Successful Implementation of Enterprise Resource Planning System (ERP) in Sri Lankan Small and Medium Scale Manufacturing industries: Client & Consultant Perspective.

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ABSTRACT

Today's business environment is highly competitive with the booming trend of technological innovations. Every business gives priority to maximizing profits. Cost reduction is one of the key factors in maximizing profit. Therefore, current business organizations use technology as one of the techniques to achieve effectiveness. When the technological environment in current businesses is considered, systems are the most important factors that are used to improve productivity and efficiency. Integrated systems are at the highest level when considering systems. Out of all the integrated systems, Enterprise Resource Planning systems (ERP) can be given priority. Sri Lanka, like other countries, invests vastly in ERP implementation to achieve the ERP implementation goals and objectives. However, not all ERP implementations deliver the promised enterprise improvements. There are situations where ERP implementation has become a failure as well. Many critical factors have affected these failures. Previous literature says many factors effect ERP implementation success or failure. Therefore, this study relating to Sri Lankan small and medium enterprises (SMEs) further explores those factors' influence on ERP implementation. Thus, this research followed a qualitative approach using the strategy of case study, followed by nine in depth interviews from the perspective of client and consultant, conducted in the specific industry personnel who implemented ERP successfully in their organization.

Keywords: Critical Success Factors, Enterprise Resource Planning System, Manufacturing Sector, Small and Medium Enterprises, Sri Lanka

1. INTRODUCTION

Globalization is one of the most important factors that has both positive and negative effects on business performance. One of the main purposes of all businesses is to make a profit from their operations. Implementation of systems using current technology contributes highly to profit maximization in businesses. The business environment relating to the implementation of systems can be divided into two parts: internal and external, where to address the competition and necessary improvements in technology, laws, government activities, and market social and economic trends. Therefore, this research focused on the identification of the importance of systems using technology in the business environment. Integrated systems are at the highest level when we consider a system such as enterprise resource planning systems (ERP), which are being used popularly in many businesses. Shah (2016), implemented an ERP system within an organization and changed the way people work and achieved the benefits of process automation, proofing mistakes, and high productivity.

An enterprise resource planning (ERP) system is an integrated software solution, typically offered by a vendor as a package, that supports the seamless integration of all the information flowing through a company, such as financial, accounting, human resources, supply chain, and customer information (Davenport, 1998). According to Oracle (2019), "Enterprise resource planning" refers to a type of software that organizations use to manage day-to-day business activities such as accounting, procurement, project management, risk management, compliance, and supply chain operations. A complete ERP suite also includes enterprise performance management, software that helps plan, budget, predict, and report on an organization's financial results. Work WiseSoftware (2014) highlighted a vast number of top benefits of implementing ERP software in business. However, there are pros and cons to all the implementations that were explored by the study as findings which will benefit the small and medium-scale manufacturing industries in Sri Lanka.

The Government of Sri Lanka recognizes SMEs as the backbone of the economy, as they account for more than 75% of the total number of enterprises, provide 45% of the employment, and contribute to 52% of the Gross Domestic Production (GDP). Levinson (2018). Manufacturing is the process of transforming materials or components into finished products that can be sold in the marketplace. Hence, the research study diverges the findings to explore a holistic view of the implementation of ERP for SME manufacturing. Following are the questions set in order to address the objectives of the study from the perspective of the client and consultations.

1. What are the organizational factors effecting ERP implementation in Sri Lankan small and medium-scale manufacturing industry?
2. What are the technological factors' effects on ERP implementation in Sri Lankan small and medium manufacturing industry?
3. What are the human factors that affect ERP implementation in Sri Lankan small and medium-scale manufacturing industry?

2. LITERATURE REVIEW

The term ERP roots the date back to the 1960s that applied to inventory management and control in the manufacturing sector (Netsuite 2019). Software engineers created programs to monitor inventory, reconcile balances, and report on status. By the 1970s, this had evolved into Material Requirement Planning (MRP) systems for scheduling production processes. In the 1980s, MRP grew to encompass more manufacturing processes, prompting many to call it MRP-II or Manufacturing Resources Planning. By 1990, these systems had expanded beyond inventory control and other operational processes to other back-office functions like accounting and human resources. Today, ERP has expanded to encompass business intelligence (BI) while also handling "front office" functions such as sales force automation (SFA), marketing automation and ecommerce. With these product advancements and the success stories coming out of these systems, companies in a broad range of industries from wholesale distribution to ecommerce to use ERP solutions. The history of ERP goes back more than 100 years (Oracle 2019). In 1913, engineer Ford Whitman Harris developed what became known as the economic order quantity (EOQ) model, a paper-based manufacturing system for production scheduling. Enterprise resource planning (ERP) software systems were first made available to very large organizations, having grown out of the manufacturing resource planning (MRP) systems that had been in use since the 1960s (Radley 2018).

A successfully integrated ERP system can enhance operational efficiency by supporting a firm's business processes as well as create competitive advantages by enabling innovative

practices (Al-Mashari et el., 2003). ERP system acquisition and implementation generally enhance productivity and working quality, since the system offers standardization and simplification in multiple, complicated operational procedures across the company Nah *et al.*, (2001).

The information systems consist of two categories, personal information systems which can manage and store information for a private person and second information system is an enterprise information system that tailored toward the support of an organization (Silva, 2017). Mario & Robert (2009), to integrate CSF management into project execution, researcher propose the ACSF method. From these factors which were discussed by Mario & Robert (2009), same as Claude, Koen, Stephan & Eric (2010), discussed Top management support, Business plan, Effective communication, Project management under five themes. According to Claude, Koen, Stephan & Eric (2010), the merging of the lists of CSFs for ERP implementations found in the literature leads to a list of over 40 candidate CSFs. In order to structure these candidate CSFs, researchers divide them into five groups as vision, scope, goal, culture, infrastructure, approach, project management. Claude, Koen, Stephan & Eric (2010), suggested that the largest fraction of the critical success factors found in the literature applies to the four-implementation studied. This indicates that a majority of critical success factors that are valid for large companies are also applicable to SMEs.

As such, employees are accustomed to change, making change management a far less important issue. According to (Shashank *et al.*, 2013), CSF are those factors or conditions which are the most important for successful implementation of ERP. These categorizations include above Claude, Koen, Stephan & Eric (2010), discussed factors like top management support, Vision, Project management also some other factors under three categorizations of organizational factors, technological factors and people factors. Mario & Robert (2009), found some factors like Top management support, Knowledge management, Effective communication also discussed by (Dimitrios *et al.*, 2011). When above researchers used framework like, people, organizational, project management factors as CSF Uchitha & Saman (2013), nine factors, identified through the literature, were selected that are most relevant to the Sri Lankan context through a pilot study carried out among domain experts in Sri Lanka. Those nine factors have been categorized under three main stages of the ERP implementation i.e. pre-implementation, implementation and post-implementation. Therefore, this is a positive sign as far as Sri Lankan ERP implementations are concerned. (Hooshang *et al.*, 2014), used following critical succes factors for the reserch study almost same with what Mario & Robert (2009). When, (Hooshang, Bruce, Dale, & James, 2014) identified above factors almost same factors which were identified by (Poonam & Divya, 2014) used following CSFs Shashank *et al.,* 2013 idetified organizational, Technological, people factos as the CSF in their study. But, (Poonam & Ajay, 2015) slected project management factors also to their study & used follwing CSF in their study.

First, this study has contributed to academic research by producing the empirical evidence to support the theories of affecting factor and ERP implementation success. The research has empirically verified that organizational, technological, people and project management factors are positively affecting the success of ERP implementation. Second, the results are largely consistent with prior studies conducted in other developed countries. As (Hooshang *et al.,* 2014) discussed including top management suuport and other CSF also discusssed by Raafat & Harshjot (2016). Shivam *et al.,* (2018) successful implementation of cloud ERP. Thus, researchers infer that the critical success factors of SMEs and the concerns faced by clod vendor needs to be in-sync so that the implementation of cloud based ERP can be termed as successful.

Based on the previous research studies discussed above, lots of researchers used organizational factors, technological factors, people factors and project management factors

as their CSF. Therefore, researcher may use following research framework for this study which are relating to Sri Lankan SMEs in Manufacturing sector and further explore what are the factors which are in additions affecting to ERP implementation success; Organizational factors, Technological factors, People factors and Project management factors

3. METHODOLOGY

Qualitative research methods originated from various sciences like sociology, anthropology, and psychology and are able to deliver excellent results, according to Carol (2016). The responses were received from nine in-depth interviews conducted based on a scheduled plan with both clients and consultant over the phone. A thematic analysis was conducted in the data analysis. The popular CAQDAS NVivo software is used in the data organization and cross-analysis in the data analysis. What factors influence successful ERP implementation?This study is based on five consecutive cases, which are related to the manufacturing sector and industries like cosmetics, pharmaceuticals, agricultural, coconut, and tea. Selected five SME manufacturers, such as Phama, Coco, Tea Teste, Cosmatic, Agric-Chemi, etc..

Case study analysis – RQ 1
The normative and mimetic pressures, which are explained in the institutional theory and imply in the selection of ERP systems, are an important sub theme discovered by the analysis.

When clients are required to evaluate and select the right ERP systems for their organizations, choosing the software is just one piece of the puzzle. The next steps are to develop a comprehensive and realistic implementation plan and to identify the best ERP implementation partner to help make the selected software work for the business. As a result of that, most companies purchase the wrong things when choosing an implementation. For example, the number one priority that many companies focus on is the implementation partner's technical and functional experience with the ERP software. Evaluation factors such as software certifications, technical competencies, and number of implementations with the chosen software often rate high on the lists of executives. However, this is one of the least relevant aspects of choosing an implementation partner.

Phama manufacturer's product finance as stated by the client;

"There were some positive recommendations from one sister company about the ERP vendor, because, they already implemented ERP from this vendor successfully."
As per all above discussions had with managers and project managers most of the companies selected their implementation partner based on the previous ERP implementations company recommendations which is termed as references.

Technical evaluation: According to (Panorama Consulting Group, 2011), How company decide which ERP system to implement when internal bias and vendor enthusiasm threaten to sway the user? The best way to evaluate ERP systems is to weigh the strengths and weaknesses of each according to the six criteria; Deployment options, Scalability, Technical fit, references, return on investment and product viability.

This theme supported from the following quotations.

Product finance of Phama manufacturer stated from the client side
"We evaluated quotations based on the presales demonstration done by ERP vendor presentation. We checked whether our requirements are available or not. And checked the price also with the initial discussion."
When analyzing all these interviews researcher found that whole companies gave their priority to select the ERP product with considering whether the company requirement can be

fulfilling by the ERP system. And, they have done some cost comparison between larger ERP like SAP R3 version, oracle, and SAP Business one, Oracle NetSuite etc. The theme emerged out from this narration was named as technical evaluation.

Solution mapping: According to (Helpjuice, 2018) Knowledge management is the systematic management of an organization's knowledge assets for the purpose of creating value and meeting tactical & strategic requirements; it consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge. This theme can be supported from the following quotations. According to the Senior Application Consultant on the consultant side,

" Before doing the implementation we are doing requirement gathering and based on the requirement gathering we are doing solution mapping. Before that, we are identifying business process of the customer then doing the implementation. Then we do the requirement gathering and solution mapping of the client business process. So that, basically, as a consultant we have the general idea about the client business process and the business environment before going to the implementation. "

Basically, all above implementations were done by implementation consultants based on their standard ERP process knowledge. After they have done the system studies identified and mapped to the system specific requirement according to the industry requirements. Hence solution mapping become one of the important factors in the implementation of ERP system.

Communication plan: Communication plan is a policy-driven approach to providing stakeholders with information. The plan formally defines who should be given specific information, when that information should be delivered and what communication channels will be used to deliver the information. An effective communications management plan anticipates what information will need to be communicated to specific audience segments. The plan should also address who has the authority to communicate confidential or sensitive information and how information should be disseminated (email, websites, printed reports, and/or presentations). Finally, the plan should define what communication channels stakeholders will use to solicit feedback and how communication will be documented and archived. Business Solutions Specialist stated that from consultant side;

"There is an available resource for supporting purpose from their side. There was supporting person from their side, when, we are handover the initial project. Then, we have supported them over the phone and through email. Anyway, if there is any issue, our resources were available to the client support. "

According to all above five projects communication plan includes on-site support, support through over the phone and the emails and major communication through project manager who is involving both customer side as well as implementation vendor side.

RQ2: Under this technological factor, we discussed the technological factors which affect ERP implementation in Sri Lankan SMEs in the manufacturing sector and the following themes were elicited under the technological factors during the research study.

IT infrastructure: An ERP implementation is only as good as the infrastructure that lies beneath. If a company doesn't have an effective infrastructure, their ERP system won't be able to give the performance they need. Business Solutions Specialist explained from the consultant's side.

"They had infrastructure readiness already. That was not a big issue. because the client is already ready. They are using the cloud option. They have a separate IT and ERP team. They solved the technical issues then and there. We

did not want to worry about it. We had good support from the client side. "

As per above discussion which had with both client and consultant most of companies doesn't have any infrastructure issue when implementing ERP project. Because initially all the companies had infrastructure readiness already. Some companies used inhouse servers and some companies used cloud servers.

Minimal customization: Panorama Consulting (2011) "No customization" is one of the most common mantras we hear about ERP systems among our global client base. As ideal as a zero-customization ERP implementation may sound, the unfortunate fact is that most organizations customize their ERP systems—at least to some degree. While most executives want to manage their implementations by simply using basic configuration, setup, and personalization of the software, an overwhelming majority end up making fundamental changes to the source code.From what the consultant said from the consultant's side

"There were no big customizations like developments or addons. We have tried to go with standard SAP. There were some minor changes."

According to the Senior Application Consultant on the consultant side,

"There were no big customizations in the production module. We have used the standard one. In addition, we also give sales and finance. There were some small changes in the sales module, and we made them. Actually, there were two consultants on this project. I did the manufacturing part, and another consultant did the sales and finance part. "

Most projects have had minimal customization and have tried to give the standard ERP to the customer.

According to the previous literature, adequate IT infrastructure and minimal customization have already been discussed, and those findings match with the previous literature. The above discussed themes can be summarized by the following diagram;

RQ 3: Researcher discussed what the people factors affected ERP implementation in Sri Lankan SMEs in the manufacturing sector, and the following themes emerged under the people factors during the research study.

Education and training: End-user education is one of the most important aspects of an effective ERP implementation. Most ERP projects fail due to people-related issues. It is essential that companies allay the fears of their staff about the implementation of the ERP system and provide clarity about their changed roles and responsibilities. Organizations also need to ensure that their people are well-trained to use the software effectively (CommLab India Bloggers, 2016).

Phama manufacturer's product finance was stated from the client side.

They gave us sufficient training and they gave us on the job training as well. They had a dedicated consultant for training. "

Business Solutions Specialist stated from consultant side, when it comes to education and training, most of the parties received sufficient education and training on the UAT stage, backlog stage, and finally on the live run stage also. Most of the customers are satisfied with education and training.

Users' involvement: User participation in the development of the system can enhance understanding and commitment to ERP implementation success. User involvement in determining ERP system requirements creates a positive attitude among internal customers towards the ERP system as they are an active participant in the development and change process. (Zhang *et al.*, 2004).

Phama manufacturer's product finance was stated by the client;

"In the manufacturing department, they had previous experience with ERP implementation and they knew how to be involved with system implementation.

The researcher found that there was some resistance at some points. But, most of the users are positively involved in the ERP implementations because they have identified the benefits of the new ERP implementation and top management forces them to use the new system.

Consultants competency: This can be included, knowledge of the importance of the integrated nature of business processes, knowledge of the typical business processes and activities in an organization, ability to map organizational business processes with those in ERP, the ability to configure ERP for implementing the relevant module, the ability to determine the appropriate approach for implementing ERP, the ability to map the organizational structure with the ERP elements, implementation knowledge

(the knowledge of activities associated with installing ERP software, testing software and training), ability to prepare management reports from ERP (Scholtz, Calitz, & Cilliers, 2011)**.**

Product Finance (A) of Phama manufacturer said from client side;

"In additions, as a system, I am very happy with SAP business one. But, the problem is implementation vendor expertise. They did not guide us very well. There is no any issue with SAP business one as a ERP system. Only the issue is implementation team is week."

Manager - System support of Cosmetic beauty manufacturer stated from client side;

"Other, key factor for ERP implementation success is mapping the business into the system. If I take mapping process, vendor did almost 99% mapping correctly. If it's not done correctly, application will not be effective"

According to this theme we can identify competency of consultant is very important factor in under people factor. Because, as per the product finance of Phama manufacturer they couldn't gain in-depth knowledge about SAP Business one ERP because, consultant doesn't have much knowledge and experience. On the other hand, Manager - System support (F) of Cosmetic beauty manufacturer says that, their project succeeded because consultant is capable and having more knowledge and experience.

Client commitment: If there is a high commitment from client side (both management and users) ERP implementation project can be success.

Manager - System support of Cosmetic beauty manufacturer declared from client side;

"I can't say, its 100% success. But its success above 95%. We are using this ERP because of this successfulness. There were some small issues with reporting areas. If I take overall, without user error, there is no any issues with the system and the application level. If we take ERP project success or failure, there should be a commitment in all level. Other thing is, if vendor, or client giving any promise, they should deliver those on time from both side. If there are any resource allocation changes, it will be negatively impact for the project."

Consultant commitment*:* Implementation consultant commitment also should be their when implementing a new ERP system.

Business Solutions Specialist expressed from consultant side.

"If I take overall, this project also a challenging project. A new challenging project that I faced. If it is industry same, there were some unique point which can be change according to this client. So, we have tried our best carried out by using minor customizations. We wanted to give client to chance to enjoy standard SAP facilities. We

have worked late hours also. Finally, we went to the final target, cut off data. It's a challengeable project. But, we have faced it successfully, finally, bring it to the end of the project. Therefore, we can say it as successful project. "

Business Analyst said from consultant side;

"Initially, time was exceeded. Some development came. IFS also didn't believe that, we can do it. Because, we were new team. Our only issue was inventory opening balance issue. Somehow, we did the reconciliation in next year from live run year and other process also going live without having any issues now. Now, we can say its success."

When considering consultant commitment, they may work late hours. They may learn and study new things, new process. Hardworking, additional working hours. Those are the things that can be identify.

According to the previous literatures, Education and training, User's involvement, Competency of consultants, Client commitment are already discussed, and those findings are match with previous literatures.

But Consultant commitment can't find in previous research hence this is a new finding. Above discussed themes can be summarized by following diagram.

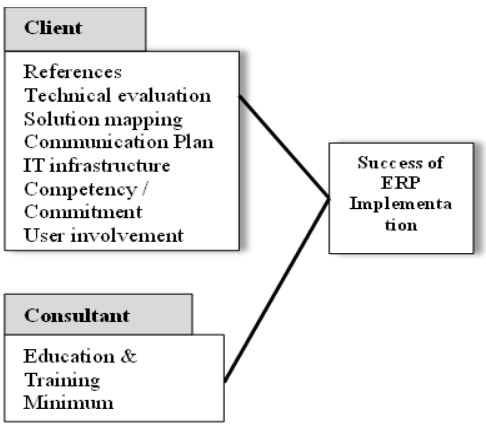

Figure 1. Mapping of success factors

4. CONCLUSION

Barbera (2015), ERP (Enterprise Resource Planning) is a business management software that allows an organization to leverage a suite of integrated applications to streamline and automate processes, creating a leaner, more accurate, and efficient operation. ERP provides complete visibility into core business processes and optimizes systems through superior resource tracking and reporting, database management, data sharing, and overall improved information systems. ERP systems can allow businesses to expand without the addition of IT or staffing costs. ERP systems enable business growth. If a company is considering implementing an ERP system, upgrading an existing system, or even if they aren't sure if they need one yet, it's worthwhile to understand the benefits that an ERP system can bring to business. Gain real-time visibility across your entire business with 24/7 access. increase the ability to understand, monitor, and control various organizational systems with unprecedented access to all facets of business. ERP can enhance business in other ways as well. makes business more agile. In a rapidly evolving business climate, being able to respond to change is essential. A good ERP system is flexible, modular, and scalable enough to adapt to shifting market dynamics and changing customer needs. A company can initially implement specific applications that make sense now and add on seamlessly integrated applications as needed as business grows. It will dramatically increase efficiency and productivity. Inefficient spreadsheets, manual workflows, and outdated software can inhibit business growth. An ERP system can streamline an entire organization and put company data all in one place, enabling more accurate reporting and a more efficient, collaboration-based, and data-driven work environment. Save on unnecessary costs. Running a business with an ERP system creates efficiencies that make a business leaner as it grows. Many businesses report that they are able to expand without adding additional staff or IT costs. The cost of implementing an ERP system is easily eclipsed by the ROI of a

more efficient, fully optimized business environment. Improve security and accessibility while reducing risk and hardware costs by moving ERP to the cloud. Embrace the future of information systems with a modern ERP hosted in a secure cloud. Moving ERP applications to the cloud allows companies to scale, extend, and upgrade quickly. It also increases visibility and accessibility even further, taking full advantage of an ERP system's capabilities. Gain a professional partner. When a company upgrades to an ERP system, it also gains the partnership of an ERP implementation provider and all the support – from implementation and training to software support to community membership – that they have to offer. Some ERP systems have dedicated user groups and communities that open up entire networks of industry innovators and dynamic brands. Grow business. An ERP system can eliminate inefficiencies, waste time and wasted resources, empowering businesses to thrive and flourish.

5. RESEARCH CONTRIBUTION

These research findings can be useful for theories of ERP implementation success factors and students seeking ERP knowledge, as well as future researchers.The findings of this research and the suggested model will be useful for every SMEs in the manufacturing sector as well as other sectors in Sri Lanka that are going to implement ERP systems, SMEs in the manufacturing sector as well as other sectors which expect to re-implementation projects as well as parties. Moreover, when we are considering client-side participants, mainly management, they can use the newly implemented ERP system to take their decisions very quickly. Because, they can generate several reports and dashboards in any module at any time, which are linked with all related modules within a short time period, and can take decisions quickly based on those. On the other hand, from the user's perspective, a lot of manual work can be automated when they are working with an ERP system. So, they can save time and use their time effectively and efficiently. When considering the whole business process, productivity, efficiency, and effectiveness will be improved when considering before implementing the ERP system. Overall company growth will be increased after implementing the ERP system. And also, from the vendor's side, their reputation will be enhanced after completing a successful ERP project. Because the client will also recommend this vendor to other companies, it is a well-known ERP vendor in the industry. So, the ERP vendor can get more sales on this. When considering the whole economy of the country, when improving this ERP industry, Sri Lanka's service sector will considerably improve.

6. LIMITATIONS OF THE RESEARCH

This study is a cross-sectional study and it only represents the perspectives of respondents at the time of the interview. If it's a longitudinal study, we can find the respondents' different responses in different time gaps. On the other hand, the researcher conducted these interviews over the phone due to some issues. If there was any capability to meet each client and consultant in their office locations or any suitable locations, the researcher could gain more reliable and detailed data from the respondent than gathered details. On the other hand, this study is limited to the Sri Lankan manufacturing sector on a small and medium scale only. It doesn't consider service industries, large scale enterprises. **Future directions:** Future researchers may focus on finding out the level of practice of identified factors with respect to different industries. If future researchers can do longitudinal studies in different time gaps like pre-implementation, implementation, and post-implementation, the resulting data will be more detailed than this kind of cross-sectional study. Researchers discussed only two factors under technological factors and only one factor was discussed under project management factors. But, previous researchers have proposed many sub factors under technological factors and under project management. Therefore, future

researchers can find more factors under these two.

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