2004; Perkins et al., 2014).

Relevant to this research, ERP is normally developed for use within the organization, so the appropriate measure of customer satisfaction should use the internal

customers such as ERP user satisfaction instead of external customer satisfaction. The success of ERP implementation depends greatly on perception of ERP users within an organization. Moreover, internal customer satisfaction should be measured from a variety of employees who have been involved and used the ERP system. Beyond this internal focus common to ERP and to some applications of BSC, the following brief review of ERP success factors used here should demonstrate that ERP and BSC concepts can often be quite closely connected.

ERP Implementation Success Factors

We examine eight success factors in this discussion. One of the most commonly mentioned ERP implementation success factors is top management support (Costa, Ferreira, Bento & Aparicio, 2016). Top management should allocate sufficient resources to support the objectives of ERP implementation. An ERP implementation steering committee should be set up to communicate the scope and objectives of the project, to engage the ERP project team, and to monitor the ERP implementation progression (Ali & Miller, 2017). This is also often cited as a critical issue in BSC; in fact, early on, Braam and Nijssen (2004, p. 345) pointed out the need to 'supplement' Kaplan and Norton's BSC schema with assessment of top management support. Occasionally, top management support has been considered an antecedent to successful use of BSC (e.g., Singh & Arora, 2018).

Project management ability of the organization plays an important role in ERP implementation success. Effective project management includes an implementation plan that defines project activities, personnel and a committed project team to support implementation activities. Competent ERP consultant capability and collaboration between ERP practitioners and developers are important aspects of this, to alleviate the problems during implementation process, and can enhance implementation success (Ali & Miller, 2017; Markus, Axline, Petrie & Tanis, 2000). ERP project competency is the major key success of ERP implementation (Ali & Miller, 2017; Tarhini, Ammar, Tarhini & Masa, 2015). Project management competence is also occasionally an element in the BSC; e.g., Barclay (2008) uses it in an adaptation of BSC called project performance scorecard.

Early on, some observers recognized that user involvement in identifying ERP system requirements can create commitment of employees toward the new ERP system implementation (Wu & Wang, 2006). User involvement is important and can enhance the perceived benefit of the new system through participating in the ERP implementation process, which decreases users' resistance of the new developed ERP systems (Wang & Chen, 2006) . However, despite occasional recommendations about user involvement, the topic has not gotten very much attention. In a recent discussion of BSC, Cooper and Ezzamel (2016) called for better dialog within organizations implementing ERP, pointing out that technical approaches alone rarely guarantee successful implementation.

Business process redesign is one of the most important factors for ERP implementation success (Ruivo, Oliveira & Neto, 2014). Many organizations change their business process to match or fit with the ERP software to avoid modifying the ERP software and to reduce the gap between current business process and ERP software. In discussions on BSC, business process redesign is sometimes considered an element in the dimension of internal business process redesign (e.g., Simon, 2005).

In addition, knowledge sharing among the key players of ERP project management is one of the important success factors (e. g. , ERP vendor, consultants, IT specialists, and business users)(Ali & Miller, 2017; Ampairatana & Rotchanakitumnuai, 2008; Shao, Feng & Liu, 2012). Knowledge sharing can be explicit knowledge or tacit knowledge among management/ operational staff, vendors, and consultants during the implementation process (Nonaka & Takeuchi, 2005). Singh and Arora (2018) discuss 'interdepartmental communication' as a critical antecedent to successful BSC implementation**.**

Moreover, organizational readiness of information technology is indicated by usage intensity and knowledge of personnel, which are major success factors of new information system implementation (Chircu & Kauffman, 2000). The usage intensity of information technology of firms assists organizations to adopt new technology more than less experienced ones. In addition, new system implementation requires complex understanding, knowledge, and experience to utilize ERP capability. Firms need to recognize the impact of selecting the right employees or managers with the right skill set, e.g. having knowledge of the business functions, having experience in information systems, having interpersonal skills, and being able to work with people (Shao et al., 2012; Zhang, Lee, Huang, Zhang & Huang, 2005). Lack of organization readiness is one of the most important factors that leads to large-scale ERP implementation failure.

System quality is one of the common success factors cited in many IT applications, including, occasionally, when BSC-like indicators are used, such as Barclay's (2008) project performance scorecard. The ERP system should fit the firm's requirements and achieve the project objectives. Inappropriate ERP systems with errors can increase implementation time and cost overruns. An ERP system with accuracy, ease of use, and timeliness output can enhance organization end users satisfaction (Kanellou & Spathis, 2013).

A clear understanding of the objectives and importance of ERP implementation should be communicated throughout the organization, especially to users who will use the ERP system. Communication helps employees recognize how ERP affects current operations. Organization communication comprises of the formal announcements from top management and the ERP project manager. The ERP implementation progress needs to advertise to all levels and functions of the organization (Ali & Miller, 2017; Shao et al., 2012).

Effective implementation of ERP systems requires extensive adaptation of the employee's current business processes to be able to fully utilize the capability of the new systems. New technology sometimes requires complex understanding and mental capabilities that may be difficult to manipulate due to the limited capability of human employees (Chircu & Kauffman, 2000). ERP users need to be trained to improve their knowledge of the ERP system and understand how to use the ERP system efficiently (Costa et al. , 2016). Specific to ERP project implementation, one major problem of ERP implementation is losing experienced personnel after a project is completed. Hence, the organization should provide education and training to create personnel expertise and knowledge within the organization in several aspects; such as understanding specific ERP features, and how to implement the ERP systems.

Research Framework

Previous studies have proposed various frameworks to assess the outcome of ERP implementation. Assessment of information system performance has become essential as it can identify worthwhile investments. For instance, Zhang et al. (2005) determined the individual task performance improvement or user satisfaction from ERP adoption. In addition, DeLone and McLean (2003) measured the IS performance with organization performance level, operating cost, overall productivity improvement, and customer service level. Markus and Tanis (2000) measured ERP implementation success with a project metric, operational metric and long-term business result. Ruivo et al. (2014) measured ERP implementation success with project perspectives (e.g. cost, time, performance, and benefit). However, in the current competitive business environment, the ERP success evaluation should seek to use effective measurements such as the balanced scorecard, which support the measurement from various perspectives; financial, customer, internal process, and organization learning. Moreover, the advantage of measuring success with the BSC is that many organizations already adopt the BSC to implement business strategy, and information technology investment needs to support and align with business strategy.

Prior work has revealed that ERP project team competence, ERP system product quality, vendor knowledge sharing, user involvement, degree of training and communication business process re-engineering, and organization readiness can enhance ERP system success (Bradford & Gerard, 2015; Wu & Wang, 2006). To date, the literature about the impacts of ERP implementation success factors on the four key measurements of the BSC is not very extensive, and has painted a fragmented view. The qualitative pilot research for this project indicates that ERP success factors have a positive impact on each measurement of the BSC, which have similar results with the study of Zhang et al. (2005). Thus, a simple set of hypotheses is proposed.

The success of ERP implementation can create organization learning and innovation (e.g., Nwankpa & Roumani, 2014). The first hypothesis is:

H₁: Higher levels of ERP implementation success factors will lead to higher levels of organization learning and innovation.

ERP implementation success factors can enhance internal process improvement. For instance, business process re-engineering during ERP implementation can enhance internal process improvement (Bradford & Gerard, 2015). The second hypothesis is:

H₂: Higher levels of ERP implementation success factors will lead to higher levels of internal process improvement.

Success factors of ERP implementation enhance employee satisfaction. For instance, Kanellou and Spathis (2013) determined user satisfaction from ERP adoption. The third hypothesis is:

H₃: Higher levels of ERP implementation success factors will lead to higher levels of employee satisfaction.

Ruivo et al. (2014) revealed that ERP implementation success can decrease operational cost and increase organizational benefit. The fourth hypothesis is:

H₄: Higher levels of ERP implementation success factors will lead to higher levels of financial benefits to the organization.

Figure 1 summarizes these four hypotheses. Of course, the ERP success factors have multiple dimensions, as do the BSC outcomes, so there are multiple arrows representing impact of ERP success factors on BSC dimensions.

ERP success factors

- top management support
- project management competence
- business process engineering
- user involvement
- knowledge sharing
- organization readiness
- ERP system quality
- communication with understanding

BSC outcomes

- organization learning and innovation
- internal process improvement
- employee satisfaction
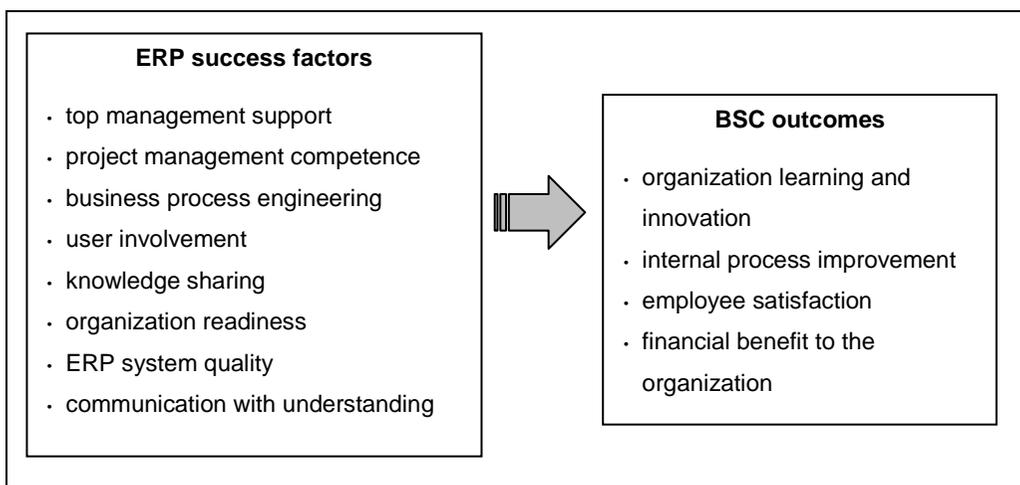- financial benefit to the organization

Figure 1 Summary of hypotheses

Methodology

Survey research was applied to collect data from large private and public companies that have already implemented large scale ERP (e.g. SAP, ORACLE). Questionnaire items were partially based on the literature noted above, but also relied heavily on making success factor items consistent with what two key informants said about these issues. Both key informants were experts who had been heavily involved in implementation of a large-scale ERP system in their company. The semi-structured interviews with them lasted about two hours.

The questionnaire content was divided into three sections. In section one, the questions about the eight ERP implementation success factors consisted of 33 items, measured by a Likert scale ranging from 1 = strongly unimportant to 6 = strongly important. Section two consisted of twelve questions to measure the four BSC dimensions by a Likert scale ranging from 1 = strongly disagree to 6 = strongly agree. Section three gathered demographic data from respondents. The questions were translated into Thai, back-translated to check accuracy, and the questionnaire was tested on twenty respondents from five companies. Cronbach alpha scores, which assess reliability, were good (above. 75), so the main survey was conducted.

Due to the nature of the study, internal customers in this research consist of multiple levels of informants ranging from operational to managerial level who have ever been involved with the implementation of large-scale ERP. The rationale for the multiple level of informants is to understand the critical issues for the entire processes of ERP implementation. Also, the BSC dimensions cover various business functions, so it was considered necessary to get views from multiple departments in the company. Hence, the internal customer perspective in this study is based on the perceptions from internal employees from both operational and managerial levels.

Judgment sampling was used for the key informants, for the pilot survey, and for the main survey. Consideration of access played a major role in the judgment. Eriksson and Kovalainen (2008) discuss the difficulty of gaining access to companies in international business research without some connection, and Srijumpa et al. (2004) confirm that this is certainly an issue in Thailand. Data collection proceeded by calling the targeted manager from each firm in order to inform them about the study and to encourage them to respond. A total of 290 questionnaires were sent out to 55 organizations. Consequently, a total 275 questionnaires were collected with 94% response rate.

Table 1 indicates the characteristics of respondents. The average ERP usage duration of ERP products (e.g. Oracle, SAP, As400.) is about 10.96 years. SAP and Oracle

accounted for most of the ERP systems in place. Just over 70 percent of the organizations were private, the others were either state companies or government agencies. Respondents were from a range of business functions, with the two largest groups being IT and accounting. About half were in operations positions, and consistent with a hierarchical management structure, the proportion of managers declining to participate in the study decreased as their level of seniority increased.

Table 1 Respondent Profile

Characteristics	N	%
Organization type		
Private	196	71.3
Public	51	18.5
Government	28	10.1
Work department		
Accounting	66	24.0
Finance	22	8.0
Marketing	14	5.1
Production	9	3.3
Sales	22	8.0
Administration	8	2.9
IT	79	28.7
Human resources	28	10.2
Others (e.g. logistic, purchasing)	27	9.8
Position		
Top management	7	2.6
Middle management	28	10.3
Primary management Level	89	32.8
Operation level	147	54.2
ERP product		
Oracle	87	31.6
SAP	155	53.0
AS400	2	0.7
DANAOS	13	4.8
People Soft	6	1.4
Others	2	0.8

Average ERP usage duration = 10.96 Years

Analysis

Exploratory factor analysis was conducted in order to examine the ERP implementation success factors. The result showed that the questionnaire captured the eight success factors well: project management competence, ERP knowledge sharing, ERP system quality, communication with understanding, user involvement, business process re-engineer, top management support, and organization readiness of adopting ERP (Table 2). Nearly all items in each factor showed a factor loading greater than .60, most were over .70, and none were less than .50. Table 3 shows the four constructs of the balanced scorecard indicators. The measurement items of each construct showed strong factor loading on the proper dimension. All constructs of ERP implementation success factors and BSC show strong reliability, with high values of Cronbach Alpha coefficients (at .75 or greater). The results of Cronbach Alpha coefficients indicate acceptable consistency and reliability of the items in the factors (Table 2 and Table 3).

Table 2 ERP Implementation Success Factors

Factor/Item	Factor Loading	Mean	SD.
Project management competence (Cronbach's Alpha=.816)			
-ERP implementation project leader competence	.766	5.02	.919
-ERP implementation team competence	.650	4.94	.871
-A clear ERP implementation project management Plan	.638	5.16	.820
-Problems anticipation continuously	.627	5.15	.788
-Careful selection of vendor and software package for ERP implementation	.584	4.93	.843
-ERP software consultants have successfully experiences in ERP Implementation	.528	4.69	.893
Knowledge sharing (Cronbach's Alpha=.852)			
-Knowledge transfer from ERP consultant experiences to the ERP user	.841	4.63	.960
-Knowledge transfer from consultant	.745	4.74	.858
to project team members by ERP implementation manual			
-Knowledge transfer from consultant's	.703	4.70	.903
ERP implementation experiences to the project management team			

Factor/Item	Factor Loading	Mean	SD.
- Knowledge transfer from project management team to user by ERP implementation manual	.598	4.73	.910
ERP system quality (Cronbach's Alpha=.861)			
-ERP system is able to serve user needs	.796	5.13	.886
-ERP system is able to create report as expected	.783	5.11	.858
-ERP system is easy to use	.753	4.96	.875
-ERP system is generated accuracy data	.706	5.53	.726
Communication with Understanding (Cronbach's Alpha=.784)			
-Communication to Stakeholders to make an understanding of the ERP benefits	.718	4.99	.776
-Communication to stakeholders to aware of the organizational change	.704	5.12	.746
-Communication to Stakeholders to create a positive attitude for the use of ERP	.673	4.92	.799
-Training ERP users to have ability to use	.500	5.07	.784
User involvement (Cronbach's Alpha=.816)			
-User involvement in defining ERP process	.781	4.61	.942
-User involvement in indicate reports requirement	.767	4.83	.826
-User involvement in defining organization's ERP system needs	.730	4.83	.880
Business process re-engineer (Cronbach's Alpha=.810)			
-Reduce process to make organization work faster	.799	5.00	.914
-Improvement of customer service process	.798	4.97	.862
-Reduce process to acceleration of reports generating	.700	4.89	.863
Top management support (Cronbach's Alpha=.750)			
-Top management support throughout the ERP implementation	.808	5.14	.784
-Change management support by top management	.694	5.23	.767
-A clear policy specific to ERP implementation	.664	5.27	.770
Organization readiness (Cronbach's Alpha=.777)			
-Evaluation of IT infrastructure readiness for ERP Implementation	.671	4.89	.806
-Evaluation of employee capability for the use of ERP	.669	4.47	.830
-Evaluation of IT personnel capability for solving anticipation in	.643	4.77	.824

Factor/Item	Factor Loading	Mean	SD.
ERP adoption			

Table 3 The Balanced Scorecard Indicators

Factor/Item	Factor Loading	Mean	SD.
Organization learning and innovation *(Cronbach's Alpha= .862)*			
- help employee initiate new idea for process improvement by using IT	.852	4.51	.865
- create new working relationships and information sharing among employee for the use of IT effectiveness	.822	4.46	.767
- encourage employee to continue learning new things	.799	4.31	.904
Internal process improvement *(Cronbach's Alpha=.877)*			
- support management information to help top management in planning and decision-making	.707	4.85	.887
- accelerate report generating	.861	4.70	.970
- reduce work process	.776	4.67	1.012
Satisfaction *(Cronbach's Alpha=.860)*			
- create management satisfaction	.873	4.64	.814
- create employees satisfaction	.654	4.58	.917
- create users satisfaction	.659	4.43	.924
Financial benefits *(Cronbach's Alpha=.936)*			
- create sustainable profitability	.883	4.46	1.103
- reduce costs of business	.834	4.28	1.117
- increase organization revenue	.880	4.22	1.121

Factor scores were used to construct the composite variables representing the dimensions to assess the relationship of ERP implementation success factors and the four balanced scorecard indicators. The regression analysis results showed that business process re-engineering and knowledge sharing factors have a positive impact on enhancing organizational learning and innovation whereas top management support has a negative impact on organization learning and innovation. Top management support of ERP projects is not strong enough to achieve organization learning, especially in the ERP implementation

process. Findings may show that a higher level of positive management support needs to be employed to overcome the slight negative effect of current support levels (Table 4).

Table 4 Impact of ERP Implementation Success Factors on the Balanced Scorecard

Path from ERP independent variables	Path to BSC dependent variable			
	Organization Learning & Innovation	Internal process improve	Employee user satisfaction	Financial benefit
Project management competence	.074	.050	.234**	.436**
Top Management support	-.163**	-.059	-.061	.272**
Understanding	.096	.067	.072	-.154
User involvement	-.004	-.032	-.025	-.050
Business process re-engineer	.241**	.422**	.219**	.279**
Knowledge sharing	.224**	.081	.115	.254**
ERP system quality	.098	.286**	.159**	.138
Organization readiness	.067	-.068	.036	.001
R^2	.292	.305	.252	.182

** Sig $p < .05$

In the internal process improvement, the results indicate that business process re-engineering and ERP system quality factors have significant effects on improving the internal process of business. Business process re-engineering has the higher impact on internal process improvement. The result of process re-engineering can help a firm to operate more efficiently. Moreover, project management competence, business process re-engineering, and ERP system quality can create internal user satisfaction to among managers at various levels and operational personnel. Finally, the contribution of project management competence, top management support, business process re-engineering, and knowledge sharing can provide financial benefits to the organization.

There was no significant relationship between organization readiness and any of the four BSC measurements. User involvement and understanding were also not significantly related to the BSC measurements.

Conclusion and Implications

This research has examined whether ERP implementation success factors have an impact on BSC indicators in large-scale ERP implementation projects. The result indicates that large-scale ERP implementation success consists of eight factors: top management support, project management competence, business process engineering, user involvement, knowledge sharing, organization readiness, ERP system quality, and communication with understanding.

Business process re-engineering is an important factor for achieving ERP implementation success based on the four BSC indicators. The business process re-engineering factor has a significant impact on creating organization learning, improving business process, enhancing satisfaction, and generating long term profit for an organization. Re-engineering business processes requires top management support so that the ERP project team can restructure their business process to achieve the objectives of the ERP investment. This study showed that negative top management support reduced the potential of the organization learning dimension of the BSC. This weak point is a concern because of both economic and policy issues. The tangible issue is financial support. The budget for ERP implementation sometimes was not sufficient to cover the software cost, implementation costs, and the development costs of add-on solutions.

Project management competence is also essential. The project plan must be well defined and with clear milestones. A project team member leader needs high experience and active human resources. Project management should consider selecting the appropriate ERP vendor and consultants so that the ERP implementation can be developed within the schedule and budget. Good project management can determine success based financial benefits and client satisfaction.

In practice, ERP project implementation limits the customization of software, the ERP system development process was sometimes done concurrently with business process reengineering. Hence, the ERP system must be implemented according to the users' needs. The outcome of ERP system must have suitable modules of business functions, provide accurate and timely information and reports to users at all levels.

Finally, this study integrates prior research on ERP implementation success, including an additional factor of knowledge sharing. Knowledge sharing has a major impact on enhancing organization learning. Past research observed the effects of knowledge enterprise factors on system implementation (e.g. Shao et al., 2012). Sharing knowledge to relevant users can also assist the organization to reduce cost and generate profits in the long run. Implicit knowledge sharing of ERP implementation project needs to be transmitted in the organization. The transfer of knowledge supports organization to become a learning organization.

Although this study was conducted in a context where the respondents are from large organizations, the results provide some valuable suggestions to any firm currently implementing small scale ERP or are considering using the large-scale ERP in the future. It should be reiterated that the results here are somewhat mixed. The success factors overall clearly do have an impact, but only some of them, and only on some BSC indicators. These results are probably consistent with other (somewhat rare) work connecting ERP implementation to BSC concepts. Results are not always consistent, probably indicating that each situation has its own characteristics and cannot be expected to mirror results in some other context. Indeed, one strength of BSC is that it is flexible, and one-size does not fit all. The same can be said about success factors – they are likely to depend on context. But there is little doubt that a comprehensive set of ERP implementation success factors should be considered, and that BSC concepts are useful for assessing ERP implementation. Future research can extend the study to SMEs and apply cross-industry samples to broaden the coverage of the study. Research framework can be expanded with constructs driving the ERP implementation success, such as, organization fit and organizational culture influences.

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