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ERP Pre-Implementation Readiness Assessment Framework: A Multi Stakeholders' Perspective

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Abstract

These days, there is a growing trend towards ERP systems in Ethiopia. This in turn created an opportunity for ERP vendors to promote their products in the country. Due to large size and inherent complexity of ERP systems, organizations are strongly advised to check their readiness prior ERP system implementation. There are some prior research attempts to develop ERP pre-implementation readiness assessment models and frameworks. However, extant literature reveal that multi stakeholders' perspective is not well considered in those prior attempts. Besides, most of the prior attempts are in the context of developed countries. The purpose of this study is to develop a framework to evaluate ERP pre-implementation readiness from multi-stakeholders perspective in developing country context. As a foundation, a set of critical success factors were identified from prior literature. Interview and survey questionnaire were used for data collection. Based on the result, an ERP pre-implementation readiness assessment framework is proposed. Feasibility assessment of the proposed framework revealed that the case company has limitations on a number of dimensions. Accordingly, recommendations are forwarded to address the identified gaps.

Keywords: ERP, ERP Success, Pre-implementation, Readiness, ERP Pre-Implementation Readiness

1. Introduction

Enterprise applications are systems that span functional areas, focus on executing business processes across the business firm, and include all levels of management. There are four major enterprise applications: enterprise resource planning systems, supply chain management systems, customer relationship management systems, and knowledge management systems. ERP systems integrate business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources into a single software system (Laudon et.al 2012). It is a key businesses that helps the organizations to gain a competitive advantage by integrating all business processes, managing and optimizing the resources available. It is not just a software package but an efficient way of doing business consisting of software support modules where information is flowing between them and they share a central database.

Many ERP implementations have limited success and the failure rate is high between 60% and 90% (Abeer et.al 2011). One of the reasons for ERP implementation failure is lack of organizational readiness in terms of business process maturity, cultural, technological and organizational aspects. In addition, in case the implementation process takes longer than the plan the implementation team loses its motivation (Ptak and Schragenheim 2004). The other reason is difference in interests between customer and organizations that aim to provide the optimum solutions for business problems and ERP vendors who prefer a generic solution applicable to a broader market and the resistance of users to change or non-acceptance of new systems (Abeer et.al 2011). Problems associated with an ERP implementation are often classified into technical and organizational aspects. Technical aspects include the technology readiness of an organization, the complexity of ERP software, data loss due to the

incompatibility of data architectures between the old legacy systems and the new ERP software and inadequacies of newly redesigned business processes. Common organizational factors may include employees' resistance to change, inadequate training, underestimated cost and time of implementation, unwillingness to adopt new business processes, and strategic view of technology adoption (Slater, 1998, Joshi and Lauer, 1999, Mabert et al., 2001).

In this research, Ethiopian electric utility is being considered for the case study to examine ERP pre-implementation readiness issues. This company is one of the biggest companies in Ethiopia with many branch offices and a huge business process which helped the researchers to see the technical and organizational aspect along with the multi stakeholders' perspective. In addition The Company is on the process of implementing ERP system so it will be a good opportunity to get all the stakeholders together to gather sufficient information for the study. The main reason that the study focused on pre-implementations is unlike developing countries, developed ones use ERP systems extensively since 88% of ERP market share is owned by North America and Europe. Such fact drove ERP vendors to turn towards developing countries - considered as a promising market – to promote their products (Khalifa et.al 2015). Now a days Ethiopia is one of the developing countries in which organizations implementing ERP system with the purpose to survive in a marketplace and gain a competitive advantage. This created a golden opportunity for ERP vendors to promote their packages as if they are providing the magic tool for business diseases but most vendors do not apply a comprehensive study before adopting such technology to surf for pre-required infrastructure and capabilities especially in developing countries (Khalifa et.al 2015).

Hence as a developing nation, before implementing any large scale software projects, the researchers believe that it is advisable to know the readiness level of companies for the intended projects before any information systems' investments. According to Nazir et al. (2013), On a study to measure ERP implementation readiness in small and medium enterprises, as the failures of ERP implementation is still considered quite high, they proposed a self-assessment of open source ERP implementation readiness which focused on the pre-implementation aspects of ERP. In addition to the above, previous studies report unusually high failure in ERP projects. Thus, (J. Razmi et al., 2008) recommend that it is necessary to perform an assessment at the initial stage of an ERP implementation program to identify weaknesses which may lead to project failure. Decision makers are also urged to investigate the readiness of businesses to move into automated and integrated business activities and also paying attention to user involvement and acceptance in advance is a critical issue for successful ERP implementation (Khalifa et.al 2015). Therefore, based on the above reviewed facts it is necessary to perform a readiness assessment at the initial stage of an ERP implementation project to identify weakness areas which may encounter the project with failure and to measure readiness level of companies for the intended projects.

2. Research Gap

The researchers have tried to review recent literature on the ERP readiness assessment frameworks to show what other researchers have published on the problem, what gaps of knowledge still exist, and what additional research needs to be done. The following are researches that have been done on this area and their gap. (Ahmadi et al. 2014) developed Strategic Framework for Achieving Readiness in Organizations to Implement an ERP System by selecting three strategic issues and critical factors under the issues which are Organizational readiness(Organization strategically readiness, Organization structural readiness and Organizational readiness for doing required planning), Social readiness(Organization cultural readiness, Achieving right user intention for interacting with ERP system and Achieving decent level of communication inside the organization)Technical readiness(Choosing proper application for implementation, Achieving proper IT capability in organization, Providing proper IT infrastructure in organization and Managing organization information properly).A research by Nizar, et al (2013) was conducted to formulate the framework of self-assessment of open source ERP implementation readiness, which focused on the ERP pre-implementation aspects. The proposed ERP implementation readiness assessment framework was developed using the Fuzzy-based ANP (Fuzzy ANP), where the examined readiness factors are grouped into three categories, namely project management, organizational, and change management readiness. Another research done by (Shiri, S et.al 2014) was to identify and prioritize organizational readiness factors for implementing ERP based on organizational agility. This study extends

McKinsey 7S model (strategy, structure, systems, skills, style, staff, and shared values) to 9S (7S+ self-evaluation and supportive factors).

Ptak and Schragenheim (2004) suggested an Enterprise Resource Management (ERM) assessment checklist with twenty-five questions. The readiness of an organization on implementing an ERP system is scored in terms of a number of criteria each one varying in a range between zero and four. Despite the fact that this research can be considered as one of the important ones on assessing the readiness of an organization for successful implementation of ERP, this approach has some shortcomings. For instance, the approach has considered customer orientation and effective implementation of 6 Sigma as main factors affecting successful implementation of an ERP system whereas factors such as IT infrastructure, the degree of business processes maturity and their integration have been ignored. (Shafaei et al, 2008)

The main factors affecting the implementation of ERP in an enterprise and suggested a ranking mechanism whereby the readiness of an enterprise can be assessed in terms of a number of different aspects. One of the works mostly related to this research belongs to Wongnum et al. (2004) who developed a framework to assess the readiness of an enterprise for implementing an ERP system. The project called BEST (Better Enterprise System implementation). It is a Process-based Model for Organizations (PMO). They considered three processes co-existing and interacting in an enterprise system implementation project and called them dimensions. The level of maturity of each dimension indicates the degree of maturity (Shafaei and Dabiri, 2008) or alignment between different dimensions in the reference framework. The dimensions are the design and tuning of a new enterprise system which includes project management, implementation process and permanent business processes. The elements of the model are called aspects which include strategy and goals, management, structure, process, knowledge and skills and social dynamics which refers to the behavior of people. Despite the fact that the proposed approach was claimed to be a good framework for assessing the readiness of an enterprises, the authors opt for further investigations to provide more comprehensive aspects and dimensions whereby the readiness of an enterprise to implement ERP systems can be assessed effectively plus its done 14 years ago which is difficult to apply it on current situations. Zewdu (2016) in his study, ERP Pre-implementation readiness evaluation issues were discussed using critical success factors as a starting point and finally framework for Evaluation of ERP Pre-Implementation Readiness was developed on the case company. This was one-time survey conducted using questionnaires. As future work the author recommended the framework could be improved if the study can include consultants, clients and vendors so that we can assess the internal reliability, validity and perceived value.

While having all this prior studies there is still the need for developing new readiness assessment framework. one of the reason is that the studies are done in the previous years with different context and on a limited amount of factors but now a days many new additional CSFs are there and incorporating them will result in a multidimensional measuring readiness assessment framework. Besides, most of them are done on the context of developed nations depending on the selected critical success factors on limited stakeholders of the system which can't be applicable for countries like Ethiopia because companies in our country do not have a stable and same way of doing business like developed countries. In addition as we can see from the recent reviewed literatures two of them are prepared for the developing nations context but the one research done in Tanzania by Mdimba et.al (2017) proposes a practical model for assessment of pre-implementation of an enterprise in Tanzania prior to implementation based on success factors related to business -Information technology alignment which does not incorporate multi stakeholders' perspective and a research done by (Zewdu 2016) in our country proposes ERP pre-implementation readiness assessment framework based on selected CSF depending organizational, technical and cultural perspectives and finally the researchers suggested that as future work to include client, vendor and consultants perspective to make the framework measure the readiness of the company from multi stakeholders' perspective. This shows that comprehensive studies and systematic studies on ERP pre - implementation are missing in developing countries. Since assessing the readiness of the company for ERP implementation is critical for the successful implementation the researchers believe that it's better to assess it from multi stakeholders' perspective which I plan to do my research on.

3. Research Design

The purpose of this research is exploring the phenomena in a new light based on theoretically identified factors from different literatures. Exploratory studies are practical if we wish to clarify our understanding of a problem (Saunders et al., 2000). (Robson, 1993) describes exploratory studies as a method of finding out what is happening; to seek new insights; to ask questions and to assess phenomena in a new light. The general approach of this research is design science case study approach in which both quantitative and qualitative methods are used to collect and analyze data. According to (yin 2003) Case study method is best fit for exploratory nature of study since the purpose of this paper is exploratory study using case study approach will be appropriate to answer the research question.

In this study Research process map is defined as a series of steps that are going to be followed throughout the research process to develop the ERP pre-implementation readiness assessment framework as well as to validate the framework by measuring the readiness of the company. It starts with problem identification and then by reviewing literatures the problem is clarified likewise it goes all the way to the validation of the framework. In this study 51 CSFs are identified with extensive literature review and those selected factors are categorized under different stakeholders' perspective the validation of CSFs has been conducted based on criticality and relevance to pre-implementation stage. Deleting /adding or modifying of identified CSFs has been done in the process. Finally, the framework will be developed and validating the framework will be conducted by measuring the readiness of the case company using the proposed framework.

Purposive sampling technique is used. In this study the sample frame is EEU's head office staffs In case study, the sample units must have the potential and richness in information to be key informants for the study. First ERP project key stakeholders of the company for this project have been identified. These members are composed from different departments. Target stakeholders for the survey are divided under five groups to see multi stakeholder's perspectives. To study organizational perspective the survey addresses mainly top managements, for the technical perspective two side technical stuffs of the company have been addressed which are application and infrastructure technical stuffs, for consultant perspective SI ERP consultants hired by the company are the targets, for the vendor's perspective tech Mahindra Indian company agents who implement SAP solution for the company is the target samples and finally for the user perspective purposely selected different level of system users have been addressed. Fifteen individuals were selected as respondents for the survey questionnaire to assess organizational, technical and user perspective and for consultants and vendors perspective one representative individuals for each have been addresses through interview respectively. These individuals are selected as key informants and respondents based on their involvement, exposure and role in the ERP project and functional role in the company. A detailed and focused literature review has been done to understand more about Enterprise Resource Planning concepts and ERP implementation framework with a central issue of identifying critical factors, questionnaire used to extract the view of multi stakeholders on ERP pre-implementation readiness assessment. For this study primary and secondary questionnaire have been prepared. The primary questionnaire is distributed for purposely selected experts in the case company to identify the CSFs that are critical and relevant to pre-implementation stage. Based on the result of the first questionnaire which is on the basis of identified CSFs the second survey questionnaire prepared to validate the framework by measuring the readiness level of the case company. Interview has been used for selected and small number of stakeholders' of the system. Specifically to assess consultants and vendors perspective one representative individuals for each have been selected as respondent to extract use full information. Using these instruments important data have been collected in order to answer the research question.

In most research results are interpreted from the quantitative perspective of the research process that can generate effective outputs. Each case at the qualitative and quantitative case is processing on its own phase independently. By employing SPSS20, the quantitative data analyzed using frequency and mean. The data collected by interview interpreted accordingly. For primary quantitative data analysis both mean and frequency analysis is used. To select CSFs relevant for Pre-implementation stage by using frequency analysis CSFs above the valid percent 50% are taken as relevant for the pre-implementation stage. Valid percent is taken not to consider the null values. mean analysis is used for validating the criticality of those selected CSFs and rating the mean value above 3.6 is taken as relevant CSF since 3.6 is round to 4 and as the value 4 & 5 are critical and very critical respectively. Which

means only critical and very critical value is taken to identify criticality of CSFs for pre-implementation stage. For secondary quantitative data analysis mean is used and the qualitative data interpreted accordingly.

4. Result and Discussion

The CSFs identified from different stakeholder's perspective are fifty-one. Participants were asked to group CSFs into three ERP implementation stages which are the pre-implementation, implementation and post-implementation since the focus of this research is the pre-implementation stage CSFs grouped under this stage are taken from the analysis result. Based on the analysis the CSFs above the valid percent 50% are taken as relevant for the pre-implementation stage. So, 37 CSFs are identified as relevant and the remaining 14 are under the margin in which the factors are believed to be relevant on the stages other than the pre-implementation stage. The identification process is not yet done on this stage their criticality is also measured and the factors are also filtered again. According to the respondents rating the mean value above 3.6 is taken as relevant CSF since 3.6 is round to 4 and as the value 4 & 5 are critical and very critical respectively. Based on the result CSF ≥ 3.6 are 35 which are taken as critical factors for pre-implementation stage and the left 2 are not critical. The validation procedure has indicated that the majority of the CSFs are critical at the pre-implementation stage. Based on the analysis result of primary questionnaire the CSFs are identified on the basis of criticality and appropriateness for pre-implementation stages and those identified CSFs categorized under five main stakeholder's perspective which are going to be elements for the conceptual framework. The following framework is proposed based on the result.

The proposed conceptual framework contains multiple stakeholders' perspective that can contribute to measure the readiness level of the company to implement ERP system. As shown in the figure 1, the arrow from each perspective pointed to ERP pre-implementation readiness which is to mean that if companies can measure their readiness from all this multiple perspective they can be ready to successfully implement ERP system. Under the five main perspectives there are list of CSFs in which companies can check their level of readiness by using them as a measuring point (I.e. By checking if the company fulfilled them or not before implementing the ERP system). For vendors perspective according to Ethiopian context its illegal for companies to contact the vendors before signing a contract therefore to check the readiness from vendors perspective they can check those details based on the listed CSFs under vendors perspective from companies bids document.

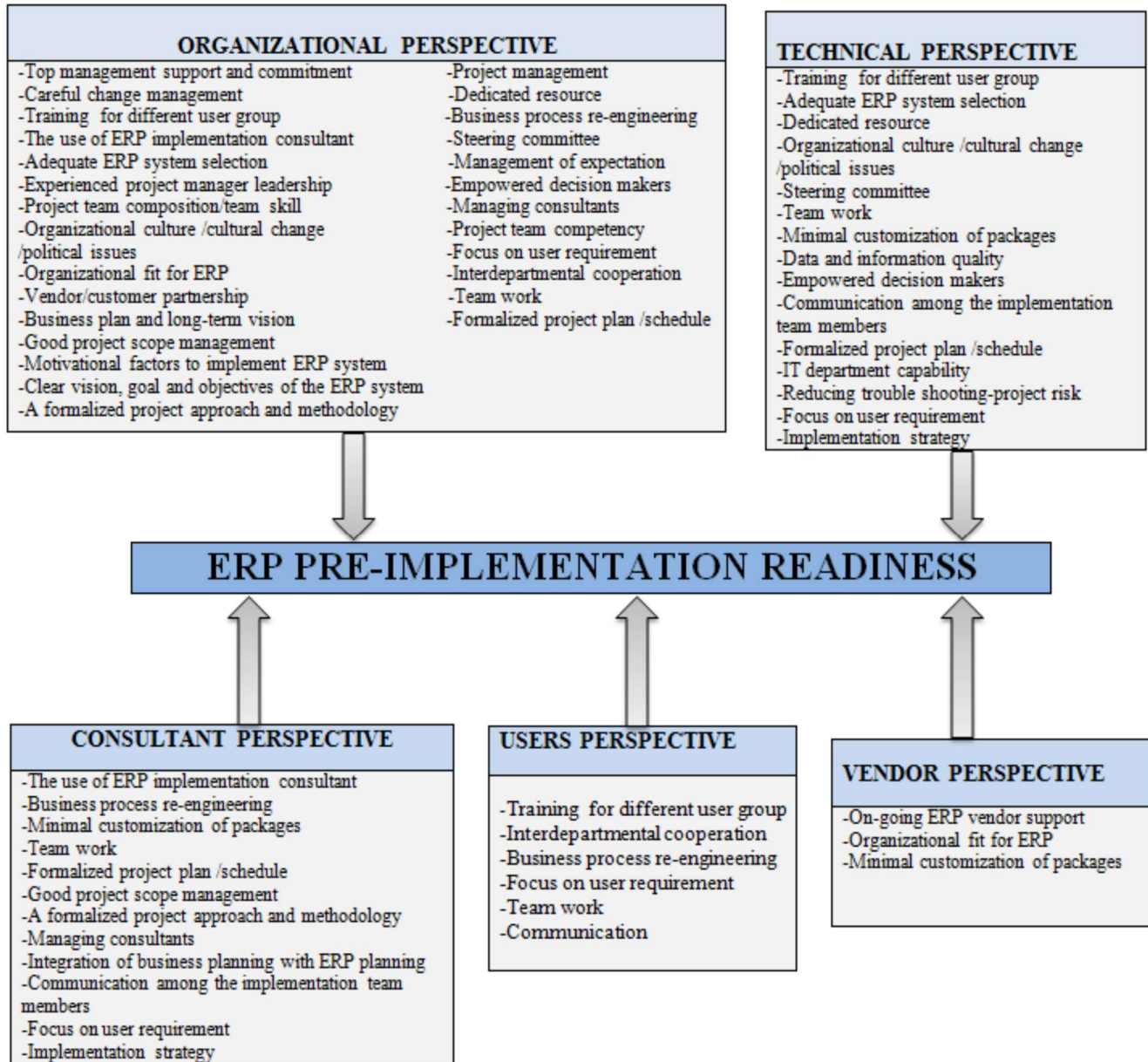


Figure 1: Proposed conceptual framework to assess ERP pre-implementation Readiness

ERP pre-implementation readiness assessment framework has been developed by different researchers depending on different factors. (Nizar A., et al 2013) proposed ERP implementation readiness assessment framework that was developed using the Fuzzy-based ANP (Fuzzy ANP), where the examined readiness factors are grouped into three categories, namely project management, organizational, and change management readiness. (Ahmadi et al. 2014) developed a new approach for assessing the ERP readiness in organization by considering casual relationships between influential factors. The approach enables an organization to evaluate its ERP implementation readiness by considering two issues: (1) how the factors influence each other and (2) how they contribute on overall readiness. (Ahmadi et.al.N.D) presents a Strategic Framework for Achieving Readiness in Organizations to Implement an ERP System developed by selecting three strategic issues and critical factors

under the issues which are Organizational readiness, Social readiness and Technical readiness. Similarly (Zewdu, 2016) conducted a study in Ethiopia to investigate ERP Pre-implementation readiness using parameters (constructs) such as technical, organizational, and cultural in the context of Dashen Bank Share Company with the view to develop a framework for evaluation of ERP Pre-Implementation readiness and design a solution framework to address those issues.

The previous farmworkers or studies conducted are in the context of developed countries and does not contain multi-stakeholders' perspective. It's clear that there is a gap in integrating different perspectives in to a single study. In addition, there is one single study in Ethiopia regarding this issue but not yet comprehensive. Therefore, the newly proposed conceptual framework in this study believed to fill the gap identified in a various ways. First it is done on the contest of developing country in Ethiopia and nowadays companies in this country are largely implementing ERP system therefore they can use this framework to measure their readiness for implementing the system. Secondly it contains five main perspectives that make it different and more comprehensive comparing to the previous studies done regarding the issue. It is also different from previously done local study by (Zewdu, 2016) through adding three perspectives that has not been addressed before which are users, consultants and vendors perspective. This additional perspective will help companies to measure their readiness from multiple ways and lead to a successful ERP system implementation. The last thing that makes this conceptual framework different is it is validated in the case company. This indicates that any company can customize the framework to its context and measure its readiness level before implementation of ERP system.

5. Conclusion

Ethiopian Electric Utility (EEU) was considered as a case organization to evaluate the readiness from organizational, technical, user, consultant and vendor perspective to implement ERP. In order to answer the research questions, critical success factors were identified from literature. From total of 51 CSFs, 37 CSFs were found relevant to assess ERP pre-implementation readiness. The proposed conceptual framework is believed to fill the knowledge gap identified in literature two ways: (a) First it is done on the contest of developing country and nowadays companies in developing countries are largely implementing ERP system. Hence, they can use this framework to measure their readiness for implementing the system; (b) Second it contains five main perspectives that make it different and more comprehensive as compared to related previous studies. The conceptual framework is also validated in a case company. This indicates that any company can customize the framework to its context and measure its readiness level before implementation of ERP system.

Using survey questionnaire and interview the researchers assessed the readiness level of the case company from five perspectives. Organizational perspective was one of the perspectives which contain 27 measuring CSFs. According to the result the researchers concluded that the organization were successful on CSFs like Top management support and commitment, experienced project manager leadership, empowered decision makers, Good project scope management, Project management , Adequate ERP system selection, Organizational fit for ERP , The use of ERP implementation consultant, Business process re-engineering, Management of expectation, Project team composition/team skill and competency, Interdepartmental cooperation , team work, motivational factors to implement ERP system, Clear vision, goal and objectives of the ERP system, Business plan and long term vision, a formalized project approach and methodology and formalized project plan /schedule. In the contrary the organization revealed Gap on CSFs like training for different user group, dedicated resource, Steering committee Careful change management, organizational culture /cultural change /political issues, focus on user requirement, vendor/customer partnership and managing consultants.

When we see the organization readiness from technical perspective organization were successful on CSFs like Empowered decision makers, training for different user group, dedicated resource, Steering committee, IT department capability, Communication among the implementation team members, Team work, Minimal customization of packages, Data and information quality, reducing trouble shooting-project risk, Implementation strategy and Formalized project plan /schedule. In the contrary the organization revealed gaps on points like Adequate ERP system selection, Focus on user requirement, Organizational culture /cultural change /political issues. When we see the organization readiness from the user perspective on all of the measuring CSFs which are

Training for different user group, Interdepartmental cooperation, Team work, Communication, Business process re-engineering and Focus on user requirement they are successful since the result gain from the survey indicate a positive result.

The consultant perspective of this study addressed through interview. The representative of the consultants' response shows that the organizations' is successful on measuring CSFs like The use of ERP implementation consultant, business process re-engineering, managing consultants, Focus on user requirement, Implementation strategy, communication among the implementation team members and Team work. On the other side negative result is gain from the response on measuring CSFs like Minimal customization of packages, Integration of business planning with ERP planning, Formalized project plan /schedule, Good project scope management and formalized project approach and methodology.

Vendor perspective of this study is also addressed through interview. Three measuring CSFs are categorized under this category namely On-going ERP vendor support, Organizational fit for ERP and Minimal customization of packages. The respondent confirmed that implementing ERP system is a life-long commitment and requires continuous investments in adding new modules and upgrading the system they are giving any support that is needed through the implementation process. The organization is successful on organizational fit for ERP since they selected package which can feet the other business process. From the response gap has been identified on minimal customization of package.

6. Recommendations

The findings can support the case company to consider and fill the gap that has been identified through measuring its readiness level. Except the user perspective on the remaining four perspectives which are organizational, technical, consultant and vendors perspective gaps have been identified on many of the measuring CSFs therefore the company should take this seriously and have to make correction so as to successfully implement the integrated system.

The implementation of the ERP system in the company resulted in dalliance because before going to the implementation process the concerned bodies didn't check the readiness level of the company from different dimensions. Even if it has fulfilled some of the requirements there is still a gap. Therefore depending on the findings the researcher recommends that each stakeholder to check and make correction on the gaps. Depending on the findings concerned stakeholders who are the top managements from organizational perspective, the application side and infrastructure side technical stuffs from technical perspective, consultants and vendors must pay a visit to fill the gap identified for successful implementation of the integrated system.

Although most organizations in our country are still in the early stage of ERP implementation, there is also a growing tendency for companies to adopt ERP to improve their business operations. Before potential benefits can be realized, an organization needs to transform itself into an ERP-ready organization. However, there are no adequate models or frameworks to assist organizations on how to be an ERP-ready. Therefore it is recommended that any organization interested in implementing ERP can use the proposed ERP pre-implementation readiness assessment framework to addresses all aspects of an organization to attain implementation success.

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