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Successful Information Technology Adaptation Process to Enable Business Agility

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ABSTRACT

Business agility is reflected on the firms' ability to adjust effectively to the changing environment and maintain consistently good performance over long periods of time. In today's information era, Information Technology (IT) solutions become the main pre-requisite to ensure firm evolution leading to sustainable competitive advantage. However, many IT implementations fall short due to unsuccessful change management and consequently, firms fail to capitalize on the business values to be generated by the IT solutions. Following the people, process, and technology perspectives in evaluating IT implementation, managing people to adapt the new IT solution is the most difficult and tedious process. Choosing one appropriate change management approach among rational-empirical, normative-reeducation, power-coercive and environmental-adaptive approaches is not an easy task. Often a combination of two or three approaches is the most suitable one. Firm agility needs to include the ability to adopt IT solutions effectively to adjust the business in accordance to the business dynamics. This paper explores academic theories and implementation practices to analyze how agile firms adapt the Enterprise Resources Planning (ERP) solution effectively. The authors argue that ERP, because of its end-to-end business process coverage characteristic, is the core component of adaptability: its adaptation process is key to effectiveness. The inner-workings of a firm determines how implementation projects can be executed and an adaptive change management must be employed to ensure effectiveness. Ultimately, this study aims at building appropriate ERP adaptation process to improve business agility.

Type of Paper: Empirical

Keywords: Business Agility; Change Management; Organizational Adaptation; Enterprise Resources Planning; Management Information Systems.

1. Introduction

Today's world economy and competitive dynamics provide more complexities than ever before. On the one hand, the rise of technology and the emergence of markets create new opportunities for businesses to grow. As a result of increases on occurrences and rate of changes, companies face more challenges to maintain or strengthen their position. From an evolutionist perspective, firms with the ability to adapt to the changes in their respective ecosystems will successfully survive. Conversely, the inability to cope with the changes will lead to failure. Firms that survive are the ones with the agility to adapt swiftly and effectively over time (Zubaedah, 2016).

Agility has become the basic necessity for businesses to overcome challenges in the current economy. Organization agility can be defined as the company's ability to deal with sudden changes, occurred internally or externally, anticipated or unanticipated, in a continuous manner in accordance to the demands of the changing environment (Dove, 2001; Goldman et al., 1995). In fact, agility involves the ability for the company to make organization-wide adjustments to respond to changes and then exploit opportunities for growth (Goldman, et al., 1995; Von Oosterhaut, et. al., 2006). In this article, business agility is reflected in the firms' ability to adjust effectively to the changing environment and maintain consistently good performance over long periods of time. Consequently, business agility allows for performance improvement and generating new growth.

In today's information era, Information Technology (IT) solutions become the main pre-requisite to ensure firm evolution leading to sustainable competitive advantage. One perspective views IT evolution coincides with evolution of industrial practices. Another views IT as the main driver for evolution of business practices. Nevertheless, IT solutions become pertinent for firms adjusting to changes and have become an integral part of organizational adaptation. Among others, Enterprise Resource Planning (ERP) solutions are one of the most popular Management Information Systems (MIS) selected to improve performance. The end-to-end processes of ERP systems offer a one-stop-solution for firms that require better management of operations. This provides a basis for our study to focus on ERP as an IT solution directly related to operations and its implementation as critical for effectiveness.

Recently, the authors observed many instances of IT implementation failures that lead to the failure of a company to progress. In Indonesia, where most of the industries made up of family-owned businesses or State-Owned Enterprises (SOE), adoption of an ERP solution provides an answer for better governance, improved visibility and better management of operations. As strategic consultants, the authors witnessed many implementation projects experienced cost-overruns and failures. Gartner predicts that up to 80% of ERP implementation will likely face delivery problems (Gartner, 2017). In addition to high costs, Gartner reports that ERP implementation risks include integration of processes and organizations' ability to execute or even define ERP strategy. Companies tend to rely heavily on vendors' capabilities during implementation and place insufficient attention to their existing enterprise conditions. These observations lead to this study on determining effective ERP implementation as part of firm adaptation.

Previous literature on ERP has included implementation phase as one of the most discussed topics. Nazemi et al. (2012) conducted a review of over 326 ERP-related articles published in 1997-2013. In addition to inconsistency in the definition of implementation, the authors found that most discussions on ERP implementations are categorized under case studies with room for improvements in the definition and validation of critical success factors. Although some studies cover implementation phases and success factors (Umble et al., 2003), there is still a need for studying the link between implementation and organizational as well as change management issues. This article offers to address this research gap by discussing a conceptual framework that relates organizational configuration with change management during ERP implementation.

Structure of this article begins with the theoretical background that examines the relationship between agility and IT, followed by change management and IT implementation approaches.

The examination of related literature is aimed at formulating the logic for effective ERP implementation using a theoretical lens. Based on these discussions, we compare the theoretical background with our own observations of IT implementations in practice. Our goal is to extend previous studies on implementation success factors by focusing on the organizational requirements, which in turn links ERP implementation with agility. The article concludes with a proposed conceptual framework in implementing ERP effectively as part of building business agility.

2. Literature Review

Initial starting point of this study is an observation of recent implementation practices in Indonesian companies. Moreover, the observation showed that business agility has become the most critical pre-requisite for future growth. Therefore, the literature review begins with a wide scanning of scientific literature that discuss agility and its link with IT. Then, the focus is being narrowed down to ERP implementation and it was discovered that change management is the most relevant to the observed phenomenon. This study aims to map constructs developed under academic studies with practical applications to formulate a solid conceptual model that can be scientifically supported.

2.1 Agility and IT

Agility relates closely with adaptation where firms must initiate adjustments to respond to the changes in the environment. Agility means that firms can easily and immediately react to threats or opportunities that arise during adaptation by rearranging processes and reconfiguring resources (Raschke and David, 2005; Sambamurthy et al., 2003). Studies have shown that agility consists of three main dimensions, which are the capabilities to sense, respond and learn (Von Oosterhout et. al., 2006; Von Oosterhout, 2010; Seethamraju and Sundar, 2013). Sensing means capturing information necessary for selecting an effective response to attain positive outcomes (Goldman et. al., 1995). The speed for detecting changes and responding effectively is the key to agility (Seethamraju and Sundar 2013). In addition, the response must entail innovative application or creation of new capabilities, structure or processes to create value for the firm (Goldman, et. al., 1995). This requires organizations to continuously learn from past experiences, acquiring and interpreting new information for better sense-making then adjust effectively when necessary (Von Oosterhout, 2010). Hence, business agility represents a combination of various characteristics, namely speed, flexibility and accuracy, and entails multiple firm abilities to adjust necessary for adapting effectively.

Previous studies on the relationship between agility and IT indicated mixed results, where some concluded IT enhances agility while others found IT impedes agility (Lu and Ramamurthy, 2011). IT systems allow for faster capturing of information, data mining and analysis to rapidly detect then interpret occurring changes to formulate reaction (Overby et al., 2003). An ERP, for example, provides an integrated way to manage all transactions, roles in the organization structure, process automation, workflow and reporting in a standardized manner to speed up decision making (Davenport et. al., 2004), including sensing and responding to changes. Other studies found the opposite where IT is found disabling agility due to poor systems architects that consumes resources but provide slow response (Von Osterhout, et. al., 2006). In addition, wrong IT infrastructure investments may cause detrimental consequences that limit flexibility and the ability for firms to make responses (Overby et al., 2003). Lu and Ramamurthy (2011)

found that the dichotomy in the agility-IT relationship is due to nature of agility and nature of human-IT interactions. Nature of agility requires a balance between flexibility and stability, where responding to changes require speed but accuracy at the same time. While human-IT interactions constantly evolve, the changes in technology or its use may result in rigidity and constrain firm movements (Orlikowski, 1992, 1996).

Despite the contradicting study outcomes, Lu and Ramamurthy (2011) conducted a study to provide improved conceptualizing of the relationship between IT capabilities and agility. The authors defined IT capabilities to include the sub set of IT infrastructure capability, IT business spanning capability and IT proactive stance. Moreover, agility was distinguished between market capitalizing agility, which focuses on exploration of new opportunities, and operational adjustment agility, which focuses on rapid strategy implementation. Empirically, the study resulted in a definitive answer and found that IT enables both types of agility. In fact, data suggests IT capabilities are proven to be essential for building agile firms. Moreover, the study found a resolution to the IT enabling or impeding agility conundrum: "while more IT spending does not lead to greater agility, spending it in such a way to enhance and foster IT capabilities does." In other words, investing in the right IT solutions coupled by appropriate implementation in accordance to firm requirements would enable development of an agile firm.

2.2. IT Implementation and Change Management

Implementation of such IT solutions as an ERP system entails a process for managing the transformation from one organizational setting to another. A generic ERP implementation consists of assessment of business requirements, design of system and roll out implementation. IT implementation is not as clear cut where many risks are involved in every stage. Ensuring success requires change management to properly coordinate with all related parties, plan then execute transition. Marchewka (2015) defined a four-step change management plan. First step is to assess willingness, readiness and ability to change where implementers evaluate current conditions of the organization to determine sponsors, change agents, objectives. Second is development of a change strategy in accordance to existing conditions. Third step is implementation of plans and monitoring throughout the process. Fourth step is to reflect and evaluate the lessons learned from the implemented change.

Change strategy can be distinguished into four approaches based on a study by Davidson (2002), namely the relational-empirical approach, normative-reeducation approach, power-coercive approach, and environmental-adaptive approach. Relational-empirical approach assumes that people will behave in certain patterns and are motivated by self-interest. This approach requires the use of change agents to convince and explain the changes to be implemented. The normative-reeducation approach stem from the basic belief that humans are social beings and transformation need to start from the social norms, values and culture of the group. As reflected in the name, the power-coercive approach resorts on authority and enforcing compliance to the changes. Lastly, the environmental-adaptive approach assumes people can adapt and changes are executed by completely abolishing the older systems. Nonetheless, each of these four approaches have its advantages and disadvantages.

Lee and Lee (2004) conducted an empirical study to develop a conceptual framework on ERP implementation effectiveness. This study found that change management effectiveness plays a

pivotal role on ERP effectiveness. Specifically, the study identified organizational citizenship behavior, user IT capability, and IT assets are key variables with significant effects on effectiveness of change management. Among others, Lee and Lee (2004) provided empirical evidence on why some ERP implementations are successful while others fail. Benefits from ERP implementation can only be realized with the execution of appropriate change management program emphasized on managing users.

Many IT implementations fall short due to unsuccessful change management and consequently firms fail to capitalize on the business values to be generated by the IT solutions. Following the people, process, and technology perspectives in evaluating IT implementation, managing people to adapt to the new IT solution is the hardest and most tedious process. Choosing one appropriate change management approach among rational-empirical, normative-reeducation, power-coercive, and environmental-adaptive approaches is not an easy task. Often a combination of two or three approaches is the most suitable one.

In terms of implementation, there is still limited number of studies on the relationship firm and ERP. A study by Shiri et al. (2014) is one that focuses on organizational readiness in ERP implementation. They defined organizational agility criteria based on McKinsey's 7S model to determine a measurement for assessing how ready the organization is to implement ERP. However, our observations indicate the need to go beyond readiness and draw some attention to the actual firm construction. We argue that some pre-requisites need to be built-in within the firm configuration to ensure effective ERP implementation. This provides a basis of our arguments of a firm construction requirements pertinent for ERP implementation.

3. Discussions

In this section, the presented theoretical background with practical applications based on the authors' combined experiences as system implementers will be compared. Comparing theory to practice is intended to provide deeper insights and develop a new theoretical framework on agility and IT solutions as presented in Figure 1.

3.1 IT Capabilities and Value Proposition

According to Peppard and Ward (2016), organization's IT Capability is organization ability to continually optimize the value derived from IT, in terms of both strategic and operational contributions. The term capability in this context refers to the strategic application of competences, i.e., their use and deployment to accomplish given organizational goals. All organizations have IT capability, but when it is weak, it severely affects the organization's ability to achieve IT-related strategic changes. When it is well-developed, the organization can both leverage IT-enabled business advantages and respond rapidly to changes in the business environment.

In this paper, IT Capability is defined as the ability of organization's IT assets, including resources and competences, to produce strategic and operational values to enable organization to achieve its goals. The values derived from IT assets can be called IT values or IT business values to be specifically linked to organization's business goals.

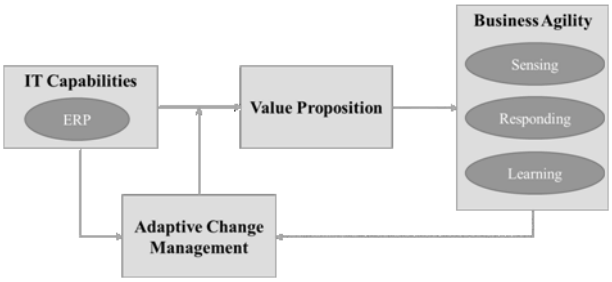

Figure 1. Theoretical Framework.

The value in IT business value is the quantifiable result of using data/information produced by IT assets to enable an organization to achieve its business strategic and operational goals, for example increased revenue and reduced operational cost, respectively. Such values can only be achieved by successful implementation of proper planned IT solutions including ERP. Failure in implementing IT solution either caused by unfit change management approach, incomplete business process, incompatible technology solution, or a combination of these, will degrade or eliminate the expected values. In fact, implementation failures may even place organizations at financial risks. In this paper, we focus on analyzing the right change management approach to increase the chance of successful ERP implementation, with the assumption that the process and technology parts are properly defined.

Thus, value proposition is a list of above-mentioned values available to be used by organizations strategically and operationally, including increasing organization's business agility level. In the process of identifying the values generated from an IT solution, for years there has been a challenge or problem in naming the values (e.g., increased productivity, increased security, reduced travelling cost, etc.). Every person will have different naming for such values although perhaps with similar meaning. If the value identification is processed by multiple individuals, then naming could linger excessively since consensus must be achieved to align perceptions on each identified value. This seemingly simple problem becomes complicated because incomplete analysis of the values produced from an IT solution will likely degrade the overall value of firm's IT capability.

To overcome this value naming problem, Ranti (2008) developed the so-called Generic IS/IT Business Values table which consists of 13 categories and 73 sub-categories of generic values. The value is called generic because it is applicable to any organization types (e.g., banking, manufacturing, government, etc.) and any IT solution types (e.g., ERP, CRM, MIS, etc.). A sample application of the use of this generic table can be found in Ranti and Tambotoh (2010). In this paper, the Generic IS/IT Business Values table is used for building the value propositions. Referring to the Generic IS/IT Business Values table, a successful ERP implementation will generate values that can be categorized, but not limited to, Increasing Productivity, Accelerating Process, Increasing Accuracy, and Increasing Internal Services. These value categories would enable organizations to increase levels of business agility.

3.2 Value Proposition and Business Agility

Agility is beyond flexibility and entails both speed and stability for gaining better performance and/or exploration of new business. Building agility necessitates development of capabilities to sense changes, formulate responses and then execute them. Sensing changes requires the internal mechanisms to identify signals and read the signs that may threaten existing conditions or offer opportunities to grow. More importantly, the internal mechanisms need to also include the ability to interprets the signs, formulate the appropriate adjustments and implement them. In other words, to sense and respond effectively, firms need to learn continuously and attain the knowledge to do so.

Knowledge is not equivalent to acquiring information, but rather applying the information into certain context. From information acquisition, knowledge creation requires a dynamic social interaction aimed at justifying towards the "truth" (Nonaka and Takeuchi, 1995). In firms, knowledge creation needs to be incorporated in how the organization is organized and processes are managed. Firm knowledge requires the knowledge creation process to be included within the functions and processes of the firm. ERP implementation allows for enhancing knowledge creation by providing fast access to complete data and ease of information processing. Effectiveness of implementation is reflected in the improved functions of analysis and processes to create firm knowledge. This provides building blocks for increasing sensing, responding and learning abilities.

Moreover, business agility is reflected on the firm's ability to maintain good performance over long periods of time. Organizational knowledge needs to be created continuously and consistently across adaptations. Capabilities to create knowledge must be incorporated within the organization systems to sense and respond persistently in accordance to the changes demands. Knowledge creating capability becomes a pre-requisite for building firm agility, which can be enhanced with implementation of an ERP. An ERP solution not only provides integration of information but also offers best practices, procedures, interfaces and controls that can accelerate effective decision making (Seethamraju and Sundar, 2013). In turn, effective implementation of ERP facilitates access to information to improve visibility and control across the organization (Davenport, 2000). Ease of access and visibility would enhance knowledge creation and becomes an integral part of building business agility.

3.3 Adaptive Context and Change Management

The authors' experiences showed IT implementation projects tend to fail due to lack of attention in selecting the appropriate change management approach. Specifically, the assessments of enterprise readiness often insufficiently addressed to result in cost overrun, ineffectiveness and, even, failure of implementations. For example, we came into an ERP implementation project in a coal mining company after it has incurred a delay of over 8 months compared to original plans. The Company has spent almost USD 2 Million total investment to implement the software in a business unit that is already producing coal. When we assessed the situation, our team found that the organization structure was not yet established where one person plays multiple roles due to its start-up context. Furthermore, standard operating procedures were still under development because of its premature structure. The situation indicates that enterprise readiness was not included as a pre- requisite for the ERP implementation.

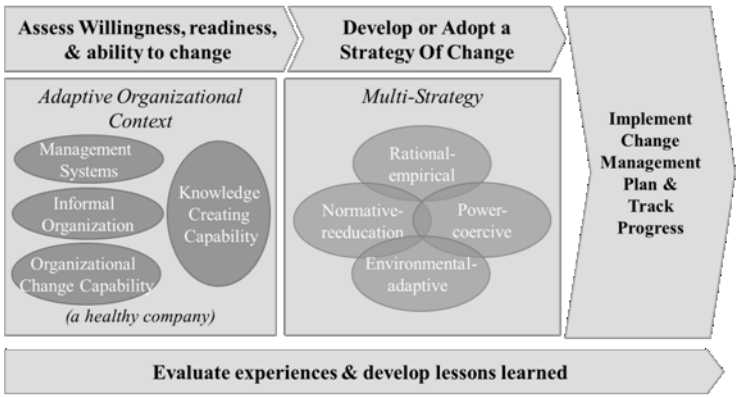

Figure 2. Adaptive Change Management.

Although re-designing and optimizing processes are part of the work for software vendors and consultants in the implementation work, many companies failed to execute changes due to organizational, cultural or technical circumstances (Davenport et. al., 2004). The authors' previous projects also showed that in many cases, there are gaps between shareholder's expectations and firm's readiness for a transformation. The initiative for a new technology implementation came from shareholders who expect operational efficiencies and better control. However, knowledge on the new technology may not be uniformly distributed across all levels of the organization, which creates operational disruptions and discomfort for the employees. In many instances, we observed negative attitudes and reluctance to change the existing ways of doing things. Management and implementers appeared to not place enough attention on such occurrences during the implementation process to foresee the undesirable outcome. Only after the completion of the implementation that management realizes their inability to create value from a new ERP solution, which leads to impeding the development of agility. The inner-workings of a firm determines how implementation projects can be executed and we posit that an adaptive change management must be employed to ensure effectiveness (see Figure 2).

The complete understanding of company current conditions is pertinent to designing change management plans in ERP implementation. In line with the strategy process perspective in strategic management, the inner workings of a firm can be observed from its strategy formulation and implementation patterns. Specifically, the existing circumstances should be analyzed to understand the premises of execution that the company undertakes. Chakravarthy et al. (2003) prescribed a strategy process study framework that looks at the relationship between organizational context (strategy formulation) as the basis decision and action reflected in the strategy core elements (implementation). Existing company conditions are represented in the organizational context that includes management systems (structure, planning, control, human resource management and incentive systems) and informal organization (values, norms, culture and leadership styles) (Chakravarthy et al., 2003). As part of change management, assessment of current organizational context is critical for determining the course of the entire implementation planning and execution.

A pre-requisite for ERP implementation is an adaptive organizational context. An organizational context that promotes positivity and value creation provide a premise for effective decisions and actions that will lead to effective adaptation. Well-defined and operated management systems provide a good base for establishing systematic operations as well as resource management that will lead to good performance. Informal organization variables that focuses on creating a

positive work environment will motivate the organization to attain value and maintain good performance, including undertaking operational adjustments. More importantly, an adaptive context needs to embed the ability to execute changes that Andreeva and Pavo (2016) denoted as organizational change capability. For companies to be ready for ERP implementations, the organization needs the capability to dynamically build more abilities in incorporating new technology for managing its resources.

Furthermore, an adaptive organizational context includes the knowledge creating capability. To be adaptable to changes in the environment, firms need to continuously create knowledge (Nonaka et al., 2006). Knowledge becomes the basis that directs firms to select strategic choices, including to adopt new IT in the business processes. Consequently, organizational knowledge creation should be an integral part of the firm's activities, strategy, structure and culture (Nonaka et al., 2000). Such capability will satisfy the sensing, responding and learning abilities pertinent for building agility.

At this point, the authors proposed to use the term "healthy company" to denote an organization equipped with ability to transition to new ways of managing activities. Specifically, a healthy company is one with well-performing functions configured to be value creating systems. The assessment portion of change management in ERP implementation needs to include a "health check" to determine organization readiness. Only after the health conditions of the firm have been fully understood is when the change management program can proceed with change strategy development. Our observations concluded that more than one approach may be necessary to roll out an ERP implementation. In fact, we often need to combine the four distinct approaches prescribed by Davidson (2002). For example, we started with power-coercive and normative-reeducation at the beginning to build the right context for implementation. Then, finished the implementation with relational-empirical and environmental-adaptive approaches to establish new working habits, abolish old mechanisms and ensure new processes are in place.

Change strategy development and implementation are conducted somewhat concurrently, while evaluations also closely managed throughout the process. In addition to the adaptive character of the organization context, the stages of the proposed change management method also evolve as the ERP implementation process progresses. The existing organizational context determines the change strategy design, which will then determine the implementation activities. Correspondingly, implementation activities provide feedback on the applied strategy and determine whether adjustments in the change strategy needs to be done. Therefore, evaluation and learning are continuously conducted throughout the implementation process. Hence, the term adaptive change management becomes appropriate.

4. Conclusions

Firm agility needs to include the ability to adopt IT solutions effectively to adjust the business in accordance to the business dynamics. This paper explores academic theories and implementation practices to analyze how agile firms adapt IT solutions, the ERP solution, effectively. We argue that ERP, because of its end-to-end business process coverage characteristic, is the core component of adaptability: its adaptation process is key to effectiveness. However, we observed many instances of ERP implementation failures attributed to inappropriate, or under-developed, change management programs. Conventional frameworks of change management appear to be inapt for adopting new IT in Indonesian companies.

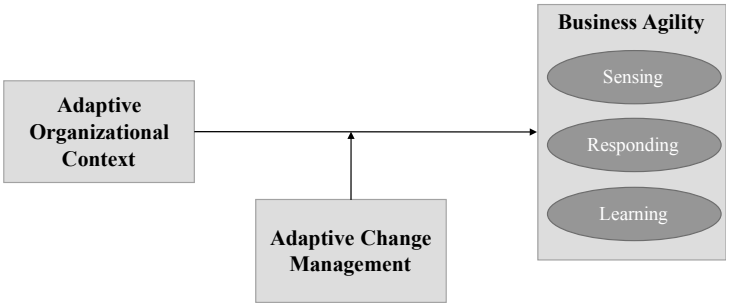

Figure 3. Proposed Conceptual Model for ERP Implementation

Particularly, it was discovered that unique internal configurations of Indonesian companies provide for added complexities in adapting new technology. Organizational adaptation calls for IT solutions while effective implementation is the critical point to ensure firms can capture and enhance value. We posit the need for an adaptive change management as a solution for ensuring effective implementation. As presented in Figure 2, an adaptive change management emphasized on the assessment portion to include a company health check as the determining factor for the entire change management design. Moreover, we propose the need for combined change management strategies in accordance with company's existing conditions.

This study presents the arguments of a proposed conceptual model for ERP implementation (see Figure 3). Specifically, we argue that certain organizational context needs to be in place before ERP implementation process is undertaken to ensure success. As depicted in Figure 1, we posit that business agility will impact change management during implementation as illustrated with the feedback loop. Since organizational context determines the success of ERP implementation, business agility then determines how change management will be carried out. If the firm is already adaptive, we argue that agility will be attained. Change management will mediate the process of the firm to adapt with ERP and sustain agility. However, if the firm has yet to achieve adaptive requirements, the change management can be adapted to help the firm reach the appropriate context necessary for effective implementation and, in turn, achieve agility. In other words, the adaptive change management not only offers a new approach to implementation, but also provides a tool for ensuring organizational context becomes adaptive.

Ultimately, this study aims at building appropriate ERP adoption process to improve business agility. Stemming from the sensing-responding-learning abilities integral in building business agility, IT value proposition can be realized with adoption of ERP systems. IT capabilities coupled with adaptive change management allows for increased value proposition that cultivates business agility. Furthermore, we expect a feedback loop from business agility to adaptive change management. Cultivation of business agility will in turn affect adaptiveness of change management to further enhance IT capabilities and value. Future research will need to enhance existing literature review and gain empirical evidence to support our proposed concept. The authors believe that business agility is the future for sustainability and achieving it demands effective IT.

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