Framework for Measuring ERP Implementation Readiness in Small and Medium Enterprise (SME): A Case Study in Software Developer Company

Achmad Nizar Hidayanto, Muhammad Azani Hasibuan, Putu Wuri Handayani and Yudho Giri Sucahyo
Faculty of Computer Science, Universitas Indonesia, Depok, Indonesia
Email: nizar@cs.ui.ac.id, muhammad.azani@gmail.com, {putu.wuri, yudho}@cs.ui.ac.id

***Abstract*—Enterprise Resource Planning (ERP) is a product that enables organizations achieving their competitive advantage. However, the failures of ERP implementation are still considered quite high. This research was conducted to formulate the framework of self-assessment of open source ERP implementation readiness, which focused on the ERP pre-implementation aspects. The proposed ERP implementation readiness assessment framework was developed using the Fuzzy-based ANP (Fuzzy ANP), where the examined readiness factors are grouped into three categories, namely project management, organizational, and change management readiness. In order to see the application of the framework, we conducted a case study on an SME engaged in software development. We did focus group discussion with Chief Technology Officer, Chief Strategy Officer and Project Manager. The results showed that the company is not ready to implement open source ERP. Although the company is strong in the human resources aspect, they are still weak in other aspects so that they need some strategies to improve their level of readiness before implementing open source ERP.**

***Index Terms*— Enterprise Resource Planning, ERP, Small and Medium Enterprise, SME, ERP readiness, ERP readiness assessment, Analytic Hierarchy Process, AHP, Analytic Network Process, ANP, Fuzzy ANP**

I. INTRODUCTION

Currently the business sectors in Indonesia, especially those in the category of small and medium enterprises (SMEs), face a tight competition since the introduction of the ASEAN-China Free Trade Area (ACFTA) on January 2010. With the implementation of ACFTA, the products from ASEAN countries and China will be easier to enter Indonesia, while the price of these products will be much cheaper than similar products from Indonesia [1].

To survive and grow in this competition, SMEs in Indonesia are required to improve the quality of their business. One way to increase such competitive advantage is by improving the effectiveness and efficiency of the planning and management of company resources, which can be achieved by using information technology (IT) [2]. The advancement of IT such as Software as a Service (SaaS) and Enterprise Resource Planning (ERP) are proven to provide benefits for many organizations [3]. ERP system is considered as one of important aspects when we talk about automating and integrating business processes. Saputro et al. [4] stated that the ERP system may be one solution to help SMEs to perform simplification, integration and automation of the business processes. While Molla and Bhala [5] in their study of an Asian company in a developing country, showed that ERP enables organizations to achieve competitive advantage, although this technology can not be considered the sole cause.

ERP system is an integrated information system that supports and integrates the various aspects of a business, including planning, manufacturing, sales, and marketing, making it easier for each functional unit to share data [6-9]. By implementing ERP, companies can obtain information real-time such as customer, supplier, and competitor information and condition of the whole company.

Considering their revenue, SMEs are not as enthusiasm as large companies in adopting ERP. Indonesia as an example, number of SMEs that implement ERP are still less than 20%. According to Saputro et al. [4], there are several reasons why the number of SMEs implementing ERP is still low, among others: limited budget, lack of experiences in implementing ERP, cost of software and services that are not affordable for SMEs, limited internal capability to implement ERP, and as well as SMEs consider ERP as complex information systems. The same were confirmed in a study conducted by Vilpola [11] who said that the SMEs have their own challenges when trying to implement ERP, the resource constraints in the selection of the ERP package, and also in the implementation.

In addition to the above challenges, in general, the possibility of failure in ERP implementation is also high. Panorama Consulting Group [12], in 2011, conducted a survey of ERP implementation during 2010. The survey was conducted on 185 participants from 57 countries

Manuscript received September 17, 2012; revised October 13, 2012; accepted October 20, 2012.
Achmad Nizar Hidayanto is corresponding author.

doi:10.4304/jcp.8.7.1777-1782

(30% from North America, while 70% of the countries around the world). The survey results showed 61.1% of respondents said ERP implementations take longer than expected; 74.1% stated bloated budget, and 48% felt the realization of benefits is less than 50%. Robbins-Gioia, a management consulting services provider located in Virginia, did a survey of 232 respondents. The survey results showed 36% of companies have ERP systems and 51% considered their ERP implementations fail.

To increase the success of ERP implementation, researchers conducted numerous studies, for example related to the identification of critical success factors of ERP implementation. Razmi et al. [10] took a different approach by constructing ERP readiness assessment in a practical framework. The results of the assessment are used to determine the status of the organization's readiness to implement ERP and further identify areas that should be improved before entering the implementation phase. Related to this, the study aims to develop a framework of ERP implementation readiness self-assessment. The proposed framework is expected to help SMEs in assessing their readiness in implementing ERP. As a case study to conduct the assessment, we selected an SME engaged in software development, which plans to implement an open-source ERP.

II. Literature Review

A. Small and Medium Enterprises

Small and medium enterprises (SMEs) are the backbone of the micro economy in Indonesia. In 2009 the Ministry of SMEs and Cooperatives record the number of SMEs amounted to 52,764,603 units, this amount at odds of 1,354,991 of the total in 2008.

The definition of SMEs in Indonesia refers to Law No. 20 year of 2008. Table I shows the criteria of SMEs according to this law.

TABLE I.
CHARACTERISTICS OF SMES IN INDONESIA

No	Enterprise type	Criteria	
		Asset (Rupiah)	Turnover (Rupiah)
1	Small	> 50 millions - 500 millions	> 300 millions – 2.5 billions
2	Medium	> 500 millions - 10 billions	> 2.5 billions - 50 billions

Source: Law No. 20 year of 2008

B. Enterprise Resource Planning Readiness (ERP-Readiness)

Implementation of ERP projects often can not run smoothly as expected. Many challenges in ERP implementation as it poses some risks [13]. These risks should be measured as early as possible to avoid potential challenges in the later stages. This underlies the need for organizations to assess their readiness to implement ERP [10].

Readiness assessment was introduced as a separate stage in the ERP project, at which stage it should be carried out before the implementation phase. This assessment does not only show the capability of the company to implement ERP, but it also identifies any areas that are becoming weaknesses of the company, so that the company can improve performance in these areas to get to a higher level of readiness.

There are several frameworks proposed by various researchers previously in accordance to the readiness assessment of ERP implementation, such as that developed by [14], as well as a framework developed by [10]. In drawing up a practical framework of ERP implementation readiness assessment, they use a similar method, which generally can be divided into four stages, namely:

- The first phase, identify the determinants of ERP implementation readiness.
- The second phase, build an assessment tool by using determinants obtained in the first phase
- The third phase, identify importance (weight) of each determinant
- The fourth phase, build assessment scheme for each determinant of ERP implementation readiness.

The framework proposed by [14] was prepared using 37 Critical Success Factors (CSFs) that are grouped into 4 categories: technoware, humanware, inforware, and orgaware. Razmi et al. [10] proposed their framework by dividing the goal of ERP readiness into three parts, namely organizational, project management, and change management readiness sub-goals. For the sub-factors, they used 15 CSFs which are grouped into five factors, namely project, vision and goals, systems and processes, culture and structures, and human resources.

Related to the assessment, Soysa and Nanayakkara [14] used the framework of Analytic Hierarchy Process (AHP), which has been simplified, as well as Hidayanto et al. [15] which also used AHP for measuring business intelligence in SMEs. Razmi et al. [10] used variation of of AHP, by using Fuzzy Analytical Network Process (Fuzzy ANP) which is actually the most common form of AHP combined with Fuzzy sets theories to deal with uncertainty in the assessment. According Razmi et al. [10], the ANP method is considered more superior in doing modeling for complex decision environment compared to AHP.

III. Methodology

A. Framework for ERP Readiness Assessment

As discussed in the literature review, this study adapts the framework which was introduced by Razmi et al. [10] to measure ERP implementation readiness. This framework defines the ERP implementation readiness in three categories, namely:

- Project management readiness
- Organizational readiness
- Change management readiness

Meanwhile, the readiness of each aspect depends on the readiness of the five factors and each factor is composed of several sub-factors. These factors and sub-factors are summarized in Table II.

Here is description of each sub-factor of ERP implementation readiness [10]:

- Project championship. The role of the ERP implementation project championship is much larger than other information system implementations. Project champion is needed to drive consensus and oversee the entire project. Thus, a project champion should be able to push and sustainably manage resistance and changes during implementation.

TABLE II.
CRITICAL FACTORS AND SUB-FACTORS OF ERP IMPLEMENTATION READINESS

No	Factors	Sub-factors
1	Project	Project Championship Resource Allocation Assign Responsibilities Project Team Project Scope
2	Vision and Goals	ERP Implementation vision ERP mission and goals
3	Systems and Processes	Existing system Existing process
4	Culture and structures	Culture Decision mechanisms Organizational structure Communication
5	Human Resource	Top Management Personel

- Resource allocation. ERP implementation requires a different allocation of organizational resources such as time, money, and personnel. Resources should be allocated according to resource planning as an important part of project management program.
- Assign responsibilities. ERP project requires the cooperation of several units of the organization. The responsibilities of each unit should be clear as one of keys to success of an ERP implementation.
- Project team. ERP project requires the project team containing the best employees who have the business skills and technical ability. Project teams should be balanced, cooperative, and cross functional.
- Project scope. The scope of the ERP project should be clearly identified, whether is it just limited to part/whole functional unit, part/whole site, part/whole business process, and so on. The scope of the project will directly affect the time and cost of implementation. It is also important to establish milestones and a realistic delivery time for the ERP project.
- ERP implementation vision. ERP Implementation also requires a clear vision of the organization. The vision is needed to guide the implementation of ERP and should contain goals and objectives that can be measured.
- ERP mission and goals. Organizations should also define the mission and goals of the ERP system clearly. The mission and goals must be understood by the organization. The implementation of the ERP system must have clear justification, considering the risks, costs, and resources needed.
- Existing system. Before implementing ERP, organizations must understand the current system is. Understanding the existing system is needed to identify the changes required at the time of implementation of ERP systems.
- Existing process. Existing process improvements and adjustments need to be identified before the implementation of ERP. In addition, organizations should design a system architecture and ensure the chosen ERP system reflects the organization's business processes are complete.
- Culture. Given the ERP implementation caused major changes in the organization, organizational culture plays an important role in the implementation phase. Organizational culture can be a facilitator or a major obstacle to change. Successful implementation of ERP requires a corporate culture that emphasizes the value to share a common goal in the interests of the individual and the value of trust between colleagues, employees, managers, and companies.
- Decision mechanisms. Decision-making requires the accuracy of the data. Therefore, the ability to search for information is an important factor in making a decision.
- Organizational structure. The organizational structure and hierarchy positions must match and support the implementation of ERP. The changes made by the ERP system must be backed existing management and structure of work in the organization.
- Communication. Expectations and objectives of the ERP project should be communicated effectively between stakeholders in all levels in the organization. The entire implementation phase, which will include the reasons of ERP implementation, change management strategy, project scope, and others should be communicated to all interested parties.
- Top Management. Many literature suggests that top management support on IT projects is critical to the success of the project, including the ERP project. Top management should view ERP as a priority project of the organization, financing projects and take an active role in leading change. Management must be involved in every step of ERP implementation, monitor project progress and provide direction to project team.
- Personnel. The success of ERP implementation requires the commitment and cooperation of personnel from all business segments. The personnel must be assured that the organization is committed to implementing the ERP system. The personnel should be well prepared for the change to prevent resistance and chaos in the implementation phase.

B. Readiness Assessment

Razmi et al. [10] have provided weights for each factor and sub-factors in accordance to the three categories of readiness which are project management, organizational and change management readiness as can be seen in Table III.

Unfortunately, Razmi et al. [10] did not provide guidance on how to conduct an assessment of each of these sub-factors. Related to this, we developed guidelines for assessing the characteristics of the level of readiness at all levels of sub-factors, compiled by adapting guidance of the Control Objective for Information and Related Technology (COBIT). For the sake of space constraints, the proposed guideline is not presented here, but it can be accessed through http://staf.cs.ui.ac.id/~nizar/AssessGuide.doc. Taking into account this assessment guide, linguistic values for each sub-factors can be determined, whether they are very low, low, medium, high, or very high.

TABLE III
WEIGHTS OF EACH FACTOR AND SUB-FACTORS ON EVERY ASPECT OF READINESS [10]

Factors	Project readiness	Organizational readiness	Change management readiness
Project	0.23	0.11	0.19
Project Championship	0.064	0.031	0.053
Resource Allocation	0.032	0.015	0.027
Assign Responsibilities	0.023	0.011	0.019
Project Team	0.062	0.030	0.051
Project Scope	0.048	0.023	0.040
Vision and goals	0.20	0.11	0.13
ERP impl. Vision	0.064	0.035	0.042
ERP mission & goals	0.136	0.075	0.088
Systems and processes	0.13	0.26	0.16
Existing system	0.065	0.130	0.080
Existing process	0.065	0.130	0.080
Culture and structures	0.21	0.25	0.27
Culture	0.078	0.093	0.100
Decision mechanisms	0.032	0.038	0.041
Organizational structure	0.036	0.043	0.046
Communication	0.065	0.078	0.084
Human resources	0.23	0.27	0.25
Top Management	0.156	0.181	0.170
Personnel	0.074	0.086	0.080

Here is the complete procedure of assessment, until obtaining the value of ERP implementation readiness for an organization:

- Assessment according to subfactors perspective
  At this stage, the assessment is done by gathering evidences in organization, such as through focus group discussions, and then mapping the findings into linguistic variables, i.e. very low, low, medium, high, or very high, by using the guideline we have developed. This linguistic variable is then transformed into a numeric al score as follows: very low - 0, low - 25, medium - 50, high - 75, very high - 100.
- Assessment according to factors perspective
  At this stage, we determine the score of each factor, by calculating the average of numerical score of their respective subfactors. These average scores are then translated into forms of linguistic variables by using fuzzy scale as shown in Table IV.
  For example, the average score for a certain factor is 10. According to Table IV, 10 falls into two categories: very low and low. In order to determine which category representing this score, we should calculate the membership values of this score for each category. The category is determined by seeking the category which has the highest membership value. This process uses a fuzzy membership function (μ) that we defined in Table V.

TABLE IV
LINGUISTIC VARIABLES FOR MEASURING SUB-FACTOR AND FUZZY SCALE [10]

Linguistic variables for sub-factors	Fuzzy scale
Very low	(0, 0, 25)
Low	(0, 25, 50)
Medium	(25, 50, 75)
High	(50, 75, 100)
Very High	(75, 100, 100)

TABLE V
LINGUISTIC VARIABLES FOR MEASURING SUB-FACTOR AND FUZZY SCALE [10]

Linguistic Variables for sub- factors	*Fuzzy* membership function
Very Low	$\mu(x)$ ={1, if x =0; 0,if $x \geq 25$; (25-x)/25, if $0 \leq x \leq 25$}
Low	$\mu(x)$ ={1, if x =25; 0,if x= 25 or $x \geq 50$; x/25, if $0 \leq x \leq 25$; (50-x)/25, if $25 \leq x \leq 50$ }
Medium	$\mu(x)$ ={1, if x =50; 0,$x \leq 25$ or $x \geq 75$; (x-25)/25, if $25 \leq x \leq 50$; (75-x)/25, if $50 \leq x \leq 75$ }
High	$\mu(x)$ ={1, if x =75; 0,$x \leq 50$ or $x \geq 100$; (x-50)/25, if $50 \leq x \leq 75$; (100-x)/25, if $75 \leq x \leq 100$ }
Very High	$\mu(x)$ ={1, if x = 100; 0,if $x \leq 25$; (x-75)/25, if $75 \leq x \leq 100$}

- Assessment according to subgoals perspective
  At this stage, we assess the readiness of each sub-goals, which is done by adding up the multiplication of sub-factor score and its respective weight (as shown in Table 3) for all their respective sub-factors. The numerical score obtained is then translated into a form of linguistic variables using the same way as the assessment of factor perspective.

C. Data Collecting

In this study, we selected company X as our case study for assessment. Company X is a privately owned company offering System Integration, Software Development, and Offshore Outsourcing Services to various clients. Founded in Jakarta in 2001, the founders of company X have a broad range of project experience in projects and services of Information and Communication Technology (ICT). With a low cost, high quality and reliable software services, company X is promising customer satisfaction. Currently, company X has 20 employees, most of them are software developers which are handling the company's core activities.

In order to collect data for assessing the ERP implementation readiness, the parties know exactly the level of readiness of each sub-factors ERP readiness are

top level managements. Therefore, to get a consensus from the top level management of the level of readiness of each sub-factors, we conducted focus group discussions with top level management of company X, namely Chief Technology Officer, Chief Strategy Officer and Project Manager. Focus group discussions were conducted using guidelines we have developed for the assessment at sub-factors level.

IV. Results and Analysis

This section describes the results of the assessment and analysis of ERP implementation readiness in company X.

A. ERP Implementation Readiness Assessment

As stated previously, sub-factors were assessed by focus group discussions to obtain consensus on the score of each sub-factors. The results of assessment for each factors and their respective sub-factors can be seen in Table VI.

TBALE VI.
ASSESSMENT RESULT IN THE FACTORS AND SUB-FACTORS PERSPECTIVE

Factors	Sub-factors	Score	Average
Project	Project Championship	25	35
	Resource Allocation	25	
	Assign Responsibilities	50	
	Project Team	50	
	Project Scope	25	
Vision and Goals	ERP Implementation vision	25	25
	ERP mission and goals	25	
System and Process	Existing system	25	25
	Existing process	25	
Culture and Structures	Culture	50	31.25
	Decision mechanisms	25	
	Organizational structure	25	
	Communication	25	
Human Resources	Top Management	50	62.5
	Personnel	75	

These numerical scores are translated into linguistic variables, using fuzzy membership functions as described previously, in order to obtain the value of readiness for each factor. The result is presented in Table VII.

TABLE VII.
READINESS LEVEL OF EACH FACTOR

Factors	Readiness level
Project	Low
Vision and Goals	Low
System and Process	Low
Structure and cultures	Low
Human Resources	Medium/high

Based on Table VII, it can be seen that the factor that has a high readiness factor is human resources. It shows that from the standpoint of human resources, company X is quite ready to implement ERP. While the results of the assessment in the perspective of sub-goals can be seen in Table VIII.

By considering readiness level of each sub-factor and also the readiness level of each sub-goal which are still low, it indicates that for now company X is not yet ready to implement open source ERP.

B. Implications to Organization

Considering the assessment result we had for company X, we formulated some recommendations to assist company X in preparing implementation of open source ERP in the future.

TABLE VIII
NUMERICAL SCORES OF EACH SUB-GOAL

Sub-factors	Project mgmt. readiness	Organizational readiness	Change mgmt. readiness
Project Championship	1.6000	0.7750	1.3250
Resource Allocation	0.8000	0.3750	0.6750
Assign Responsibilities	1.1500	0.5500	0.9500
Project Team	3.1000	1.5000	2.5500
Project Scope	1.2000	0.5750	1.0000
ERP impl. vision	1.6000	0.8750	1.0500
ERP mission and goals	3.4000	1.8750	2.2000
Existing system	1.6250	3.2500	2.0000
Existing process	1.6250	3.2500	2.0000
Culture	3.9000	4.6500	0.5000
Decision mechanisms	0.8000	0.9500	1.0250
Organizational structure	0.9000	1.0750	1.1500
Communication	1.6250	1.9500	2.1000
Top Management	7.8000	9.0500	8.5000
Personnel	5.5500	6.4500	6.0000
Total	36.6750	37.1500	32.5250

With respect to Project factor, company X needs to prepare a formal procedure that is used to carry out all the activities of the project, including the control mechanisms to ensure the procedure runs. In addition, they should also start preparing the team who will be involved in the ERP implementation project.

In accordance to Visions and Goals factor, company X needs to formulate visions and goals of the ERP implementation. The visions and goals should be documented in the form of a formal document, and get approval from the top level management as a commitment to ERP project implementation. The vision and mission should be communicated to all employees intensively.

Regarding Systems and Processes factor, company X needs to improve their business processes and documents by refering to available best practices in industry. Business processes need to be formulated in the form of Standard Operational Procedures (SOP) and disseminated to all employees. If possible, company X can also establish reward and punishment procedure to ensure the SOPs has been made fully implemented by all levels of employees.

Related to Culture and Structures factor, company X needs to reorganize the ownership structure of data and information, so that the ownership of data and information becomes more apparent. For that, they need to establish formal procedures to define the duties and responsibilities associated with decision-making.

At last, with respect to Human Resources factor, this factor has the highest score. Even so, there should be intense communication to the top management to keep track of their commitment to the implementation of ERP in the company.

V. Conclusion

This research has successfully formulate a framework for assessing the readiness of ERP implementation at SMEs. The framework was developed from existing framework, equipped with a guide for assessing the readiness at all levels, thus allowing the SMEs to perform a self assessment of their readiness. The results of the assessment to company X, our case study, it can be concluded that company X is not ready to implement ERP. Unreadiness of company X can be seen from the low score of most of readiness factors. Of the five factors were observed, there are 4 factors considered weak, namely: project, vision and goals, stucture and culture, as well as systems and processes. As for human resource factors, company X has achieved medium/high level. This indicates that the entire personnel of the company have sufficient understanding of the technology of ERP and ERP implementations have supported the company's plans.

ACKNOWLEDGMENT

This research is supported by Universitas Indonesia through 'Riset Madya' grant No. 2139/H2.R12/HKP.05.00/2012. It is a pleasure to convey our gratitude to our university for their continuous support, particularly for Research and Public Service Directorate for their excellent services.

REFERENCES

[1] M. Dewitari, R. Sai'o, D. A. Ramadhani, Erika, and T. Andriyanto, "ASEAN-China Free Trade Area (ACFTA) Agreement as an International Regime: The Impact Analysis on ASEAN," Technical Report, Facuty of Social and Political Science, Universitas Indonesia, 2009. Available at http://www.scribd.com/doc/24674929/ASEAN-China-Free-Trade-Area-ACFTA-Agreement-as-an-International-Regime-The-Impact-Analysis-on-ASEAN, last accessed 10 September 2012

[2] E. Cofriyanti and A. N. Hidayanto, "The Relationship among Organizations Factors, Information Technology, Innovation and Performance: An Indonesian SMEs Study," *International Journal of Innovation and Learning* (*IJIL*), in press.

[3] A. N. Hidayanto, Y.Y. Karnida and G. Moerita, "Analysis Of Software As A Service (SaaS) For Software Service Provision Alternative: A Case Study of E-Office On-Demand Service of PT Telkom Indonesia," *International Journal of Innovation and Learning (IJIL)*, Vol. 12, No. 3, pp. 294-318, 2012.

[4] J. W. Saputro, P. W. Handayani, A. N. Hidayanto, and I. Budi, "Roadmap of Enterprise Resource Planning (ERP) Research for Small and Medium Enterprises (SMEs) in Indonesia," International Conference on Advanced Computer Science and Information Systems (ICACSIS), 2010.

[5] A. Molla and A. Bhala, "ERP and Competitive Advantage in Developing Countries: The Case of an Asian Company," *The Electronic Journal of Information Systems in Developing Countries*, Vol. 24, No. 1, 2006, pp. 1 – 19.

[6] L. Jessup and J. Valacich, "Information Todays," Prentice Hall, 2006, ISBN 0132190443 978

[7] G. R. Dantes and Z. A. Hasibuan, "The Impact of Enterprise Resource Planning (ERP) System Implementation on Organization: Case Study ERP Implementation in Indonesia," IBIMA Business Review, Vol. 2011, 2011, Article ID 210664.

[8] X. Yuanqiang, P. Lok, and Y. Song, "The ERP Implementation of SME in China," 6th International Conference Service Systems and Service Management (ICSSSM), 2009.

[9] B. Baki, T. Dereli, and A. Baykasoglu, "An Investigation on the Readiness of Turkish Companies for Enterprise Resource Management," *Journal of Manufacturing Technology Management*, Vol. 15, No. 1, 2004, pp. 50-56.

[10] J. Razmi, R. Ghodsi, and M. S. Sangari, "A fuzzy ANP model to assess the state of organizational readiness for ERP implementation," International Conference on Information and Automation for Sustainability (ICIAFS), 2008.

[11] I. Vilpola, "Development and Evaluation of a Customer-Centered ERP Implementation Method," *Journal of Information Technology Theory and Application (JITTA)*, Vol. 9, No. 4, Article 3. 2007.

[12] Panorama Consulting, "ERP Report," Available at http://panorama-consulting.com/Documents/2011-ERP-Report.pdf , last access 15 June 2011.

[13] J. J. Sullivan, M. Wyeth, and W. M. Chumney, "Research and Practical Issues Of Enterprise Information Systems," *International Federation for Information Processing*, Vol. 205, 2006, pp. 341 – 351, Springer.

[14] S. Soysa and J. Nanayakkara, "Readiness for ERP Implementation in an Organization: Development of an Assessment Model," International Conference on Information and Automation (ICIA), 2006.

[15] A. N. Hidayanto, R. Kristianto, and M. R. Shihab, "Measuring Business Intelligence (BI) Implementation Readiness: A Framework Development and Its Application to Small Medium Enterprises (SMEs)," 3rd International Research Symposium in Service Management (IRSSM), Beijing, 2012.

Achmad Nizar Hidayanto is Head of Information Systems/Information Technology Department, Faculty of Computer Science, Universitas Indonesia. He obtained his PhD in Computer Science from Universitas Indonesia. His research interests are related to information systems/information technology, e-learning, information systems security, change management, distributed systems and information retrieval.

Muhammad Azani Hasibuan was born on 22 July 1985 in Pekanbaru, Indonesia. He obtained his master degree in Information Technology in 2011 from Faculty of Computer Science, Universitas Indonesia. He is currently a Vice President of Software Development and R&D in PT. Totalindo Rekayasa Telematika at Jakarta, Indonesia. His research interests are in enterprise system and education engineering area.

Putu Wuri Handayani is a lecturer in Faculty of Computer Science, Universitas Indonesia. She obtained her master degree from University of Applied Science Fulda, Germany. Her research interests are related to information system/information technology such as e-commerce, enterprise resource planning, supply chain management, and customer relationship management.

Yudho Giri Sucahyo is a lecturer in Faculty of Computer Science, Universitas Indonesia. He obtained his PhD degree from Curtin University of Technology, Australia, in 2005. His research interests are related to information system/information technology such as e-government, IT governance, information security and data mining.