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IMPLEMENTATION OF INTEGRATED INFORMATION SYSTEMS FOR SMALL MEDIUM ENTERPRISE

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Abstract

The swift growth of Internet Technology in Indonesia brings variety of new opportunities for small and medium enterprises (SMEs) particularly in business process innovation. Observing the cost of acquisitioning Integrated information systems has become more affordable now compared to ten years ago, more and more SMEs are implementing it. Various studies in the field of small medium enterprise in adopting information technology have been done, but not much found a study that combines the real implementation and the study of how SMEs adopting it, in particular the level of adoption with the aim of creation and development of SMEs. Considering SMEs as the important factors to success in the reduction of unemployment and economic growth in Indonesia, systematic studies which combine real implementation and its adoption need to be done, particularly to anticipate the ASEAN free trade area competition.

The approach of this article will utilize a common information systems implementation life cycle which considers frequently success factors of an SME in the process of adoption of integrated information systems using Openbravo ERP. This article exploited a mix method of literature study and real implementation. The results opened further opportunity to investigate causal relationship among the variables of integrated information system adoption including the moderating effect of agile technique implementation.

Keywords: small medium enterprise, integrated information systems, openbravo erp, agile technique

Introduction

Small and Medium Enterprises (SMEs) now have the challenge of an increasingly complex and competitive industry, including the challenges of exploiting information technology in which, the needs are more and more akin to the needs of information technology in large business enterprises. SMEs also often do not have access to human resources in the field of information technology to ease the adoption of information technology, even though most SMEs agree that information technology is needed to compete in a growing and increasingly global market.

Information systems continue to play as an important role in the success of any business despite the size of the SMEs. Computer network installation even in the smallest of small businesses will boost overall office efficiency by allowing employees to quickly access and share information and network resources such as high-speed internet connection, integrated information systems, collaboration systems, office productivity and cloud based data backup system. Previous studies note that most big enterprises are using Enterprise Resource Planning (ERP) software packages as their Integrated Information Systems, and nowadays more SMEs are on the route of adopting them however the bulk benefits of ERP software packages remain hidden (Maditinos, Chatzoudes, & Tsairidis, 2012).

Specifically in Indonesia, SMEs are the key to success in the reduction of unemployment and boosting economic growth in Indonesia. SMEs have contributed a great deal in the resilience of the Indonesian economy, especially in a period of economic stagnation and financial crisis during 2008-2009. Support to SMEs should be encouraged to support Indonesia becoming 10 most influential economic powers in the world by 2025 according a study from the OECD (2012). Therefore, research on SMEs is considered very important for academics and business practitioners in Indonesia.

Literature Study

The purpose of literature study is to thoroughly review sources related to Small and Medium Enterprises decision in implementing Integrated Information Systems in order to improve productivity and working quality since the system offers standardization and simplification to several common business processes.

Small and Medium Enterprises (SMEs)

The term Small and Medium sized Enterprise (SME) varies in one country to another. Due of the diversity of SMEs, every simple definitions are subject to criticism. The Indonesian Ministry of micro, small and medium enterprise under the Statute number 20 year 2008 defined SMEs according to 3 categories based on the company assets and revenue: (1) Micro business, (2) Small business, and (3) Medium business as listed in table 1 below:
Contributions of SMEs are also significant to reduce unemployment, both in the developed and developing countries, including Indonesia. In today's era of global economy, SMEs are required to make changes in order to increase their competitiveness. One important factor that will determine the competitiveness of SMEs in Indonesia is the use of information technology (IT) (Rahmana, 2009). The use of IT can improve business transformation through speed, accuracy and efficiency of information exchange in large numbers. Case studies around the world show more than 50% productivity is achieved through investments in IT. SMEs may increase their global competitiveness if they able to run to take advantage of IT to make their business operations reliable, balanced, and standardized.

### Integrated Information Systems

A study conducted by Dillard and Yuthas (2006) note that most big enterprises are using Enterprise Resource Planning (ERP) software packages as their Integrated Information Systems, and nowadays more SMEs are starting to also take advantage of ERP in automating their business processes.

Growing SMEs need to managewith decisions around the best business system to handleits expanding operations. Proper planning of an integrated business management software system often treated as back seat to short-term revenue acceleration targets. As consequence, many un-well planned applications are installed at different points in time in various functional areas, forming islands of applications, hence resulting in business process inefficiencies and software integration challenges.

To keep SMEs growth pace at the controllable rates, it is essential to have business software applications integrated. The benefits of integrating information systems in this manner produceimprovement to business process productivity as well as expensesavings ("Benefits of an Integrated Business Software System - NetSuite," 2015), including but not limited to:

1. Process efficiency across organization to several key processes such as order management, fulfillment, invoicing, cash collection, expense approvals, and financial consolidation.
2. Improved decision making due to real-time data visibility which is important in making timely informed decisions. The benefits may include, when information can be accessed promptly, organizations are able to make accurate and quicker judgments.
3. Accelerated geographical growth with the support of integrated information system enables expansion to multiple locations and reaching extrasales channels can be achieved faster due to automated order and accounting management processes. Organizations able to upsell and cross-sell more efficiently to their existing customer base.

### Agile Project Management

Unlike the traditional Waterfall project management technique that relies comprehensive requirements gathering up front, the Agile technique offers more flexibility that suits the nature of SMEs. The history of agile development started during early 1990s with the association to evolutionary method in 1980s. Despite of many definitions, it has been difficult to precisely define agile technique (Abrahamsson, Salo, Ronkainen, & Warsta, 2002). The agile technique values (1) Individuals and Interactions over processes and tools, (2) Working software over comprehensive documentation, (3) Customer collaboration over contract negotiation, and finally (4) Responding to change over following a plan. Highsmith & Cockburn (2001) wrote that agile method is not about the practice the use, but their recognition of people as the primary drivers of project success, coupled with intense focus on effectiveness and maneuverability.

Critics to Agile are also numerous, including the offshore outsourcing and sub-contracting which may not well fit with well with this method.

### Openbravo ERP

The success of an organization may depend on largely on their information systems and in particular on the effective transfer of information throughout the supply chain. ERP systems form a complex series of software modules used to integrate many business processes (Avison & Fitzgerald, 2006). Initially, the business processes include production, inventory management, and logistics modules, however over the time the automation adds more business processes integration such as finance, accounting, human resource management and customer relationship management.

Openbravo ERP is a web-based integrated business solution application developed for SMEs, particularly for the retail industry. The licensing scheme was made following the Openbravo Public License, which is based on the Mozilla Public License. Openbravo is developed based on its predecessor, the Compleo ERP which is also open-sourced and
licensed under the GNU General Public License version 2. In January 2008, Openbravo was one of the ten most active projects on Sourceforge. It was originally developed as business administration software initiated by the work of Nicolas Serrano and Ismael Ciordia of the University of Navarro in Pamplona, Spain. They both were also involved in the development of software for their university and utilize the Internet in the software they have created, hence Openbravo has various advance features that are superior because it uses the internet mindset from the beginning. This is in contrast with some other prominent ERP software package originating from desktop platform.

Factors influencing SMEs’ adoption of ERP are different from the factors influencing SMEs’ adoption of other previously studied information systems (IS) innovations. SMEs were found to be more influenced by technological and organizational factors than environmental factors. Hence, the SMEs with greater perceived relative advantage, greater ability to experiment with these systems before adoption, greater top management support, greater organizational readiness and a larger size are predicted to become successful adopters of ERP systems (Ramdani, Kawalek, & Lorenzo, 2009). Furthermore, Garg & Garg (2014) empirically verified that Strategic, Technological, People and Project management factors are positively influencing ERP implementation success.

A study by Lee & Lee (2012) indicate that community service quality has a positive direct effect on open-source ERP use. Open-source ERP quality has a direct positive effect on user satisfaction, which in turn has a positive effect on individual net benefits, which also positively affects organizational net benefit. Hence, implementers using open-source ERP need to take the community service quality identified in the study into account when implementing open-source ERP.

Implementation Methods

The implementation method for SME Integrated Information Systems usually adopts waterfall methods where it begins with a needs assessment of information technology in order to justify the spending and to increase effectiveness, reliability and expandability. This needs assessment will include the recommended hardware, software, upgrades, and training office staff. Trainings are needed because if employees do not know how to use the system then it will be useless. Using agile techniques some of the steps are modified to suit the nature of SMEs which some loops during the implementation process are necessary, however the main methods remain the same.

Needs Assessment

The process begins by conducting interviews with the common problems experienced by SMEs. After the interview, it was found that in general SMEs have problems where they do not have the system to manage their financial records (mostly still use paper based, some are using excel) and a planning for production process. This happens because SMEs in Indonesia were generally established by one or several founders with a focus on starting the business, so the main attention is focused on improving sales and production capacity. The efficiency and innovation of business processes have not been taken seriously until problems occurred.

In general, if an SME has been running for more than two years, they will start thinking to have a better management system. The purpose of this management system is to achieve profit increases due to various improvements in the business process management. The results of this needs assessment is often embodied in the gap analysis document.

Project Management Techniques

Maditinos et al. (2012) main findings of their empirical study summarizes the success in ERP implementation closely relates to the following categories: (1) the assistance provided by external consultants during the ERP implementation process is essential, (2) knowledge transfer is an extremely significant factor for ERP system success, (3) knowledge transfer concerning technical aspects of ERP systems is more important than effective handling of communication, as well as conflict resolution among organizational members, (4) the role of top management support seems to be of less importance that the one provided by users. Hence the Agile approach in ERP implementation for SME is a better approach compared to classic waterfall techniques. The agile philosophy believes that requirements are so difficult to be defines, so that they must be evolved in some other way following the idea of evolutionary approach (Boehm, 1988) together with prototyping. Changes must be embraced as norm rather than something to be fought.

Business Process Management

Integrated Information Systems are generally considered as applications that focus on managing and integrating whole business processes including accounting, finance, manufacturing, human resources, and inventory management (Davenport and Brooks, 2004). Generally SMEs in Indonesia also implement above mentioned business processes, starting from accounting and inventory management. Manufacturing business process is considered the hardest process to manage and implemented using ERP software package.

Software and Hardware Selection

A sizing is an estimation of the hardware resources required to support a specific software implementation, in this study Openbravo ERP was used. Openbravo has experience managing internal product installations on the basic instance types provided by Amazon EC2. At the same time Openbravo embraces experience of our customers running
product on physical hardware and also using virtualization ("Sizing - OpenbravoWiki," n.d.). The sizing table includes Topology, where it can be either Single (one instance for the database and the application server) or Dual (two instances; one for the database server and another one for the application server). Database can be either Oracle (SE - 10g, 11g) or PostgreSQL (8.3.x, 8.4.x). Hardware equivalence will depend on whether the installation will be cloud based using Amazon EC2 instance or simply company hosted CPU with physical RAM of 8 GB and hard disk larger than 100GB was recommended.

**Data Migration**

Truth be told, the migration of SMEs historical and live data to its new ERP system is fundamental to a successful ERP project. But the important part, it has to be clean data. Most of the times SMEs do not have a standard in data entry, hence the data are scattered everywhere and dirty. Migrating legacy data in Openbravo ERP is very standard and must be followed thoroughly, consequently all existing data must be converted using Openbravo ERP’s standard. Period cut off was necessary to be done after successful test of parallel data input.

**Customization, Training and Documentation**

Following data migration are the various procedures to support the quality control. The manual procedures, including user guide need to be tested to the satisfaction of users as well as any other employee involved within the SME. End user of the ERP software should join a user acceptance test (UAT) session and write down the necessary customization to be done, particularly the reporting modules. When the customization already has been done, the subsequent phase is training. Without a proper training, user will be unfamiliar with the new system and unlikely to cope with the new system.

Documentation such as the operations and user manuals must be created using the perspective of users. Finally the whole process ends with the application of security settings that ensure that there are no unauthorized accesses may reach the system.

**Results and Discussions**

Based on the research findings, the ERP adoption by SMEs in Indonesia is still low, however many SMEs owners or managers show great interest to utilize ERP, therefore, government and academia need to improve education by providing computer training covering the Internet, websites, e-commerce or applications that are beneficial for SMEs with the aim to familiarize SMEs in using information technology, so that it will eventually trigger the desire to manage the company's business process with Integrated Information Systems such as ERP software package.

Future research may want to investigate factors influencing the adoption of ERP by SMEs using popular framework for technology adoption such as Technology Acceptance Model (TAM) for individual perception (Davis, 1989; Moon & Kim, 2001; Venkatesh & Bala, 2008) or Technology Organization Environment for firm based perception (Ghobakhloo, Arias-Aranda, & Benitez-Amado, 2011; Kuan & Chau, 2001; Zhu & Kraemer, 2005).

**Conclusion**

SMEs need to utilize ERP to improve the competitiveness of the company, small and medium enterprises (SMEs) should be able to compete in the globalization and preparing for the coming ASEAN economic community. The implementation of better strategy for Integrated Information Systems is necessary to improve the competitiveness of enterprises. Agile approaches in the implementation of the ERP appears to be more effective for SMEs due to more effective knowledge transfer that occurs when the ERP consultants interact directly amid process and adjust to the conditions.

**References**


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