



# ERP Critical Success Factors-Roles and Impact on Promoting Cross Functional Integration

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**Abstract:** There are only a few researches that focus on Enterprise Resource Planning (ERP) and its effects on cross-functional integration and none of them have stated clearly and comprehensively what is needed to be done to let ERP reach its full potential on enhancing cross-functional integration level. This research aims to identify answers on why some ERP user organizations are successful in promoting cross-functional integration, while the others are not? Is Critical Success Factors (CSF) the root cause of different levels of firm cross-functional integration after ERP implementation? If yes, how they are put into practice so that they will enhance cross-functional integration. Multiple-case studies with in-depth interview techniques are used with 55 respondents, either ERP consultants or representatives from ERP user organizations. As a result of this study, the definition of ERP success in cross-functional integration is proposed. Moreover, this qualitative research shows that it is the individuals who are "change agents" that drive the ERP project to its full potential of unifying cross-functional departments. In addition, the pattern of characteristics of change agents and the empowering factors that can strengthen their capability are discovered. Furthermore, the study allows us to gain more insight into how organization have practically done to sustain or even improve cross-functional integration through ERP systems over time. The findings of this research should trigger the new dimension of further development of theory about the relationship between ERP system and organization behaviour and the further research on sustainability factors that could improve organization performance through ERP usage.

**Keywords:** *ERP, ERP critical success factor, organization behavior, change agent, sustainability, continuous improvement.*

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## INTRODUCTION

Information technology have become a common facilitator for enhancing cross-functional integration. ERP systems are one of the means that has been applauded by a lot of practitioner and academic literatures on its promising benefit of unifying cross-functional departments (Davenport, 1998; Hendricks, Singhal, & Stratman, 2007; Maderazo, 2016; Turkulainen & Ketokivi, 2012). CSFs' of ERP implementation have been studied vastly in the past years (Akkermans & van Helden, 2002), but none of the prior researches has studied on how CSFs are applied to enhance firm cross-functional integration.

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## LITERATURE REVIEW

### *Cross-Functional Integration*

Internal integration or so-called cross-functional integration is proven to be not only a significant factor of business and operational success, but also as a foundation for extended integration to suppliers and customers (Barratt, 2004; Fawcett & Magnan, 2002; Flynn, Huo, & Zhao, 2010; Krisnawati, Perangin-Angin, Zainal, & Suardi, 2016). Before striving for external collaboration, Firms should understand that the real obstruction to an outrival supply chain happens internally as 'functional silos' (De & George, 1999; Maderazo, 2016; Sundar & Al Harthi, 2015). Also, studies show that higher level of cooperation between internal supply chain related functions (e.g., purchasing, manufacturing, and logistics) is correspondingly to better customer services, higher customer and employee satisfaction, competitive advantages, inventory turn-over, lower forecast inaccuracy, and operating costs reduction (Barratt, 2004; Ensign, 1998; Kahn & Mentzer, 1996; Reza, Rusidah, & Forasidah, 2017).

### *ERP*

Firms are striving to enable integration in many ways. ERP is one of the means that has been applauded by a lot of practitioners and academic literatures on its promising benefit of unifying functional integration (Davenport, 1998; Gupta, 2000; Hendricks et al., 2007; Turkulainen & Ketokivi, 2012). ERP is one of the effective "coordination mechanism" (Gattiker, 2007). The systems are comprised of modular functions that represent real business operations (Hsu & Chen, 2004) where its single database ensures seamless integration of information flows between and across functional units (Barratt, 2004). ERP improves visibility because it links together all operations in one common platform. For example, production planners can have the visibility to the orders status, which allow them to plan an appropriate schedule or reschedule production plan in response to customer demand (Madiawati & Pradana, 2016; Spathis & Constantinides, 2003). In other words, ERP systems were emerged to serve the idea of connecting functional entities within an organization together through their robust integrated capability and functionality. Therefore, it is not surprising that ERP implementation becomes a common approach to progress integration within a particular firm (Beheshti).

**ERP success:** The evaluation of ERP implementation success depends on the perspective of stakeholders (Dezdar & Ainin, 2011). Similar to any other project implementation, project management aspect which comprises of time, cost and performance must be according to what project managers and ERP implementation consultants have defined at the initial project phase. Avoid turbulence after go-live and ensure smooth business operations is what ERP users perceive it as ERP success. For top management, achieving long-term business results, such as return on investment and achieve predefined business goals, are their expectation of the implementation outcome (Dezdar & Ainin, 2011; Markus & Tanis, 2000).

**ERP and CFI researches:** In general, ERP studies have mostly focused on 2 major areas which are (1) system implementation and (2) organizational performance after implementation, while the researches of the former are more outnumbered (Gattiker, 2007). Despite of their popularity and tremendous impact on firm operation and processes, the researches about the effectiveness of ERP systems on the intangible aspect such as on human behavior, especially on CFI, are far less in numbers (Elbanna, 2007; De Vries & Boonstra, 2012). Some literatures are doubtful in terms of whether the existence of ERP system will spontaneously create cross-functional integration. Referring to Pagell, a series of qualitative case studies has been done in order to identify positive and negative factors in internal supply chain integration. ERP is mentioned to be one of the factors that enables effective communication only if data in ERP systems is maintained correctly (Pagell, 2004). In other words, just the existent of them could not enable integration as evidence by inconsistent result in different social contexts. Companies with low level of integration cannot design or gain benefits from the system in terms of enhancing integration (Pagell, 2004).

### *CSF of ERP*

To ensure completeness of CSFs list, we select the latest taxonomy of CSFs done by Dezdar and Sulaiman as our foundation of further literature review. Referring their research, there are 17 CSFs were recognized, we select 11 factors which were realized as CSF by more than one-third of previous literatures published between 1999 to 2008 (Dezdar & Sulaiman, 2009).

**Top management support and commitment:** Top management support and commitment have been recognized as the most frequently mentioned ERP CSFs (Dezdar & Sulaiman, 2009). Prior ERP implementation, the communication from

top management on the vision of the future integrated firm preceding to ERP implementation (i.e., centralized database which accessible to all functions) promotes a stronger cross-functional perspective of the organization (Gosain, Lee, & Kim, 2005; Rowe, El Amrani, Bidan, Marciniak, & Geffroy, 2005). In ERP success cases, Top management contribute to the project by getting control and directly involving with the project since planning phase until implementation complete. Their mindsets were set that project not just as technology challenges, but also as a business challenges (Davenport, 1998; Dezdar, 2012).

**Project management:** Strong project management leads to higher chance of project success (Carton, Adam, & Sammon, 2008; Zhong Liu & Seddon, 2009). From a case study conducted by Fergal, it is recommended to follow project management body of knowledge which was proven to encourage a successful case study of ERP implementation (Carton et al., 2008).

Based on Dezdar's research in developing countries, project management contributes to ERP success. Firms should define project plan in detail with clear objectives, deliverables, achievable milestones and measurable outcomes where formal project progress tracking is necessary.

**Business process management and Business Process Reengineering (BPR):** BPR is a drastic transformation approach to as-is processes of the organization in order to achieve a far-reaching improvement on cost, quality, service and speed. Such alteration could not be actualized without the use of information technology (Hammer, 1990; Hammer & Champy, 2009; Subramoniam, Tounsi, & Krishnankutty, 2009). The most commonly use information technology for enabling BPR is ERP (Subramoniam et al., 2009). Both BPR and ERP emerged with the same goal of transforming organization from functional silo to a process-based organization (Davenport, 1998; Pandla, 2016; Subramoniam et al., 2009). Implementing BPR on the initial stage of ERP project brings about a successful project implementation (Annamalai & Ramayah, 2013). While some researches state that ERP and BPR have a recursive relationship which the implementation of each would be beneficial to the others (Subramoniam et al., 2009). Even after ERP implementation, business objectives could be realized with the continuous effort of improving business processes (Davenport, Harris, & Cantrell, 2004).

**ERP team composition, competence and compensation:** Selecting competence project team across organization is proved to be one of the most important factor contribute to ERP success (Garg & Agarwal, 2014) which results in higher user satisfaction after implementation (Wu & Wang, 2006). A full-time effort of a project team consisting of both business and technical personnel is crucial. Moreover, the project team should consist of the best people with business knowledge across organization who are authorized to make decisions relating to all aspects of the project, including technical and business issues (Dezdar, 2012; Wu & Wang, 2006). Key-users are connections between their business function and the ERP consultants. Their roles involve in reflecting business requirement, data preparation during implementation and providing training to end users. Delegation the right key users will impact the daily operation after the system went live. Key users must not only understand the processes of their own functions, but also the cross-functional processes, including all exception cases. Lastly, firms could support all ERP users to share their practice through internal knowledge management platform so as to ensure that the best practices are used to get the best result out of firm operations (Al-Mudimigh, 2007; Maas, van Fenema, & Soeters, 2016). In some researches call group of key users and IT personnel as 'cross-functional team'. Regardless of the names, their importance is undeniable and their involvement in any information technology projects has a direct impact to project success (Annamalai & Ramayah, 2013; Gosain et al., 2005; Schelin, 2004). Moreover, as most of the time users are required to collaboratively work with ERP consultants, the relationship between the two groups become important to project results (Madininos, Chatzoudes, & Tsairidis, 2011).

**Change management:** Aladwani proposes an approach for change management of ERP implementation using marketing strategies of introducing new products. The author states that change management in ERP implementation context is to prepare organization readiness for the new system by reducing user resistance (Aladwani, 2001). There are two sources of user resistance in ERP projects, (1) perceived risk linked with the decision to adopt the system and (2) habit. Like other type of projects, change management for ERP project required top management to identify resistance and develop strategy to handle resistance (Aladwani, 2001; Al-Mudimigh, 2007). As part of change management, sufficient user training and education positively leads to user satisfaction which consequently results in ERP implementation accomplishment. Training should be provided to all users from top management to operational staffs in order to unleash full potential of the system (Dezdar, 2012; Dezdar & Ainin, 2011).

**Business plan and vision:** The wider terms of business plan and vision are related to goals and objectives of the ERP projects (Dezdar & Sulaiman, 2009). Goals are prerequisite of project success and evaluation for project success. In order to direct team members to increase cross-functional awareness, the goals of an ERP project must steer the organization towards a more integrated information and organization processes. In other words, a clear project goal of actualizing a more integrated organizational processes and information could eliminate silo thinking (Wood & Caldas, 2001). Judging whether the organization is success with ERP implementation or not is often related to the firm's goals for the system (Ifinedo, 2008). Clear goals definition and list of deliverables must be explicit. Goals are basically about why the systems are being implemented and what business requirement the system will satisfy (Bhatti, 2005).

**Interdepartmental communication and cooperation:** Interdepartmental communication and cooperation are very important in bringing about ERP success as the systems will define how the whole organization will operate after they went live. As ERP implementation has a huge impact on firms' operation, interdepartmental communication and cooperation are crucial (Akkermans & van Helden, 2002). It is evident in Akkermans and Helden's case study that insufficient communication and collaboration causes inadequate presence and/or attitude of key stakeholders during the project implementation. The key stakeholders are (a) top management, (b) project team, (c) project management, (d) project champion, (e) package vendor (Akkermans & van Helden, 2002). Dezdar argues that the reason of adopting ERP system should be communicated to operational staffs with the objectives of boosting motivation, reducing resistance and anxiety. The communication should even go beyond firm boundaries where suppliers and customers are acknowledged on what is happening inside the firms. The content of the communication generally covers information such as project timeline, expected benefits, change in business processes, system demonstration, change management plan, and project contact points (Dezdar & Ainin, 2011).

**Organizational culture:** Lack of cultural readiness for ERP implementation leads to ERP implementation failure (Gargeya & Brady, 2005). Cultivating corporate culture to emphasize the crucial of realizing project success before own functional interest is one of the practices which firm should proceed in order to enhance coordination level in ERP project (Gosain et al., 2005). Based on Annamalai and Ramayah study on the relationship between ERP CSF and its successful implementation, organizational culture has an influence on moderating the relationship between ERP CSF and its successful implementation. In the research, five CSF are (1) ERP business goals and objectives, (2) cross-functional team, (3) business process reengineering, (4) project monitoring and control, (4) data analysis and conversion, while they refer organizational culture as values, traditions, policies, business principles, employees' beliefs and beliefs about enterprise systems (Annamalai & Ramayah, 2013).

**Vendor/consultant support:** Consultants play a vital role in ERP implementation and considered as an important factor that brings about implementation effectiveness and success (Al-Mudimigh, 2007; Akkermans & van Helden, 2002). In an empirical study by Maditinos, Chatzoudes and Tsairidis argues that the support from ERP consultants is more imperative than top management support (Ifinedo, 2008; Maditinos et al., 2011). Quality consultants can suggest on how the system could help firms achieve organization goals which is essential in planning phase (Ifinedo, 2008). As one of the implementation agents, if the knowledge of the consultant is limited, their capabilities in actualizing business requirement becomes more difficult (Wood & Caldas, 2001; Kakouris & Polychronopoulos, 2005).

**System development and stabilization, testing and data quality:** In realization phase business blueprint is interpreted, configured, and developed into ERP application. Business cases are tested to proof whether they are match with project design in integration test. At this phase both key users and consultants need to validate interoperation between business functions by using sample data. The challenge of this phase is to disclose any overlooked points before go-live (Kakouris & Polychronopoulos, 2005). Educate employee through the simulation of potential processes in order to let them understand the impact of change will lead to implementation success (Davenport et al., 2004). Sufficient testing is the key factor which determine success or failure for some companies (Gargeya & Brady, 2005).

## RESEARCH DESIGN AND METHODOLOGY

### *Research Question*

This paper has reached the final list of research questions as follow:

1. Why some ERP user organizations are successful in promoting CFI, while the others are not?
2. Are CSFs the root cause of different levels of firm CFI after ERP implementation?
3. If yes, how specifically ERP CSFs are put into practice so that they will promote CFI.



## **Research Methods**

The research questions are related to the decision or set of decisions which were made on different phases in ERP project, as a result, to understand why those decisions were taken and how they were implemented, the most suitable research strategy is case study methodology (Yin, 2003). In addition, ERP, CSF are the actions which are contemporary events and such events may vary from firm to firm which makes the causal links between the interested situation and its context is too complex to find the answer by using quantitative strategy, therefore case study strategy is the right approach for this research. Moreover, as the events are uncontrollable, conducting an experiment is impossible (Yin, 2003). Last but not least, ERP systems are identified as enterprise-wide systems that not only involved heavily on technological aspect, but also related to changes in social aspect of the firms (Elbanna, 2007; De Vries & Boonstra, 2012), as a result, the only possible source of information is through interview with the persons who were part of such event (Yin, 2003). Therefore, the study is proceeded to collect data from the unit of analysis as described in the following section. Next, to answer the research questions, each individual of the two groups of participants are invited for the interviews. The first group are ERP implementors. The second group are two experts who represent ERP users' perspective. The reason of having two groups of participants is to guarantee research reliability and able to apply triangulation (Yin, 2003). Furthermore, to ensure reliability, multiple cases of ERP project implementation are compared and contrasted.

## **RESEARCH RESULTS**

### ***Definition of ERP Success in terms of Cross-functional Integration***

To the best of our knowledge, existing literatures have never defined the meaning of ERP success in terms of cross-functional integration clearly. Therefore, the study is required to begin the search for the definition of ERP success in terms of cross-functional integration based on ERP experts point-of-view. ERP experts have given the following definition;

- The visibility of same dataset by all stakeholders throughout the supply chain which encourages fact-based decision making and avoid bias.
- Smooth operations after go-live are mandatory. The whole end-to-end process could be posted to the system smoothly without errors.
- In full integration environment, each department is able to transfer and interpret information with each other with minimum effort (Turkulainen & Ketokivi, 2012).
- Flexibility on activating new functions after all stakeholders have realized their necessity.

### ***Change Agents are the Key to Promote Cross-Functional Integration***

Referring to the research questions, CSFs have been applied into many projects implementation which could lead to project success, however it does not guarantee the enhancement of cross-functional integration or process improvement. The patterns from the data analysis shows that successful cases of ERP implementation that can enhance firm's intra-departmental integration link to an individual or group of individuals. Many participants mention about their counterparts in the implementation that they were impressed about. Individuals who dedicate to the project implementation are mentioned and praised to be the factor that enhance cross-functional integration and the main driver who lead the project to success. To apply common term for referring to those individuals, we consider ERP implementation as change in the organization and those individuals who are mentioned frequently are the ones who facilitate and coordinate the change which we could described them as "change agents" (Lunenborg, 2010). Therefore, from the evidence of the qualitative research, this paper is proposed that to actualize the best out of ERP system, organizations require the help from "change agents."

Previous researches superficially describe role of individuals in ERP projects in terms of project assignment. For example, previous researches suggest organizations to select right persons who have computer skills and being expert on own business area and across-function to become key users (Maditinos et al., 2011) or focus on the role of top management in proceeding change management for ERP, (Aladwani, 2001; Al-Mudimigh, 2007). Referring to below quotation, it supports that idea that change agents are not restricted by any particular positions. Instead, change agents could be at any level from top management, business process leader, project leader, business consultant and to key users.

In other words, we propose that CSF mentioned in previous research may lead companies to only project management success (i.e., on-time, within budget and smooth operations), but does not encourage higher level of cross-functional integration into firm processes nor into people mindset. It is actually the individuals who are "change agents" that drive the ERP project to its full functionality of unifying cross-functional departments. In addition, apparently, none of the prior research has stated criteria of selecting the right people based on individual characteristics such as attitudes and organization behaviors. The study learns the similarities of those personal characteristics. According to the data analysis, the characteristic of change agents can be grouped into two categories. The first set of characteristics are their intrinsic attitudes. The second set of characteristics are their skills which are visible by others in the organization. In addition to characteristic of change agents, organizations can strengthen change agent capability or accelerate the outcome of unified organization by utilizing the two empowering factors. The empowering factors are top management and external consultant. In addition, the study leads to the discovery of sustainability factors that help firm sustain or even improve their high level of cross-functional integration through ERP usage. The research findings could be depicted as in Figure 1.

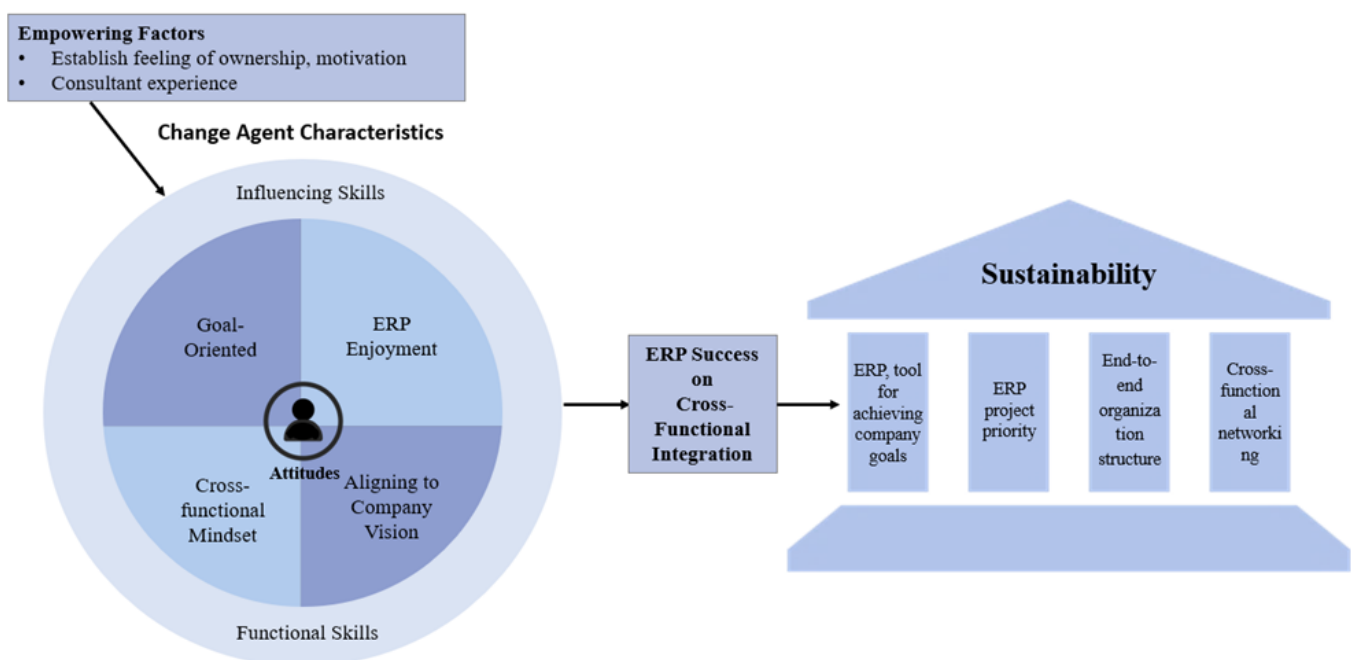


Figure 1 *Finding Results of the Qualitative Analysis*

### **Change Agents Characteristics**

#### **Change Agent Attitudes**

**Cross-functional mindset:** For successful cases, change agents are eager to learn and understand ERP system. They would like to understand the effect of the system on their functions and its interrelationship with connecting departments. Most of the interviewees who were referred as the key factors in the implementation demonstrated that they commonly have cross-functional mindset. In other words, they seem to think beyond their own functions. They vision the effects of ERP from end-to-end. Therefore, they are willing to work collaboratively with other functions and ERP consultants in order to gain understanding on the system and how they can apply the knowledge to their jobs after go-live. Change agents are referred by either external consultants or their colleagues as the key contributors of ERP implementation. Each of them mentions general factors that match with previous researches, but from pattern matching we find that they themselves have some common attitudes and behavior. Change agent is willing to go beyond their scope in order to truly understand end to end process and also to find root cause of problems.

Moreover, change agents show that they work collaboratively with various functions in order to gain as-is processes and are able to connect pieces of information together. In other words, they are capable of depicting the whole processes. While previous research suggests that the most important factor to drive ERP success is top management

support, from our interview, it is possible that the project team itself could drive the success, especially when they have cross-functional mindset. Nevertheless, in case of lacking of leadership can cause some delay in progressing the level of cross-functional integration which is described in Empowering Factor section.

On the contrary, in unsuccessful cases, most of the external consultants normally mentioned about users who have closed-mindset and resist to changes. They see that ERP would only increase the steps of their jobs, but do not see the benefits that the organization could gain as a whole. They perceive ERP would just increase their workload or as a burden because they need to learn new things or do extra jobs in addition to their routine works.

**Aligning to company vision:** About half of our research participants are ERP consultants. Most of them have stated clearly that direction from management is a crucial factor. In order to see business transformation in eliminating departmental silo, the target should be stated clearly in the project objectives. However, this factor of having a clear direction of management seems to be predictable and obvious. To any management, having a more integrated process though ERP was used as the main benefits which is frequently mentioned during project presales. But the importance is whether the company could find their change agents and be able to convey those messages to change agents or not. In successful case, change agents are the main project drivers, regardless of their positions.

**Goal-oriented:** In addition to the behavior of aligning to company vision, change agents showing strong sense of duty to achieve such vision. Change agents will not just wait for issues to be closed but they rather set deadline for open topics and try to close the issues by themselves. Even when the topics are beyond their responsibilities on the project, they try to bring stakeholders together or seek for solutions and/or conclusion. One of interviewees who are ERP consultant mentioned that most of the projects have some weaknesses and reach about the same level of cross-functional integration after ERP implementation. However, there was one factor that make one project different from the others.

**ERP enjoyment:** It is evidenced that some of the change agents have preference in information technology landscape. They find enjoyment in working with ERP system and would like to explore deeply on how the system works and explore system structure. Mostly it is because of their own curiosity which make them would like to understand more about the system which is not just restricted by their assignment to the project.

The enjoyment on using ERP system usually comes as a complement to their functional knowledge. The functional knowledge may come from their educational background, responsible functions or their assigned role in the project. They find interesting aspects on such systems and would like to learn more about the system even on voluntarily. The study finds that several of the interviewees even later decided to change their profession to deep dive into ERP arena after their have discovered their strength and enjoyment during the assignment as project members. They want to understand ERP in greater details and find that the system is interesting. On the contrary, many external consultants similarly give that same feedback that in unsuccessful cases, users do not even have computer literacy skills and find that learning and using ERP is their burdens.

### **Change Agent Skills**

In addition to attitudes, there are certain skill sets which are possessed by change agents. Firstly, change agents are commonly described as competent or being helpful. Secondly, in addition to their functional competency, change agents commonly apply certain tactics to influencing other stakeholders for their collaboration.

**Functional knowledge:** External consultants similarly stated that for successful cases, users possess good level of functional knowledge. This finding is in accordance with previous researches which stated that key users in ERP project must not only understand the processes of their own functions, but also the cross-functional processes, including all exception cases (Carton et al., 2008). In addition to the prior studies, those who could be considered as change agents, must be recognized by others in their organization as competent colleagues. In other words, they must be perceived by others in the organization as skillful and therefore their opinions are trustworthy.

*"They are normally well recognized as competent individuals, if we have this kind of people assigned to the project then it would be very beneficial for us[implementor] as they are someone who already gained trust in the organization." (Participant 029)*

Repetitively, the importance of knowledgeable people assigned to ERP project is mentioned. Not only key users, but also the knowledge of project management that is important as stated by one the participant. It is also evidenced that the knowledge about ERP system that change agents could gain during implementation can complement their functional knowledge and make them become valuable assets to the firms. In some cases, it may not necessarily that functional knowledge must be available in the individual prior the project implementation, but it is the willingness to

learn, educational background, and ability to converting tacit knowledge into visible end-to-end processes. Change agents are referred and impressed by their expertise. Or in other success cases, if the company sees the gap of the level of knowledge they currently have comparing to what they want to become. They close the gap by hiring external business consultants who will then play role of change agents.

**Influencing skills:** Incorporating with change agent competent, there are evidences that change agents tend to apply influence tactics in order to get collaboration from other stakeholders. In success cases change agents are referred as someone who can resolve conflicts and being trusted by others in the organization. To be trusted by others, normally the change agents would have described as having high capabilities in their own functional knowledge. Successful organizations tend to understand the basic of having cross-functional people within the projects or even establish the new role into organization structure. Most of the positions are the hybrid of IT and business who oversee group of interconnected functions, rather than specific function. From the interviews, it is evidenced that the quality of being "friendly" or referent power (Koslowsky & Stashevsky, 2005). Most of the change agents are mentioned as someone who can lead meetings and steer the project effectively. She is perceived by both her colleagues and external consultants if having a good knowledge and gain respect from them. It is evidence that this change agent uses legitimate and expert power as tactics to gain collaboration (Koslowsky & Stashevsky, 2005).

### **Empowering Factors**

There are two factors that can strengthen the capability of change agents. First factor is how top management establish the feeling of ownership and commitment from change agents. Another factor that could empower change agents is external consultant experience.

**Top management establish feeling of ownership and commitment through regular communication:** From the interview, it is affirmed that if top management communicate to all stakeholders about the vision of the future integrated firm, there would a higher chance of leading company to stronger cross-functional integrated organization (Gosain et al., 2005; Rowe et al., 2005). In ERP success cases, Top management contribute to the project by getting control and directly involving with the project since planning phase until implementation complete. Their mindsets were set that project not just as technology challenges, but also as a business challenges (Davenport, 1998; Dezdar, 2012). In addition to existing research, some practical examples done by top management of successful firms is given. The below quote supports the idea that in the firm that top management effectively gain commitment from project team would not only result in higher morale, but also encourage higher cross-functional integration if the message is clearly stated on the goal of having unified company.

*"The top management raised the point that he could not get daily sales volume, he could only get it at the end of the month or need to ask IT to get the data for him. Before go-live, many meetings were conducted with many key users, he emphasizes the importance of having SAP and to let everyone see the same target on why we need SAP, why do we need to get it through within limited timeline. He is more focus on the importance of the system."* (Participant 007)

The statement is given by one of middle level manager who mentioned how top management have communicated throughout the project life cycle. The communication theme focusses on the importance of ERP system, why does the company need it and how it could solve current pain-points. Nevertheless, in case that change agents met all other criteria except this top management support, cross-functional integration may actualize, but in later stage after go-live.

**Consultant experience:** It is in accordance with previous research that highly experience consultant can give a good advice to change agents which they can adapt to their organizational As one of the implementation agents, if the knowledge of the consultant is limited, their capabilities in actualizing business requirement becomes more difficult (Kakouris & Polychronopoulos, 2005; Wood & Caldas, 2001). Therefore, to get most out of the system, when hiring consulting firms should ensure that they possess both technical skills and experience in implementing the system, especially in similar industries. Moreover, the ability of transferring knowledge to ERP users is also an important qualification which companies need to consider when hiring consultants (Dezdar, 2012; Ifinedo, 2008; Maditinos et al., 2011). Many of participants who are in position of project management such as project managers or directors commonly stated that consultant experience is very crucial. The number of implementation cycles results in level of ERP consultant capability to understand ERP system thoroughly and able to suggest the best solutions that fit with their client business requirement. On the contrary, inexperienced consultants may lead to delay the firms on actualizing cross-functional integration such that the firm may take some time to realize that the provided solutions have room for improvement.



### **Reach Sustainability**

From the in-depth interviews, it is in accordance with the previous studies that the fine-tuning effort of ERP system in a continuous manner can help organization actualize the real benefits of the systems on unifying cross-functional departments (Davenport, 1998; Davenport et al., 2004; Hendricks et al., 2007; Hillman & Hillary, 2002; Turkulainen & Ketokivi, 2012). Nevertheless, more insight is gained on how organization have practically done to sustain or even improve cross functional integration through ERP system overtime.

**ERP tool for achieving company goals:** From our interviews, the companies that could sustain the level of cross-functional integration and can gain benefit of having ERP system, vastly use ERP as a tool to extract data for further analysis of company performance.

**ERP project priority:** In addition, in success cases, the participants mention on how companies put priority to ERP projects so that they can sustain the momentum of integrated firm. After the initial implementation of ERP systems. Organizations tend to enhance or activate more of ERP functions in order to fulfill company goals. They said that ERP is the backbone of the organizations and most of information technology projects are developed Around this system. In a success case quoted below, employees are motivated to be part of ERP project assignments.

**End-to-end organization structure:** After implementation, successful organization have improved their cross-functional integration by reorganize their firm structure in align with ERP processes or by end-to-end responsibilities.

*"Team are aligned to modules, in the end it split based on these ERP modules on how business and IT functions people support the project itself. Many teams don't exist before the ERP implementation. Or beyond modules, such as warranty process. It involves customers, supplier, engineering, and so on. So, it is something cover across modules, but there is a team owning the whole end-to-end. And the whole team know wing to wing and knows how it works on the ERP." (Participant 045)*

**Cross-functional networking:** In order to ensure the continuous improvement of cross-functional integration, successful organizations tend to carry-on the network of ERP expertise within the organization. While the unsuccessful cases face the problem of change agents decided to leave the company as they claimed to be overworked and having no counterpart in other departments. For example, two of the interviewees who have characteristics of being a change agent in successful ERP user organizations have commonly the same problems of being overworked. They both are the first contact persons for ERP query in each of their firms due to their capability in both functional and ERP knowledge. They explain their stress after go-live that and what they wish to change is to have another person who is keen on connecting process as they could not cover all of the questions that flowing in. On the contrary for success cases, companies tend to avoid the turnover of change agents by keeping teamwork environment and be able to keep the momentum of continuous improvement.

## **DISCUSSION**

As a contribution to existing theory, the new aspect in the area of knowledge about ERP CSF and cross-functional integration is introduced. These findings lead us to comprehend the importance of individuals who drive ERP project to success and help the organization reaching higher level of cross-functional integration. In other words, we propose that only CSF mentioned in previous researches might lead companies to only project management success (i.e., on-time, within budget and smooth operations), but does not encourage higher level of cross-functional integration into firm processes nor into people mindset. It is actually the individuals who are "change agents" that drive the ERP project to its full potential of unifying cross-functional departments. As a result, the result of this research should be able to trigger a new dimension of further development of theory about the relationship between ERP system and organization behavior aspect.

Moreover, while previous research focus on CSF that should be done prior or during implementation, our research proposes factors that could lead the company to sustainability of unifying cross-functional integration after the implementation. This perspective should trigger further study about sustainability factors that could help improve organization performance through the mean of ERP usage.

For ERP user organizations, the findings of this research could be applied by any firms who are about to implement or upgrade their ERP system so as to ensure that their ERP would result beneficially in terms of enhancing cross-functional integration which is the most critical element of ERP success. Certain characteristics of "change agents" are suggested both in terms of attitudes and skills in which firms can apply to find their change agents or to include as one of their preparation plan to build up required functional knowledge and influence skills for their employees. In addition, in case

the firms could not find internal change agents, they may consider to hire business consultants to fulfill some the gap of functional knowledge. Moreover, the study discovers that there are two factors which can strengthen capability of change agents. First factor is how top management establish the feeling of ownership and commitment from change agents through communication. Some practical examples of top management communication to their employees are given. Another factor that could empower change agents is suggested to be external consultant experience. By keeping in mind that consultant knowledge and experience affect project success, firms should consider this as factor when hiring consultants to the project. Furthermore, the in-depth knowledge about how organizations have practically done to sustain or even improve cross functional integration through ERP system overtime is revealed. Firms are suggested to get the most of this highly invested enterprise system by putting priority to ERP projects so that they can sustain the momentum of integrated firm. In addition, firms can consider to improve their cross-functional integration by reorganize their firm structure in align with ERP processes or by end-to-end responsibilities. Lastly, in order to ensure the continuous improvement of cross-functional integration, it is recommended that organizations should carry-on the network of ERP expertise within the organization as proved to be effective in those success cases mentioned above.

ERP Implementation Service Providers are encouraged to ensure the effectiveness of ERP implementation on cross-functional integration, ERP implementation service providers are suggested to point out the importance of individuals who are assigned to the project to their clients. Also, to empower their clients, the project management of implementation service provider should consider the importance of consultant's experience on project success and apply it when they plan project organization structure. In addition, the service provider firms can suggest their clients to get most from the ERP systems through applying sustainability factors. ERP implementation service providers could consider to suggest their clients to maintain long-term partnership and plan ERP continuous improvement roadmap together which allow mutual benefits to both parties.

## CONCLUSION

From a comprehensive literature review, the existing literatures show no explicit evidence of the linkage between CSFs and cross-functional integration. With our qualitative research, it shed the light on why some ERP user organizations are successful in promoting cross-functional integration, while the others are not. It has triggered the new dimension in the area of knowledge about ERP critical factors and cross-functional integration by focusing on the importance of individuals who drive ERP project to success and help the organization reaching higher level of cross-functional integration.

In other words, it is evidenced that CSF mentioned in previous research may lead companies to only project management success (i.e., on-time, within budget and smooth operations), but does not encourage higher level of cross-functional integration into firm processes nor into people mindset. It is actually the individuals who are "change agents" that drive the ERP project to its full functionality of unifying cross-functional departments.

Moreover, the study leads us to the discovery of common characteristics of change agents. The first set of characteristics are intrapersonal attributes which consists of four attitudes which are:

- Cross-functional Mindset
- Aligning to Company Vision
- Goal-oriented
- ERP Enjoyment

The second group of characteristics are change agent skills which are (1) functional knowledge and (2) influencing skills. The importance point to emphasize is that the knowledge of change agent on functional skills must be acknowledged by their peers in order to let them effectively using their influencing skills, especially on the most used influence tactic of expert power. In other word, they must possess a good level of knowledge which others in the company perceived them as competent colleagues.

Moreover, this paper proposes that there are two factors which can strengthen capability of change agents. First factor is how top management establish the feeling of ownership and commitment from change agents through communication. In success cases, top management truly focuses on project communication which project objectives repetitively emphasized. In additional, his subordinates in middle level management positions also follow his lead by conveying his message to their team members. Another factor that could empower change agents is external consultant experience. Consultants' knowledge and experience affect project success. In other words, experienced consultants are able to give various options to change agents which allow change agents to compare pros and cons of each option and

able to make constructive decision which suitable for their firms. As a result, change agents can support consultants by help convincing their colleagues at ERP user organization.

Furthermore, more insight is gained on how organization have practically done to sustain or even improve cross functional integration through ERP system overtime. In success cases, ERP is vastly used as a tool for extracting data for further analysis of company performance. In addition, in success cases, the participants mention on how companies put priority to ERP projects so that they can sustain the momentum of integrated firm. Additionally, it is evidenced that some organization has improved their cross-functional integration by reorganize their firm structure in align with ERP processes or by end-to-end responsibilities. Lastly, in order to ensure the continuous improvement of cross-functional integration, the paper proposed that successful organizations tend to carry-on the network of ERP experts within the organization, while the unsuccessful cases face the problem of change agents decided to leave the company as they claimed to be overworked and having no counterpart in other processes.

In sum, the research objectives are fully met through the mean of in-depth interviews and from data analysis. The research questions are answered with the new perspectives of ERP implementation have been introduced in which its contribution to theory and implication is discussed in the following section.

## LIMITATIONS

Like other qualitative research, while patterns are discovered between cases, the results cannot be used to generalize to the overall population. In order to gain more generality, quantitative research needs to be conducted to strengthen the findings. The future research should quantify and generalize the findings of this to a larger sample population. Future research could test the proposed findings to provide a deeper understanding of the importance and of each of the identified factors and the strength of their inter-relationships. For instance, it would be interesting to understand the strength of relationship of empowering factors to change agent behavior and attitudes. Another example of future research is to gain generality on the definition of ERP success in terms of cross-functional integration through quantitative research. In addition, our research does not consider cultural differences between companies and different countries. There is some evidence of cultural impact on ERP implementation. In other words, implementing ERP in one country may need different approach and require different factors from another culture (Shanks et al., 2000). Our study has access to representatives from both domestics and overseas firms in which the time is too limited for us to gain more insight on cultural impact on organization behavior that will affect ERP implementation. Culture may be taken into account as controlled factors in order to compare cases more comprehensively.

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