DEALING WITH THE MISFITS IN AN ERP IMPLEMENTATION: EXPERIENCES FROM A UNIVERSITY CONTEXT IN INDONESIA

Fathul Wahid[1], Primanita Setyono[2]
[1]*Department of Informatics, Faculty of Industrial Technology, Universitas Islam Indonesia, Yogyakarta*
fathulwahid@fti.uii.ac.id
[2]*Department of Accounting, Faculty of Economics, Universitas Islam Indonesia, Yogyakarta*
primanita@fe.uii.ac.id

ABSTRACT
The study aims to identify misfits in an ERP system implementation in a university context in a developing country with special reference to Indonesia. Various misfits related to business, information systems, and human resources domains are identified in each stage of implementation. Diverse solutions taken to cope with the misfits are also described. We also find several lessons learned that may be adapted into a similar context of implementation to increase the possibilities to succeed, such as the significant role of top management support, the importance of stakeholders' involvement, the importance of well prepared blueprint document, the criticality of considering the context, and the significance of attention to change management process.

***Keywords**: ERP, SAP, misfit, developing country, Indonesia, university.*

1. INTRODUCTION

The growth rate of worldwide market for Enterprise Resource Planning (ERP) packages has been predicted to be 4.8% annually and will be reach USD 21 billion in 2010 [1]. Nowadays, ERP market is not solely large profit-oriented companies, but since several years ago, ERP vendors compete among others to enter university sectors [2]. ERP software often claimed by the vendors to be developed based on best business practices.

In university sector, ERP system has been adopted by several leading universities worldwide [2] mostly in developed countries to support their business processes. Organizations adopting ERP software need to configure the software to meet their specific requirements and often is encouraged to adopt the software without modifications since the best practices is supposedly embedded in this standard configuration. However, recent studies have documented gaps or misfits between the best practices embedded in ERP software and real condition that is often context specific [e.g. 3, 4]. While some organizations have enjoyed significant gains, others have had to scale back their projects and accept minimal benefits, or even abandon ERP implementation [5].

Most studies [e.g. 6] of ERP implementation have been conducted in the context of large companies in developed countries. As far we can observe from published literatures, only few studies documented [e.g. 7, 28] on ERP implementation in the context of developing countries, especially in a university context. We believe that the context plays an important role in determining what approach should be taken to ensure successful implementation of ERP [e.g. 8, 9]. Disobeying the context may lead to issues of misfit that have been discussed by several researchers [e.g. 28]. Wang et al. [28] identify that misfit could be found in country, organizational, or individual level. The current study aims to fill the void of limited study on ERP implementation in a university context in a developing country that strives to adopt modern business practices in some respects, but is still preserving the best local characteristics. Often, global ERP vendors are striving for generic solutions and have less incentive and ability to incorporate in their systems the new features required by the local firms in a particular country [28].

Against this backdrop, the current study, that is exploratory in nature, aims to seek answer of the following main research question: what are the misfits faced in implementing the ERP system and what are solutions taken to cope with the misfits?

The rest of the paper will be organized as follows. In the next section, theoretical basis of ERP implementation will be presented along with recent development its critical success factors. Research methods will be explained in the third section, followed by section on results and discussion. Section of conclusion brings this paper to an end.

2. THEORETICAL BACKGROUND

Studies on ERP with various perspectives have been conducted in recent years. Issues covered by the studies ranges from implementations of ERP system, optimization of ERP system, to management through ERP system [6]. Motives behind ERP system vary from an organization to another, such as legacy systems replacement and company organization restructuring [10].

Botta-Genoulaz et al. [6] summarize that there are many issues in ERP implementation to address. Getting a positive attitude towards the ERP system among key users in the project preparation stage is of critical issues [11]. In another study, Amoako-Gyampah and Salam [9] conclude that shared beliefs will make implementation easier through a better

acceptation of the system by stakeholders. Organizational cultures should also be taken into account in this regard [12]. Ke and Wei [12] find that ERP implementation success is positively related with organizational culture along the dimensions of learning and development, participative decision-making, power sharing, support and collaboration, and tolerance for risk and conflicts.

Other studies [e.g. 13] unveil that trust building between members of taskforce and other stakeholders is another critical issues in implementation of the ERP system. Conflicts during and after the implementation process are found to occur frequently and these should be well addressed [14, 15].

A significant number of the literatures [6] also discuss about selection of implementation stages should be taken. The literatures lead to a conclusion that the organizational context, such as size of the organization, involvement of various stakeholders, and level of internal capabilities, should be taken into consideration when determining the appropriate stages. The context also will determine necessary actions that should be carried out in each stage. Hence, fit or alignment of the ERP system and business processes is a critical factor that should be considered in the implementation process [e.g. 16].

As regards strategy for implementation, there are two main strategies that may be adopted. The first is single go-live date for all modules (so-called Bing Bang), while the second is single go-live date for a subset of modules (Mini Big-Bang) [10]. The first strategy is used more frequently than the second one.

Several factors are identified to be very critical in the ERP system implementation [e.g. 12, 17]. Previous studies find that among the critical factors are strong and committed leadership, open and honest communication, and balanced and empowered implementation team. A study by Motwani et al. [18] unveils that careful change management, network relationships, and cultural readiness are factors lead to successful ERP implementation.

Top management support is considered as a prerequisite for successful implementation of ERP system [12]. In this regard, top management can allocate its time as a clear signal to its followers about the importance of the project. Top management can also foster a culture of tolerance for conflicts, and a culture of power sharing by delegating power to managers at lower levels on critical decisions, such as organizational restructuring and business processes redesign.

From users' perspective, perceived usefulness and learnability are found to be determinants of end-users' satisfaction as an indicator of a successful ERP implementation [19]. Other theories or models have been used to study ERP adoption are Diffusion of Innovation Theory [20] and Technology Acceptance Model [21].

Lack of fit between business, information systems, and human resources strategies, according to Willcocks [29], will inevitably compromises the values of information systems to the point of rendering it of marginal utility, and in some cases, even counter-productive. This fit will also be required to ensure successful implementation of an ERP system [30]. A study of Wang et al. [28] among Taiwanese companies found that perceived initial misfits have negative impact on quality of an ERP system after implementation.

Three main sources of the misfits related to ERP system that have been identified are company specific, industry-sector-specific, and country-specific [31]. Even though all ERP adopters may face such a problem of misfits, the problem may be more pronounced when organization in one social context adopt an ERP system developed in another social context [31]. From another point of view, the misfits may also relate to country-, organizational-, or individual-level context [28].

At organizational- and individual-levels, there are two main parties who interactively shape the final form of the ERP system, i.e. users and consultants. Users are the main source of local business knowledge, whereas consultants are a major external source of information and technical skills [28]. At this level, Soh et al. [31] identify at least seven misfits of an ERP system should be addressed. The misfits are in data format, relationships among entities as represented in the underlying data model, access requirements needed to perform a task, validation procedures or checking routines, standard operating procedures, presentation format of the output, information content of the output.

3. RESEARCH METHODS

3.1 Research Setting

Universitas Islam Indonesia (UII) is the oldest national private university, which was established by the founding fathers of Indonesia before the independent day in 1945. UII has more than 1,000 educative staffs, around 700 administrative staffs, and around 18,000 students coming from all corners of Indonesia distributed in eight faculties. Variety of degree programs is offered: four diploma, 22 undergraduate, two professional, nine master, and three doctorate programs.

In Indonesia, since last few years, business context of university management have changed significantly. The role of board of trustees was made more independent. Hence, a better control of the board of trustees to university should be afforded by many initiatives. The statute of UII should be adjusted to cope with the central government's new policy.

UII has been investing billions of rupiahs in information technology (IT) and information systems (IS) since the beginning of 1990s. Most

business processes, from admission process, academic management, finance management, asset management, human recourse management, until alumnae tracer study, are nowadays supported by IT. Before implementing ERP, UII has developed various IS, mostly in-house, including those for academic management, finance management, asset management, human resource management and library management.

After having conducted a long series of analysis and involved various stakeholders, in 2006, UII made significant changes in organization structure. The main principle used is "decentralization of academic affairs and centralization of operational ones". The role of the department in academic development was encouraged and the role of faculty was focused on coordinative issues and act as facilitator of common interest at the faculty level.

After having used the old finance IS developed in-house, top management realizes that the systems are no longer support recent developments. For instance, top management would like to migrate from cash-basis accounting systems to accrual ones, which was not supported by the former IS. In addition, the old IS neither enables the top management, especially in the board of trustees to control real time cash flow in all the involved units.

In addition, changes in the business environment and aspirations to give a better services to stakeholders has forced UII to adopt modern business practices, among other by adopting a more sophisticated IS that support those practices. After considering possible options, UII then decided to adopt an ERP system provided by SAP (http://www.sap.com). Prior this adoption, UII has acquainted with those ERP system, since 2005, UII has been officially being one of the authorized training centers for SAP University Alliance Program. This ERP system replaced the old finance IS that was considered no longer support the current business practices.

There are three main reasons identified why UII adopted the ERP system: (a) changes in the business environment; (b) desires to give better services to the stakeholders; and (c) needs to have supporting systems to improve business processes. The implementation of ERP system is expected, among other, to improve access to accurate and timely information, enhance workflow, increase efficiency, tighten controls and automate alerts, adopt best business practices, have a richer functionalities, and reduce reliance on paper. However, hitherto, these expectations are not yet evaluated systematically.

3.2 Data Collection and Analysis

Documents analyses and qualitative data acquired through a series of semi- structured interviews with key persons are used as a basis. The documents include the planning document of ERP implementation and minutes of meetings among internal taskforce members and between internal taskforce with external consultant. First-hand experience of one of the authors as leader of the internal taskforce is also an important information enriching the discussion. However, to give an objective view, the experiences will be validated by quantitative information from the various involved stakeholder in the decision making to adopt and implementation process.

Semi structured interviews are conducted with key persons involved in the decision-making stage to adopt ERP, during planning, implementation, and daily end-users post implementation stages. The key sources of information include vice rector for financial affairs, vice deans who are responsible for coordinating procurement, financial allocation and reporting, ERP implementation taskforce, head of treasury office at board of trustees level who is responsible for controlling all financial flows both in the board of trustees, university, and faculty levels. From daily end-users, we conduct interviews with heads of financial division at university/faculty levels and heads of logistic division at university/faculty levels. Each interview lasts for 30-60 minutes.

The interviews focus on issues of the implementation process and misfits or problems faced in the period of pre, during, and post implementation. Information from the interviews is then analyzed supplemented by written documents analysis.

4. MISFITS AND SOLUTIONS: FINDINGS AND DISCUSSION

Analysis and discussion of the findings are made in light of the research question stated in the outset. Like any other large scale IT projects, implementation of ERP system in UII also faced various misfits in each stage from project preparation to day-to-day operations after the implementation. The misfits are context specific and related to main activities carried out in each stage. In total, UII needed four and a half months effectively from preparation to go-live with the new systems.

Stage 1: Project preparation

Project preparation consisted of two main activities; (a) setting a project environment, project standards, and project planning; and (b) training of key users for each main module that was going to be installed (three main modules: i.e. Financial Accounting (FI), Management Accounting/ Controlling (CO), and Material Management (MM)). This stage began in September 2006 and took one full month to accomplish. In this stage, top management was involved.

Several misfits were identified in this stage. Division of responsibilities between the internal taskforce and the consultant was a crucial part in the beginning. Even though most of members of the

internal taskforce have acquainted with ERP system since they were certified training of ERP for university students, but they have no implementation experiences.

A series of training for functional key users was conducted. Functional key users were academic staffs. Alike to the taskforce, they have been familiar with the system prior the training. The training was intended to refresh the knowledge of the functional key users (i.e. FI, CO, and MM modules) and to make a common ground before proceeding to the implementation process. University's board of information systems also gave a full support by assigning several personnel to master the technological aspect of the ERP system i.e. database management, ABAB programming, and SAP Basis administration).

After considering the internal capabilities, and the responsibilities of each team (the internal taskforce and the consultant) were define, the statement of work was signed. The agreed implementation model with the consulting firm is a joint application development project. This model was chosen to ensure that UII would not be very dependent to the consultant and to avoid from being a hostage in the future. In the future, using internal capabilities, UII plan to be more independent to develop and maintain the ERP system.

Stage 2: Business blueprint

Main activities carried out in this stage were (a) defining business process scenarios, and (b) conducting customizing training. The final objective was to setup a set of business process scenarios that would be implemented. This stage took a whole month of October 2006.

The scenarios were very crucial, since in the mid of 2006, UII has just adopted a new organizational structure as a result of restructuring process and the implication of this new structure were not yet well established in the operational level. Intense debates in this issue arose between members of the taskforce to translate the new structure into operational terms. Going into operational level was very important in the stage of ERP implementation. Business process scenarios were drawn from that level.

Another issue also relates to business process integration in FI, CO, and MM modules. Before the ERP implementation, accounting and procurement functions were separate units and not well integrated. The ERP system were designed to integrate these functions to ease audit and controlling process.

Issues related execution of the new business process was also taken into consideration. The taskforce discussed with top management to define transition method from the old systems to the new one. They agreed that the three modules (i.e. FI, CO, MM) should be adopted in a whole, mandatory for all units, and not gradually. This decision was chosen to ensure that the adoption of the ERP system would give significant effects to the organization's goal.

Change management is another crucial issue. A set of initiatives were agreed to be taken to guarantee the preparedness of all involved personnel. In the operational level, not all personnel to be involved in the ERP system deployment were familiar with computer usage and English, which is the language of the ERP system. This condition needs to be addressed since the required new capabilities raised personal concern of their capability to use the ERP system and understand English. They should also be ready to be sent to another position if they were incapable to perform. A set of training, were then, setup to ensure the preparedness of the personnel.

In an interview, a member of taskforce asserts, "This is a crucial part. We discuss heavily in this stage, since many of the end-users are not familiar with the computer and English. They are afraid if they do not perform." On the other hand, one end-user claimed that he should struggle to master the system despite his lack of English capabilities. "I use the way a child learns a new language. I focus to understand what are needed by remembering the words," he says.

The deliverable of this stage was a blueprint document to be implemented in the subsequent stage. This document is intended to avoid under-estimated work and weak planning method that may lead to sub optimal success of implementation of the ERP system [10].

Stage 3: Realization

This stage also took effectively one month time period from November to December 2006. At this stage, the blueprint document was used a reference for several activities performed, (a) configuring the ERP system, (b) documenting the process into a report, (c) conducting user acceptance test, (d) developing training materials, (e) developing change management action plan, and (f) preparing a beginning balance.

System configuration was done by the consultants. However, the taskforce was involved in understanding the system configurations and checking business process scenarios through user acceptance test. The taskforce agreed that to avoid high maintenance costs the ERP system were implemented with minimal customization. This strategy was used by many companies for the similar reasons [26]. Too much customization is considered by Botta-Genoulaz and Millet [10] as trap should be avoided.

However, huge efforts were made in this stage, since the taskforce should compete with limited time they had. In addition to their responsibilities in this stage of the ERP implementation, they could not run away from their duties as lecturers. A full commitment was needed to cope with these limitations.

Based on the customized system configuration, training materials were constructed by key users. In addition to give an overview of the systems, the materials were mainly designed for end-user training covering all business process scenarios. These end-users then played their important role in data collecting from various units. For instance, in order to make MM module ready for deployment, all procurements data from all units (including tens of laboratories with thousands types of materials) were collected. The data was then cleaned and verified to avoid duplication, and converted into formats already prepared in the ERP system. Purging and making data consistent before migration is a trap should be dealt with to ensure successful implementation of the ERP system [10]

Next activities in this stage were preparation of general ledger, balance sheet, profit/lost (PL) statement, list of assets, customer and vendor data masters, and material beginning balance. All these activities were accomplished before proceeding to final preparation stage. One member of the taskforce affirms, "Cleansing the data from various sources is not an easy task. We found many duplications and all should be detected before being converted into the agreed format".

Stage 4: Final preparation

Another one month was needed to make a final preparation, although this stage was scheduled less than one month. This stage took place in January 2007. Four main activities were carried out: (a) preparing production systems; (b) migrating data from the legacy to the ERP system; (c) executing organizational changes; and (d) organizing a series of training for end-users.

To ensure that the ERP system would be running well (as production systems), UII upgraded IT infrastructure. This upgrade took a longer time than expected, and additional investment was made. Building interfaces between the two legacy systems, i.e. bank management and asset management, with the ERP system was also another issue. This process again took a longer time since one of the systems was not developed in-house. An external programmer who known the systems well was then involved.

A series of training were then conducted involving end-users for all three modules (i.e. FI, CO, and MM). The most significant efforts were made for training end-users of MM modules, since computer-based information systems were new for them and most of them were lack of computer skills and English.

No persons in the internal taskforce specially was assigned and responsible for change management, made the process ran not as smooth as expected. The taskforce made a series of presentations to eight faculties, one unit at university level, and four units at board of trustees level. These road show presentations were aimed to give a better understanding of all stakeholders and gain their support in the operational stage. In addition, the road show was also designed to get constructive feedbacks before the deployment.

"We got many criticisms from faculty members. Some of them are even very skeptical that the [ERP] systems will work. But, fortunately, through the road show, we can give them a better understanding to potential benefits UII will get. We are trying to convince them," states a member of the taskforce. Another member of the taskforce asserts, "The road show was time consuming and sometime conflicting with other duties as functional team". She continues, "An important senior taskforce member who understood very well change management suitable for UII was suddenly sick and passed away. This made another problem to address."

Stage 5: Go-live and support/deployment

After having the final preparation on place, in 29 February 2007, all modules (i.e. FI, CO, MM) of the ERP system did go live and effectively used by all units to support day-to-day business processes. UII chose to use a single go-live date for the three modules (Mini Big-Bang) [10], since nowadays, only these three are utilized by UII. Other modules, such as human resource module, UII expects to implement in the near future.

The first few months were then set to provide supports for business process issue or to get feedbacks especially from the end-users to adjust the systems. In the first months, several problems were identified due to lack of personnel capabilities and familiarization with the systems. In a few first months, incorrect journal entries also occurred, as some accounting staffs were not familiar with the accrual-basis accounting systems that has significant differences with cash-basis accounting systems used in the old systems.

Implementation that takes place within one period under the same rector and deans give us better opportunities for necessary adjustment and evaluation. Unlike practices in many developed countries, rector and deans in Indonesian universities are also lecturers with various academic duties and will be elected every four years. Alike, head of the board of information systems, who is responsible for managing IT infrastructure is a lecturer either.

Every four years, key-users and probably end-users may sit in their new position that are not related to the ERP system, and new persons, instead, will be in charge and should use the ERP system. The new persons in charge with various backgrounds and knowledge level should get familiar with the ERP system in a short time to ensure a smooth transition from the current persons in charge to their successors. From aforementioned description, various misfits are identified in each stage. Diverse solutions are also taken to deal with the misfits as summarized in Table 1.

Table 1. Misfits and solutions

No.	*Misfit*	*Solutions*	*Stage**	*Misfit domain*
1	Internal taskforce lack of experiences in implementing EPRP systems, even though the internal taskforce have acquainted with ERP system.	Inviting external consultant and choosing joint application development project as implementation model, to avoid of being a hostage in the future.	1	Human resource
2	The current business processes in financial and procurement functions are not well aligned to best practices in the ERP system.	Planning how to adjust and integrate business process scenarios in financial and procurement functions.	2	Business
3	End-users' are identified not ready to use the ERP system due to lack of computer capability and English proficiency.	Planning as series of training to ensure end-users' readiness to use the ERP system.	2	Human resource
4	Original configuration of the ERP does not accommodate the current business processes.	System configuration is conducted with minimal customization to avoid high maintenance costs.	3	Information systems
5	Members of the taskforce are not professionals who only deal the implementation of the ERP system, but they are lecturers with various academic duties.	Keeping workload in a manageable level and escalating commitments with full support of top management.	3	Human resource
6	Data of materials are not an integrated format and spread in various units.	Integrating, cleaning, and converting data into a consistent and integrated dataset.	3	Business
7	Available IT infrastructure is not supported the ERP system.	Upgrading the IT infrastructure.	4	Information systems
8	Not all stakeholders in faculty levels give a full support to the ERP adoption.	Conducting a series of road shows to all stakeholders in faculty levels.	4	Human resource
9	The installed modules support not all business processes, but integration should be made to other business processes facilitated by other applications.	Integrating the ERP system with legacy systems.	4	Business
10	Continuity of the ERP system is not well ensured and is volatile due to regular rotation of persons in charge.	Conducting a series of training for new persons in charge, or considering to hire professional to maintain the ERP system.	5	Human resource

Notes: 1. Project preparation, 2. Business blueprint, 3. Realization, 4. Final preparation, 5. Go-live and support/deployment.

5. CONCLUDING REMARKS

Changes in business environment, which is more competitive and need for more integrated and controllable business processes, and desires to give better services to the stakeholders, have been identified as main drives behind the ERP system implementation. Such the reasons should be accompanied with manageable expectations by taking the context into consideration.

In all implementation stages, from preparation to deployments as discussed above, we identify several lessons learned. Those lessons are: (a) top management support is very critical; (b) all stakeholders should be involved from the beginning; (c) well prepared blueprint document is important to guide and evaluate the implementation process; (d) considering the context, includes capabilities of human resources, is beneficial to setup policies (e.g. drafting contract with the consultants, and developing necessary training for end-users); (e) the taskforce should pay a significant attention to change management process; (f) good communi-cation to all stakeholders is a must to get a full supports; and last but not least; (g) discipline of all users to comply with business process scenarios is required to ensure that the ERP system will give significant impacts.

Several misfits are also identified in each stage that calls for appropriate solutions. Several misfits fall into business domain (misfits 2, 6, 9), while others relate to information systems (misfits 4, 7) and human resources (misfits 1, 3, 5, 8, 10). This finding asserts that the role of and preparing human resources is very critical in the ERP implementation.

REFERENCES

[1] ARC Advisory Group (2006) *Enterprise Resource Planning (ERP) Market to Exceed $21 Billion*. 2006, accessed on 12 November 2009 from http://www.arcweb.com/res/erp.

[2] Wagner, E.L. and Newell, S. (2004) 'Best' for whom?: the tension between 'best practice' ERP packages and diverse epistemic cultures in a university context. *Journal of Strategic Information Systems*. 13, 350-328.

[3] Shanks, G. and Seddon, P. (2000) Editorial: enterprise resource planning (ERP) systems. *Journal of Information Technology*. 15, 243-244.

[4] Soh, C., Kien, S.S., and Tay-Yap, J. (2000) Cultural fits and misfits: is ERP a universal solution? *Communications of the ACM*. 43, 47-51.

[5] Markus, M.L. and Cornelius, T. (2000) The enterprise systems experience: from adoption to success, in Zmud, R.W. (ed.) *Framing the Domains of IT Research: Glimpsing the Future Through the Past*. Cincinnati, OH: Pinnaflex Educational Resources.

[6] Botta-Genoulaz, V., Millet, P.-A., and Grabot, B. (2005) A survey on the recent research literature on ERP system. *Computers in Industry*. 56, 510-522.

[7] Huang, Z. and Palvia, P. (2001) ERP implementation issues in advanced and developing countries. *Business Process Management Journal*. 7, 276.

[8] Kumar, V., Maheshwari, B., and Kumar, U. (2002) ERP system Implementation: best practices in Canadian government organizations. *Government Information Quarterly*. 19, 147-172.

[9] Amoako-Gyampah, K.K. and Salam, A.F. (2004) An extension of the technology acceptance model in an ERP implementation environment. *Information and Management*. 41, 731-745.

[10] Botta-Genoulaz, V. and Millet, P.-A. (2005) A classification for better use of ERP system. *Computers in Industry*. 56, 573-587.

[11] Abdinnour-Helm, S., Lengnick-Hall, M.L., and Lengnick-Hall, C.A. (2003) Pre-implementation attitudes and organizational readiness for implementing an enterprise resource planning system. *European Journal of Operational Research*. 146, 258-273.

[12] Ke, W. and Wei, K.K. (2008) Organizational culture and leadership in ERP implementation. *Decision Support Systems*. 45, 208-218.

[13] Lander, M.C., et al. (2004) Trust building mechanisms utilized in outsourced IS development projects: a case study. *Information and Management*. 41, 509-528.

[14] Luo, W. and Strong, D.M. (2004) A framework for evaluating ERP implementation choices. *IEEE Transactions on Engineering Management*. 51, 322-333.

[15] 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*. 87, 251-266.

[16] Daneva, M. (2004) ERP requirements engineering practice: lessons learned. *Software*. 21, 26-33.

[17] Sarker, S. and Lee, A.S. (2003) Using a case study to test the role of three key social enablers in ERP implementation. *Information and Management*. 40, 813-829.

[18] Motwani, J., Subramanian, R., and Gopalakrishna, P. (2005) Critical factors for successful ERP implementation: Exploratory findings from four case studies. *Computers in Industry*. 56, 529-544.

[19] Calisir, F. and Calisir, F. (2004) The relation of interface usability characteristics, perceived usefulness, and perceived ease of use to end-user satisfaction with enterprise resource planning (ERP) systems. *Computers in Human Behavior*. 20, 505-515.

[20] Bradford, M. and Florin, J. (2003) Examining the role of innovation diffusion factors on the implementation success of enterprise resource planning systems. *International Journal of Accounting Information Systems*. 4, 205-225.

[21] Bueno, S. and Salmeron, J.L. (2008) TAM-based success modeling in ERP. *Interacting with Computers*. 20, 515-523.

[22] Hunton, J.E., Lippincott, B., and Reck, J.L. (2003) Enterprise resource planning systems: comparing firm performance of adopters and non-adopters. *International Journal of Accounting Information Systems*. 4, 165-184.

[23] Quattrone, P. and Hopper, T. (2005) A 'time-space odyssey': management control systems in two multinational organisations. *Accounting, Organizations and Society*. 30, 735-764.

[24] Law, C.C.H. and Ngai, E.W.T. (2007) ERP system adoption: An exploratory study of the organizational factors and impacts of ERP success. *Information and Management*. 44, 418-432

[25] Murphy, K.E. and Simon, S.J. (2002) Intangible benefits valuation in ERP projects. *Information Systems Journal*. 12, 301-320

[26] Ghost, A.K., Howell, C., and Whittaker, J.A. (2002) Building software securely from the ground up. *IEEE Software*. 9, 14-16.
[27] Holland, C.P. and Light, B. (1999) Global enterprise planning implementation. *Proceedings of the 32nd International Hawaii Conference on System Science (HICSS'99)*, Hawaii.
[28] Willcocks, L. (1992) IT managing the Catch-22. *European Management Journal*. 10, 220-229.
[29] Wang, E.T.G., Klein, G., and Jiang, J.J. (2006) ERP misfit: country of origin and organizational factors. *Journal of Management Information Systems*. 23, 263-292.
[30] Yen, H.R., and Sheu, C. (2004) Aligning ERP implementation with competitive priorities of manufacturing firms: An exploratory study. *International Journal of Production Economics*. 92, 207-220.
[31] Soh, C., Kien. S.S., and Tay-Yap, J. (2000) Cultural fits and misfits: Is ERP a universal solution? *Communications of the ACM*. 43, 47-51.