Why Selecting an Open Source ERP over Proprietary ERP?
A focus on SMEs and Suppliers perspective

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Author: Nasimul Huq
Syed Mushtaq Ali Shah
Tutor: Daniela Mihailescu
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Nasimul Huq               Syed Mushtaq Ali Shah

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Abstract

Introduction: Open Source ERP is considered as a viable alternative of proprietary ERP paradigm. Open Source ERP is getting more and more acceptance among Small and Medium Sized Enterprises (SMEs) recently. Majority of Proprietary ERP vendors are changing their strategy nowadays and extend their focus on SMEs, even though SMEs are not that interested in Proprietary ERP systems. The factors that may motivate SMEs to select an Open Source ERP over proprietary ERP are not identified empirically in previous researches. Few researches raised the issue of cost and thus proposed that Open Source ERP is appropriate for SMEs. The other factors than cost involved in the selection process are yet to investigate empirically.

Purpose: The overall purpose of this thesis work is to contribute in knowledge domain of Open Source ERP. Open Source ERP is an emergent area but it has the potential to attract many organizations to implement this kind of ERP Systems. The issue under investigation throughout this research will be the selection process of Open Source ERP in Small and Medium Sized Enterprises (SMEs). The focus will be to identify mutually most important factors, from the perspective of SMEs and Suppliers that may motivate the Small and Medium Sized Enterprises (SMEs) to select OS ERP.

Method: Data obtained from the respondents is quantified in the research. Information gathered from the SMEs who have implemented Open Source ERP and from the Suppliers through web based survey. Two separate questionnaires comprised of various questions related to different factors in selecting of Open Source ERP solutions were made and sent to both SMEs and Suppliers of Open Source ERP. Opinion from an Open Source ERP expert is obtained regarding different factors motivate SMEs to select Open Source ERP. The results obtained from respondents through empirical findings were analyzed thereafter.

Conclusions: SMEs were investigated regarding the importance of various rationales when they were selecting Open Source ERP solutions. The degree of importance of various factors in selection process might be diverse from organization to organization. It might be dependent on the size, geographical location of the organization or many other issues. Despite all this, there might be some common factors that may be always considered as foremost factors which influence SMEs to select an Open Source ERP over proprietary ERP.
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List of abbreviations used

OSS = Open Source Software
ERP = Enterprise Resource Planning
OS ERP = Open Source Enterprise Resource Planning
SMEs = Small and Medium Sized Enterprises (SMEs)
FOS = Free/Open Source
1 Introduction

This section will explore the background of the study, the problem discussion, research questions, purpose of study, delimitations of the research and outline of thesis work.

1.1 Background

In today’s information age, the use of computers in any organization is fundamental. We use computer in each and every aspect of our lives. Anybody who wants to succeed in today’s world cannot afford to ignore computers and information technology. Any industrial, business or administrative organization comprises of different components such as employees, business processes and the machinery equipment etc. It is essential to manage and utilize these components in order to achieve the desired goals. The management and utilization of these components is possible only if the managerial authorities are provided with the full information about the availabilities and capabilities of all components. For this purpose Information Systems (IS) was introduced in an attempt to gather required information and store it for efficient running of the organization in order to achieve its goals. Later on the demand arose to focus on development of some sort of information systems which would be integrated, cross functional and could work efficiently across organization (Motiwalla & Thompson, 2009).

Markus and Tanis (2000) explain how the need for such integrated systems emerged. The authors point out that “the 1970s vision of a single integrated information system for the enterprise remained a mirage for the majority of computer-using organizations” (p.174). Software entrepreneurs at that time started developing integrated software packages in which multiple functional applications can share a single common database. They succeeded in their mission and finally they came up with such systems/packages known as Enterprise Resource Planning (Markus & Tanis, 2000).

According to Kumar and Hillegersberg (2000), ERP systems initiated in manufacturing industries and it was the first generation of ERP system. The authors further point out that the development of first generation of ERP system was an inside-out process, expanded and developed from standard inventory control (IC) packages, then turn into material requirements planning (MRP), and further to material resources planning (MRP II). Then the ERP systems advanced to a software package that aimed to support the entire organization described as the next or second generation ERP system branded as ERP II system(Kumar & Hillegersberg, 2000).

In the mean time the Open Source ERP also came into the market. According to Hars and Qu (2002), Open Source software derived back to 1950s and 1960s. The authors mention, during that time macros and utilities were freely exchanged in User Forums when software was sold. ‘However, the real impression of Open Source software was probably noted when Richard Stallman founded the Free Software Foundation (FSF)
which provided the academic foundation for Open Source software’ (Johansson & Sudzina, 2009; p.651). Open Source software is a special kind of software development, design and distribution method. It allows access to source code. It became popular with the rise of internet. Anyone can use, modify and redistribute the Open Source software and the access to the source code provides more freedom to users to reconstruct or modify the code according to their own needs so that the software best fits their requirements (Wheeler, 2007). Usually communities of users and developers having collaboration through internet communicate, design and develop Open Source software. Contributors from different parts of the world may contribute. The communities have capabilities to change project source code and they have regular code contribution among themselves. The community reviews the contribution of the users and developers and accepts that one that fulfills the project standards.

Open Source software has got maturity. It has strength in many areas like - Operating Systems, application servers and security tools (Bruce, Robson & Spaven, 2006). With the passage of time different types of Open Source software came into the market, so as the Open Source ERP also emerged. Bruce et al. (2006) refer this as third wave of Open Source software adoption. The authors further mentioned that Open Source is strong in business applications areas like ERP, CRM, content management and Business Intelligence. Valkov (2008) refers Open Source ERP as a system for innovative businesses aiming for global collaboration. Some of the well known Open Source ERP Solution providers are-Compiere, Opentaps, ERP5, OpenERP, WebERP, xTupple, Openbravo, JFire and vTiger.

1.2 Problem Discussion

The ERP systems have rapidly become the de facto industry standard for replacement of legacy systems (Parr & Shanks, 2000). The global ERP applications market is growing at a fast rate and continues to grow due to an increase demand for integrated solutions. The ERP vendors are providing organizations with different applications for their requirements. Parr and Shanks (2000) explain that the vendors of these fully integrated software (ERP systems) offer software which is capable of processing all commercial functions of companies, even if they are diverse or geographically dispersed.

Despite the significance of ERP systems the reality is that ERP is a complex systems. The complexity comes from the reality that ERP systems are fabricated to integrate the organization in tow way i.e inter-organizational as well as intra-organizational, and its business processes in one group (Koch, 2001). Nowadays a majority of ERP vendors are changing their strategy and increasingly developing it to make their position strong amongst the SMEs (Bajaj, 2008). Only large firms have been able to enjoy the benefits of ERP systems (Cereola, 2000). On the other hand for the small and medium sized companies it is hard to deploy such ERP systems in their firms. Most SMEs operate in a highly dynamic world, where both internal and external requirements may change (Branzei
SMEs play an important role in the economy and it is a significant market to focus. That is why ERP vendors want to draw the attention of small and medium sized business with a number of offerings which can help SMEs to take full advantage of ERP without spending much time, efforts and manpower (Bajaj, 2008). Nonetheless, the requirements of the SMEs may be different from each other. With the changed strategy to create a center of attention of the SMEs the vendors came up with new ideas like- Application Service Providers (ASP), Outsource ERP systems and Pre-configured ERP Applications for SMEs (Bajaj, 2008). In spite of these efforts from ERP vendors, SMEs are still not deeply interested to consider Proprietary ERP.

According to Johansson and Sudzina (2009, p. 147), “There is no doubt that there is a great interest in Open Source”. The increasing interest in this field can be understood from the Open Source ERP Project registered in the ‘SourceForge.net’. It provides free hosting to Open Source software development projects, and it also provides with a central resource administrate projects, issues, communications, and code (Johansson & Sudzina, 2009). According to Johansson and Sudzina (2008), OpenBravo is the most downloaded and the only system that clearly describes with clear focus on SMEs.

Serrano and Sarreiegi (2006) argue that 12 SMEs successfully implemented Open Source ERP after evaluating proprietary ERPs and the interesting fact is that the adopting SMEs were not interested in Open Source license (cited in Johansson & Sudzina, 2008). This can also be understood from the client’s successful implementation cases of Compiere which is one of the leading players in the Open Source ERP market. Two of Compiere’s customers replaced their legacy ERP systems with Compiere ERP.

From the discussion so far it is obvious that the use and growth of Open Source Software in Enterprise Systems arena yet to be mentioned. Even in the academic sector there have not been so much research work done about different issues of Open Source ERP (Carvalho, 2009). Many important areas inside it are yet to study. It can also be said that cost is not the only fact, there might be quite a few other factors than cost involved in the selection process when organizations make a decision on adoption of Open Source ERP (Johansson & Sudzina, 2008).
1.3 Purpose
The overall purpose of this thesis work is to contribute in the knowledge domain of Open Source ERP. Open Source ERP is an emergent area but it has potential to attract many organizations to implement this kind of ERP Systems. The issue under investigation throughout this research will be the selection process of Open Source ERP in Small and Medium Sized Enterprises (SMEs). The focus will be to identify the most important factors that may motivate the Small and Medium Sized Enterprises (SMEs) to select OS ERP. For this, perspective of both Users (SMEs) and Suppliers (Vendors/Consultants) of OS ERP as well as the potential difference between their perspectives will be analyzed in this research. The ultimate purpose will be to identify mutually most important factors while selecting an OS ERP system. Consequently the research question will be investigated in this study.

1.4 Research Question
The research question gives us a clear direction for investigation throughout our research. In order to fulfill the purpose of this research the following research question is formulated:

Q. What are the most important factors from the perspective of users (SMEs) and Suppliers in Open Source ERP selection?

1.5 Interested Parties
This paper is an attempt to provide information to those who are interested in Open Source ERP concept and issues related to its selection, and to those who are interested in using these OS ERP solutions. The paper will not only benefit the SMEs but will give the insight about such solutions to large organizations as well.

1.6 Delimitations
Most of the research works have some delimitation as they are limited to some restrictions. This research has delimitations as well. The study is based on those companies which fall under the definition of SMEs. Specific definition of the SMEs are tough to find as it varies and depends on criteria such as number of employees and turnover (Burgess, 2002). According to Deelmann and Loos (2002, p. 2214), “The acronym SME (Small and Medium sized Enterprise) tries to group a sort of companies, which are small and medium sized in a special way. Unfortunately this classification is not well defined.”

According to Europa (2003), definition of SMEs is based on a combination of following criteria: number of employees, independence, turnover and balanced-sheet total. In order to be considered as an SME an enterprise must have less than 250 employees and annual turnover not exceeding 40 million euro. A further basic criterion added in the de-
inition is “independence” which means that the firm cannot be owned by one or jointly by several large enterprise more than 25%. The differentiation of SMEs can be understood clearly from the following table.

**Table 1.1 EU official definition of SME**

<table>
<thead>
<tr>
<th>Enterprise Category</th>
<th>Maximum number of employees</th>
<th>Maximum annual turnover</th>
<th>Maximum annual balance sheet total</th>
<th>Maximum % can be owned by one or jointly by several large enterprise.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Small</td>
<td>9</td>
<td>7 million Euros</td>
<td>5 million Euros</td>
<td>25%</td>
</tr>
<tr>
<td>Small</td>
<td>49</td>
<td>40 million Euros</td>
<td>27 million Euros</td>
<td>25%</td>
</tr>
</tbody>
</table>

According to the definition(2003) of Swedish Statistics Bureau (SCB), a company is typically categorized as SME when it has maximum 199 employees.

This research work will not be able to provide empirical findings collected from the Small and Medium sized Enterprises(SMEs) which fall under a single definition of SMEs. As there is lack of statistics about Open Source ERP users i.e. SMEs in particular area or country, a single definition of SMEs cannot be used.

**1.7 Outline of the thesis**

This section is set up to give readers a brief overview of the thesis. The scheme here outlines the basic theme of each chapter i.e. from chapter 1 “Introduction” to chapter 6 “Conclusion”.

**Chapter 1 - Introduction**

This chapter provides the background of the study. Moreover this chapter also discusses the research problem, research question, the purpose of study and delimitations of the thesis.

**Chapter 2 - Frame of Reference**

Different concepts related to Enterprise Resource Planning systems and Open Source are discussed in this chapter. Furthermore related work in the field of Open Source ERP is elaborated and a concluding framework for the study has been presented.

**Chapter 3 - Method**

This chapter explains various research concepts, the way data is collected and will be analyzed. By explaining research concepts a description of how the research is conducted is provided there.
Chapter 4 – Empirical Findings

This chapter summarizes the results obtained from respondents through empirical findings. The results include the perspective of both users and Suppliers of the Open Source ERP systems. In addition to that perspective of the Open Source ERP expert is also mentioned.

Chapter 5 – Analysis

This chapter aims at analyzing the empirical findings in order to find out the answer of the research question. The analysis reviews the results critically and displays patterns related to the theory derived from the frame of reference.

Chapter 6 – Conclusion and Future Studies

This chapter discusses the main findings obtained from the research. The reflections are made based on the obtained results and analysis; and the recommendations for future studies are encompassed.
2 Frame of Reference

This chapter focuses on describing various concepts including Enterprise Resource Planning systems and Open Source. The concept of Open Source ERP and different issues related with it have been elaborated. In addition to that the probable motivating factors for SMEs in selecting Open Source ERP solutions have been accentuated. The different definitions, concepts and the related work in the field of Open Source ERP is discussed here to help us in presenting the concluding framework for our study.

2.1 The concept of Enterprise Resource Planning (ERP)

Motiwalla and Thompson (2009) argue that information systems need to have integrated data, applications, and resources from across the organization. The authors explain that to accomplish this, the integrated information systems are needed today to focus on customers, processes efficiency, and to help build teams that bring employees together from different functional areas.

An Enterprise Resource Planning (ERP) system is an integrated software system that manages the mainstream operations of an organization. ERP is often defined as standardized packaged software designed to integrate the entire value chain in the organization (Hall et al., 2004, Rolland et al., 2000). According to Alshawi et al. (2004), “What is different about ERP systems is that they integrate across functions to create a single, unified system, rather than a group of separate, insular applications”. Davenport (1998) defined ERP as a commercial software package that assure the seamless integration of all the information flowing through the company’s financial, accounting, human resources, supply chain and customer information.

Kumar and Hillsigersberg (2000, p. 23) have a similar definition to Davenport’s (1998), “ERP systems are configurable information systems packages that integrate information and in-formation-based processes within and across functional areas in an organization”. Tadjer (1998, p. 40) describes ERP as “One database, one application and a unified interface across the entire enterprise”. ERP systems are comprehensive software applications that support critical organizational functions. These integrated information systems support enterprise functions like accounting, financial, marketing, and production requirements of organizations. This allows real time data flow between the functional applications (Motiwalla & Thompson, 2009).

Wier et al. (2007) argue that the aim of ERP systems is to incorporate business processes as well as ICT into a coordinated set of procedures, applications and metrics that can work over the boundaries of firms. ERP systems are all inclusive applications that can perform specific critical organizational functions. It makes the information flow smooth and dynamic. The purpose is to make the information flow instant and eliminate data redundancy, and to add more flexibility. It allows different units of the organization
to come under one infrastructure. The data integration allowed by the ERP empowers the reusing of the data across all the systems.

Motiwalla and Thompson (2009) discuss that the goal of ERP is to integrate departments and functions across an organization onto a single infrastructure that serves the needs of each department. The authors further explain that an ERP system combines all units of an organization together into a single, integrated software environment that works on a single database, thereby allowing various departments to share information and communicate with each other more easily.

### 2.2 The concept of Open Source Software

At present the use of Open Source software is obvious in almost every field as Open Source Software programs licenses give users the freedom to run the program for any purpose, to study and modify the program, and to redistribute copies of either the original or modified program (Wheeler, 2007).

Open Source Initiative (OSI) is a nonprofit organization work as a standards body for maintaining the Open Source definition to serve the software community. According to their definition Open Source means access to the source code but it should comply the following characteristics as well.

**Free distribution** – means that there should not be any restrictions on a party from selling or distributing any component of a software and shall not require any fee for sale.

**Source Code** – the program must include source code and it must be in a readable form so that a programmer could modify the program.

**Derived Works** - the license must allow modifications, other derived works and distribution of such work under the original license terms.

**Integrity of The Author’s Source Code** – the license may restrict source code that modifications are distributed as ‘patch files’. In addition the license should contain that derived works and hold a different name or version number from the original software.

**No Discrimination Against Persons or Groups** – means that the license must not discriminate against any person or group of persons.

**No Discrimination Against Fields of Endeavor** – It should not restrict the program from being used by someone in a business or for genetic research.

**Distribution of License** – the rights of a program must apply to all those to whom such program is redistributed.
License Must Not Be Specific to a Product – the license should have the same rights to all parties to whom the program is redistributed and that are granted in conjunction with the original software distribution.

License Must Not Restrict Other Software – there should not be any restrictions on other software that is distributed along with the licensed software in a license.

License Must Be Technology Neutral – the license should not contain any prerequisite on any individual technology or style of interface.

Those software licenses that fulfill the above conditions can obtain certificates from OSI and after being certified by OSI may use their certification mark.

People often misinterpret the term Open Source which they believe refer to freely available software and that they can modify or distribute it without any restriction, while the reality is not like this. There are certain types of Open Source software. According to Riehle (2007) there are two types of Open Source software, known as community Open Source and commercial Open Source. Riehle (2007) clarifies that the Community Open Source is software developed by a community while commercial Open Source software is developed and owns for some revenue. The author further discusses that in the case of community Open Source a broad community of volunteers which includes individual developers decide which contributions should be accepted in the source code base and where the software is bearing. On the other hand in commercial Open Source case a company opt what should be included in software code base. In this type of software the company maintains the copyright and make a decision to implement something in it.

Riehle (2007) formulates that in the community Open Source software case no market entry hurdle is present, and therefore given the right license, anyone can set up a company and start selling software which is not in the case of commercial Open Source where market entry barrier exists. According to the author in commercial Open Source case, the interest is not in selling software, instead they sell its provision, maintenance, and support to end users.

2.3 Open Source ERP Systems

The term Open Source ERP is difficult to explain precisely due to an amalgamation of many broad concepts. No agreed or specific definition of Open Source ERP was found during the literature review. Rather it is defined in the context of Open Source and ERP collectively. The literature review revealed that Open Source ERP got acceptance might be organizations were confronted with problems while using Proprietary ERP systems or Open Source phenomenon got maturity (Johansson & Sudzina, 2008). Valkov (2008) discusses problems of traditional ERP systems and illustrate that current commercial
ERP software models are too complex, hard to extend or update which leads to high costs, big development efforts, and redundant data structures. The author further argue that the integration and implementation are too complicated, sluggish, costly and unable to meet the needs of clients in most of the cases.

Joseph et al. (2005) elucidate that current commercial ERP systems development is facing a lot of unresolved problems with less available solutions to solve them properly. The reasons is that the software development models have not changed much in the last decades. Johansson (2008) explains that vendors of Proprietary ERPs face various challenges, which they should tackle of if they want to remain in business market in upcoming times. The authors illustrate that the question, whether or not Open Source software can serve as a useful input to manage future challenges engender by current proprietary ERP systems.

Kim and Boldyreff (2005) explain that Open Source ERP is still in its infancy but the Open Source Software community has started to move into ERP sector. The authors further discuss that because of the complexity associated with large corporations of their business processes, Open Source ERP might never be suitable for them, while SMEs are more suitable candidates for it as they can more easily adapt themselves to ever changing business environments.

Dreiling et al. (2005) argue that dissatisfaction with Proprietary Enterprise Systems can be explained by the relation between developers and users, which is in favor of developers and the proprietary nature of software licensed to organizations is a significant cornerstone for that. With various successful Open Source development initiatives the Open Source software development provides a viable alternative to proprietary development of Enterprise Systems. Soh et al. (2000) describe that problems of ‘misfit’ persists in adopting software package, which means that there is a gap between the functionality offered by the package and the functionality required by adopting organization. This gap can be trounced by the Open Source phenomenon. Valkov (2008) emphasizes the importance of the concept of Open Source ERP system and refers to it as an innovative business platform which is based on global collaboration. Herzog (2006) illustrates that Open Source ERP has less than 5 percent of the business software market. Although there is opportunity for expansion of this kind of software, most of the Open Source solutions are too small and there target groups includes mostly SMEs.

According to Johansson and Sudzina (2008), observing the number of downloads of the Open Source ERP software’s in recent years, reveals increased interest of organizations in this sort of software. The authors acknowledge that although the number of downloads does not give any confirmation of the adoption of the Open Source ERP by organizations, it might be assumed that the rate of adoption will increase with the increase of downloads. According to them, examination of number of downloads of six
different Open Source ERP solutions indicates that at this moment the SMEs are more interested in using these Open Source ERPs.

2.4 Factors that motivate SMEs to select an Open Source ERP

In this section past studies were reviewed to identify the factors motivating SMEs to select Open Source ERP System. For this purpose main Critical Success Factors(CFS’s) that are related to selection of the right ERP package matching the organizational needs have been reviewed. The factors that have influence on selection due to the openness of the ERP Systems and are related to organization size to the organizational size have also been identified.

As the purpose of this study is to identify the factors that may motivate SMEs to select Open Source ERP systems, all the factors are selected considering its effect on organizational size and Openness of the ERP Systems. From the review of these factors in the literature a model is proposed. In the light of that model the empirical investigation is conducted.

Deploying an Enterprise Resource Planning (ERP) system is a significant decision for the company that affects the future performance of the company (Wei et al.,2005) and it has effect on the strategic position of the company (Stefanou, 2001). Due to the complexity in the business environment and variety of ERP offerings, the selection process of ERP systems is somehow tedious and time consuming (Wei et al.,2005). ERP systems architecture are not appropriate for all the business requirement (Sarkis & Sundarraj, 2000; Teltumbde, 2000; Hong & Kim, 2002; Wei et al.,2005). Therefore it is very important for the companies to choose a flexible ERP systems and a cooperative vendor that in turn can be responsive to the customer needs (Wei et al.,2005).

SME’s are evident to be different than the large organizations in their practices. There are also differences between large organization and SME’s in terms of the selection process of an ERP system (Bernroider & Koch, 2001). These different organizational practices and unique business processes of SME’s cause them prioritizing different factors while selecting an Open Source ERP (Baki & Cakar, 2005). The factors that affect the selection process of an OS ERP by the SME’s can be categorized in to three categories. Factors that are critical for successful ERP Implementation , Factors related to organizational size, and Factors related to openness of the ERP software.

2.4.1 Factors that are critical for successful ERP Implementation

ERP systems automate core activities of the organization by re-engineering core business activities or by making adjustment in the software according to organizations requirement (Holland & Light, 1999). The successful implementation of ERP system promises huge benefits but the disastrous effect of it is also built-in it (Vidyaranya et al., 2005). Hence selection of appropriate ERP systems is really important for the organization.
Among the previous literature on the Critical Success Factors (CSF’s) of successful ERP implementation one of the main CSF’s is the ‘Selection of the Right ERP Package’ itself matching organizational needs and implementation partner (Nah et al., 2001). Somers et al. (2001) in their study proposed careful package selection to be one of the most important critical success factors of successful ERP implementation. Luliana (2007) also argue that careful selection of appropriate package is one of the most important factors for successful ERP Implementation. A closer look on to the literature identified more factors that are directly related to the ‘Selection of the Right ERP Package’.

Al-Mashari et al. (2003) grouped the critical success factors in three phases. In the implementation phase ERP Package selection itself is an important factor and ‘Training and Education’ is another important factor. The implementing organizations think about ‘Training and Education’ from the vendors/consultants before deciding to implement a particular ERP solution, because a particular challenge of ERP implementation is selecting an appropriate plan for Education and training for end user (Al-Mashari et al., 2003). Sia (2008) argued that the SMEs are evident to fail to achieve the benefits from the ERP project because of the lack of staff with appropriate education and training on technology related to the ERP systems. Hence it is an important that the implementing organization evaluates whether the vendors or Suppliers of ERP solutions provide enough training and education. Johansson and Sudzina (2009) also identified that it is an important selection criteria of Open Source ERP Selection.

Motwani et al. (2005) have described CSFs along three different steps pre-implementation, Implementation and Post-implementation throughout the lifecycle of ERP system. Among the CSFs they included ‘ERP Package selection that best fits with current business procedures’ and ‘Exhaustive analysis of current business processes’. Everdingen et al. (2000) in their study found best fit with current business procedures to be most important factor to be evaluated before the selection of the certain ERP Solution. As they mentioned, fit with current business process is the most important selection criteria for a new system. Johansson & Sudzina (2009) also identified it as an important selection criteria of Open Source ERP Selection.

‘Exhaustive analysis of current business processes’ in the Implementation step that allow the organization to identify if certain system fits with the current business processes or not and is also related to the ‘Business Process Reengineering (BPR) and minimum customization’ which is also one important Critical Success Factors of ERP implementation (Loh & Koh, 2004). Al-Mashari et al. (2003) mention that taking full advantages from ERP implementation requires Business Process Reengineering (BPR) and it is achieved through a ‘Exhaustive Analysis of Current Business Processes’. It helps to identify potential changes in the Business Processes to avoid customization of the software.

Loh and Koh (2004) found several Critical Success Factors of ERP implementation in the SMEs based on four implementation phases. Among those factors ‘Business Process
Reengineering (BPR) and minimum customization’ needs to be evaluated before selecting a solution. ‘Exhaustive Analysis of Current Business Processes’ is also related to it as mentioned by Al-Mashari et al. (2003). ‘Business Process Reengineering(BPR) and ‘minimum customization’ is more critical than having a business plan and vision (Loh & Koh, 2004).

‘Vendor Support’ is also one of the most important critical factors mentioned by Somers et al. (2001). Johansson & Sudzina (2009) in their study found it to be one of the most important selection criteria in selecting an Open Source ERP system. It is also evident to be importantly related to organizational size as Sia (2008) mention ‘Vendor Support’ to be important to the smaller organizations as they lack educated and trained staffs.

Based on the literature review following critical success factors have been identified:

**Training and Education:** Training from Suppliers (vendors/consultant). Type and amount of training depends on the ERP solution that the implementing organization is going to implement. For training organizations depend on Suppliers(vendors/consultant) but in terms of Open Source ERP this service can be found from community as well (Johansson & Sudzina, 2009).

**ERP Package selection that best fits with current business procedures:** While selecting the ERP solution for the organization it is important to select one that best fit with organizational current business processes because it is not easy to change in the software and it seems problematical for both Open Source and proprietary ERP (Johansson & Sudzina, 2009).

**Exhaustive analysis of current business processes:** The organization should thoroughly analyze the current business processes as it provides them with information that which ERP solution fits Processes of the organization and what business process needs to be re-engineered (Al-Mashari et al., 2003).

**Business Process Reengineering(BPR) and minimum customization:** It is an important factor because the organization’s business processes need to fit with the new system in order to get maximum benefits and it is critical to align business process with the system implementation (Nah et al., 2001).

**Vendor Support:** Vendor Support should be taken in to account while selecting the ERP Solution (Nah et al., 2001). In proprietary ERP customers are locked with single vendors or Suppliers for support. On the other hand, in case of Open Source ERP support from Suppliers and large community which can support in implementation (Johansson & Sudzina, 2009).

## 2.4.2 Factors related to organizational size

The criteria for the selection of a particular ERP systems show different priorities related to the organization size (Baki & Cakar, 2005). Bernroider and Koch (2001) studied the selection criteria of the ERP systems among SME and large organization.
Total 29 different ERP selection criteria were used but only 12 criteria were evident to have strong association with organizational size (Bernroider & Koch, 2001). Their study indicates that only two factors are important for the smaller organizations and those two are ‘Short Implementation time’ and ‘Adaptability and flexibility of software’. While increasing organizational flexibility, process improvement, internationality and additional organizational ties with customers are evident to be less important to the SME’s (Bernroider & Koch, 2001).

Johansson and Sudzina (2009) describe Price of the software as one of the most important selection criterion. Wei et al. (2004) describe the Total Cost of ERP to consist of: price of the software, maintenance cost, consultant expenses, infrastructure cost, and mentioned ‘Implementation Time’ as a separate selection criteria. According to (Bernroider & Koch, 2001), a short implementation time results in lower cost. Johansson and Sudzina (2009) expressed implementation time as ‘Ease/speed of implementation’ and mentioned ‘Ease/speed of implementation’ as most important selection criteria of Open Source ERP solution.

Rao (2000) proposes that SMEs should focus on the ‘Affordability’ of the software including the attractive price and support. Rao (2000) also proposed ‘Domain Knowledge of the Suppliers’ and ‘Local Support’ from Suppliers in terms of IT expertise and domain knowledge as the criteria for the SME’s to focus on while selecting ERP system.

Accordingly the factors related to the organizational size identified in the literature are:

**Short Implementation time:** ERP Implementation is costly and company-wide project (Baki & Cakar, 2005). Implementation time is directly connected to strategy being followed and implementation time can also be changed with the implementation scope, while more customization needs more time and cost as described by Baki and Cakar (2005).

**Adaptability and flexibility of software:** Adaptability allows software to be modified as needed as the unique business processes need to be preserved. It also refers to how easy it is to customize the software (Bernroider & Koch, 2001). OS ERP gives unlimited access to the source code and increase the adaptability (Johansson & Sudzina, 2008).

**Total Cost:** Total cost includes price of the software, maintenance cost, expenses for the consultants and infrastructure cost (Wei et al., 2005). Johansson and Sudzina (2008) mentioned that Open Source ERP implementation reduces one third of the implementation cost then compared to proprietary ERP implementation, and it can reduce cost as the SMEs do not need costly and sophisticated hardware.

**Local Support:** Support from Suppliers includes support from vendors/consultant. It is important for the smaller organizations as they have the employees who lack the education and training on potential technology (Sia, 2008) and also in terms of domain knowledge (Rao, 2000).
**Domain knowledge of the Suppliers:** It is important for the Suppliers and developer to know the industry. If the organization is manufacturing industry, it should source the system from the supplier or vendor who has experience in that industry (Rao, 2000) and provides industry specific best practices (Stefanu, 2001).

### 2.4.3 Factors related to Openness of the ERP System

Free Open Source Software represent a viable alternative to proprietary systems from a software quality and reliability point of view (Tawileh, Rana, Ivins & McIntosh, 2006). Besides software quality and reliability, high flexibility and adaptability of Open Source ERP can also be an influential reason for selecting Open Source ERP (Raymond, 2005 cited in Johansson & Sudzina, 2008). Greater benefits can be obtained by deploying Open Source ERP than other Open Source software systems mainly due to three reasons: Increased adaptability, Decreased reliance on a single supplier and Reduced cost (Serrano & Sarriegi, 2006 cited in Johansson & Sudzina, 2008). Johansson and Sudzina (2009) reviewed ERP system selection criterion and represent a set of common ERP selection criteria and compared these criteria with respect to Open Source and Proprietary ERP Systems.

The following Table (*Table 2.1*) shows the Open Source ERP selection criterion adopted from Johansson and Sudzina (2009).

**Table 2.1 OS ERP selection criteria adopted from Johansson and Sudzina (2009)**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Meaning</th>
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<tr>
<td>Ease/speed of implementation</td>
<td>It refers to the required time to implement ERP systems. It also refers to how fast and easily an ERP systems can be implemented.</td>
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<tr>
<td>Price</td>
<td>Price of the ERP system licensing.</td>
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<tr>
<td>Vendor support</td>
<td>For proprietary user it is important as they are locked in one vendor. For OS support from vendor and large enough community which can support in implementation.</td>
</tr>
<tr>
<td>Reliability</td>
<td>Proprietary vendor tries to be highly reliable but Open Source community find an error faster and solve it quickly while for proprietary it is much harder because same people have access to code always.</td>
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<tr>
<td>Ease of use</td>
<td>Proprietary ERP tries to be more user friendly but community of users can make the OS ERP more-or-less acceptable for most of the users.</td>
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<tr>
<td>Customization</td>
<td>Customization of code is important in terms of OS though it is not the only feature of OS ERP systems anymore, now MS Dynamics AX allows certain level of customization but the others are still not customizable.</td>
</tr>
<tr>
<td>Integration</td>
<td>Proprietary ERP allows usage of Data Warehouse for integration but it is possible to be solved by customization in OS ERP.</td>
</tr>
<tr>
<td>Organizational fit</td>
<td>Checking the functionality of the potential ERP System. If it fits with the current organizational business processes.</td>
</tr>
<tr>
<td>Functionality</td>
<td>Proprietary ERP may offer more but in Open Source ERP they are less, may be easier to master them. Checking functionality of specific solution meets the needs or not.</td>
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<tr>
<td>Vendor Reputation</td>
<td>The reputation of the vendor in the market, how the previous customer evaluate them in terms of services.</td>
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<tr>
<td>Flexibility</td>
<td>How flexible the software is to change to fit with the business processes and according to the requirements.</td>
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<tr>
<td>Training</td>
<td>Education and Training from the vendors or the Suppliers for the key users in the implementing organization.</td>
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<tr>
<td>Upgrade</td>
<td>Upgrading Open Source ERP is free but Proprietary ERP customers have to buy upgrade or pay an annual fee.</td>
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These selection criteria show obvious difference between Open Source ERP and proprietary ERP and according Johansson and Sudzina(2009) these criteria needed to be studied further in order to determine specific Open Source ERP selection criteria.
Serrano and Sarriegi (2006) states that the most important benefits got from the Open Source software are mainly three: ‘Increased adaptability’, ‘Decreased reliance on a single supplier’ and ‘Reduced Cost’ (cited in Johansson & Sudzina, 2008). These three benefits are also important in selection of Open Source ERP (Johansson & Sudzina, 2008). The business that acquire proprietary ERP is the owner of that and the customers are locked in for support, change, upgrades and training (Johansson and Sudzina, 2008), while in terms of Open Source ERP ‘Vendor Support’ can be interpreted as having large community (Johansson & Sudzina, 2009).

Table 2.2 Summarize the result of the literature review: factors that influence SMEs to select an Open Source ERP.

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<td>‘Decreased Reliance on Single Vendor’</td>
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### 2.5 Concluding Framework

A theoretical model was developed based on the frame of reference discussed above for the factors that influence SMEs to select an Open Source ERP. The theoretical model includes all the probable factors that may motivate SMEs to select Open Source ERP.

- Critical Success Factors for both Proprietary and Open Source ERP implementation that are related to ERP selection or evaluated at the time of selection have been discussed in this chapter.
The Selection criteria that are related to organizational size have also been discussed. It is found that SMEs emphasize more on few criteria in ERP selection, while these criteria might be less important to larger organizations.

The factors related to Openness of the ERP systems have been discussed. It is also found to influence the ERP selection by the SMEs.

The model is a combination of these three types of factors. It shows the probable factors that may motivate SMEs to select Open Source ERP.

Figure 2.1: Theoretical Model for Open Source ERP selection by SMEs
3 Method

This chapter deals with various research concepts including research philosophy, research approach, available research methods and the way data is collected and will be analyzed. Using these concepts a description of how the research was conducted will be provided here.

3.1 Research philosophy

Galliers (1991) define research philosophy as a belief about the way in which data about a phenomenon should be gathered, analyzed and used. The author discussed two major research philosophies in the Western tradition of science, namely positivist also known as scientific; and interpretivist or phenomenological philosophy.

Easterby-Smith et al. (1991) explain some key features of these two philosophy paradigm alternatives in order to differentiate them. They identified positivist approach as the one in which the observer is independent, focus of research is on facts. Here the researcher formulates some hypothesis and then test them; and the preferred methods of research is usually done by taking large samples. On the other hand in interpretivist approach the observer is part of what is observed, researcher focus is on meanings, tries to understand what is happening by developing ideas and the includes investigation of small samples. Saunders, Lewis and Thornhill (2003) also supported Smith et al. (1991) by describing positivism as scientific based approach where researcher formulates a hypothesis from some theory, tests that hypothesis by experiment and then examines the results to confirm a theory or suggests for modifications. They describ phenomenological or interpretivist as a philosophy in which people experience some social phenomena in the way as they perceive.

For any sort of study we might to select among these two research philosophies. This study as it involves opinion of respondents and reflects mostly qualitative nature, using phenomenological (interpretivist) philosophy is more reasonable for it, because the data is mostly qualitative and it will be appropriate to develop ideas on that base. Hussey and Hussey (1997) identify that qualitative research takes the phenomenological philosophy because qualitative data is often rich by nature, and the gathering process is usually subjective due to the level of involvement of the researcher. Saunders et al. (2003) also explain phenomenological as a process where the researcher tries to understand what is happening and why it is happening. The phenomenological philosophy is applied in this study as the focus of research is to investigate the opinions of correspondents in selection process of Open Source ERP solutions.
3.2 Research Approach

Sekaran (2003) identifies two types of research approaches. These includes inductive and deductive. The author defined deduction as the process of arriving at reasoned conclusion by logical generalization of a known fact while induction is the process where certain phenomena is observed and conclusions are made on that basis.

In research mainly two broad methods of reasoning are referred known as deductive and inductive approaches (Burney, 2008). Deductive reasoning starts from more general to more specific, informally called top-down approach and conclusions are drawn logically from available facts; while inductive reasoning works from specific observations to broader generalizations, informally known as bottom up approach and conclusions are drawn on available facts (Burney, 2008).

Hussey and Hussey (1997) define deductive research as a study where some theoretical model is made and then is tested through empirical findings; in this way specific opinion is taken from general phrase. On the other hand in inductive research theory is formed empirical findings and in this general opinion is made from specific instances.

In this study mainly deductive approach has been used, having emphasis on identifying empirically all the rationales that influence SMEs to select Open Source ERP system. The aim is to identify all those factors that are of importance for SMEs to take into consideration while selecting Open Source ERP solutions.

3.3 Research Methods

“Research method refers to systematic, focused and orderly collection of data for the purpose of obtaining information from them, to answer a particular research problem or question” (Ghuari & Gronhuag, 2005, p.109).

The research methods are normally separated from each other according to the way the data is being collected and can be categorized as either ‘quantitative method’ or ‘qualitative method’. Malhotra (1996) explains quantitative research as a method which quantify the collected data and applied where study includes any statistical analysis. Quantitative research is a kind of specific research which involves large representative samples and relatively structured data collection procedures (Parasuraman, 1991).

Qualitative research involves investigating opinions, behaviors and experiences from the informant points of view. Walker et al. (2008) describe qualitative research as process to discover and explain the nature of some phenomenon and data obtained here is usually exhaustive, affluent and holistic. Quantitative research requires a huge amount of data to investigate and then conclusions are drawn on that basis. Maylor and Blackmon (2005) also illustrate that when a study includes statistical conclusion, it is appropriate to use quantitative research while if the research deals with processes that involves analyzing non-numeral information, it is better to use the qualitative approach. For this study there are limited number of respondents and we are dealing with
non-numeral information in the form of respondents opinion about factors that motivate SMEs in selecting OS ERP systems.

Sedmak and Longhurst (2010) argue that researchers in the field of enterprise systems normally prefer qualitative method. One reason might be that enterprise systems is considered as a complicated subject and it is difficult to formulate any hypothesis and to test them. This research investigates the opinion of respondents, although nature of study reflects it as a qualitative method but the data collected through empirical findings will be quantified to extract the information from results which are obtained and will be used for analysis of research thereafter. This signifies that the method of research is not quantitative itself rather focus of researchers will be to use qualitative reasoning for quantifying data. Ghuari and Gronhuag (2005) explain that quantification process can be applicable in qualitative research when the intend of research is to confine the frequency of definite events.

3.4 Research Strategy

Research strategy means that which research design alternative is used for study to solve the problem. There are a number of research strategies: surveys, case study, experiment, ethnography and action research. Research strategies are similar to literary genres, indicating very broadly the style of the work like a survey, an experiment or a case study (Thomas, 2004).

Sekaran (2003) also discusses types of studies having certain nature. The author illustrates that a study may be either exploratory, descriptive, or hypotheses testing. The exploratory study is used when there is little or no information available for a situation which is to solve; it is good for obtaining a well clutch of the phenomena of the interest while the descriptive study is used when the purpose is to describe the characteristics of the variables of the interest in a situation. Parasuraman (1991) defines descriptive study as the study which is used to produce data that describes the composition of relevant group including customers, salespersons, and organizations. Studies that includes hypothesis testing in order to explain the nature of certain relationships by certain factors are known as hypothesis testing studies (Sekaran, 2003).

This study will be exploratory in nature since Yin (2003) implies that if a research is dealing with new concepts and there is not enough material available for that, then exploratory study is applicable for this.

Thomas (2004) argue that using survey through questionnaires is a useful tool for gathering information on a wide range of topics. For this study survey was conducted using questionnaires to get opinions from wide respondents. Ghuari and Gronhuag (2005) also define surveys as a method for collection of data which utilizes questionnaire or interview tool; and is an effective technique to get opinions, attitudes and descriptions from respondents.
3.5 Data Collection

There are two types of data. One is primary data and the other is secondary data. Primary data is collected through data collection techniques like surveys, interviews and observations etc while secondary data is that which is already available to us in the form of books, journals etc. Sekaran (2003) defines that primary data is collected from the site where events are occurring while secondary data is obtained from existing resources.

Both types of data are used for conducting this study. The secondary data is obtained from multiple resources including books, academic journals, articles about Open Source and ERP systems, and websites of various companies that are developing or using Open Source ERP solutions through World Wide Web. The names of the company’s websites (both users and Suppliers), and various articles were obtained from opensourceerpguru.com and erpwire.com. Jonkoping Library search engine was also used for academic work.

The primary data is obtained from SMEs that are using Open Source ERP systems, vendors who are developing such solutions; and consultants who work on behalf of vendors and provide guidance to firms on Open Source ERP solution issues. Responsible representatives from various companies were contacted through mail. In this research survey in a form of web based questionnaires was used. Two questionnaires were made; one for SMEs and the other for Suppliers. These questionnaires were comprised of various questions addressing which rationales are most important in selecting an OS ERP systems for SMEs. The respondents were provided with multiple alternatives to choose from. These questionnaires were then sent to those companies who are using OS ERP systems and to Suppliers who are developing such Open Source ERP solutions. The aim for two separate questionnaires was to get the opinions of both users i.e. SMEs in their preferred reasons for selection of OS ERP solutions as well as to get the perceptions of the vendors and consultants that what they think about their customers preferences in selection of Open Source ERP solutions. In both cases Questionnaires had two versions. In the second version of the questionnaire for the SMEs 1 more option was added in the answer options of the questions. And in the second updated version of the Questionnaire for the Suppliers two more questions were added. These new versions were subsequently sent to SMEs and Suppliers. The questionnaires were considered as correctly completed when respondents answered all the questions in the questionnaire.

Questionnaires in both cases were web-based survey which is described by Williamson (2002) as technique to get fast responses at relatively low cost, and has the ability to acquire data from a widespread respondents. This was in our case since we have to obtain feedbacks from companies which were geographically dispersed. The survey questionnaires were made by using an internet based survey tool known as ‘kiwik
Surveys’ (https://www.kwiksurveys.com/, 2008-2010 ). Please refer to appendix (7) to view these questionnaire forms.

Individually an email was sent to all the respondents. The e-mails contained a letter describing the purpose of the survey, why the respondents were chosen and a web link to web based survey questionnaire. There are two questionnaires for the survey; one is for the SMEs who have implemented Open Source ERP and the other for the Suppliers (vendors/consultants) of Open Source ERP solutions. Both questionnaires were comprised of closed and open ended questions. Each questionnaire was split into two sections; where section 1 deals with basic information of the respondents while section 2 deals with importance of different factors in selection of Open Source ERP.

The email was sent to SMEs on 12th of April and to Suppliers on 19th of April. After one week on 18th of April, 2010 a reminder was sent to SMEs who did not answer the questionnaire.

Moreover a questionnaire comprised of open ended questions was also sent to an expert named ‘Prof. Rogerio Atem de Carvalho, D. Sc.’ who has adequate knowledge in the domain of Open Source ERP field. ‘Prof. Rogerio Atem de Carvalho, D. Sc.’ is a prominent researcher in the field of FOS-ERP. He is a consultant for the ERP5 FOS-ERP. He is a member and chair of the Brazilian Chapter of IFIP Working Group on Enterprise Information Systems and founder member of the IEE SMC Society Technical Committee on Enterprise Information Systems. He is also an Associate Editor of Enterprise Information Systems journal.

The aim for this was to get the insight of his opinion about various issues asked from both SMEs and Suppliers and to use the perception of expert in the analysis of results found through empirical findings. The opinion of Open Source ERP expert was collected by sending a questionnaire via e-mail.

3.6 Sampling

Population refers to the entire group of people, events, or things of interest that researcher wishes to investigate (Sekaran, 2003); while sampling is a technique of selecting a certain number of units from a total population (Clark & Hockey, 1981). Population for this study can be all the Small and Medium Sized organizations who have implemented Open Source ERP but population cannot be taken into consideration as all these companies cannot be accessed entirely due to some practical limitations such as there is no valid statistics in most of the countries about the number and list of the SMEs who have implemented ERP systems. In few countries there is statistics about the proprietary ERP implementation in the enterprises but it is not available when it comes to Open Source ERP systems. That’s why finding out the real number and list of the SMEs who have implemented Open Source ERP would be really troublesome and time consuming.
For example in case of Sweden statistics on all the registered companies are available to institution named ‘Government’s Statistical Bureau of Sweden’. According to the statistics of year 2008 from Government’s Statistical Bureau of Sweden, about 30 percent of the enterprises use an ERP systems to share information in the enterprises. It would be really problematic to find out who have implemented the Open Source ERP systems among those 30% SMEs and difficult to complete the study within the time frame allocated for this thesis work.

Ghuari and Gronhuag (2005) discuss that usually sampling is used instead of population for two reasons, i.e. cost and time. Similar argument is made by Sekaran(2003) that investigating the whole population would be practically impossible and even if this is not the case, it would be unaffordable in terms of time, cost, and other human resources. Furthermore studying a sample rather than the entire population would make it possible for researchers to generalize the characteristics to the population elements effectively Sekaran (2003). Saund et al. (2003) argue that sampling gives us different techniques to select a subset of population which represents the whole population.

There are two major types of sampling, i.e. probability and non probability sampling. In probability sampling, the elements in the population have equal chance of being selected and is used when the representatives of the sample are of importance in the interests of wider generalization. In non probability sampling the elements in the population do not have predetermined chance of being selected and is used when generalization is less critical and other factors like time are of importance. The drawback of this sampling technique is that generalization of results is limited (Sekaran, 2003).

Non probability sampling is either convenience sampling or purposive sampling. Convenience sampling is that where the respondents are conveniently available and is easy to access them for obtaining information. On the other hand purposive sampling is that where it is essential to get information from specific group of people who have more knowledge about certain facts (Sekaran, 2003).

For this study objective/ random sampling could not be taken because in that case the exact number and list of population of SMEs that implemented Open Source ERP would be needed. The list must be assigned with numbers and then statistical random sample could be taken from the list. That is why the non probability (purposive and convenient) sampling technique is used in this study. For taking responses from the SMEs the convenience sampling was used. Castillo (2009) explains convenience sampling as a non-probability sampling technique where respondents are selected because of their easy availability for research. The sample of SMEs has been selected in a convenient way from customer lists available on Open Source ERP vendors web sites. An email containing the link to the web based questionnaire survey (https://www.kwiksurveys.com?s=KIOHLN_f1e899b9) was sent to 50 SMEs who had
valid contact addresses on the web sites of Open Source ERP vendors. The same mail was also sent to ‘Community Mailing List’ of WebERP and OpenERP.

To obtain information from the Suppliers (vendors/consultants) of the Open Source ERP systems, purposive sampling technique was used. The reasons for using a purposive sampling technique for vendors/consultants have been numerous such as; there might be existence of many Open Source ERP names in the internet but most of them are just a project registered in ‘Sourceforge.net’. Many of them have websites but no evidence of having any customers or implementers. Statistical random sample technique could not been used in this case because there would have been a chance of selection of some Open Source ERPs that do not exist in reality or have no customer at all. That is why 8 vendors were selected purposefully who are prominent in the Open Source ERP market and who have cases of successful implementations. The purpose was to get trustworthy opinion for research. Polkinghorne (2005) describes purposive sampling as a technique when the focus is on obtaining rich information from more specific source rather than having a large amount of data. 20 consultants were selected based on the availability of their contact addresses from the website of those 8 vendors. The selection of consultants was also a convenient sampling.

An e-mail containing the link to web based survey questionnaire (https://www.kwisurveys.com?s=KIKL0M_cba7a44b) was sent to those 8 vendors and 20 consultants.

A total of 24 responses were received from all respondents including SMEs and Suppliers (vendors/consultants). They were divided into two groups. Out of 24 respondents, 14 of them were users of Open Source ERP and rest of them i.e.10 were Suppliers (vendors/consultants) who were developing Open Source ERP solutions or providing implementation support to their users. In case of Suppliers the second version of questionnaire that was sent to them. Two Suppliers did not provider their opinion on question about two new added factors.

The expert having knowledge about Open Source ERP issues was selected purposefully to acquire his opinion for investigating the results obtained. Polkinghorne (2005) explains purposive sampling as a technique to get rich information from respondents and where the researchers select the participants based on their willingness to explains their experience to researcher. The expert was selected since he has involvement in research and development of Open Source ERP for long and have adequate knowledge about Open Source ERP and was willing to participate in the research.

3.7 Analysis of Data

Data analysis is the process of ordering and organizing raw data so that it can provide useful information. Raw data in the form of surveys responses, or observations are not
greatly useful but when converted into information through data analysis it becomes useful (Smith, 2008). When data is obtained through sampling the next step is to analyze data, known as data analysis (Sekaran, 2003). The data analysis needs more attention and care when collected data is qualitative (Walker et al. 2008).

The study is qualitative and qualitative data in form of opinions of respondents will be quantified to attain the final results. For quantifying, the data obtained from the Respondent (SMEs and Suppliers of OS ERP) a 5 point Likert Scale (4=Very Important, 3=Important, 2=Less Important, 1=Not Important, 0=Don’t Know) is used and the mean value is taken to make a mean ranking in an ascending order of importance of the factors. Two different ranking of motivating factors of OS ERP were made based on the responds from the SMEs and Suppliers. In both cases results are formulated based on second version of questionnaire.

Two Suppliers did not provide their opinion for questions which were asked about two latest added factors in the second version of the questionnaire, and hence the mean value of importance for those two factors could not be compared with the mean value of importance from SMEs for the same two factors.

### 3.8 Credibility of Data

Walker et al. (2008) discuss that subjectivity affects qualitative research so credibility of data should be accentuated in this sort of research. Credibility can be enhanced by reducing wrong answers and paying attention on two important terms i.e. reliability and validity (Saunders et al. 2007). Carmines and Zeller (1982) describe reliability as a degree of consistency in measurements which are repeated for same phenomena while validity refers to the degree to which one measures what it supposed to measure. This indicates that reliability deals with consistency of results while validity with their accuracy. Ghuari and Gronhuag (2005) suggest that the researchers should present both questions and answers to ensure the reliability and validity. To ensure reliability and validity the questionnaires used in this study have been presented in the appendix and answers have been presented in the result section.

#### 3.8.1 Reliability

Joppe (2000) argues that the degree at which the results are steady over the time and the representation of total population is accurate can be referred as reliability. Carmines and Zeller (1982) describe reliability as a degree of consistency in measurements which are repeated for same phenomena. The aim of the literature review was to conclude with a model that will be extensive sufficient to categorize factors that may be important to SMEs in OS ERP selection. In order to increase the reliability extreme care was taken during the selection of previous studies of authentic authors and from reliable sources. The survey was comprised of questions which were based on the past reliable literature. The surveys were conducted among the reliable respondents. The respondents are
evidently existent in reality so the answers received from the respondents can be claimed reliable and trustworthy.

3.8.2 Validity

Holloway (1997) describes validity as a degree to which a tool measures what it is projected to measure. In qualitative research it refers to the degree to which the answers of a research are true and accurate. According to Saunders et al. (2003), it is called internal validity. On the other hand external validity refers to generalizability where the findings can be generalized or applicable to other population, times and settings (Saunders et al., 2003; Greenberg & Schroder, 2004). In this research the results were validated by sending the answers to respondents. In the data collection level the primary data collected is believe to be valid in the logic that the authors received information about the fact that was required for. In case of SMEs, though the samples included in this study is not big enough to represent total population, the diverse location of the SMEs and similar characteristics of the SMEs can be the reasons to claim generalizability of the results. In case of the Suppliers (Vendors/Consultants) it can be said that the result can be generalized as there are only few Suppliers (Vendors/Consultants) of OS ERP at this moment.

3.8.3 Triangulation

Patton (2002) discusses that triangulation should be used in order to have increased credibility (cited in Islam & Aleem, 2009). According to Foss and Ellefsen (2002), when researcher has to combine two or more theories, data sources, methods or investigations for studying a single phenomenon, this referred as triangulation in research terminology. Different types of triangulation techniques proposed by Patton (2002) represented in the Table 3.1 (cited in Islam & Aleem, 2009).

<table>
<thead>
<tr>
<th>Types of triangulation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodological triangulation</td>
<td>Reliability of findings achieved by different data collection methods.</td>
</tr>
</tbody>
</table>
**Triangulation of sources of data**

| Different data source within the same method.  
For example:  
- Observations with interviews,  
- Interviews with written material,  
- Peoples opinion in public and in private  
- If people are consistent and say the same thing over time. |

---

**Analyst Triangulation**

Multiple analysts to review findings.

**Theory/ Perspective triangulation**

Multiple perspectives or theories to interpret data.

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As mentioned in **section 3.6** data collection method such as survey has been used to collect primary data from the respondents to ensure the methods triangulation. Beside the methods triangulation it is also important to triangulate the source of data in single method. In this study data have been collected from different sources (certain types of respondents) i.e. SMEs who have implemented OS ERP, Supplies (vendors/consultants) of OS ERP and an expert having well knowledge about Open Source ERP systems and various issues related with these solutions.
4 Empirical Findings

The empirical findings contain the summary of the data collected in the empirical study. As the study contains three perspectives, the empirical findings are also summarized in three parts. First part focuses on the user’s perspective, i.e. the perspective of small and medium sized companies who have implemented Open Source ERP Systems. Second Part focuses on the perspective of Suppliers(vendors/consultants) of Open Source ERP regarding their views on what factors were important to the SMEs while selecting their solutions. Third part focuses on the perspective of the Open Source ERP expert.

4.1 Results

The results are presented in two sections where section 4.2 is explaining users perspective i.e. the perspective of small and medium sized companies on Open Source ERP systems and the other section 4.3 is explaining the opinions of the Suppliers (vendors/consultants) developing such systems.

A total of 24 responses were received from all respondents including both SMEs and Suppliers. Four collected questionnaires from the SMEs were not completed properly and hence were eliminated. Totally 20 correctly answered questionnaires were used for presenting and analyzing the results; out of which 10 correct answers were from users of Open Source ERP systems and 10 correct answers were from Suppliers (vendors/consultants) of such systems.

4.2 Users (SMEs) Perspective

Among the 10 corrected responds, 8 respondents mentioned their company name and 2 of them wanted to be anonymous. The complete answerers are treated as correct answer. Among the complete answers obtained there were 3 Asian SMEs(1 from India; 1 from China; 1 from Malaysia); 3 were from Europe(1 from Spain; 1 from Netherlands; 1 from Turkey); 1 US and 1 African SME from Kenya. Among the respondents 9 (90%) of them were small and only 1 (10%) of them was Medium. Table 4.1 represents the Industrial sectors the respondent SMEs are operating in.

<table>
<thead>
<tr>
<th>Industrial Sectors</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution</td>
<td>20</td>
</tr>
<tr>
<td>Service</td>
<td>20</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>40</td>
</tr>
<tr>
<td>Others</td>
<td>20</td>
</tr>
</tbody>
</table>

The personnel who took part in the survey on behalf of the SMEs had diverse responsibilities in the organizations. 3 of the respondents are working as IT
Consultant (30 per cent, highest percentage in the set) in the SMEs, 2 (20%) are working respectively as IT Manager and Project Manager, respectively 1(10%) of the respondents is Business/System Analyst, Chief Information Officer and Programmer. Table 4.2 shows the responsibilities of the respondents in the SMEs.

**Table 4.2: Job Title of the respondents**

<table>
<thead>
<tr>
<th>Job Title of the respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business/System Analyst</td>
<td>10</td>
</tr>
<tr>
<td>IT Consultant</td>
<td>30</td>
</tr>
<tr>
<td>Information System Technician</td>
<td>0</td>
</tr>
<tr>
<td>IT Manager</td>
<td>20</td>
</tr>
<tr>
<td>Project Manager</td>
<td>20</td>
</tr>
<tr>
<td>Programmer</td>
<td>10</td>
</tr>
<tr>
<td>System Designer</td>
<td>0</td>
</tr>
<tr>
<td>Senior Manager</td>
<td>0</td>
</tr>
<tr>
<td>Chief Information Officer</td>
<td>10</td>
</tr>
<tr>
<td>Project Engineer</td>
<td>0</td>
</tr>
<tr>
<td>Research and Developer</td>
<td>0</td>
</tr>
</tbody>
</table>

The SMEs took part in the survey are using different Open Source ERP solution in their organization. 4 SMEs, a percentage of 40 are using WebERP, 2 SMEs (20%) are using Dolibarr ERP and 1 SME equally use the following ERP solutions: Compiere ERP, Opentaps, OpenERP and Openbravo. The ERP solution adopted by the SMEs can be seen in the table 4.3.

**Table 4.3: ERP solutions adopted by SMEs**

<table>
<thead>
<tr>
<th>ERP system Implemented</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>WebERP</td>
<td>40</td>
</tr>
<tr>
<td>Dolibarr</td>
<td>20</td>
</tr>
<tr>
<td>OpenERP</td>
<td>10</td>
</tr>
<tr>
<td>Compiere ERP</td>
<td>10</td>
</tr>
<tr>
<td>Opentaps</td>
<td>10</td>
</tr>
<tr>
<td>Openbravo</td>
<td>10</td>
</tr>
</tbody>
</table>
4.2.1 Ranking of the factors that motivate SMEs to select OS ERP solutions

The responses of the SMEs about the factors motivated them to select Open Source ERP are presented in a mean ranking in an ascending order of importance in the table 4.4, as mentioned in the research method that a general psychometric ‘5 point Likert Scale’ is used to measure the importance of the factors that motivated SMEs.

‘Reduced Cost’ of the Open Source ERP solutions is termed as most important factor (mean: 3.8) by the SMEs while they choose respective Open Source ERP solution, highest 80% of the respondents identified it to be very important factor. ‘Support from the community’, ‘Ease of Use’ and ‘Functionality’ are termed as second most important factors with a mean value of importance of 3.6. Right after these factors ‘Implementation time’, ‘Business Process Re-engineering’ and ‘Customization’ resulted in a same mean value of importance of 3.2. But ‘Implementation time’ is more important (50%) considered than ‘Business Process Re-engineering’(40%) and ‘Customization’(40%) by the SMEs.

‘Best fit with the current Business processes’, ‘Increased Adaptability & flexibility’ and ‘Easy Integration with current systems’ got the same mean value of importance, though ‘Best fit with the current Business processes’ was very important to more(40%) respondents than ‘Increased Adaptability & flexibility’ and ‘Easy Integration with current systems’ which were very important to only 20 % respondents.

‘High Reliability’ got 2.9 mean value of importance with 40% respondents acknowledgment of being very important. ‘Education and training from Suppliers’, ‘Free Upgrades’, ‘Thorough analysis of current business processes’ and ‘Supplier Support’ have the same 2.8 mean value of importance. ‘Decreased reliance on Single Vendor’ got 2.7 mean value of interest though to half of the respondents it was an important factor. ‘Domain Knowledge of the vendors’ have a mean value of 2.4 and ‘Vendor Reputation’ comes at the bottom of the table with a mean value of 2.2.

Table 4.4: Mean ranking of the factors that may motivate SMEs to select OS ERP

<table>
<thead>
<tr>
<th>Factors motivated to select an Open Source ERP</th>
<th>Very Important (%)</th>
<th>Important (%)</th>
<th>Less Important (%)</th>
<th>Not Important (%)</th>
<th>Don't know (%)</th>
<th>Mean Value of Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced Cost</td>
<td>80</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3,8</td>
</tr>
<tr>
<td>Support from the community</td>
<td>60</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3,6</td>
</tr>
<tr>
<td>Ease of Use</td>
<td>60</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3,6</td>
</tr>
<tr>
<td>Feature</td>
<td>Value</td>
<td>Percentage</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Functionality</td>
<td>60</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3,6</td>
</tr>
<tr>
<td>Business Process Re-engineering</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>3,2</td>
</tr>
<tr>
<td>Customization</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>3,2</td>
</tr>
<tr>
<td>Implementation Time</td>
<td>50</td>
<td>30</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>3,2</td>
</tr>
<tr>
<td>Best fit with the current Business processes</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>3,1</td>
</tr>
<tr>
<td>Increased Adaptability &amp; flexibility'</td>
<td>20</td>
<td>70</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>3,1</td>
</tr>
<tr>
<td>Easy Integration with current systems</td>
<td>20</td>
<td>70</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>3,1</td>
</tr>
<tr>
<td>High reliability</td>
<td>40</td>
<td>30</td>
<td>10</td>
<td>20</td>
<td>0</td>
<td>2,9</td>
</tr>
<tr>
<td>Education and training from Suppliers</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>0</td>
<td>2,8</td>
</tr>
<tr>
<td>Free Upgrades</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>0</td>
<td>2,8</td>
</tr>
<tr>
<td>Thorough analysis of current business processes</td>
<td>30</td>
<td>20</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>2,8</td>
</tr>
<tr>
<td>Supplier Support</td>
<td>20</td>
<td>50</td>
<td>20</td>
<td>10</td>
<td>0</td>
<td>2,8</td>
</tr>
<tr>
<td>Decreased reliance on Single Vendor</td>
<td>20</td>
<td>50</td>
<td>10</td>
<td>20</td>
<td>0</td>
<td>2,7</td>
</tr>
<tr>
<td>Domain Knowledge of the vendors</td>
<td>20</td>
<td>20</td>
<td>40</td>
<td>20</td>
<td>0</td>
<td>2,4</td>
</tr>
<tr>
<td>Vendor Reputation</td>
<td>0</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td>0</td>
<td>2,2</td>
</tr>
</tbody>
</table>
4.2.2 Additional Opinion of the SMEs

The respondent were also asked about the factors that should be given priority in the OS ERP selection in an open ended question but there were few opinions. Among the four opinions received, two of them identified ‘‘Support from the Community is more important’’. One of them mentioned that ‘‘top management needed to be convinced about Open Source concept as it is not only about reduced price but also the community supports it provides’’. The other respondent’s opinion was “Open Source is good for Africa”.

4.3 Suppliers (vendors/consultants) Perspective

From the 10 Suppliers who have completed the survey correctly, 3 of them are vendors of Open Source ERP solutions and the rest 7 of them are consultants. The vendors are Compiere, xTuple and NightLabs. Among the consultants 3 of them supply OpenERP, 2 of them are working with WebERP, one with Dolibarr and one is working with vtiger CRM. Among the consultants 3 of them supplying OpenERP, 2 of them are working with WebERP, one with Dolibarr and rest of the consultant is working with vtiger CRM. The vendors and Consultants information can be seen in the table 4.5.

Table 4.5: Suppliers (vendors and consultants) information

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Geographical location</th>
<th>Vendor/consultant</th>
<th>ERP Solution</th>
<th>Responsibility of the respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiere, Inc.</td>
<td>USA</td>
<td>Vendor</td>
<td>Compiere ERP and CRM</td>
<td>Sr. Director of Sales</td>
</tr>
<tr>
<td>xTuple</td>
<td>USA</td>
<td>Vendor</td>
<td>xTuple ERP: PostBooks Edition</td>
<td>CEO</td>
</tr>
<tr>
<td>NightLabs Consulting GmbH</td>
<td>Germany</td>
<td>Vendor</td>
<td>JFire</td>
<td>Architect &amp; Lead Developer</td>
</tr>
<tr>
<td>SRL</td>
<td>Italy</td>
<td>Consultant</td>
<td>OpenERP</td>
<td>Software Developer</td>
</tr>
<tr>
<td>UAB &quot;Sandas&quot;</td>
<td>Lithuanian</td>
<td>Consultant</td>
<td>Open ERP</td>
<td>Project Manager</td>
</tr>
</tbody>
</table>
The vendors/consultants were asked about the industry specific solution, whether they have special knowledge on specific domain or not. 50% of them are specialized in specific domain while 50% provide general solution. Table 4.6 depicts this. Among the vendors only Compiere found to provide industry specific solution but Compiere itself does not do it, it is done by its authorized partners. The details of domain knowledge of vendors and Consultants can be seen from the table 4.6.

**Table 4.6: Domain Knowledge of Suppliers (vendors/consultants)**

<table>
<thead>
<tr>
<th>Company</th>
<th>Industry Specific Solution</th>
<th>Specialization in Specific Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiere</td>
<td>Yes</td>
<td>Provided by Authorized Partners</td>
</tr>
<tr>
<td>Vicus eBusiness Solutions bv.</td>
<td>Yes</td>
<td>automotive, services, ICT, consulting</td>
</tr>
<tr>
<td>UAB &quot;Sandas&quot;</td>
<td>Yes</td>
<td>Finance Accounting, MRP, Long project management</td>
</tr>
<tr>
<td>Moxx Consulting</td>
<td>Yes</td>
<td>Distribution &amp; Trading</td>
</tr>
<tr>
<td>Company</td>
<td>Interaction</td>
<td>Industry</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>SRL</td>
<td>Yes</td>
<td>Service Industry</td>
</tr>
<tr>
<td>Digitals India Security Products Pvt. Ltd</td>
<td>No</td>
<td>-----------------</td>
</tr>
<tr>
<td>xTuple</td>
<td>No</td>
<td>-----------------</td>
</tr>
<tr>
<td>NightLabs Consulting GmbH</td>
<td>No</td>
<td>-----------------</td>
</tr>
<tr>
<td>Mitija Australia</td>
<td>No</td>
<td>-----------------</td>
</tr>
<tr>
<td>Artoge</td>
<td>No</td>
<td>-----------------</td>
</tr>
</tbody>
</table>

### 4.3.1 Ranking of the factors that Suppliers (vendors/consultants) think motivate their customers

The responses received from the Suppliers (vendors/consultants) about the factors they think motivate their customers to select the Open Source ERP they are providing are presented in a mean ranking in an ascending order of importance in the *table 4.7*. As mentioned in the research method that a general psychometric ‘5 point Likert scale’ is used to measure the level of importance the Suppliers think given by their customers when selecting their solution.

The Suppliers think that ‘Functionality’ of their ERP Solutions was the most important factors to their customers when they were selecting their ERP Solution, it got maximum 3.4 mean value of importance. ‘Increased Adaptability & flexibility’ is second most important factors in the list with a mean value of 3.3. Right after that ‘Reduced Cost’ and ‘Supplier Support’ resulted in a same 3.2 mean value of importance but more Suppliers (60%) assumed that ‘Supplier Support’ was important to their customer than ‘Reduced Cost’ (40%). ‘Business Process Re-engineering’, ‘Best fit with the current Business processes’ is the next important factor in the ranking with a mean value of 3.1. ‘Education and Training from Suppliers’ goes after ‘Best fit with the current Business processes’ in the ranking with a mean value of 3. ‘Customization’ got the 2.9 mean value of importance. After that ‘Implementation Time’ and ‘Ease of Use’ got 2.7 mean value of importance in the ranking.

‘Easy Integration with current systems’ and ‘High reliability’ are next two factors in the ranking with the mean value of 2.6 and 2.5 respectively. ‘Domain Knowledge of vendors’ come after ‘High reliability’ with mean importance value of 2.4. ‘Free
Upgrades’ got 2.2 mean value. ‘Thorough analysis of current business processes’ with a mean value of 2.1 goes just before the least important factor ‘Support from the community’ that has 1.7 mean value of importance.

Table 4.7: Mean ranking of the factors that the Suppliers(Vendors/Consultants) think motivated their customer

<table>
<thead>
<tr>
<th>Factors motivated to select an Open Source ERP</th>
<th>Very Important (%)</th>
<th>Important (%)</th>
<th>Less Important (%)</th>
<th>Not Important (%)</th>
<th>Don't know (%)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionality</td>
<td>50</td>
<td>40</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>3.4</td>
</tr>
<tr>
<td>Increased Adaptability &amp; flexibility</td>
<td>40</td>
<td>50</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>3.3</td>
</tr>
<tr>
<td>Reduced Cost</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>3.2</td>
</tr>
<tr>
<td>Supplier Support</td>
<td>60</td>
<td>20</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>3.2</td>
</tr>
<tr>
<td>Business Process Re-engineering</td>
<td>20</td>
<td>70</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>3.1</td>
</tr>
<tr>
<td>Best fit with the current Business processes</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>3.1</td>
</tr>
<tr>
<td>Education and training from Suppliers</td>
<td>20</td>
<td>60</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Customization</td>
<td>20</td>
<td>50</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>2.9</td>
</tr>
<tr>
<td>Implementation Time</td>
<td>20</td>
<td>50</td>
<td>10</td>
<td>20</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>Ease of Use</td>
<td>10</td>
<td>50</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>Easy Integration with current systems</td>
<td>10</td>
<td>60</td>
<td>20</td>
<td>0</td>
<td>10</td>
<td>2.6</td>
</tr>
<tr>
<td>High reliability</td>
<td>20</td>
<td>30</td>
<td>30</td>
<td>20</td>
<td>0</td>
<td>2.5</td>
</tr>
<tr>
<td>Domain Knowledge of the vendors</td>
<td>20</td>
<td>30</td>
<td>30</td>
<td>10</td>
<td>10</td>
<td>2.4</td>
</tr>
<tr>
<td>Free Upgrades</td>
<td>10</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>2.2</td>
</tr>
<tr>
<td>Thorough analysis of current business processes</td>
<td>0</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>0</td>
<td>2.1</td>
</tr>
<tr>
<td>Support from the community</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>30</td>
<td>10</td>
<td>1.7</td>
</tr>
</tbody>
</table>
4.3.2 Upgrades of the Solutions and Reliance on the community

The Suppliers were asked about the ‘Free Upgrades’ of their OS ERP Systems. 60% of the vendors/consultants provide free upgrade of their solution to the user while 40% of them charge for it.

The Suppliers were asked to what extent they agree that Open Source ERP adoption increase the reliability on large community. 50% of the respondents strongly agree that the adoption of Open Source ERP decrease the reliance on single vendor, 25% disagree on that while rest 25% of the vendors/consultant remained neutral.

4.3.3 Suppliers (vendors/consultants) Opinion about ‘Supplier Support’ and their Most important features or services

The respondents were asked for their opinions about their customers evaluation on ‘Vendor Support’ in the form of an open ended question. They were also asked about their most important features and services that influence the organization to select their solution. Their opinion regarding these two questions are presented in the table 4.8.

*Table 4.8: Suppliers (vendors/consultants) Opinion about ‘Supplier Support’ and Most important features or services*

<table>
<thead>
<tr>
<th>Vendors</th>
<th>Opinion about ‘Vendor Support’</th>
<th>Most important features or services that influence the customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiere</td>
<td>“Vendor support viewed as important.</td>
<td>“Cost, flexibility”</td>
</tr>
<tr>
<td>xTuple</td>
<td>“High-quality paid support is extremely important to our paying customers - and for our community users, the free user-to-user support available on our forums is great.”</td>
<td>“Open Source core product Runs on Windows, Mac, and Linux Tier 1 features not usually found in Open Source”</td>
</tr>
<tr>
<td>NightLabs</td>
<td>“It is very important to our customers that a company (i.e. we) reliably supports the software for them. But as important as this it is for many of them to be able to support/modify/extend it themselves or with the help of another IT company - i.e. being independent from us.”</td>
<td>“Flexibility due to modularity and extensibility”</td>
</tr>
</tbody>
</table>

**Consultants**
Mitija Australia  “My customers do not care about the 'vendor support' from the original ERP Manufacturer; they only worry about our (Mitija’s) ability to provide the support they need”  “The ability to customize/extend the existing ERP to meet the customer needs”

Digitals India Security Products Pvt. Ltd  “Customers are always looking for tried and tested vendor from whom they are already taking services. Mostly mouth publicity is working well.”  “Multi location, multi currency, multi user and web interface are plus points.”

SRL  “They don't know what it means”  “personal relations with customers”

Moxx Consulting  “Higher expectations than with commercial software providers, since vendor is expected to take end-to-end support responsibility.”  “Knowledge of the application and 'best-practice' customizations - guaranteed response and turnaround times - data migration services”

Vicus eBusiness Solutions bv  “They looked for experienced partner with > 5 years experience with the product”  “SFA(Sales Force Automation)”

UAB “Sandas”  -----------------  “The most experience in our country, other customers success stories”

Artoge  “They haven't looked for it”  -------------

4.3.4 Additional opinions of Suppliers (vendors/consultants)

At the end the respondents were asked if they had any further comments or not. Only three of the respondent made further comments. *Vicus eBusiness Solutions bv*, mentioned that the upgrades of their solution are for free but not the services for that. *Digitals India Security Products Pvt. Ltd* made further comment about ‘Support from the Community’, as the respondents mentioned, “Community and developers are quite helpful, Most of the time their solutions are working well. They are not charged anything but at the same time developers are also offering their paid services for product...
support, customization and development”. Moxx Consulting commented about ‘Education and training from Suppliers/vendors’ as such that key users of their customers were trained and rest of them were handled by implementing organizations themselves.

### 4.4 Open Source ERP expert’s perspective

Prof. Rogerio Atem de Carvalho, D. Sc. was asked about different important factors in selection process of Open Source ERP to get experienced and detailed opinion. When the expert was asked about the ‘Implementation Time’ he replied: “SME lead-time perception is different, they are used to faster decisions and process, simply because they have less people involved. SME also understand that since they are smaller, lead-time MUST be smaller”.

It is important for the implementing organization to analyze the business process to match it with the functionality of the ERP systems. When the expert was asked about this regarding small and medium sized company he replied:

“They know their business process well, because there are fewer process. However, they don't apply very complicated ERP selection process”. For further query on ‘Analyzing the functionality of the ERP solution’ he added, "Usually, they search for the "most similar" ERP, and sometimes keep non-compliant process outside the ERP - in special the small ones. Although this can sound as an idiosyncrasy, their perception is that is less effort than adapting the company - or the system. It is interesting to say that there is a difference between the small and the medium company, and for the ERP realm I suggest that they should be considered in separate”.

By answering the question about ‘changing the software to match the organizational requirements’, he emphasized on evaluating small and medium company separately as he replied “Again we should separate small from medium.” He further added, regarding the question of ability of the SMEs to change the OS ERP systems “Probably small companies wouldn't do that, but some medium yes”.

Regarding Industry specific solutions he replied, “Sure, industry specific solution is much better for the smaller, since they don't have money to customize the system a lot”.

When Mr. Carvalho was asked about his opinion on the vendor reputation he replied, “Yes, but some users also check the community involvement”. Regarding ‘Education and training from Suppliers’ he replied, “Community is enough only for small cases. Sending someone (sometimes, only one or two persons!) to be trained in the vendor site is the most common solution”.
Regarding ‘Supplier Support’ and the ‘Support from the community’ Mr. Carvalho replied, “There is a difference on Commercial Open Source and Community Open Source. Most successful FOS-ERP are of the second type for sure. And the companies behind the ERP needs to earn money from the services, therefore, it is very hard for them to admit that (which is perfectly understandable)”.

For the question regarding cost of ‘Supplier Support’ he replied, “Typically it is smaller than for P-ERP (proprietary) because they relay also in other open source technologies (database, operational system, office suite). Also, it is possible to find support from "anyone who knows the system", including others than the main vendor, consultants etc. Although the adopter is free to choose, the support network generally is smaller, giving the smaller marketing work (less people know the system = less consultants)”.

Regarding the support from the community during the implementation Mr. Carvalho replied, “Depends on the customization complexity. For environments not so complex, the user can do parameterization, for instance”.

For the question regarding the cost to implement updates Prof. Rogerio Atem de Carvalho pointed the individual case and problem as he answered, “The same above, it depends on the problem but generally is less expensive than P-ERP”
5 Analysis

This chapter aims at analyzing the empirical findings in order to find out the answer of the research question. The analysis reviews the results critically and displays patterns related to the theory derived from the frame of reference. In this chapter the rank of the factors identified by the SMEs to be important are interpreted and rank of the factors that the Suppliers of OS ERP identified as important to their customers are also interpreted. The variation in level of importance for each of the factors and average level of importance for each of the factors among the two parties are discussed and analyzed in the light of expert’s opinion.

5.1 Analytical Discussion

The comparative representation of the results from two kind of respondents (SMEs and Suppliers) will be presented. The difference between two mean value of importance for each of the factors will be presented to make the reader comprehend for different factors how much disagreement is there between SMEs and Suppliers regarding importance of those factors. The average of two mean values for each of the factors will also be presented to find out comparatively which factors of Open Source ERP are most important that motivate SMEs to select Open Source ERP.

The factors are illustrated in the Table 5.1 which are ordered in a Descending order of Average of the two mean value of importance.

Table 5.1: Comparative ranking of factors that motivate SMEs to select OS ERP

<table>
<thead>
<tr>
<th>Factors motivated to select an Open Source ERP</th>
<th>Mean value of Importance (SMEs)</th>
<th>Mean Value of Importance (Suppliers)</th>
<th>Difference</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced Total Cost</td>
<td>3.8</td>
<td>3.2</td>
<td>0.6</td>
<td>3.5</td>
</tr>
<tr>
<td>Functionality</td>
<td>3.6</td>
<td>3.4</td>
<td>0.2</td>
<td>3.5</td>
</tr>
<tr>
<td>Increased Adaptability &amp; flexibility</td>
<td>3.1</td>
<td>3.3</td>
<td>0.2</td>
<td>3.2</td>
</tr>
<tr>
<td>Ease of Use</td>
<td>3.6</td>
<td>2.7</td>
<td>0.9</td>
<td>3.15</td>
</tr>
<tr>
<td>Business Process Re-engineering</td>
<td>3.2</td>
<td>3.1</td>
<td>0.1</td>
<td>3.15</td>
</tr>
<tr>
<td>Best fit with the current Business processes</td>
<td>3.1</td>
<td>3.1</td>
<td>0</td>
<td>3.1</td>
</tr>
<tr>
<td>Customization</td>
<td>3.2</td>
<td>2.9</td>
<td>0.3</td>
<td>3.05</td>
</tr>
<tr>
<td>Supplier Support</td>
<td>2.8</td>
<td>3.2</td>
<td>0.4</td>
<td>3</td>
</tr>
<tr>
<td>Feature</td>
<td>SME Mean</td>
<td>Supplier Mean</td>
<td>Difference</td>
<td>Rating</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------</td>
<td>---------------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td>Implementation Time</td>
<td>3.2</td>
<td>2.7</td>
<td>0.5</td>
<td>2.95</td>
</tr>
<tr>
<td>Education and training from Suppliers</td>
<td>2.8</td>
<td>3</td>
<td>0.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Easy Integration with current systems</td>
<td>3.1</td>
<td>2.6</td>
<td>0.5</td>
<td>2.85</td>
</tr>
<tr>
<td>High reliability</td>
<td>2.9</td>
<td>2.5</td>
<td>0.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Support from the community</td>
<td>3.6</td>
<td>1.7</td>
<td>1.9</td>
<td>2.65</td>
</tr>
<tr>
<td>Free Upgrades</td>
<td>2.8</td>
<td>2.2</td>
<td>0.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Thorough analysis of current business processes</td>
<td>2.8</td>
<td>2.1</td>
<td>0.7</td>
<td>2.45</td>
</tr>
<tr>
<td>Domain Knowledge of the Vendors</td>
<td>2.4</td>
<td>2.4</td>
<td>0</td>
<td>2.4</td>
</tr>
<tr>
<td>Decreased reliance on Single Vendor**</td>
<td>2.7</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Vendor Reputation**</td>
<td>2.2</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
</tbody>
</table>

(** 100% reply could not be received from Suppliers**)

As visible in the Table 5.1, ‘Reduced Total Cost’ and ‘Functionality’ are the two most important factors on an average. ‘Reduced Total Cost’ of the ERP systems got maximum importance to the SMEs (mean value: 3.8) when they were selecting Open Source ERP. Suppliers also identified that ‘Reduced Cost’ of their ERP systems was important to their customers though there is a significant difference (0.6) between the mean values of importance. The reasons might be less total cost that includes zero or less price of the software, less maintenance cost, less consultation and infrastructure cost. Open Source ERP implementation reduce one third of the implementation cost then compared to proprietary ERP implementation (Johansson & Sudzina, 2008).

The empirical findings revealed that the factor ‘Functionality’ of OS ERP got high level of importance to most of the SMEs, and most of the Suppliers also considered it important to their customers. The average mean value of importance for this factor is 3.5. The difference of 0.2 between two mean values is insignificant value. It indicates no disagreement between SMEs and Suppliers regarding importance of ‘Functionality of ERP’ is less. Analyzing the functionality let the SMEs to select the right Open Source ERP which is similar to their organizational processes. The expert interview also revealed the same as Mr. Prof. R., A., Carvalho mentioned “Usually, they search for the ‘most similar’ ERP”.

SMEs identified ‘Increased Adaptability & flexibility’ as an important factor to evaluate before the selection, 3.1 mean value of importance from SMEs responds represents that.
The Suppliers even identified it to be more important to their customer which can be said from their responses with 3.3 mean value of importance. The reason of this factor being more important to Suppliers assumption is probably because of business aspect, as it is an attribute of the ERP systems which tells how flexible the software to edit or modify as per the needs of the customers and it is one of the factors that the Suppliers use for promotion of their systems. The importance of this to the customers can be linked with the necessity of the customization in the code. As visible in the Table 5.1 customization is important to the SMEs. The easy and flexible customizability also got importance to SMEs on an average, as ‘Increased Adaptability & flexibility’ got 3.2 average mean value.

‘Ease of Use’ got higher importance to most of the SMEs though in Suppliers point of view it was little important to their customers, the 2.77 mean value of importance from them indicates that. The difference between these two value is 0.9 which is almost 1 point in the used Likert Scale. So the level of disagreement is high. The reason behind getting importance of ‘Ease of Use’ to the SMEs is their willingness of the implementers to implement an ERP which is easy to operate. Here the answers received from the Suppliers do not reflect the real circumstance how exactly their customers gave importance to it. It can be said because it is normal expectation of all implementers to have an ERP system easy to operate. The answer was bit biased may be due the Suppliers predetermined claim about easiness of their systems. However, with an average mean value of 3.15 ‘Ease of Use’ is an important factor.

‘Business Process Reengineering’ was identified by most of the Suppliers to be important to their Customers, the 3.1 mean value of importance represents it. SMEs as well identified this factor as important in selection of Open Source ERP, the mean value is 3.2. With an average mean value of importance of 3.15 ‘Business Process Reengineering’ is an important factor and the difference between the mean values of importance is also small i.e. 0.1, which represents that the Suppliers anticipation about their customers given importance on ‘Business Process Reengineering’ represent almost the real level of importance given by the SMEs when they were selecting their ERP solution. The reasons behind ‘Business Process Reengineering’ of being important to the SMEs might be the cause of Standardization of the processes. With the globalization the SMEs specially the smaller firms suffer in the competition and they need to standardize the processes to exist in competition but proprietary system’s high cost and obligatory deadlock with single supplier prevent them to implement such ERP and to get standardized processes. SMEs might have found less expensive support in different ways including, individuals, supplier, and other users through the community(Carvalho, 2009). ‘Business Process Reengineering’ might have been important from another perspective that is: the smaller organizations do not have enough resources to do extensive editing in the code, they might have been interested to the ‘Business Process Reengineering’ because they want to avoid this cost. The expert interview also revealed that ‘Business Process Reengineering’ is important to the SMEs to avoid editing the code of ERP Systems. Prof. R., A., Carvalho says, ‘Probably small companies wouldn’t
do that, but some medium would”. Smaller organization cannot afford to change the Code as per their need because they want to avoid unnecessary cost further more SMEs are more flexible to adopt changes (Carvalho & Johansson, 2009). And almost all the SMEs in the study are small in size, only one of them are medium. More involvement of the Medium organization might have made the result different.

On an average ‘Best fit with the current Business processes’ is an important factor to the SMEs in the selection processes and the Suppliers also identified it to be important to their customers. The mean value of importance of both parties for this factor is 3.1. The difference between two mean values is 0, from which it can be said that Suppliers perfectly identified their customer’s given importance of this factor. There might be several reasons for this factor to be important. One of the reasons may be the SMEs wanted to avoid the adaptation of the Software to prevent increased cost. Another reason is attempting to avoid Re-engineering of the Business Processes because they might have some unique business processes which is also evident from the result. The Size of their Organization might have influenced them to give importance to the ERP that match their Business Processes. Due to the limited size SMEs normally have fewer processes specially the smaller organizations, which are generally less complex than the larger organizations and hence they easily could match them with the ERP Solutions. That is why they might have given importance to the ERP systems that are closest to their functionality. The expert interview also revealed the same as Mr. Prof. R., A., Carvalho mentioned, “Usually, they search for the "most similar" ERP, and sometimes keep non-compliant process outside the ERP - in special the small ones”.

‘Customization’ feature of the systems at the same time got importance to the SMEs, it got 3.2 mean value of importance in the study. The Suppliers expectation about importance given by their customers was 2.9. With an average mean value of 3.05 ‘Customization’ is an important factor overall. Giving importance to ‘Customization’ and ‘Business Process Reengineering’ by SMEs at the same time is difficult to understand because the SMEs wanted to avoid changing the code. That is why they identified ‘Business Process Reengineering’ as important and for the same reason they gave importance to ‘Best fit with the current Business processes’. The probable reason to indentify ‘Customization’ as important might be SMEs attempt to save certain unique business process which is the source of their competitive advantage. To those SMEs who did not identify ‘Customization’ to be unimportant or identified it as less important, they might have no unique business process.

‘Supplier Support’ got less importance to SMEs than Suppliers assumption. SMEs relied on the Community mostly, it can be said because the Empirical findings show high expectations of SMEs to Community. The mean value of importance of ‘Supplier Support’ identified by the SMEs is 2.8 which is less than the level of importance the Suppliers assumed their customer given, which is 3.2. Over all ‘Supplier Support’ can be said an important factor with the average mean value of 3. The reason for this factor to be less important to the SMEs may be the cost of support. Because the Vendor Support is not free even in some cases it can overweight the zero cost of the systems for
example, in Sweden nowadays a consultant can charge even 1,500 SEK per hour for Open Source Software while Consultants expert in Microsoft Products charge almost half of the figure (Danielsson, 2007). Open Source ERP provide limited warranty of the software and less ongoing support (Baharum et al., 2008), these can also be good reasons for that. As the warranty is limited, ongoing support cannot be obtained after a certain period and as that will require fees, the SMEs may be relied on the Suppliers preliminarily during the implementation. It can be assumed from the Empirical findings as few of the Suppliers commented that the customers in few cases did not even care about it. For example; Artoge, one of the consultant of DOLIBARR ERP/CRM commented “they haven't looked for it” when they were asked about how important the factor ‘Vendor Support’ was to their customers when they choose the solution they provide. For the same question the CEO of xTuple answered, “High-quality paid support is extremely important to our paying customers - and for our community users, the free user-to-user support available on our forums is great.” So it can be understood that regardless the customers are paying or non-paying they rely on the community for the support. Because each time the smaller companies may not be willing to pay for support from the Suppliers when the solution is possible from the community.

‘Implementation Time’ was given importance by the SMEs, the mean value of importance of 3.2 identifies it. It was very important to most of the SMEs because the lesser the time the lower the cost. There can be another reason for that which is the nature of smaller organization as they want everything to be done in less time. Prof. R., A., Carvalho also commented on that like this. As he says, “SME lead-time perception is different, they are used to faster decisions and process, simply because they have less people involved. SME also understand that since they are smaller, lead-time MUST be smaller”. In the Suppliers point of view ‘Implementation Time’ was not that important to their customer, the mean value of importance of 2.7 indicates that. The difference between the two mean value is 0.5 which indicates that Suppliers responses do not represent actual level of importance given by their customers. Over all ‘Implementation Time’ is not that important as the average mean value of importance is under 3 which is 2.95.

‘Education and training from Suppliers’ was another factor that did not get that importance to the SMEs overall. But the Suppliers highlighted it as important factor to their customers. The mean value of importance it got from Suppliers responds is 3.00 which is higher than 2.8 which is the mean value of importance given to it by the SMEs in selection process. The findings implies that the Suppliers claim that Education and training they provide is an attractive feature with their system that attracted their customers but it was not that important to the SMEs. There might be several reasons, one of them is the insufficient education and training from the Suppliers, another reason can be the cost for the training. Another possible reason is that for the smaller organization the Community is enough as they have less functionality and those are less complex relatively, so they might have thought that for those limited functionality and features they could rely on Community rather than the Suppliers as then they do not
have to pay for it in that case. The comment from the interviewee Open Source ERP expert Prof. R., A., Carvalho makes it more clear as he says, “Community is enough only for small cases. Sending someone (sometimes, only one or two persons!) to be trained in the vendor site is the most common solution”. So only the key actors are trained by the Suppliers and the rest of them are handled by the customers themselves with the help of the community. So they were just focusing on the preliminary education and training from the Suppliers and for the rest they rely on community.

‘Easy Integration with current systems’ comes after that in the list. Which got importance to the SMEs in the selection process with a mean value of importance of 3.1. While apart from few Suppliers most of them do not think that it was very important or important to their customers. The mean value of importance for this factor is 2.6. The average mean value of importance is 2.85 which indicates it is not that important overall. The possible reason of ‘Easy Integration with current systems’ being important to the SMEs might be they were habituated with their legacy systems. Though they decided to implement an ERP, The expertise of legacy system may influence them to search for such systems which can be integrated easily with their legacy systems.

‘High Reliability’ of the ERP systems is a factors which concerned with fixing the problem rapidly and solve it as early as possible. When the community is involved in an ERP solution then it is easy to find out problems and solve it. Because then the whole community watches it. It is related with the community involvement. In the Table 5.1 it is visible that the community involvement was important to the SMEs. But ‘High Reliability’ through the community support was not that important like community as the mean value of importance it got from the responds of SMEs is 2.9. It was very important to few SMEs and important or less important to most of the SMEs. While it was totally unimportant to fee SMEs. According to Suppliers anticipation it was not that important to their customer. Probable reason behind this factor not to be that important is the participation in the community. All the Open Source ERP users participate in the community do not contribute in design and development, all the participants do not have programming skill to contribute in coding to solve the problem and make the software more reliable. Most of the Open Source ERP users just get support from the community. That is why overall ‘High Reliability’ was not that important to the SMEs, and overall average mean value of importance is also not that high which is 2.7.

‘Support from the community’ is one of the most important factor identified by the SMEs. The high mean value of importance indicates it from the responds of the SMEs. With a high mean value of importance of 3.6 it is the second most important factor to SMEs. But to the Suppliers the mean value is 1.7 that is why the average mean value of importance is also low. The difference between the two mean values of importance is 1.9 which is really a big number and it indicates a big difference between the SMEs expectations to the Community and the Suppliers acknowledgement about it. So it can be said that the opinion from the Suppliers does not reflect the real importance given by the SMEs on the factor ‘Support from the community’. The Suppliers might have been biased in their opinion. It is commercial reason that might have biased them in their
opinion. Prof. R., A., Carvalho’s self-assessment is “And the companies behind the ERP needs to earn money from the services, therefore, it is very hard for them to admit that (which is perfectly understandable).” There might another reason for which SMEs gave more importance to ‘Support from the community’ and that is: most of the successful Open Source ERP solutions are Community Open Source Software though some of them also have Commercial Professional Edition with more features and Commercial licenses and contract for support. Prof. R., A., Carvalho also supports this as he mentioned, “There is a difference on Commercial Open Source and Community Open Source. Most successful FOS-ERP are of the second type for sure”. So, when the SMEs search for Open Source ERP solutions their expectations to the community is much more higher than their expectations to the Supplier because one of the most important benefits of deploying Open Source Software is that it decreases reliance on single supplier (Serrano & Sarriègi, 2006) and the ‘Vendor Support’ can be interpreted as support from the community (Johansson & Sudzina, 2008). That’s why the ‘Support from the community’ got higher importance to the SMEs and in fact it can be termed as one of the most important factors to them though the Suppliers did not admit it.

The answers from SMEs and Suppliers for some of the factors described above also expose the given importance of SMEs to community support. ‘Education and training from Suppliers’ got less importance to the SMEs as they relied more on the community for it. SMEs little importance to ‘Supplier Support’ also indicates their reliance on the community. Even on other important factor ‘Increased Adaptability & flexibility’ also linked with community involvement. Johansson and Sudzina (2008) argues that the adaptability and flexibility of the Open Source ERP systems is due to the modularity. The high modularity increases the adaptability and flexibility of the systems and which is due to the process of design and development and most importantly involvement of the large community regardless the geographical location. The increased reliance on the community can be understood from Suppliers agreement on that, as 60% of the Suppliers strongly agree that the adoption of Open Source ERP decrease the reliance on single vendor and increase reliance on community. So it can be said ‘Support from the community’ was really important to SMEs even though the Suppliers did not admit it.

‘Free Upgrades’ was not that important to SMEs, the mean value of importance of 2.8 also reflects that. It was not that important to SMEs the probable reason is, adopting an ERP system makes the implementers dependent on it and frequently updating the systems may require extra efforts which the organizations may not accept. According to Suppliers assumption it is less important and the mean value of importance is 2.2. The possible reason of ‘Free Upgrades’ for being less important to the Suppliers is all the Suppliers do not offer upgrades for free, 40% supplier’s upgrades are not free. On an average mean value of 2.6 ‘Free Upgrades’ is a less important factor overall.

‘Thorough analysis of current business processes’ was not that important to SMEs as the mean value of importance is 2.8 which is under 3. It indicates that to some SMEs it was very important but to most of them it was either important or less important. Analyzing the business process is really very important in ERP selection process to
check if the potential ERP Solution best fits with the current Business Processes or not. Though Analyzing the ‘Functionality’ of Open Source ERP systems got high importance to SMEs, ‘Thorough analysis of current business processes’ got less importance. It might be for Organizational size and having less number of business processes. The Business Processes of the SMEs are very few and they know those very well and they do not need to analyze their business processes thoroughly. The expert Prof. R., A., Carvalho also mentioned this as the reason for not analyzing business processes thoroughly, as he mentioned, “They know their business process well, because there are fewer processes”. That is why ‘Thorough analysis of current business processes’ was not that important to SMEs. Suppliers also identified ‘Thorough analysis of current business processes’ to be less important to their customers. The mean value of importance of Suppliers perspective is 2.1. The difference between to mean value of importance is 0.7 and average value of mean value of importance is 2.45.

The factor ‘Domain knowledge of the vendors’ or industry specific solution got less importance to the both types of respondents. The mean value of importance for both types of respondents is 2.4. To most of the SMEs it was either less important or unimportant. Suppliers also identified it to be less important to their customers. Possible reasons for that is half of the Suppliers do not deal with Industry specific solution, so to their customers definitely it was less important. Among the SMEs only 1 evaluated “Industry Specific Solution” as Very Importantly and to one it was important. May be the solutions the others are using are general. Since the SMEs want to avoid customization except saving few unique Business Processes and want best fit with the current business processes ‘Domain knowledge of the vendors’ should have been given importance by them specially for the smaller organizations. The Open Source ERP expert Prof. R., A., Carvalho also commented like that. As he says, “industry specific solution is much better for the smaller, since they don’t have money to customize the system a lot”. But the result found in the study is dissimilar. The reason behind can be the smaller size of Organization as they have few processes and they might have searched for similarities only for those processes and kept the unnecessary functionality uninstalled or outside the systems. As Mr. Carvalho also mentioned, “Usually, they search for the ”most similar” ERP, and sometimes keep non-compliant process outside the ERP - in special the small ones”. With an average mean value of importance of 2.4 it come at the bottom of the list.

It is mentioned in the Method chapter that about two factors 100 % Suppliers responds could not be received. That is why could not be compared with the SMEs responds. The factors are ‘Decreased reliance on Single Vendor’ and ‘Vendor Reputation’ that got the mean value of importance respectively 2.7 and 2.2 for the responds from SMEs. To most of the SMEs the ‘Decreased reliance on Single Vendor’ was Important but not very important to all because they expected some involvement of the Suppliers somehow and probably it is in the implementation phase but to most of them for after implementation problem solving and support Community appealed most. Those users of Open Source ERP who are payee they usually rely on single Suppliers. 
May be there were few payee users of Open Source ERP. But Vendor reputation got little importance because the SMEs may wanted the solution which would fit their processes. The reputation and name of the vendors were not a matter to them.

5.2 Most important factors that motivate the SMEs to select Open Source ERP Over the Proprietary ERP

Based on the average of the two mean values of importance for each of the factors represented in the ‘Table 5.1’, the top important factors were identified. The Suppliers in few cases might have not given the exact opinion, they might have thought about their business perspective while answering the questions. It become more clear when one of the top important factors identified by the SMEs got lowest importance from the anticipation of the Suppliers. For the company promotion the Suppliers might have not acknowledged the Community which is the most important to the Open Source ERP Users. It can be claimed from the high difference between the mean values of importance for the factor ‘Support from the community’. The value of difference between the two mean values for the factor ‘Ease of use’ is 0.9, which is also high.

One interesting relation can be drawn here between ‘Support from the community’, ‘Education and training from Suppliers’ and ‘Supplier Support’. The high expectations of SMEs to ‘Support from the community’ might have been the reason behind giving less importance to ‘Supplier Support’ and ‘Education and training from Suppliers’.

So, the consideration is, the factors that has average mean value of importance more than 3 will be considered as important factor to motivate SMEs to select Open Source ERP as 3 indicates ‘Important’ in the scale used to measure the level of importance. These are mutually important factors identified from the result of the responds from both SMEs and Suppliers.

As subjective answer is understandable from the Suppliers for ‘Support from the community’ and as it is one of the most important factors identified by SMEs, ‘Support from the community’ is also included in the list.

Table 5.2 represents Mutually top most important factors that may influence SMEs to select an Open Source ERP.
Table 5.2: Mutually top most important factors (Perceived by SMEs & Suppliers) in OS ERP selection

<table>
<thead>
<tr>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced Total Cost</td>
</tr>
<tr>
<td>Functionality</td>
</tr>
<tr>
<td>Increased Adaptability &amp; flexibility</td>
</tr>
<tr>
<td>Ease of Use</td>
</tr>
<tr>
<td>Business Process Re-engineering</td>
</tr>
<tr>
<td>Best fit with the current Business processes</td>
</tr>
<tr>
<td>Customization</td>
</tr>
<tr>
<td>Supplier Support</td>
</tr>
<tr>
<td>Support from the community</td>
</tr>
</tbody>
</table>
6 Conclusion

In this chapter the conclusion will be drawn mainly from the analysis which was done in the previous chapter. It will also be done by elaborating on the purpose of this study and specifically answering the research question. Furthermore emergent results from the study and recommendations for future studies is also highlighted.

The purpose of this study was to identify the most important factors that motivate SMEs to prioritize an Open Source ERP over the Proprietary ERP. The supplementary aim was to draw implications for the interested parties. This study also revealed that Open Source ERP is gaining acceptance day by day. This can be due to some significant reasons. May be the users of Proprietary ERP are facing various challenges after implementation. Another reason can be the maturity of Open Source ERP solutions. With the passage of time Open Source ERP solutions might be more mature and reliable. It was also observed that the concept of Open Source ERP opened new way for enterprises to collaborate, distribute, use and customize the software. Open Source ERP also gave flexibility in enterprise computing area with its downsizing cost and increased customizability. It is developed from many distance places, hence more modular and there is no exact owner. Anyone can share, download, distribute and edit this sort of software which makes it more robust for enterprises. It has a different view than the proprietary licensing and support. However, lets return to the Research Question: What are the most important factors from the perspective of users (SMEs) and Suppliers in Open Source ERP selection?

Throughout the analysis the discussion was directed to the answer of the research question. The following conclusion can be drawn from the analysis.

Mutually top most important factors (Perceived by SMEs & Suppliers) in OS ERP selection.

- Reduced Total Cost
- Functionality
- Increased Adaptability & flexibility
- Ease of Use
- Business Process Re-engineering
- Best fit with the current Business processes
- Customization
- Supplier Support
- Support from the community

From the discussion it can be concluded that the purpose of this study has been fulfilled as the SMEs and Suppliers were investigated regarding the importance of these factors. Furthermore, that results were compared. It allowed to observe the difference between the two level of importance and to identify mutually most important factors in OS ERP selection. It can be said that the importance of the motivating factors to select an Open Source ERP might be different from organization to organization. It might be
dependent on the size, geographical location of the organization or many other issues. Yet, as mentioned earlier there might be some common factors that may be considered as foremost factors which SMEs always take into consideration in selection process of an open source ERP.

6.1 Emergent results from the study

Apart from the result exposed above related to the motivating factors in the selection of Open Source ERP, this study gives some other results. We observed that the Suppliers do not acknowledge importance of the Community.

Another emergent result we found regarding the economical condition of the country where the implementing organization is located in. it is found that Open Source ERP is very good for the Developing Countries and Poor Countries.

6.2 Further Studies

This study aimed at investigating the SMEs. The medium organizations have more business processes and which are more complex than the smaller organizations. So, their expectations to the Open Source ERP and level of giving importance to different factors of Open Source ERP would also be different in some ways. It would be very interesting to study the medium and smaller organization separately.

The study was conducted on different SMEs having different geographical locations and which could be done for a single country with randomized selection.

There are many large organizations even some fortune 500 companies who have implemented Open Source ERP solution. It could also be very interesting to study the factors motivated them to overlook many prominent proprietary ERP.

What happened to the adopters after implementation of Open Source ERP solutions, are they satisfied once they deployed such systems? Moreover, Did they face any problems or challenges after they adopted such Open Source ERP solutions? If so, how they overcome those challenges? Investigating these issues will be of great interest and importance as it will also explore the real success rate and future scope of these Open Source ERP systems.

A research can be made to check the issues in developed countries and developing countries separately regarding Open Source ERP; and then to make a comparison between them. Because the licensing issues are different in developed and developing countries and this way there is a possibility to obtain different results.
References


Appendix

Appendix A- Questionnaires

Questionnaire 1 (Version 1) : For SMEs

Selecting an Open Source ERP over Proprietary ERP

Dear respondent, this questionnaire is aimed to get your company’s opinion about Open Source Enterprise Resource Planning (OS ERP) system selection process. This research is a requirement for the completion of master thesis in Informatics in Jönköping International Business School, Jönköping University, Sweden. We promise to treat any information you consider confidential as such and to use it for the sole purpose of this academic undertaking. The feedback being provided by you will only be used in analysis of our master thesis. Your real opinions are very important to us. This research will strictly follow research ethics (If you want to be anonymous respondent even then it can help us a lot). It will take approximately 10 minutes from you, and we will really appreciate that. The results of this survey could be received if you wish. It would be really helpful for us if you could answer the questionnaire within week.

The questionnaire is split into two sections. Section 1 in the page 1 requires brief introduction about you and your company, while Section 2 in the page 2 deals with the rationales that influence the companies to select an Open Source ERP.

For going to page 2 use next Button at the bottom

Section 1

1. Company Name

2. Country of location:

3. Industrial sector:

4. Size of your organization

5. Job Title of Respondent
6. If you wish to receive the result of this survey please enter you email address:


Section 2

7. Which Open Source ERP Systems are you using?

8. How important was the Reduced Total Cost of Open Source Enterprise Resource Planning system to you while selecting Open Source ERP for your company?

☐ Very Important ☐ Important ☐ Less important ☐ Not important

9. The more time requires to implement an ERP System the more cost it needs. To what extent the Implementation Time of ERP Solutions was important to you in the selection process?

☐ Very Important ☐ Important ☐ Not important ☐ Less important

10. ‘Thorough analysis of the current business processes’ allows to determine which ERP Systems best fits with current business processes. How important was thorough analysis of current business processes to you before deciding to select?

☐ Very Important ☐ Important ☐ Less important ☐ Not important

11. When implementing ERP Systems organizations want to select the solution that best fits current Business Processes. How important was the ‘Best fit of ERP systems with the current Business processes’ to you while selecting Open Source Enterprise Resource Planning system?

☐ Very Important ☐ Important ☐ Less important ☐ Not important

12. Implementing organizations want to avoid customization in software for this they focus on Re-engineer their Business Process minimum customization of software. How important was Changing Business Processes(Business Process Re-engineering) to you to avoid the customization in the software?
13. Open Source System allows anyone to download, edit and change in the code. How important was this 'Customization' feature of Open Source ERP to you while selecting an Open Source ERP for your Company?

14. 'Increased Adaptability & flexibility' of ERP Solution means the ERP System is highly flexible and easy to change. How importantly you focused on this issue while selecting an Open Source ERP?

15. There is a common belief that Open Source ERP Systems are not user friendly. How importantly you evaluate 'ease of use' of systems while selecting certain Open Source ERP System?

16. How importance did analyzing the functionality of potential ERP solutions get before the selection?

17. Domain knowledge of the vendors provide Industry Specific Solution. How important was it to you to select a solution from the vendors who have specialty to provide solution in the domain of your business?

18. How important was vendor reputation to your company while selecting the ERP solution?
19. How important was education and training from Suppliers/vendors to you while selecting?

[ ] Very Important  [ ] Important  [ ] Not important  [ ] Less important

20. How important was 'Vendor Support' to you in selection of Open Source ERP?

[ ] Very Important  [ ] Important  [ ] Not important  [ ] Less important

21. Deploying Open Source ERP decreases the reliance on single vendor. How important was Decreased reliance on Single Vendor to you while selecting an Open Source ERP?

[ ] Very Important  [ ] Important  [ ] Less important  [ ] Not important

22. Deploying Open Source ERP decreases the reliance on single vendor and increases reliance on large community. How important was Support from the community to you while selecting an Open Source ERP?

[ ] Very Important  [ ] Important  [ ] Less important  [ ] Not important

23. Vendors providing proprietary ERP systems try to achieve as high reliability as possible but in case of Open Source ERP Large Community using an open source ERP system might be able to find errors faster and systems can be more reliable. How important was this issue to you while selecting Open Source ERP Solution?

[ ] Very Important  [ ] Important  [ ] Less important  [ ] Not important

24. Upgrades for open source ERP systems are for free. To what extent it was important in selection of Open Source ERP for your company?

[ ] Very Important  [ ] Important  [ ] Less important  [ ] Not important

25. Customers are often searching for means of integration of their systems/data. How important was Easy Integration with your systems to you while selecting Open Source ERP?
26. Can we contact you again for further opinion from you?

☐ Yes  ☐ No

27. If you have any further opinion or thoughts about Open Source ERP systems which you think is important and should be given importance in ERP Selection process or comments about this research, please write in the space provided below.

**7.1.2 Questionnaire 1 (Version 2) : For SMEs**

**Selecting an Open Source ERP over Proprietary ERP**

Dear respondent, this questionnaire is aimed to get your company’s opinion about Open Source Enterprise Resource Planning (OS ERP) system selection process. This research is a requirement for the completion of master thesis in Informatics in Jönköping International Business School, Jönköping University, Sweden. We promise to treat any information you consider confidential as such and to use it for the sole purpose of this academic undertaking. The feedback being provided by you will only be used in analysis of our master thesis. Your real opinions are very important to us. This research will strictly follow research ethics (If you want to be anonymous respondent even then it can help us a lot). It will take approximately 10 minutes from you, and we will really appreciate that. The results of this survey could be received if you wish. It would be really helpful for us if you could answer the questionnaire within a week.

The questionnaire is split into two sections. **Section 1 in the page 1** requires brief introduction about you and your company, while **Section 2 in the page 2** deals with the rationales that influence the companies to select an Open Source ERP.

For going to page 2 use next Button at the bottom

**Section 1**

1. Company Name

   

2. Country of location:

   

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3. Industrial sector:

4. Size of your organization

5. Job Title of Respondent

Senior manager

6. If you wish to receive the result of this survey please enter you email address:

Section 2

7. Which Open Source ERP Systems are you using?

8. How important was the Reduced Total Cost of Open Source Enterprise Resource Planning system to you while selecting Open Source ERP for your company?

9. The more time requires to implement an ERP System the more cost it needs. To what extent the Implementation Time of ERP Solutions was important to you in the selection process?

10. ‘Thorough analysis of the current business processes’ allows to determine which ERP Systems best fits with current business processes. How important was thorough analysis of current business processes to you before deciding to select?

11. When implementing ERP Systems organizations want to select the solution that best fits current Business Processes. How important was the ‘Best fit of ERP systems with
the current Business processes’ to you while selecting Open Source Enterprise Resource Planning system?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

12. Implementing organizations want to avoid customization in software for this they focus on Re-engineer their Business Process minimum customization of software. How important was Changing Business Processes (Business Process Re-engineering) to you to avoid the customization in the software?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

13. Open Source System allows anyone to download, edit and change in the code. How important was this 'Customization' feature of Open Source ERP to you while selecting an Open Source ERP for your Company?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

14. 'Increased Adaptability & flexibility' of ERP Solution means the ERP System is highly flexible and easy to change. How importantly you focused on this issue while selecting an Open Source ERP?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

15. There is a common belief that Open Source ERP Systems are not user friendly. How importantly you evaluate 'ease of use' of systems while selecting certain Open Source ERP System?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know
16. How importance did analyzing the functionality of potential ERP solutions get before the selection?

- [ ] Very Important  
- [ ] Important  
- [ ] Less important  
- [ ] Not important  
- [ ] Don’t know

17. Domain knowledge of the vendors provide Industry Specific Solution. How important was it to you to select a solution from the vendors who have specialty to provide solution in the domain of your business?

- [ ] Very Important  
- [ ] Important  
- [ ] Less important  
- [ ] Not important  
- [ ] Don’t know

18. How important was vendor reputation to your company while selecting the ERP solution

- [ ] Very Important  
- [ ] Important  
- [ ] Less important  
- [ ] Not important  
- [ ] Don’t know

19. How important was education and training from Suppliers/vendors to you while selecting?

- [ ] Very Important  
- [ ] Important  
- [ ] Less important  
- [ ] Not important  
- [ ] Don’t know

20. How important was 'Vendor Support' to you in selection of Open Source ERP?

- [ ] Very Important  
- [ ] Important  
- [ ] Less important  
- [ ] Not important  
- [ ] Don’t know

21. Deploying Open Source ERP decreases the reliance on single vendor. How important was Decreased reliance on Single Vendor to you while selecting an Open Source ERP?

- [ ] Very Important  
- [ ] Important  
- [ ] Less important  
- [ ] Not important  
- [ ] Don’t know

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22. Deploying Open Source ERP decreases the reliance on single vendor and increases reliance on large community. How important was Support from the community to you while selecting an Open Source ERP?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

23. Vendors providing proprietary ERP systems try to achieve as high reliability as possible but in case of Open Source ERP Large Community using an open source ERP system might be able to find errors faster and systems can be more reliable. How important was this issue to you while selecting Open Source ERP Solution?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

24. Upgrades for open source ERP systems are for free. To what extent it was important in selection of Open Source ERP for your company?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

25. Customers are often searching for means of integration of their systems/data. How important was Easy Integration with your systems to you while selecting Open Source ERP?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

26. Can we contact you again for further opinion from you?

☐ Very Important ☐ Important ☐ Less important ☐ Not important ☐ Don’t know

27. If you have any further opinion or thoughts about Open Source ERP systems which you think is important and should be given importance in ERP Selection process or comments about this research, please write in the space provided below.
Selecting an Open Source ERP over the Proprietary ERP

Dear respondent, this questionnaire is aimed to get your opinion as a vendor/consultant of Open Source ERP about what factors you think your customers prioritized while selecting your solution. This research is a requirement for the completion of master thesis in Informatics in Jönköping International Business School, Jönköping University, Sweden. We promise to treat any information you consider confidential as such and to use it for the sole purpose of this academic undertaking. The feedback being provided by you will only be used in analysis of our master thesis. Your real opinion is very important to us.

This research will strictly follow research ethics. It will take approximately 10 minutes from you, and we will really appreciate that. The results of this survey could be received if you wish. It would be really helpful for us if you could answer the questionnaire within few days.

In this questionnaire **Question 1-6** deal with the personal information of you and the ERP Solution you are working with and **Question 7-28** deal with the rationales that influence the SMEs to select your Open Source ERP solution.

1. Company Name

2. Country of Location

3. Name of the Open Source ERP solution you provide:

4. Your company works as-
   - [ ] Vendor
   - [ ] Consultant

5. Job title of the respondents-

6. If you wish to receive the result of this survey please enter you email address

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7. How important you think was the reduced cost of open source ERP system to your customers while selecting your solution?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

8. The more time requires to implement an ERP System the more cost it needs. To what extent you think your customers evaluated implementation time that your system needs while they were choosing your solution?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

9. To what extent you think 'Best fit of the software with the current Business process' was important to your customer in the selection process?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

10. How Important 'Through Analysis of the Current Business Process' was to your customers before selection?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

11. To what extent you think Customization of software was important your customers?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

12. How important you think was the flexibility of your software to your customer, to change the software as their requirement?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

13. To what extent you think the ‘Ease of Use’ of your solution was important to customers while they were evaluating your systems?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

14. Do you offer industry specific solution?
15. If yes then what industry you are specialized in?

16. How important was industry specialization to your customer while they were evaluating your solution before selecting?

17. What is your opinion about your customers evaluation on 'Vendor Support' while they were selecting your solution?

18. How important was 'Vendor Support' - that is support from you to your customers while they were selecting your solution?

19. How important the 'education and training' from you was to your customer while they were selecting your solution?

20. Deploying Open Source ERP decreases the reliance on single vendor and increases reliance on large community. To what extent you agree on that?

21. How important was Support from the community to your customers?

22. Vendors providing proprietary ERP systems try to achieve as high reliability as possible but in case of Open Source ERP Large Community using an open source ERP system might be able to find errors faster and systems can be more reliable. How important was this issue to your customers?
23. Upgrades for your ERP system are for free?

☐ Yes

☐ No

24. To what extent you think "Free Upgrades" option was important to your customers?

☐ Very Important

☐ Important

☐ Less Important

☐ Unimportant

☐ Don't Know

25. Easy integration of legacy system with new ERP system is important factors organizations focus on in selection process. To what extent you think it was important to your customer?

☐ Very Important

☐ Important

☐ Less Important

☐ Unimportant

☐ Don't know

26. In general what do you think are the most important features of your software or supports/services of your company that usually influence the organizations to select your solution?

27. Can we contact you again for further opinion from you?

☐ Yes

☐ No

28. If you have any comments on this research please write here:
7.1.4 Questionnaire 2 (Version 2) : For Suppliers (Vendors/Consultants) of OS ERP

Selecting an Open Source ERP over the Proprietary ERP

Dear respondent, this questionnaire is aimed to get your opinion as a vendor/consultant of Open Source ERP about what factors you think your customers prioritized while selecting your solution. This research is a requirement for the completion of master thesis in Informatics in Jönköping International Business School, Jönköping University, Sweden. We promise to treat any information you consider confidential as such and to use it for the sole purpose of this academic undertaking. The feedback being provided by you will only be used in analysis of our master thesis. Your real opinion is very important to us.

This research will strictly follow research ethics. It will take approximately 10 minutes from you, and we will really appreciate that. The results of this survey could be received if you wish. It would be really helpful for us if you could answer the questionnaire within few days.

In this questionnaire Question 1-7 deal with the personal information of you and the ERP Solution you are working with and Question 8-29 deal with the rationales that influence the SMEs to select your Open Source ERP solution.

1. Company Name

2. Country of Location

3. Name of the Open Source ERP solution you provide:

4. Your company works as-
   ○ Vendor
   ○ Consultant

5. Job title of the respondents-

6. If you wish to receive the result of this survey please enter you email address
7. How important you think was the reduced cost of open source ERP system to your customers while selecting your solution?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

8. The more time requires to implement an ERP System the more cost it needs. To what extent you think your customers evaluated implementation time that your system needs while they were choosing your solution?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

9. To what extent you think 'Best fit of the software with the current Business process' was important to your customer in the selection process?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't Know

10. To what extent you think that your customers give importance to analyze the Functionality of your ERP?

It was-

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't know

11. To what extent you think that your customers give importance to Business Process Re-engineering?

It was-

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't know

12. How Important 'Through Analysis of the Current Business Process' was to your customers before selection?

☐ Very Important ☐ Important ☐ Less Important ☐ Unimportant ☐ Don't know

13. To what extent you think Customization of software was important your customers?

☐ Very Important ☐ Important ☐ Less important ☐ Unimportant ☐ Don't Know
14. How important you think was the flexibility of your software to your customer, to change the software as their requirement?

- Very Important  - Important  - Less Important  - Unimportant  - Don't Know

15. To what extent you think the 'Ease of Use' of your solution was important to customers while they were evaluating your systems?

- Very Important  - Important  - Less Important  - Unimportant  - Don't know

16. Do you offer industry specific solution?

- Yes  - No

14. If yes then what industry you are specialized in?

17. How important was industry specialization to your customer while they were evaluating your solution before selecting?

- Very Important  - Important  - Less Important  - Unimportant  - Don't know

18. How important you think the factor ‘Decreased reliance on Single Vendor’ to your customer

- Very Important  - Important  - Less Important  - Unimportant

19. How important the factor 'Vendor Reputation' was to your customer you think?

- Very Important  - Important  - Less Important  - Unimportant

20. What is your opinion about your customers evaluation on 'Vendor Support' while they were selecting your solution?

- Very Important  - Important  - Less Important  - Unimportant  - Don't know

21. How important was 'Vendor Support' - that is support from you to your customers while they were selecting your solution?

- Very Important  - Important  - Less Important  - Unimportant  - Don't know
22. How important the 'education and training' from you was to your customer while they were selecting your solution?

☐ Very Important  ☐ Important  ☐ Less Important  ☐ Unimportant  ☐ Don't Know

23. Deploying Open Source ERP decreases the reliance on single vendor and increases reliance on large community. To what extent you agree on that?

☐ Strongly Agree  ☐ Agree  ☐ Neutral  ☐ Disagree  ☐ Strongly Disagree

24. How important was Support from the community to your customers?

☐ Very Important  ☐ Important  ☐ Less Important  ☐ Unimportant  ☐ Don't Know

25. Vendors providing proprietary ERP systems try to achieve as high reliability as possible but in case of Open Source ERP Large Community using an open source ERP system might be able to find errors faster and systems can be more reliable. How important was this issue to your customers?

☐ Very Important  ☐ Important  ☐ Less Important  ☐ Unimportant  ☐ Don't Know

26. Upgrades for your ERP system are for free?

☐ Yes  ☐ No

27. To what extent you think "Free Upgrades" option was important to your customers?

☐ Very Important  ☐ Important  ☐ Less Important  ☐ Unimportant  ☐ Don't Know

28. Easy integration of legacy system with new ERP system is important factors organizations focus on in selection process. To what extent you think it was important to your customer?

☐ Very Important  ☐ Important  ☐ Less Important  ☐ Unimportant  ☐ Don't know

29. In general what do you think are the most important features of your software or supports/services of your company that usually influence the organizations to select
your solution?

30. Can we contact you again for further opinion from you?

☐ Yes

☐ No

31. If you have any comments on this research please write here:

7.2 APPENDIX B

7.2.1 Questionnaires For OS ERP Expert

1. Do you think implementation time is important for the small and medium sized Company in OS ERP selection?

2. Most of the cases do you think the SMEs really analyze their Business processes thoroughly and check it with the functionality of the OS ERP to have best fit?

3. What is your opinion about analyzing the functionality of the OS ERP solution? Do the Small and Medium Companies do it during selection?

4. As the code is open, do the small and medium companies want to edit the code to fit with their requirements or they want to change the process? Which one you have found to be most important in the reality and why?

5. How easy it is to edit the code for the small and medium company?

6. Does Industry specific solutions work better then general solutions? Do the small and medium organizations give importance to it?

7. Does vendor reputation play some important role in selection of an Open Source ERP?

8. Education and training from the Suppliers (vendors/customers) identified to be important by most of the SMEs, what is your opinion about that? In reality is the training sufficient or they rely on the Community?

9. The OS ERP user identify ‘Community Support’ to be one of the most important factors but the Suppliers (vendors/customers) do not acknowledged it. What is your opinion about that?

9. The Suppliers (vendors/customers) identify ‘Supplier Support’ to be one of the most important factors. What is your opinion about that?

10. Normally how costly is the support during implementation and after implementation from Suppliers (vendors/customers)?

11. What do you think, how is Users acceptance to Community? Is it enough for Implementation support and problem solving after implementation?
12. We know that there is no cost of Open Source ERP, updates are free, is there any cost for services to implement Updates?

7.3 Appendix C- Letter to Respondents

7.3.1 Letter 1 (To SMEs)

Dear Sir/Madam,

We are writing this mail from Sweden. We are students of Jönköping International Business School (JIBS), Jönköping University, Sweden. We are doing our master thesis on Open Source ERP. We are going to study the factors that influence Small and Medium Sized company to select an Open Source ERP.

As you are an user of Open Source your opinion is really important to us.

We promise you not to waste much of your valuable time. It will take approximately 10 minutes. We just want to send you a questionnaire. We hope you will help us in the research as an Open Source ERP user. This research will strictly follow research ethics (If you want to be anonymous respondent even then it can help us a lot).

Please let us know if you can help us in our research.

Thanking you in advance,
Nasimul Huq
Syed Mushtaq Ali Shah
Jönköping International Business School (JIBS)
Jönköping University
Sweden.

7.3.2 Letter 2 (To SMEs)

Dear Sir/Madam,

Thank you so much to agreed share your important experience and help us in the research. Here is the link to the web based questionnaire: https://www.kwiksurveys.com?s=KIOHLN_f1e899b9

We will receive the results when you fill it up. We promise to treat any information you consider confidential as so and to use it for the sole purpose of this academic undertaking. The feedback being provided by you will only be used in analysis of our master thesis. Your real opinions are very important to us.

We are really grateful to you for supporting us in our research.

Best Regards,
Nasimul Huq
Syed Mushtaq Ali Shah
Jönköping International Business School (JIBS)
Jönköping University
Sweden.
7.3.3 Letter 3 (To Supplier)

Dear Sir/Madam,

We are writing this mail from Sweden. We are student of Jönköping International Business School (JIBS), Jönköping University, Sweden. We are doing our master thesis on Open Source ERP. We are going to study the factors that influence Small and Medium Sized company to select an Open Source ERP. We are going to study SMEs perspective as well as The Vendor/Suppliers perspective.

As you are Vendor/Consultant of leading Open Source ERP solutions your opinion is really important to us.

We promise not waste much of your valuable time. It will take approximately 10 minutes. We just want to send you a questionnaire. We hope you will help in the research as the leading Open Source ERP solutions provider. This research will strictly follow research ethics (If you want to be anonymous respondent even then it can help us a lot).

Please let us know if you can help us in our research.

Thanking you in advance,

Nasimul Huq
Syed Mushtaq Ali Shah

Students of Jönköping International Business School (JIBS)
Jönköping University
Sweden.

7.3.4 Letter 4 (To Suppliers)

Dear Sir/Madam,

Thank you so much to be agreed to share your invaluable experience and help us in the research. Here is the link to the web based questionnaire: https://www.kwiksurveys.com?s=KIKLOM_cba7a44b

We will receive the results when you fill it up. We promise to treat any information you consider confidential as so and to use it for the sole purpose of this academic undertaking. The feedback being provided by you will only be used in analysis of our master thesis. Your real opinions are very important to us.

We are really grateful to you for supporting us in our research.

Best Regards,
Nasimul Huq
Syed Mushtaq Ali Shah
7.3.5 Letter 5 (To community mailing list of webERP, OpenERP, Dolibarr and ERP5)

Dear Sir/Madam,

We are writing this mail from Sweden. We are doing our master thesis on Open Source ERP. We are going to study the factors that influence the SMEs to implement Open Source ERP. Your opinion as user/Suppliers of world leading Open Source ERP (ERP5/webERP/Dolibarr/OpenERP) will greatly help me in my research.

We promise I will not waste your valuable time. We just sent you a link to questionnaire this mail. We hope your kind participation in the research. It will take approximately 10 minutes to answer the questions of Questionnaire.

As Open Source ERP user/Supplier, we hope you will help the research. This research will strictly follow research ethics (If you want to be anonymous respondent even then it can help us a lot).

Here is the link of the questionnaire for the users of:
(ERP5/webERP/Dolibarr/OpenERP)
https://www.kwiksurveys.com?s=KIOHN_f1e899b9
and here is the link of the questionnaire for the consultants/partners of:
(ERP5/webERP/Dolibarr/OpenERP):
https://www.kwiksurveys.com?s=KIKLOM_cba7a44b

The feedback being provided by you will only be used in analysis of our master thesis. Your real opinions are very important to us.

We will be really grateful to you if you please fill the questionnaire and help us in this research on Open Source ERP. As an Open Source Enthusiastic we expect this help from (ERP5/webERP/Dolibarr/OpenERP) Community.

Thanking you in advance,
Nasimul Huq
Syed Mushtaq Ali Shah
Student Jönköping International Business School (JIBS)
Jönköping University
Sweden.
7.3.6 Letter 6 (To OS ERP Expert)

Hello,
Mr. Prof. Rogerio Atem De Carvalho,

We are students of Jönköping International Business School, Sweden. We are an Open Source enthusiastic in Enterprise Computing arena. In our master Thesis We are studying on Open Source ERP selection by SMEs. Our research objective is to find out the reasons that motivates SME’s to select Open Source ERP. As an expert in this area, your experience on that issue can help our study. As you know, lot more yet to discover in academic research in the area Open Source ERP. Your expert opinion and experience will really be a great source.

We are planning to take a little interview from you as you are an expertise in this area. We hope you will be agreed to give the interview that will add a valuable dimension in the study.

Please inform us how you prefer to give the interview, whether by phone or by email?
Thanks in advance and waiting for your kind reply.

Regards,
Nasimul Huq
Syed Mushtaq Ali Shah
Student of Master in Information Technology and Management
Jönköping International Business School(JIBS)
Jönköping University
Sweden.