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**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
COLLEGE OF NATURAL SCIENCE
SCHOOL OF INFORMATION SCIENCE**

**THE CHALLENGES AND CURRENT STATUS OF ERP
IMPLEMENTATION: THE CASE OF MUGHER AND
DERBA CEMENT INDUSTRIES**

KIBEBEWORK ASRAT

JANUARY 2015

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DERBA CEMENT INDUSTRIES

*A Thesis Submitted to the School of Graduate Studies of Addis
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By
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ABSTRACT

Enterprise Resource Planning (ERP) systems are commercial software packages that promise seamless integration of all information flowing through a company. While ERP originated from manufacturing and production planning systems used in the manufacturing industry, it expanded its scope in the 1990's to other "back-office" functions. These days organizations are operating in a highly dynamic and competitive environment as a result they are in a new phase of transforming the way they handle their operations. ERP has become the backbone of business intelligence for organizations by giving managers an integrated view of business processes. However, ERP implementations are extremely complex. The software itself is very complex and requires large investments of time, money, and expertise. Besides, not all ERP implementations have been successful.

The main objective of this study is to assess the challenges and current status of ERP implementation in DERBA and Mughher cement industries, exhaustively the Mughher Cement Factory. A theoretical framework that encompasses critical success factors in every stage of ERP implementation was used to determine and assess the challenges and status of the ERP implementation practices.

To this end, both quantitative and qualitative research methods were used and the necessary data is collected using questionnaire interview and focus group discussion in order to get the overall picture of the ERP implementation in cement industry. The study population was MCE system users, managers of INSA and MCE, system designers and IT professionals and managers of Derba and national cement industry.

The result from this study shows that successful implementation of ERP system was greatly affected by ignoring critical success factors in each ERP implementation stages. Disregarding organizational, people and strategy factors that encompass top management support, users training and education, effective project management, user involvement, suitability of software and hardware communication and data accuracy creates great challenge for the success of an ERP implementation.

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List of Acronyms

MCE	Mugher Cement Enterprise
ERP	Enterprise Resource Planning
BPR	Business Process Reengineering
MIS	Management Information System
IT	Information Technology
ICT	Information Communication Technology
CSF	Critical Success Factors
SDD	System Design Document
RAD	Requirement Analysis Design
LAN	Local Area Network
WAN	Wider Area Network
CCR	Central Control Room
INSA	Information Network Security agency
ICT	Information Communication Technology
PLC	Programmable Logic Controller
CEO	Chief Executive Officer
MMS	Material Management System
PQMMS	Production Quality and Maintenance Management System
IBFMS	Integrated Budget and Finance Management System
SMMS	Sales and Marketing Management system
HRMS	Human Resource Management System

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

ERP originated from manufacturing and production planning systems used in the manufacturing industry, in the 1990's ERP extends its scope to other "back-office" functions like human resources, finance and production and it becomes a common concept based on application software's to control all organization's resource. ERP systems are commercial software packages that promise seamless integration of all information flowing through a company which are designed to solve the fragmentation of information in large business organizations. It can be thought of as a company-wide information system that integrates all aspects of a business. Enterprise resource planning (ERP) system has been one of the most popular business management systems, providing benefits of real-time capabilities and seamless communication for business in large organizations and it becomes a software solution that integrates business functions and data into a single system to be shared within a company. [14]

Most of the organizations these days have large complex operations for which manual tracking becomes extremely difficult and some are in a new phase of transforming the way they handle their operations, while some others already have legacy systems which intend to do the job. [1] As a result of its benefits, ERP has become an integral part of business intelligence for organizations by giving managers an integrated view of business process. [14]

Though ERP software provides numerous benefits for business there are factors that needs to be considered for the successful completion of the project. Excellent project management, project teams with clear guidelines to execute ERP implementation from their project objectives and work plan for adequate resource allocation are some essential factors. Companies adopt ERP for various reasons technical and business factors are the typical ones which promise to improve IT architecture, accommodate business growth, improve business processes, and standardize business operations and procedures. [13]. However, ERP implementations are extremely complex. The software itself is very complex and requires large investments of time, money, and expertise. Besides, not all ERP implementations have been successful. ERP implementation affects the entire organizational

environments including the business process, people, and culture and they may encounter a number of challenges through the implementation process. [14].

Though ERP have a number of benefits, failures of ERP implementation can be caused by multiple factors associated with either organizational, and social and technical factors. The challenges in the implementation of ERP systems are becoming severe which sometimes turns the project into a complete failure. These challenges affect the success of ERP project in the implementation stage and must be identified. The implementation costs and time of ERP solutions vary greatly. The implementation costs varied from \$2million to \$130 million among fifteen production companies and the implementation process took from one to five years from the signing of the agreement until the eventual. [6] Different authors have aggregated the most important critical success factors for ERP implementation and based on these factors, it is possible to determine if the implementation process will be successful or not [16].

In order to better understand the process of ERP adoptions, a number of researchers have developed conceptual ERP life cycle frameworks or process models. A model should go a step further to give guidelines while taking context into consideration with the aim of improving the implementation outcomes. To do so, a good model should provide a rich picture of an implementation scenario and the possible sources of influences on implementation and how these actors interact and interrelate to come up with a working acceptable relation beneficial to both the organization and the individuals. [20]

1.2 Statement of the problem

In this competition era, using ERP systems, companies can manage and utilize information efficiently which is the main power for competition. Despite ERP's promises to benefit companies and a substantial capital investment, not all ERP implementations have successful outcomes and Selecting and implementing a suitable ERP system is a very challenging task.[22]Furthermore, the literature indicates that ERP implementations have sometimes failed to achieve the organization's targets and desired outcomes. Much of the research reported that the failure of ERP implementations was not caused by the ERP software itself, but rather by a high degree of complexity from the massive changes ERP causes in organizations. [14].

Mugher cement enterprise is one of the largest cement producing industry in Ethiopia Based on the evidence found from the factory reports and key representatives it has implemented BPR before 4 years

ago. Following the BPR implementation the industry starts the ERP software implementation work before 4 years ago.

As found from the reports of the factory, the ERP software project development task was assigned to the Information Network Security Agency (INSA) and the planned life time of the project was 1 and half years. However the project practically takes more than 4 years and still it was not yet finished. After the ERP software is implemented in MCE, users and IT professionals of MCE has assigned to test the real functionality by entering data in to the system.

According to key representative of the factory, during the implementation phase, a number of comments have been given from users of MCE and IT professionals both on the functional and technical part of the project. All comments have been given to the software designers for correction but almost all the sub systems were not corrected according to the users need and the implementation processes has took a lot of time. In order to make an adjustment and resolve the gap created by MCE and INSA, the Ethiopian ICT Company were involved in assessing what was done and what was left on each module of the system based on the Requirement analysis document (RAD) and system design document (SDD). Even though a number of activities were done by the INSA, MCE and ICT companies, as it was seen, the developed system is not yet fully functional and complete.

Derba cement factory is another private cement producing factory in Ethiopia which was started its operations recently and tried to customize the Systems, Applications and Products (SAP) software encompassing various modules. As evidenced from the industry documents, reports and key representatives of the factory, though the factory passed through the various processes related with the implementation of the SAP software, the software customization process were not completed.

As can be seen from the findings of various review of literature, the types of critical success factors may be similar from countries to countries and from organizations to organizations but, their level of influence may differ. [3].The research findings are country and organization dependent this implies that, ERP implementation practice and the rate of influence of critical success factors is not equal in different organizations. As a result, the challenges and the success factors for ERP implementations need to be evaluated against the legacy system and the nature of the organization. [15]

Concerning researches on ERP system implementation in Ethiopian context, only three studies are conducted. Abiot and Jorge have made an assessment on Ms-Dynamics ERP implementation in Mesfin Industrial Engineering which is a private company [26]. Derese has conducted a study on Oracle ERP

system at Ethio-Telecom, a government company. [27] Sintayehu Demeke has also tried to review Success Factors for Implementation of Enterprise Resource Planning System at Ethiopian Airlines. [28] Various organizations have different working practices that depend on their culture and nature of business. In addition, the different ERP systems have their own unique implementation methodologies and technical requirements.[15]The organizational culture of cement industries differs from either the airlines or Ethio-Telecom organizations culture and no research is done on the ERP implementation practices of Cement industries that comprises both private and government factories in Ethiopia. In this regard, the study explores and answers the following research questions.

- What is the current status of ERP implementation in Cement industries?
- What are the challenges that face on the ERP implementation process of Cement industries?

1.3 Objectives of the study

1.3.1 General objectives

The general objective of this research project is to investigate and identify the challenges and current status of ERP software implementation in some Ethiopian Cement industries exhaustively the Mughher Cement Factory.

1.3.2 Specific objectives

The specific objectives of the research project are the following:-

- To assess the challenges that cement factories have encountered during the ERP software implementation practice.
- To conduct survey questionnaire, and focus group discussions, and document assessments about ERP software implementation process of Mughher cement factory.
- To conduct detail interview in order to determine the SAP software customization process of Derba Cement Factory.

1.4 Methodology

1.4.1 Research Design

The nature of the problem under investigation determines the research design to be employed in conducting the research. The purpose of this study is to assess the problems and the current status of ERP software implementation practices held at some Ethiopian Cement Enterprise and to this end, a combination of both qualitative and quantitative data collection techniques will be used in the study.

1.4.2 Sample design and Sample Size

On this research paper the target population comprises system users, system developers, IT professionals, Project managers of INSA, managers of MCE, representatives of National Cement and Derba Cement Factory. Though some cement industries in Ethiopia has been selected and included in the sample, a special attention was given to MCE .Mugher Cement Factory has a total number of 1600 employees found in different branches of the factory, out of this, 250 employees are direct system users. On the other hand, INSA, the ERP software developer company has a total number of 15 system developers and project managers assigned for the design of ERP system implementation at MCE. Accordingly, 83 direct system users, IT professionals, INSA system developers and project managers which account 33% out of the total 250 were selected for the study. These 83 sample respondents were selected from each department using systematic sampling techniques.

15 MCE, INSA managers and key representatives of National Cement and Derba Cement Factory were selected from each factory using purposeful sampling technique. Accordingly, the sample size was 98 which encompass MCE direct system users, IT professionals, INSA system developers and project managers of INSA and key representatives of National Cement and Derba Cement Factory.

Random sampling techniques can be split into simple random sampling and systematic random sampling. Systematic random sampling is a more commonly employed method.[25] After numbers are allocated to everybody in the population frame, the first individual is picked using a random number table or out of a hat and then subsequent participants are selected using a fixed sampling interval, i.e. every n th person. (25).

The overall theme of the interview questions were on the ERP practices held at MCE. The main aim of the interview questions were to describe the current status and challenges of ERP implementation in Ethiopian Cement industries and to identify the factors that plays a major role for the successful implementation of ERP in cement industries. Twelve main questions were presented for interviewees.

These questions cover whether or not critical success factors were considered during the implementation of ERP, the challenges, benefits and the status of ERP implementation in cement industries.

Systematic sampling technique is preferred for the purpose of selecting 83 system users of MCE so as to increase the probability of including representative of the population system users and to make the sample units to uniformly distribute over the population. The purposeful sampling technique is used for the purpose of focusing on 15 key top management of MCE and project managers of INSA, key representatives of DERBA and national cement factories which best enabled the researcher to answer questions directly related with the undergo concept.

1.4.3 Data source

Both primary and secondary source of data is used for this study. The primary data was gathered through questionnaire, interview and observation. Interview is conducted on key top management of MCE and project managers of INSA, key representatives of DERBA and national cement factories. Questionnaire was also was forwarded for direct system users. In addition, focus a group discussion which is a qualitative data collection method was used in order to get more in-depth information on perceptions, insights, attitudes, experiences, or beliefs. Focus groups are useful for gathering subjective perspectives from key stakeholders. In addition it is used for gathering additional information as an adjunct to quantitative data collection methods. Focus groups, like other are held with IT professionals and designers of INSA to get information about their attitudes and opinions on the ERP software.

The secondary data is obtained from published and unpublished documents collected from MCE and INSA. Besides, different Brochures, magazines, books and journals of DERBA and National Cement factory on ERP software implementation, agreement documents in between MCE and INSA, requirement analysis design documents (RAD), system test case documents and comments given by IT professionals and system users and the actual deployed system of MCE, was used as a secondary source of data collection techniques.

Interview, focus group and other questions were obtained from literatures that was done and associated with ERP implementation issues. For this purpose various literatures related to the practices of ERP implementation, critical success factors for ERP projects and challenges in implementing ERP system were reviewed and important questions related with the thesis were selected. [30]

The questionnaire used in this research paper encompassed a numbers of questions and is organized into two parts. The first part of the questionnaire was related to personal background information of the respondents. The second part of questionnaire consisted of ERP related questions which includes, the challenges of ERP implementation in cement industries, the current status of ERP implementation, the impacts of critical success factors which comprise people, organizational and strategy factors for ERP implementation, and respondent's comments and suggestions.

1.4.4 Data Analysis Technique

The data collected using interview, questionnaire and observation, is analyzed, organized and interpreted quantitatively and qualitatively. Quantitative data analysis technique is essential for providing a broad base of insight on which typically a final course of action is recommended. Unlike qualitative research, which allows unlimited expression from respondents, quantitative techniques relies on responses to pre-formulated questions and the data that was collected using questionnaire were analyzed using percentage as a statically techniques. Qualitative data analysis is an iterative and reflexive process that begins as data are being collected rather than after data collection has ceased [24]. The analysis techniques used in this research paper are the frequency and percentage.

Data collection in qualitative technique is rarely based on unstructured or semi-structured, but methodologically flexible techniques, e.g. individual depth interviews or group discussions that are suited to elicit great detail and a comprehensive view. The responses are exploratory or investigative in nature. Its findings are often not conclusive and cannot automatically be used to make generalization. [24].Concerning the qualitative data analysis, data collected through structured interview and focus group discussions were organized in to themes for analysis. Then, data were verified and analyzed systematically to view a clear picture of the issue under study. For the purpose of analyzing the qualitative data obtained using interviewee and focus group discussion, the study uses an inductive analysis approach which starts with specific observations in the data to find patterns and regularities and to end with general conclusions that produce reliable and valid findings.

1.4.5 Significance of the study

- This study was carried out on the challenges and current status of ERP implementation practices on the selected cement industries in Ethiopia. Thus, knowing the current status and the challenges concerning ERP implementation helps cement industries to learn from their past

mistakes and to accommodate the suggested solution for the successful and sustainable implementation of the ERP software.

- In addition, it would enable system developers and project managers to recognize major obstacles and take the suggested solutions for their future work.
- The proposed study will benefits and help the future researcher as their guide

1.4.6 Scope and Limitation of the study

While findings of this research work can fairly be considered as relevant for future researcher as their guide, the scope of this research is bound to conducting a study to investigate the challenges and current status of ERP system software implementation at Mughher Cement factory and SAP system customization process of Derba MIDROC cement factory.

1.4.7 Organization of the Thesis

This research paper is organized in four chapters.

- Chapter one deals with the background of the study which mainly introduces the problem area, statement of the problem, the general and specific objectives of the study, the research methodology, the scope of the study, and significance of the study.
- Chapter two deals with reviewing of the literature that provides detailed information related to history, ERP implementation process, and critical success factors (CSFs); critical failure factors (CFFs) in ERP implementation, benefits of ERP, Criteria's for evaluating an ERP software, ERP implementation models and critical success factor models.
- The third chapter focuses on the results and discussions of the data analysis.
- The last chapter, chapter four presents conclusion and recommendation based on the results.

CHAPTER TWO

LITERATURE REVIEW

2.1. Definition of ERP

The enterprise resource planning (ERP) system incorporate a set of programs that provides support for main organizational activities such as manufacturing and logistics, finance and accounting, sales and marketing, and human resources. It also helps for sharing of data and knowledge among different parts of the organization as well as reducing costs, and improves management of business processes. [10]

An ERP system is a vast information system which enables decision-makers to have an enterprise-wide view of the information they need in a timely, reliable and consistent fashion. [8]

ERP packages are integrated software packages that cover the techniques and concepts employed for the integrated management of businesses that helps effective use of resources, to improve the efficiency of an enterprise. [17]

ERP packages are integrated software packages that cover the techniques and concepts employed for the integrated management of businesses that helps effective use of resources, to improve the efficiency of an enterprise. [17]

The standard response to a need for responsiveness, reliability, and rapidly increasing expectations is to create an organization based on departments with a clear linear structure for this end ERP provides a common language for shared references policies and communication. [1].

2.2. History of ERP

The history of ERP systems were datebacktothe1960s, while the initial accounting and inventory systems we reintroduced. During the period operating expense were the key competitive thrusts. As a result, manufacturing strategies became more product-centered based on high-level volume production, and minimization of expenses [5]. But companies could no longer afford the luxury of maintaining large quantities of inventory. As a result material requirements planning (MRP) systems were introduced in 1970 which represented a huge step forward in the materials planning process (6)

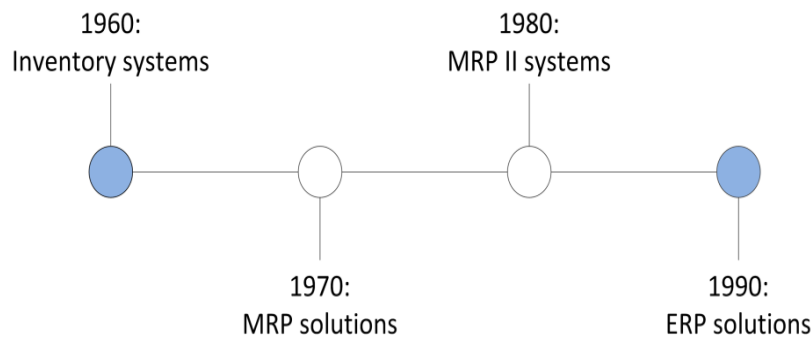


Figure 1 The History of ERP (Jacobs&Weston, 2007)

MRP was become the foundation of MRPII and ERP and Enterprise Resource Planning was born from its predecessor, Manufacturing Resource Planning (MRP).At this time Tools and techniques for supporting the planning of aggregate sales and production levels (sales and operations planning), master production scheduling, forecasting, sales planning and customer order promising (demand management), and high-level resource analysis were developed. The key competitive thrust in the late 1970s was transition towards marketing. [12]

During the time, MRP solutions were employed by production companies to ease dealing with production and inventory planning techniques. During the 1980s, manufacture resource planning systems (MRPII) came into the front lines. MRPII is an extended and more comprehensive version of MRP, which covered other operations and business processes in manufacturing companies [12].

Besides manufacturing planning, the extension handled financial, order handling, inventory management, distribution and procurement processes. MRPII can also handle business processes within, and between several entities within large companies, like plants, warehouses, and distribution centers. Although MRP implementations were non trivial, however, MRPII were more time and resource consuming, as they were broader in scope and have a larger impact on business processes and people. [11]

The 1990s was a time of explosive growth for the technology, particularly with ERP software systems that were meant to integrate businesses processes throughout every functional area. It incorporated the next generation of solutions which are different from the previous systems in the domains of relational database management, graphical user interface, and client-server hardware architecture. In 1992, SAP released a product called R/3. The most essential characteristic that separated the product from earlier ERP solutions was its deployment of client-server architecture. In 2000, Enterprise Resource Planning

or ERP uses multi-module application software for improving the performance of the internal business processes. An ERP system often incorporates business activities across functional departments, from product planning, parts purchasing, inventory control, product distribution, fulfillment, to demand tracking. ERP software systems may include application modules for supporting marketing, finance, accounting and human resources. [6]

2.3. Lifecycle of ERP software implementation

Like any other project, the ERP implementation project also has passed through different phases. There are no clear separating lines between these phases and in many cases, one phase will start before the previous one is completed. But the logical order is followed also, all the phases that we are discussing this session may not be applicable in all cases. In some cases, the organization might have already identified a particular package; then the pre-selection screening and package evaluation phases are not done. The different phases of the ERP implementation are Pre-evaluation Screening, Package Evaluation, Project planning phase, Gap Analysis, Reengineering, Configuration, Implementation Team Training, Testing, Going live, End-user Training, and Post-Implementation. Usually, companies go through implementations-in different business units, different modules, or manufacturing locations. So at any given time, more than one of the phases may be functional. [23]

2.4 Challenges of ERP implementation in Business

Though the implementation of an ERP system is associated with a number of benefits and affects the entire organizations such as process, people, and culture not all ERP implementations have been successful as it is accompanying with a number of challenges that companies may encounter in implementing ERP systems. ERP implementation projects vary in scale and arrangement, each project obliges careful and timely management decisions during its lifecycle phases [13]. ERP system implementations require dedication, commitment, significant amount of resources, and organizational changes. Failures of ERP implementation can be caused by multiple factors like organizational, social, and technical factors. However, there are extensive challenges in the implementation of ERP systems which sometimes turn the project into a complete failure. These challenges affect the success of ERP project in the implementation stage and must be identified. [12]. Furthermore, the literature indicates that ERP implementations have sometimes failed to achieve the organization's objectives and desired outcomes. Much of the research reported that the failure of ERP implementations was not caused by the ERP software itself, but rather by a high degree of complexity from the massive changes ERP causes in organizations. The challenges include organization and human related issues like resistance to change, organizational culture, incompatible business processes, project mismanagement, top management commitment, etc.)[13].

Priority	Name
1	Lack of senior manager commitment
2	Ineffective communications with users
3	Insufficient training of end-users
4	Failure to get user support
5	Lack of effective project management methodology
6	Attempts to build bridges to legacy applications
7	Conflicts between user departments
8	Composition of project team members
9	Failure to redesign business process and Misunderstanding of change requirement
10	

Table 1 Top ten risk factors of ERP risk (Huang et al., 2004)

2.5 Critical Success factors of ERP implementation

The implementation of an ERP system is a complicated and time-consuming process. Various studies identify a number of challenges associated with the system. The time and implementation costs of ERP solutions vary greatly. According to Ross and Vitale the implementation costs varied from \$2 million to \$130 million among fifteen production companies. The implementation process took from one to five years from the signing of the agreement until the eventual “go-live”. The magnitude of these companies varied from \$125 million in sales to over \$25 billion (US). Regardless with the challenges and coast associated with ERP, a collection of factors that can have a crucial impact on a successful ERP implementation. As was depicted in the following figure, Umble et al. have identified the most important factors for the ERP system which is critical to determine if the implementation process will be successful. [16]

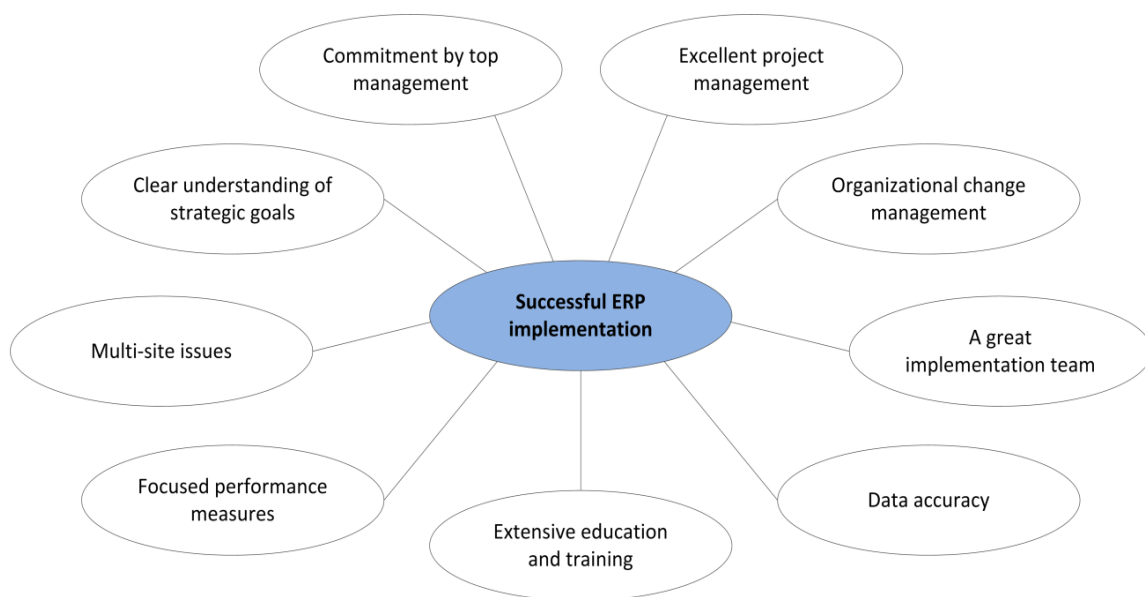


Figure 2 the nine essential factors affecting a successful implementation of an ERP system (source Umble et al., 2003).

As it was depicted in figure 3, the nine essential factors affecting a successful implementation of an ERP system are the following.

Clear understanding of strategic goals: -Clear understanding of strategic goals is the crucial critical success factor for the successful implementation of an ERP system. Goals, expectancies, and

products of the company need to be explicitly recognized. Besides, the key reasons for implementing an ERP system solutions and what essential organizational necessities the software will deal with need to be precise. The key personnel of the entire company have a distinct, immersive image of the activities the company should exercise so that it can fulfill the needs of customers, empower workers, and facilitate a supply chain for the impending three to five years. [16]

Commitment by top management: - top management commitment is the main critical for the successful implementation of an ERP system. Management commitment and support is the eventual strategy that will shelter the necessary conditions for successfully introducing the change brought by ERP into the organization. Successful implementations require strong leadership, commitment, and participation by top management. Since executive level input is critical when analyzing and rethinking existing business processes, the implementation project should have an executive management planning committee that is committed to enterprise integration, understands ERP, fully supports the costs, demands payback, and champions the project. Moreover, the project should be spearheaded by a highly-respected, executive-level project champion. [16]

Excellent project management: -To successfully implement an ERP system, organizations needs to recognize the importance of project management throughout the ERP implementation processes. Projects should have clear, mutually agreed and understood project and business objectives, which correspond to the project deliverables. [14].Furthermore, the project time table should be demanding, but reachable and the project timetable was too demanding due to tight deadlines. Some of these deadlines were not met because some unforeseen issues were encountered during the implementation. The scope should recognize both the implementable modules and the business procedures that are concerned. If there is no need to implement more than a basic version of an ERP solution with no notable modifications, the customization of the source code will be minimal. [16] In general, having a formal implementation plan, a realistic time frame, periodic project status workshops, an effective project leader who is also a champion, and having project team members who are stakeholders are the major parts of project management.

Organizational change management: -An organizational change management strategy should be developed that will maximize productivity and customer satisfaction as a direct byproduct of ERP technology. [20] Many enterprises have existing organizational structure and procedures that are not in accordance with the structure, tools, and forms of data supplied by potential ERP solutions. No matter

how adjustable the ERP system is, it still affects the strategy, organization, and culture of a company. [11]

Communication, planning, teamwork, and education are core functions that affect and are affected by the management of organizational change. They arise from peoples' different perspective about change management as it relates to an ERP implementation. [20] Among them, communication is the most critical aspect of change management for an ERP implementation. Both vertical (up and down the management chain) and horizontal (peer to peer) communication is imperative for a clear understanding of user roles and responsibilities required from the new system, as well as managing expectations of ERP change. [20] Unfortunately, several top managers consider ERP only as a piece of software and the implementation process mainly as a technological challenge. [11]. and they should come to understand that an ERP solution may substantially alter the operational means of the organization. The implementation of an ERP system may change corporate culture in a systematic way. Organizations should be fully aware of and ready for the immediate transformation in order to avoid contradiction, resistance, and confusion caused by an unsuccessful implementation. If the organization employs appropriate transformation practices, it should be able to adopt the possibilities supplied by the new ERP software. In addition, ERP enables the availability of larger amount of information and the possibility to have more improvements than originally seemed feasible. [16]

A great implementation team:-Another critical factor for the successful implementation of an ERP system is a great implementation team consists of top-quality people who are trained, productive, flexible, and have a good reputation. Besides, they have to be empowered to make crucial decisions. [16].The team implementing the software has significant role in creating the initial elaborate project scheme or overall timetable for the whole project, appointing obligations for several operations, and setting deadlines.[11]

Data accuracy: -Data accuracy is an essential characteristic of correctly operating ERP software. While ERP is an integrated system, in putting wrong kind of data can have a great impact on the whole organization and to avoid this, the importance of data accuracy and proper data input orders should have a crucial place in an ERP implementation process. Besides, it is essential that all the staff in a company operate the ERP software, not avoid it. [16]

Extensive education and training: - Many researchers consider users training and education to be an important factor of the successful ERP implementation. In ERP implementation process many projects fail in the end due to lack of proper training. Assigning project team members to run the in-house training is

necessary and the training program should accommodate both the employee and end user of the system. It is less costly and very effective if you train the trainer and revision training should also be provided as needed on an ongoing basis. A critical mass of expertise is needed by an ERP implementation in order to make it possible for the people to resolve complexities within the framework of the software. The trainees need to be clear on issues including logic and concepts of ERP, Features of the ERP system software and Hands-on training.[16].

End users must use ERP appropriately so that they can fully benefit from the software. In order to successfully train the people to use the system, the education process should start as soon as possible, preferably plenty of time before the start of the implementation.[11]. Often top management tends to drastically underestimate both the amount of education and training and the related costs needed to implement an ERP system successfully. Senior managers must demonstrate that they are entirely devoted to provide sufficient amount of money on education as well as end user training and include it in the ERP cost estimate. [16]

2.6 Criteria's for evaluating an ERP software

Criteria's for evaluating ERP software (source Shankarnarayanan 1999)

- functional fit with the Company's business processes,
- degree of integration between the various components of the ERP system,
- flexibility and scalability
- complexity; user friendliness,
- quick implementation; shortened ROI period,
- ability to support multi-site planning and control,
- technology; client/server capabilities, database independence, security
- availability of regular upgrades
- amount of customization required,
- local support infrastructure,
- availability of reference sites
- total costs, including cost of license, training, implementation, maintenance, customization and hardware requirements.[23]

2.7 ERP Implementation and critical success factor models for ERP

The following session deals about the ERP implementation models found in different literatures. As far as an ERP system implementation is dealt they are exposed to an extensive challenge, with a typical ERP implementation taking between one and five years. In additions, the performance of the firm will get worse before it gets better and firms are expected to counter the staff resistance throughout the stages of ERP implementation. As a result a number of researchers have developed different models for ERP implementations. Various Models were developed by different authors. A model named enterprise system experience cycle, which has four phases: charter, project, shakedown and onward and upward was suggested by Markus and Tanis whereas, Parr and Shanks developed a Process Phase Model (PPM) for ERP implementation, which is an extension of Ross and Markus & Tanis models, but integrating CSFs for each implementation stage. In the PPM, an ERP project is divided into three continuous phases such as planning, project and enhancement.[20]

The ERP implementation models mentioned above contain implicit assumptions with regard to the content, context, and nature of the change process. Like conventional IT implementation models, they rely on linear, staged models which do not take into account the dynamic interplay and reciprocal interaction between technology and the social process involving its use. Parr and Shank's model (PPM) was a move towards what can be called an implementation model because it attempted to identify the pertinent factors which should be controlled in each phase of implementation in order to achieve a successful implementation. However, the main weakness of the PPM is that it over-emphasis the project management aspect of a ERP implementation project at the expense of other pertinent factors such as organization itself its characteristics and external factors such the environment in which an organization operates. A model should go a step further to give guidelines while taking context into consideration with the aim of improving the implementation outcomes. To do so, a good model should provide a rich picture of an implementation scenario and the possible sources of influences on implementation and how these actors interact and interrelate to come up with a working acceptable relation beneficial to both the organization and the individuals. However, ERP models discussed above do not include or consider other relevant contextual or environmental influences. [20].

2.7.1 McKinsey 7S Model

Another model called the McKinsey 7S Model was developed in the early 1980s by Tom Peters and Robert Waterman, who are consultants and working at the McKinsey& Company consulting firm and

has been used to analyze over 70 large organizations. The model was created as a recognizable and easily remembered model in business. The seven variables, which the authors termed “levers” all beginning with the letter S include structure, strategy, systems, skills, style, staff, and shared values/super ordinate goals. The following table, table 2 summarizes the definition of the model elements. It is believed that for long-term benefit, these variables should be changed to become more congruent as a system. [22]

Effective organizations achieve a fit between these seven elements. These elements are categorized in so-called hard S’s and soft S’s. The hard elements (strategy, structure, and systems) are feasible and easy to identify. The four softS’s (shared values, skills, staff, and style) however, are hardly feasible. The external environment is not mentioned in the McKinsey 7S model. Regarding the high capability of the 7S model to give a comprehensive view of every organization, authors have exploited the model in developing their conceptual framework. This would help them have a proper and comprehensive look on organizational diverse dimensions and their associated factors. [22]

Dimension

Definition

Structure	Basis of specialization and coordination influenced primarily by strategy, size, and diversity of organization	<input type="checkbox"/> Formalization <input type="checkbox"/> Size <input type="checkbox"/> CIO Position <input type="checkbox"/> Centralization <input type="checkbox"/> Specialization
Strategy	Actions a company plans in response to changes in its external environment	<input type="checkbox"/> Vision and mission <input type="checkbox"/> Goals and objectives <input type="checkbox"/> Strategic IT plans
Systems	Formal and informal procedures that support the strategy and structure	<input type="checkbox"/> IT infrastructure <input type="checkbox"/> Business processes <input type="checkbox"/> Data
Skills	The distinctive competences-what the company does best	<input type="checkbox"/> Management’s skills <input type="checkbox"/> IT staff’s skills <input type="checkbox"/> Users’ skills
Style/Culture	Consisting of two components as below: <input type="checkbox"/> Organizational culture: the dominant values, beliefs, and norms which develop over time and become relatively enduring features of organizational life	<input type="checkbox"/> Top management support <input type="checkbox"/> Communication <input type="checkbox"/> Organizational culture

	<input type="checkbox"/> Management style: more a matter of what managers do than what they say; how do company managers spend their time; what are they focusing on	
Staff	The people/human resource management processes used to develop management processes, and ways of introducing young recruits to the company	<input type="checkbox"/> HR management <input type="checkbox"/> Training and education <input type="checkbox"/> Project team
Shared values	Guiding concepts, fundamental ideas around which a business is built must be simple, usually stated at abstract level, have great meaning inside the organization even though outsiders may not see or understand them	<input type="checkbox"/> Shared beliefs <input type="checkbox"/> Company-wide commitment <input type="checkbox"/> Project champion

Table 2. The proposed framework of ERP Readiness Assessment (Source Hanafizadeh & Ravasan, 2011)

2.7.2 Unified Model of CSFs for SAP Implementations

Another ERP system implementation model was the unified model for CSFs on SAP implementation developed by Rockart in 1979 who was the first author that applied the CSF approach in the information systems area. He proposed the CSF method to help CEOs (Chief Executive officers) in order to specify their own information needs about issues that were critical to their organizations, so that information systems could be developed to meet those needs. According to him, Critical success factors are the limited number of areas which ensure successful competitive performance for the organization. They have been applied to many aspects and tasks of information systems, and more recently to ERP systems implementations. The advantage of this model is that it unifies a set of studies related with lists CSFs identified by other authors; the CSFs are categorized in different perspectives and, each CSF is identified and defined. The following figure shows the unified critical success factors model by Esteves and pastor.

organization	Strategic	Tactical
	<ul style="list-style-type: none"> • Sustained management support • Effective organizational change management • Adequate project team composition • Good project scope management • Comprehensive business re-engineering • Adequate project champion role • Trust between partners • User involvement and participation • Dedicated staff and consultants • Avoid customization 	<ul style="list-style-type: none"> • Appropriate usage of consultants • Empowered decision makers • Adequate training program • Strong communication inwards and outwards • Formalized project plan/schedule • Reduce trouble shooting
Technology	<ul style="list-style-type: none"> • Avoid customization • Adequate ERP implementation strategy • Adequate ERP version 	<ul style="list-style-type: none"> • Adequate software configuration • Adequate legacy systems knowledge

Figure 3 Unified critical success factors model (Source Esteves and pastor 2000)

2.7.3 The proposed theoretical framework

The implementation of an ERP system in an organization is very complex as a result different researchers have developed models and frameworks for the successful completion of an ERP projects. The proposed theoretical framework comprises strategy, people and organizational critical success factors and attempts to relate them to various implementation stages. The theoretical framework as depicted in figure 5 is represented by three main sets of factors, namely strategy related factors (top management commitment, clear goals focus and scope, legacy systems, and ERP strategy), people related factors (training and education, users involvement, employee’s attitude and project team) and organizational related factors (effective project management, process management, change management strategy, IT maturity, computer culture, empowerment, organizational culture, and communication).. A theoretical implementation process was identified by Ibrahim (2007) such that it is suggested that there is an explicit linkage between factors and ERP implementation stages. [20]

The theoretical framework comprises strategy, people and organizational critical success factors (soft factors) and attempts to relate them to various implementation stages. The theoretical framework is represented by three main sets of factors, namely strategy related factors (top management commitment, clear goals focus and scope, legacy systems, and ERP strategy), people related factors

(training and education, users involvement, employee's attitude and project team) and organizational related factors (effective project management, process management, change management strategy, IT maturity, computer culture, empowerment, organizational culture, and communication). No attempts have been made in the academic literature to link any soft critical success factors to the various ERP implementation related stages. A theoretical framework suggested that there is an explicit linkage between factors and ERP implementation stages. [20]

The following figure, figure 4 shows the proposed theoretical framework for ERP implementation.

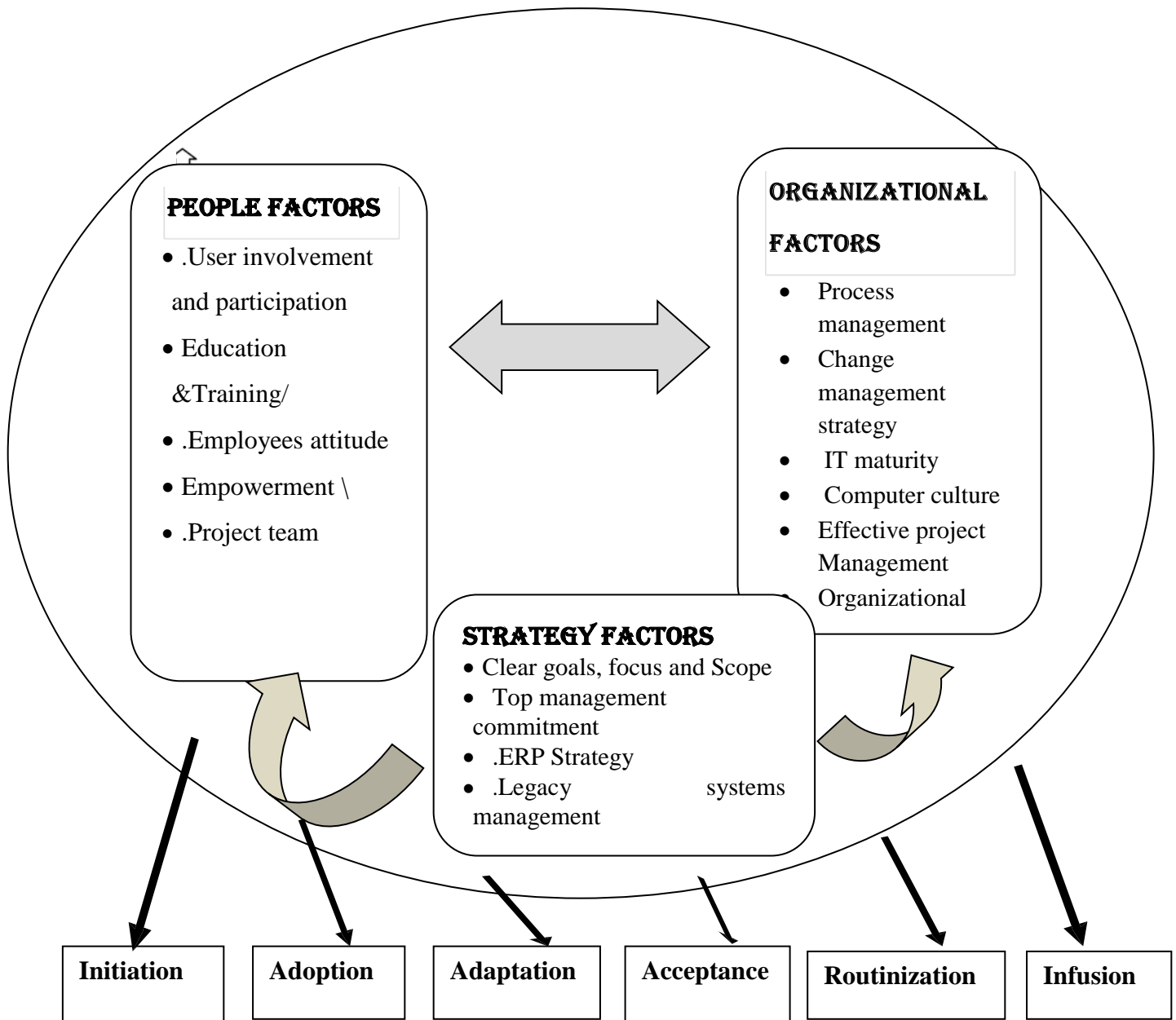


Figure 4 the theoretical framework ((Source: Ibrahim (2007)

As was depicted in the above figure, failures of ERP implementation can be caused by multiple factors like due to organizational, social, and technical factors. Some serious challenges occurred in the implementation of ERP systems and they may turn the project into a complete failure. These challenges affect the success of ERP project in the implementation stages (including both the implementation and post implementation stage) and needs be identified at the beginning of the project to avoid potential risks in latter stages. Thus, it would be necessary to assess and analyze the preparedness of an

organization before initiating the project. Without proper readiness, the project probably fails or faces intensive challenges. The success of an ERP implementation greatly depends on the state of readiness of the company. In general, before deciding to implement an ERP system, making an assessment have to be done which is not solely identifies an organization's current capability to implement an ERP project, but also identifies weakness areas that must be improved to achieve a better state of readiness for ERP implementation.

2.8 Overview of ERP implementation in Ethiopian cement industries

2.8.1 Messobo Cement factory

The construction of the Messebo Cement Factory started in February 1997 and was completed at the end of 1999. The plant is located in the northern part of Ethiopia, 7 km from Mekele city. The annual capacity of the plant is 900,000 tones and it is capable of producing Portland cement with or without additives. The production process of Messebo cement factory consists of the latest pre-claimer technology. Messebo Cement Factory was established to become a leader in manufacturing of building materials in Ethiopia and in the Tigray region and to substitute the importing of cement to reduce cash out flows, to export qualitative and competitive cement, to supply cement at low cost and to facilitate the expansion of construction activity in the region as well as in the country; and to generate profit for its persistence and further expansion. [31]

Coming to the ERP implementation practice of the factory, besides the PLC software which has both an expert and MIS systems and used for controlling and reporting the production activities in cement technology, the factory has implemented some modules of the ERP software used for its business activities. The company implements ERP software that encompasses the Finance Management system, Material management System (inventory Management system and the Human resource management system modules which were developed by the Microsoft Company.

2.8.2 National Cement Share Company (NCSC)

National Cement Share Company (NCSC) was established in November 2005 through a joint venture of East Africa Mining Corporation, the Federal Government of Ethiopia's Privatization and Public Enterprises Supervising Agency and others. Over the next few years, government shares were bought out by East African Mining Corporation. The company is located 515 kilometers from Addis Ababa, in Dire Dawa Administrative Region. The factory was the first cement plant in Ethiopia, which was

established in 1936 by Italians. It was previously called "Dire Dawa Cement Factory". After renovating the old factory, the company has boosted which he production from 150 Tons per Day to 400 TPD and is currently producing 3000 TPD clinker with the new plant. [32]

Besides the PLC software which has both an expert and MIS systems and used for controlling and reporting the production activities in cement technologies, the factory has implemented Dynamics based ERP system tailored specifically to meet the requirements of National Cement Share Company. The software was developed and deployed by Techno Brain Company. Techno Brain is involving in performing IT Education and Training and started its operations as an IT Training center in Tanzania. Techno Brain gradually started offering ICT Solutions and Training across the Africa region. It then expanded operations to African countries. [32]

The ERP solution enabled NCSC to automate critical business functions such as Finance, Sales, Procurement, Production and Manufacturing among others. The solution streamlined the individual processes and made them work in tandem to contribute towards core business objectives. NCSC was also able to achieve greater flexibility through remote networking. Though the system is hosted at the main production plant in Dire Dawa, key stakeholders are able to manage real time operations and financial reports from NCSC's Addis Ababa office via Virtual Private Network. The newly implemented Dynamics ERP at National Cement Share Company has drastically reduced strain on the company's human and financial resources through automation. NCSC officials have a great collaborative platform, which is flexible and efficient to work on.

2.8.3 Derba Cement Factory

Derba MIDROC Cement PLC is executing a number of cement production projects in different parts of the country. The 5000 tpd clinkerization (7000 tpd cement) production plant to be put up at Derba 70 km from Addis Ababa will be the largest and state-of-the-art cement production plant in the country. The plant produces Ordinary Portland Cement (OPC) and Portland Pozzolana Cement (PPC) that will meet the requirements of Ethiopian National Standard EN 1177-1: 2005 or European Standard EN-197. The OPC will be produced as per CEM-I-42.5 grade and will contain 95% clinker and 5% gypsum. The PPC will be produced as per CEMII-32.5 grade and will contain 67% clinker, 28% pumice and 5% gypsum. The design and manufacturing of all production machineries of the plant are based on the latest state-of-the-art cement technology. The fuel used is Coal and HFO alternatively. [33]

Just like the national cement factory Derba cement factory has both an expert and MIS system that was related with controlling the activities of cement production and providing vital information's (reports) for decision making activities. Derba Midroc Cement factory was tried to implement the SAP ERP software and is passed through the process of an ERP system customizations.

2.8.4 Dangote Ethiopia cement Industry

Dangote Cement PLC has commenced project works of US\$ 400 Million green field cement plant of 2.5 million tons/ annum capacity at Muger in Ethiopia. Mobilization of men and machinery is done and project execution is underway in full pace. The Plant is scheduled to be commissioned by the Q1 of 2015. Dangote Cement's foray into Ethiopia in the Oromia region close to Addis Ababa, comes at a time when the Horn of Africa nation is grappling with a severe cement deficit amidst rising demand as a result of substantial investments in infrastructure like roads, dams, bridges and railways. Currently, Cement demand in Ethiopia is around 7 to 8 MTPA, while production stands at 2.4 MTPA forcing the nation to import the deficit for several years. Over the next five years, demand is expected to soar to 13.8 MTPA, while local supply will reach 8 MTPA when existing manufacturers complete the upgrading of their factories. This provides Dangote Cement an ideal investment opportunity to bridge the deficit and consolidate its operations. [34]

As it was described previously the factory will begin its operations in February 2015 just like the other cement industries the factory and have both an expert and MIS system that was related with controlling the activities of cement production and providing vital information's (reports) for decision making activities. Coming to the ERP software practice of the Danghotee Cement factory, though the factory begin its operation by April 2015, it was not implemented the ERP software.

All of the above cement industries have large complex operations for which manual tracking becomes extremely difficult. In order to cope up with the changing environment and to be competitive in cement industry, ERP software has played a great role by giving to both managers and users an integrated view of business processes which has become the backbone of business intelligence. As a result, cement industries that was not implemented an ERP software will come in a line for transforming the way they handle their manual operations using the ERP software.

2.8.5 Muger Cement factory

Coming to ERP software for cement producing companies in Ethiopia, besides the PLC software which has both an expert and MIS systems and used for controlling and reporting the production activities in cement technology, most industries are in the process of implementing the ERP software developed by the Microsoft GP company. Muger cement enterprise has been the one and the first cement producing factory that was trying to implement the ERP software using in-house software developers. Associated with a number of reasons and challenges as depicted in chapter two the software was not successful and it was not fully functional. [35]

Before the implementation of BPR that leads to major business process and structural changes, MCE has exercised different in-house developed data base software's like the delivery system, the sales system, the purchase follow up system and the inventory control system software. In addition, to enhance its competitiveness and increase its profitability, MCE has also made a contractual agreement with the representative of the Microsoft Company to implement the Microsoft dynamic GP ERP software.

Microsoft Dynamics GP (Great Plains) has applications for financial management, human resources management, manufacturing planning, supply chain management, field service, business intelligence, collaboration, compliance, and IT management. As a result, after in-depth analysis of user requirements, and an approval of the agreement made, the software installation and the customization job has been started with the selected finance and store departments. Besides, direct system users of finance and store department as well as IT professionals were involved in the customization and testing part and test data's have been entering in to the system. Even though MCE has assigned all the necessary resources and spent a lot of money, the customization process was interrupted without testing the full functionality of the dynamic GP ERP software as a consequence; the company hasn't got any benefits from it.

Following the rejection of the dynamic GP software and BPR implementation, the enterprise was given a due emphasis to improve its information systems infrastructure and for this purpose it has made an agreement with the local government agency named INSA Company involved with networking, security and software Development tasks. The total budget assigned by MCE for both the network and system software development task was more than 18 million birr. A major accomplishment on the network tasks was the implementation of a wide area network (WAN) connecting its branches located

at different areas to the head office using a virtual private network (VPN), which was leased from an international telecommunications services provider.[35]

Concerning the software tasks, the INSA Company has assigned software developers and they were starting to collect requirement analysis and based on it they developed a requirement analysis design (RAD) documents. The developed RAD document contains nine sub modules, which have five main systems.

The Human resource management system [36].The Production management system, maintenance management system, Quality management system and residence management system [37].The material management System [38].The Sales and marketing management system [39].The Integrated Budget and finance management system [40] and the factory Portal system [41]. Besides, the RAD contains detailed justification on each part of the module. Based on the RAD document, the software designing part was done by taking the INSA software designers to their own office located at INSA head office. It was after completing the designing part that the INSA software developers come to MCE and started to deploy and implement the software. The same to RAD, the deployed system also contains nine modules.

After the ERP software is implemented in MCE, users and IT professionals of MCE has assigned to test the real functionality by entering data in to the system. During this phase, a number of comments have been given from users of MCE and IT professionals both on the functional and technical part of the project. All comments have been given to the designers for correction but almost all the sub systems depicted in the previous figure was not corrected according to the users need and these phase has took a lot of time. As a result, MCE has been asked the ICT Company to evaluate the deployed system software and to act as a negotiator in between MCE and INSA. Following this, ICT Company was assigned its own experienced IT professionals for this purpose. Even though a number of activities were done by both the INSA, MCE and ICT companies, the developed system is not yet used by users and as well as it doesn't fully achieve its intended purpose. In the meantime, unless and otherwise a new amendment on the previous agreement is made, the INSA company has decided not to continue and correct any comment.

2.9 Related works

2.9.1 Summary of related works

Related works associated with ERP implementation were summarized in the following table.

Author(year)	Objectives/purpose	Methods/techniques	Key findings
H kalbasi (2007)	assessing an ERP implementation in light of critical success factors and recognizing ERP implementation critical success factors and comparing them to theory	judgmental sampling which is a non-probability sampling technique	functionality, maintained scope, project team, management support, consultants, internal readiness, training, planning and adequate testing are found to be as critical
Aljaz ,RK Maliki,RN Lodh and V Habibe(2006)	Identifying and evaluating the critical success factors affecting ERP implementation in Malaysia	Questionnaire survey method is used. A postal survey questionnaire was used as the research Instrument	Allocating the necessary resources by top management is the most important duty of top managers in ERP implementer companies. Having clear project goals will prevent a failure implementation project. Sharing information within the project team is the most important thing for good communication. Effective ERP project management cannot be done without a realistic time frame
Jaideep Motwania, Dinesh Mirchandani, Manu Madanc, A.Gunasekaran (2002)	Examining what factors facilitate or inhibit the success of ERP projects and what actions can be taken to bring troubled ERP projects under control.	Case study	Providing content and discovery of elements that surround each construct to identify those facilitating and inhibiting factors that lead to ultimately successful or unsuccessful ERP projects.
Fahd Nazir Ahmed (2007,2008)	Proposing list of Critical Success Factors (CSFs) in the form of CSFs	Case study	Proposing CSFs framework on the basis of the author personal experience of implementing Smart Office in HSV

	framework for Enterprise Resource Planning (ERP) system implementation at Small and Medium sized Enterprises (SMEs).		
HKalbasi published in 2014	Identifying CFs occur in all stages of ERP implementation	Case study	Business Process Reengineering, change management, effective communication, effective training, infrastructure, inter-team cooperation leadership, management involvement, rewards and recognitions, standardized implementation sequence, team composition and top management commitment are identified as the CSFs during the phase of ERP system implementation. Different CSFs have been identified in post-implementation, stage such as end user satisfaction, employee motivation, organizational productivity, software reliability, professional development services and support & maintenance. In Pre-implementation stage of ERP System study found different CSFs such as Clear objectives and scope, complete awareness, organizational analysis, right product selection, study of organizational culture and team composition

Sintayehu Demeke in 2004	Success Factors for Implementation of Enterprise Resource Planning System at Ethiopian Airlines	Case study	Identified twenty critical success factors important for the success of ERP implementation. Success factors such as project planning and strategy, top management support and commitment, project management and leadership, training, documentation and knowledge transfer, clear user requirement and need assessment, capability of consultants and implementers, change management and communication, team composition and retention and organizational culture and readiness are high ranking findings of this study as to be critical for ERP.
Abiyot and Jorge in 2012	A Successful ERP Implementation in an Ethiopian Company: A case Study of ERP Implementation in Mesfine Industrial Engineering Pvt. Ltd.	Case study	It is the best way to share successful experiences among companies of similar nature. Issues of post implementation period should also be taken in to consideration such that strategic needs and requirements for sustaining the effectiveness of such enterprise information systems after a period of relative stability following initial implementation will be clearly understood.

Table 3. Summary of related works

2.9.2 Limitations identified from above related works

Factors affecting ERP implementation are complex and abundant and numerous authors have identified a variety of factors that can be considered to be critical to the success of an ERP implementation. Industry type, size, structure, which researchers imply are critical in achieving positive outcomes from

ERP acquisitions. Culture is a set of shared beliefs within a country or community where a person lives and has a substantial and definite influence on organizations, organizational behavior, and the management of organizations. [3]

Many difficulties have been faced when implementing and using western technologies, management processes, information systems methods, and information systems techniques in developing countries. It can be argued that cultural differences will mean that factors extremely important in one culture may be less important in another, and vice versa. The above researchers deal with the critical success factors related with some countries and organizations which implements ERP software. However, the types of critical success factors may be similar from countries to countries and from organizations to organizations but, their level of influence may differ as can be seen from the findings of various related review of literatures. [3]

All research findings are country and organization dependent this implies that ERP implementation practice and the rate of influence of each critical success factors is not equal in different organizations. As a result, the challenges and the success factors for ERP implementations need to be evaluated against the legacy system and the nature of the organization. Since most of the studies conducted on ERP are also in the context of Western countries where the ERP systems are produced, it is not clear and confirmed if the critical success factors already identified are applicable to developing countries like Ethiopia [13].

Concerning researches on ERP system implementation in Ethiopian context, only three studies are conducted. Abiot and Jorge have made an assessment on MS-Dynamics ERP implementation in Mesfin industrial engineering which is a private company [26]. Derese has conducted a study on Oracle ERP system at Ethio-Telecom, a government company [27]. Sintayehu Demeke has also tried to review Success Factors for Implementation of Enterprise Resource Planning System at Ethiopian Airlines [28]. These Ethiopian companies have different business practices. In addition, the different ERP systems have their own unique implementation methodologies and technical requirements. No research is done on the ERP implementation practices of Cement industries comprises both private and government factories in Ethiopia.

Over the past few decades, various types of innovation have helped the cement industry improve its environmental profile and contribution to society. These innovations were motivated by pressure for cost reduction, by the emergence of public and government concern over environmental degradation, and sometimes by the scarcity of land resources or an interest in improving the company's image and helping society. As a result, some cement companies have introduced innovations such as novel

quarrying methods, energy efficiency improvements, environmental controls, and new cement products that incorporate waste products and reduce natural resource use. Cement companies interested in becoming more sustainable in the future can follow a number of different pathways. Each company will need to choose an individualized approach to sustainability that fits well within its organizational culture, company-specific situation, and business strategy. [30] Cement industries in Ethiopia are growing and come up with new and latest technologies. The organizational culture and nature of cement industries is not the same with other business centers. They have used a process control system called CEMAT the Leading Distributed Process Control System for Cement Production for the purpose of controlling mining and related cement production activities. The CEMAT process control system offers an entirely new approach and is the best way to optimize cement production potential at all corporate levels and throughout the value chain. The software was implemented by Siemens Industry Automation Division (SIAD).

In line with the factory automation system they are starting to use ERP software for facilitating their business activity and achieve business excellence. The ERP system software of MCE was designed by the in-house government software developer company called INSA. Before the software implementation, INSA was finished the federal government software implementation process and users of the agency is now accomplishing their activity using the developed system. Even though INSA was successful in the federal government, its ERP software development practice at MCE has created a great challenge. DERBA cement factory was also passed through the SAP customization process however, the software is not complete. It is on this ground that i am interested and motivated to do my work on the challenges of ERP software at MCE and DERBA cement factories.

CHAPTER THREE

RESULTS AND DISCUSSION

This chapter deals with the results and discussions of the data analysis. At First the questionnaires were developed by the researcher using a case study research paper entitled a framework for the implementation of ERP to improve business performance and from the my3q.com ERP related survey questions. Then, the questionnaires were distributed to participants, and the data were gathered from respondents found in Cement industries. It was obtained through questionnaires and interviews.

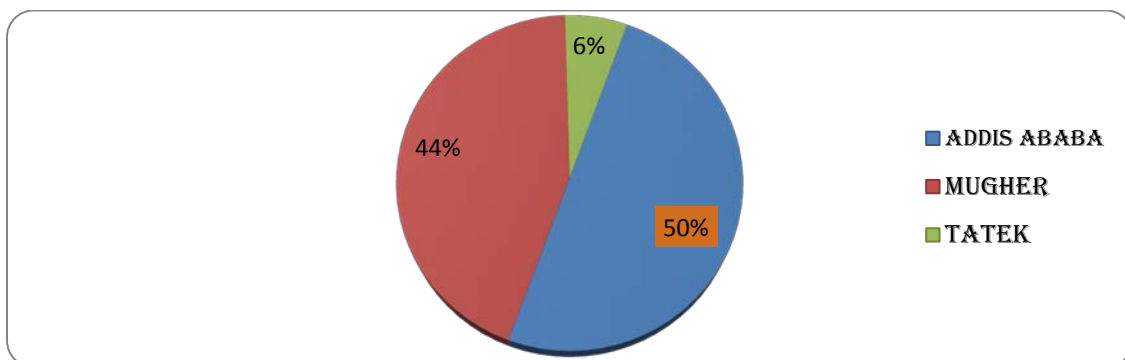
The findings from questionnaire is presented in two main parts, Chart one, two, three and table one presents the characteristics (Educational Background, work experience, branches and departments) of the respondents. The remaining Tables and Charts present the data related to ERP implementation practices held in cement factory. The total numbers of distributed questionnaires were 83. Out of which 80 were filled and returned. The questionnaires distributed to different respondents were collected and filled as per the instruction correctly. As a result the response rate is 95%. Thus, in this chapter the information gathered from the respondents are analyzed in detail.

3.1 Quantitative study

3.1.1 Background of the Respondents

The first part of the questionnaire consists of the background information of the company and the respondents, which represent system users located at different branches. Accordingly, the variables are described and summarized in the subsequent sections using tables, figures and charts.

Chart 1 location of the respondents



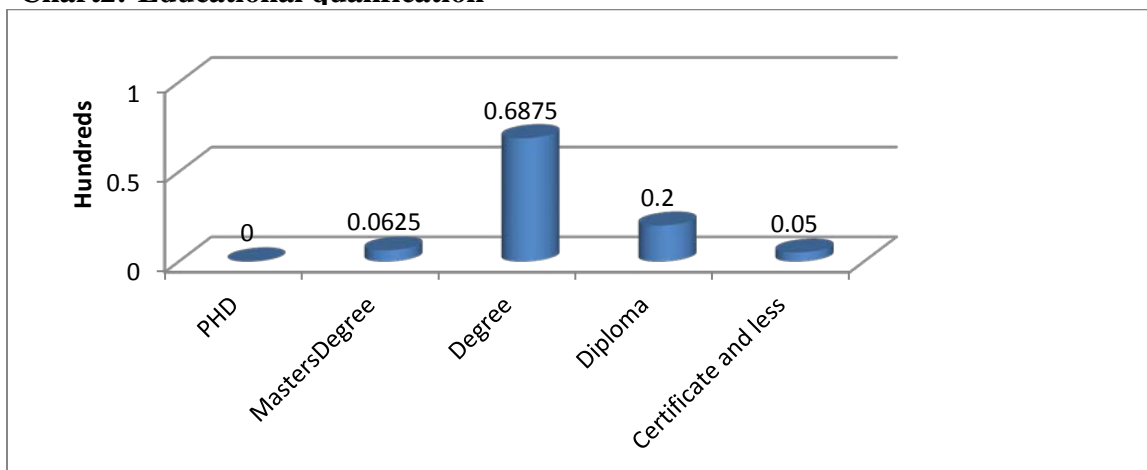
As indicated in the above chart ,50 %(40) of the respondents are worked at Addis Ababa branch and the rest 44% and 6% are worked at Mughher and Tatek site. Hence different respondents from located at different places were involved in the study which creates an opportunity for getting diverse and first-hand information.

Table1 department of respondents

Department name	Frequency	Percent	Cumulative Percent
Budget and Finance	10	12.5	12.5
Human resource	10	12.5	30
Sales and Marketing	20	25	55
Procurement and store	16	20	75
Production	20	25	100
Total	80	100	

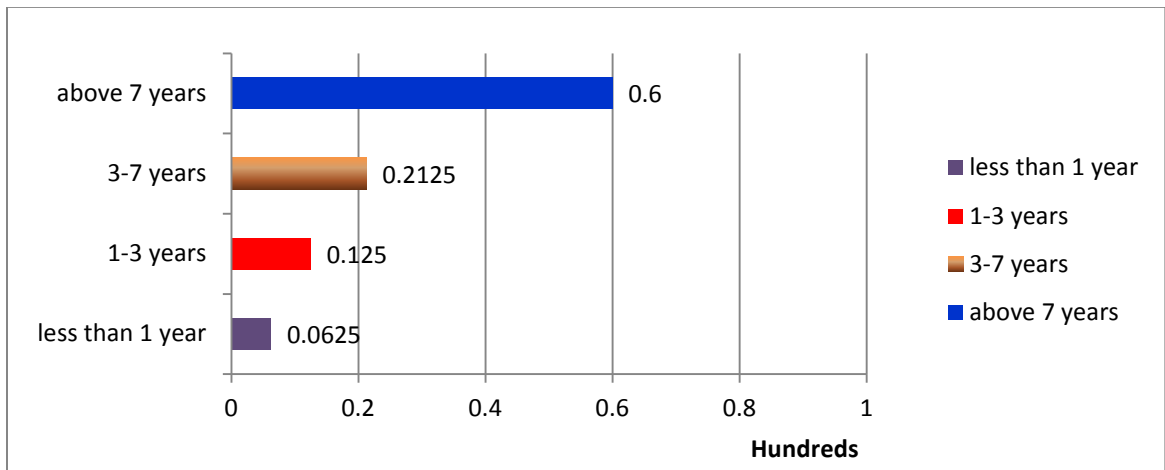
As it can be shown from table 1, almost half of the respondents are from Sales and Marketing and Production departments the rest 50% are from Budget and Finance, Human resource and Procurement and store departments respectively. As a result, it would be possible to get vital and detail information from respondents worked in different departments.

Chart2:-Educational qualification



As depicted on chart 2, among the respondents, there is no PHD holder, but more than 75% of the respondents have masters and bachelor degree holders and the remaining 25% are under degree level. As chart 2 indicates, most of the respondents have masters and bachelor degree holders. As Chart 3 indicates that, the highest working experiences of the respondents were above 7 years. As a result respondents that can easily understand the questions and have enough knowledge and experience about the subject matter were participated in the study.

Chart 3 Respondent’s experience



As was indicated in the above charts and table, the background of the respondents which includes their location, department, education and experience were included in the questionnaire. The reason for explaining all this is to inform that the questionnaire is distributed to different branches and departments of the organization as well as to various education and experience groups and is expressed in the following session independently.

3.1.1.1 Location of the respondents

Though the number of users was not the same from branches to branches, ERP software implementations’ were practiced in different branches of the organization. As was indicated in the location of respondent’s information, depicted in chart 1, the respondents are worked at different places of the organization called mugher, tatek and Addis Ababa respectively. The main reason for including such information is to inform the questionnaire is distributed to different branches of the organizations. As a result, system users of the enterprise located at different places is involved in the questionnaire which in turn makes the result to be representative.

3.1.1.2 Departments of the respondents

Different system users from different departments are included in the questionnaire. As indicated in table 1 system users from budget and finance, human resource, sales and marketing, procurement and store, and production departments were involved in the questionnaire. The challenges and current status of sub systems may vary from departments to departments. Hence considering diverse departments create an opportunity for collecting vital and detail information about ERP software implemented in the organization.

3.1.1.3 Educational background and work experience of the respondents

As was indicated in chart 2 and 3, respondents from different educational background and work experiences are included in the study. Most of the respondents have passed through the different stages of ERP software implementations practice held in the factory. They have vital knowledge and experience about the challenges as well as the status of the ERP software. As a result, it would be clear that the probability of getting diverse, first hand and reliable information is high.

3.1.2 ERP Implementation practices.

In this session, Questions related with ERP implementation process is described using tables and charts. Questions regarding the requirement gathering process, the project team, involvement of management trough out the progress of the project, user training, availability of resources for the project, challenges related with ERP projects, current status of ERP projects and the views and perspectives of users on the ERP project is forwarded to respondents and the results was discussed thoroughly.

Table 2 respondent's involvement in requirement gathering phase

Were you involved in the requirement analysis phase?	Frequency	Percent	Cumulative Percent
yes	54	26.25	67.5
No	21	67.5	93.75
I don't know	5	6.25	100
Total	80	100	

Table 2 indicates that, only 26.25% of the respondents were involved in the requirement phase the rest 73.75 have not involved in the requirement gathering phase.

The below table 3 shows that, 82.5% of the respondents did not believe that the full requirement is collected in accordance with the business processes and requirements of the organization. 11.25% of the respondents replied the full requirement is gathered and the rest 6.25% answered I don't know.

Table 3 requirement gathering phase

Do you feel that the full requirement is collected in accordance with the business processes and requirements of the organization?	Frequency	Percent	Cumulative Percent
A) yes	9	11.25	11.25
B) no	66	82.5	93.75
C) I don't know	5	6.25	100
Total	80	100	

Responses presented in table 2 and 3 shows that, though respondents are direct system users of the industry, they did not thoroughly involve in the requirement gathering phase and give their reliable requirements. As a result, there is a doubt on the collection of full and complete requirements that would be answered by the developed system. This would in turn have a great impact for the successful implementation and customization of the project.

Table 4 problems associated with requirement gathering

What are the problems associated with requirement gathering phase?	Frequency	Percent	Cumulative Percent
A) Users weren't aware about the requirement collection phase	27	33.75	33.75
B) lack of responsible person assigned to give requirements	28	35	68.75
C) Incomplete requirements	4	5	73.75
D) Lack of top management commitment	21	26.25	100
Total	80	100	

Table 4 shows that almost all (95%) of the respondents' answered that lack of awareness of Users about the requirement collection phase, lack of attention and responsibility from Top managers were the main problems associated with requirement gathering phase. The rest 5% replied that Users weren't interested to give their complete requirement.

From table 2, 3 and 4 it can be inferred that, though the requirement gathering phase is the basement, crucial and vital in the system development process, both managers and users of the system were given less awareness and attention to the phase as a result, the full requirement were not collected in such a way that would reflect the legacy system of the organization which have a great impact for the successful implementations of the factory ERP projects.

Table 5 project team

Is there an ERP project team and is it possible to deal with unexpected difficulties (comments) using a regular steering team meeting?	Frequency	Percent	Valid Percent	Cumulative Percent
A) Yes	8	10	10	10
B) No	62	77.5	77.5	87.5
C) I don't know	10	12.5	12.5	100
Total	80	100	100	

As can be seen from the table 5 the highest numbers of respondents, 87.5% replied that there was not know any project team that has been selected for the successful implementation of the ERP project. As a result, unexpected difficulties and problems related with the deployed system were not solved using a regular steering team meeting. As shown, 10% replied yes whereas, the rest 12.5% answered I don't know.

From this it would be clear that the respondent's hasn't known any ERP implementation team that was organized from different departments which is vital for the successful implementation of ERP system. As a result it would be very difficult for users of the system to deal with unexpected difficulties (comments) identified on the software with a responsible and coordinated team using regular steering team meeting. As was discussed on the literature, without good project management, ERP implementation projects that are large in scale and must take place over longer time periods may end in failure in addition, the composition of team members plays a crucial role in ERP implementation.

Table 6 top management involvement

Does the upper management follows on how the project is going on a weekly or bi-weekly basis?	Frequency	Percent	Valid Percent	Cumulative Percent
A) Yes	15	18.75	18.75	18.75
B) NO	60	75	75	93.75
C)I don't know	5	6.25	6.25	100
Total	80	100	100	

As shown from the above table, 75% replied that upper managers were not follow on how the implementation is going .the rest 18.75% and 6.25% responds yes and I don't know. From this, it would be clear that the interest and involvement of top managers on the implementation process was low.

Table 7 Training

Did you attend any training course during the implementation process?	Frequency	Percent	Valid Percent	Cumulative Percent
A) Yes	23	28.75	28.75	28.75
B) NO	52	65	65	93.75
C)I don't know	5	6.25	6.25	100

The above table illustrates that more than 60% of the respondents were not attend any training course related with the ERP implementation; whereas the remaining 28.75 % says they have taken some training courses and the rest 6.25 replied I don't know. From this, it would be recognized that though MCE has deployed and started its work using the software, a great number of respondents have not taken any training course concerning the ERP software.

As shown from the below table 8, related with training manual document, almost all of the respondents replied that there is no training manual document designed for user of the system.

This shows that a user manual document which is vital for end users of the system were not designed and prepared during the implementation period.

Table 8 Training manual

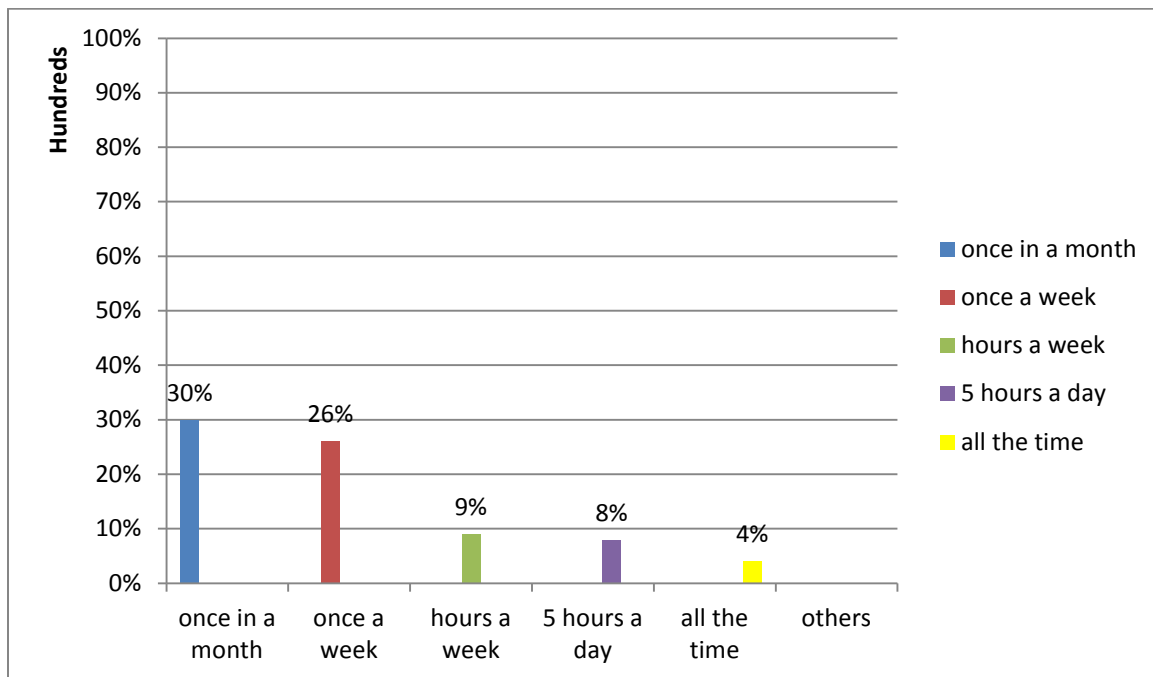
Is there a Design Training manual for different user group?	Frequency	Percent	Cumulative Percent
A) Yes	7	8.75	87.5
B) NO	70	87.5	96.25
C)I don't know	3	3.75	100
Total	80	100	

Table 9 Availability of Resource needed for ERP implementation

Have you got the right resources needed for the implementation of the project?	Frequency	Percent	Cumulative Percent
A) Yes	63	78.75	78.25
B) NO	9	11.25	90
C)I don't know	8	10	100
Total	80	100	

Table 9 shows that 78.75% of the respondents believe that the right resource needed for the implementation of the project was provided by the factory whereas, the remaining 11.25% and 10% of the respondents answered no and I don't know respectively. From this it would be clear that, the company has provided the necessary resource needed during the implementation of the project as a result, problems associated with allocation the necessary resource for the projects was not become a challenge through the progress of the project.

Chart 4 frequency of using the ERP software



As can be shown from the above chart on average, 37 (46.25%) of the respondents replied they use the system once in a month, 32 (40%) use it once a week. use it 5 hours a day. Whereas, 19(23.75%),8(10%),4(5%),3(3.75%) of the respondents use the system in hours a week,5 hours a day, all the time and others respectively.

This shows that 70% of the respondents rarely use the system and only 5% are use it all the time. From this it would be inferred that though MCE has provide the necessary material for the project, after the system is deployed , employees of the factory were not independently use the system for their day to day activities which in turn leads to conclude that, the majority of the work is done using the manual system.

Table 10 Time to fix comments

How often is your comment in the implementation process is fixed	Frequency	Percent	Cumulative Percent
A) Lately	69	86.25	86.25
B) urgently	11	13.75	100
Total	80	100	

As illustrated in table 10 and 11, large number of the respondents verifies that comments that have been given to the INSA designers were fixed lately not on time. Besides, they believe that the current status of the MCE project was more complex and incomplete which in turn makes users of the system to lose confidence on the deployed system and stick to the manual system.

Table 11 Status of ERP System

Status of the ERP system implementation	Frequency	Percent	Cumulative Percent
A) More Efficient and use it independently to operate daily activities.	3	3.75	3.75
B) More complex and incomplete and use it with the manual system.	71	88.75	92.5
C) I don't know.	6	7.5	100
Total	80	100	

From table 9, 10 and 11 it would be inferred that the ERP project deployed by the industry was not effective and users of the system are diverting to use the manual system to operate their daily work. In addition, though the project is implemented with a significant amount of cost the benefit that was expected from the investment was insignificant in addition, the current attitudes and views of users on the deployed system was become negative and they lose their confidence and trust on the project.

Table 12 challenges of ERP implementation

Challenges for the successful implementation of ERP	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of senior manager commitment	62%	20%	9%	4%	5%
Ineffective communications with users	71.25%	20%	5%	2.5%	1.25%
Insufficient training of end-users	70%	22.5%	3.75%	2.5%	1.25%
Failure to get user support	67.5%	18.75	8.75%	0.375%	1.25%
Lack of effective project management methodology	65%	21.25%	3.75%	5%	5%
Attempts to build bridges to legacy applications	70%	20%	5%	5%	0
Conflicts between user departments	63.75%	17.15%	3.75%	7.5%	7.5%
Composition of project team members	65%	16.25%	5%	6.25%	7.5%
Failure to redesign business process and Misunderstanding of change requirement	61.25%	21.25%	5%	6.25%	6.25%
Total					

As was indicated in the above table, 80 to 90% of the respondents have agreed on Lack of senior manager commitment, lack of composition of team members, bridge to legacy applications, failure to redesign business process and misunderstanding of change requirement, insufficient training and communication and lack of effective project management methodology was a great challenge in the ERP implementation process. 5to 10% of the respondents answer neutral, disagree and strongly disagree.

As evidenced from literatures, Since ERP implementation inevitably causes organizational changes; it requires the engagement of senior management from across the organization that is able to resolve conflicts. Without the commitment of senior management, ERP implementation has a high risk of

failure. Lack of end-user training increases risks by creating confusion and inaccuracy, thereby decreasing user satisfaction and the credibility of the system. Excellent project management is also needed for successful ERP implementation. Project teams should have clear guidelines to execute ERP implementation from their project objectives and work plan to their resource allocation plan. Without good project management, ERP implementation projects that are large in scale and must take place over longer time periods may end in failure.

In addition, composition of team members plays a crucial role in ERP implementation. ERP integrates diverse business functions across an organization into one single system, necessitating a complex and integrated software package. If a project team does not clearly understand the changes in its organizational structure, strategies, and processes from ERP implementation, it will not be in a position to benefit from ERP's competitive advantage.

In order to best implement ERP, project team members should be selected with a balance between members with business experience within the organization and external experts with specialties in ERP. Even though the above factors are highly critical for the successful implementation of ERP, as was evidenced from the responses, all the factors has been the challenges identified on the progress of the project.

Table 13 current status of ERP software

Current status of ERP	Frequency	Percent	Cumulative Percent
Successfully Implemented and plays a major role	5	6.25	6.25
Partially Implemented and used together with the manual system	15	18.75	25
It is just automation no integration in between sub systems and is difficult to get integrated information	36	45	70
Not used at all and worked manually	24	30	100
Total	80	100	100

Table 13 indicates, 45% of the respondents claimed that though ERP is implemented, It is just an automation of the manual system as a result getting an integrated information that was highly required by departments as well as the entire business is impossible. About 30 % of the respondents assert that they are working manually and they didn't use the software at all. 18.75% of the respondents state that they are using the software together with the manual work where as 6.25% reported the software is Successfully Implemented and plays a major role.

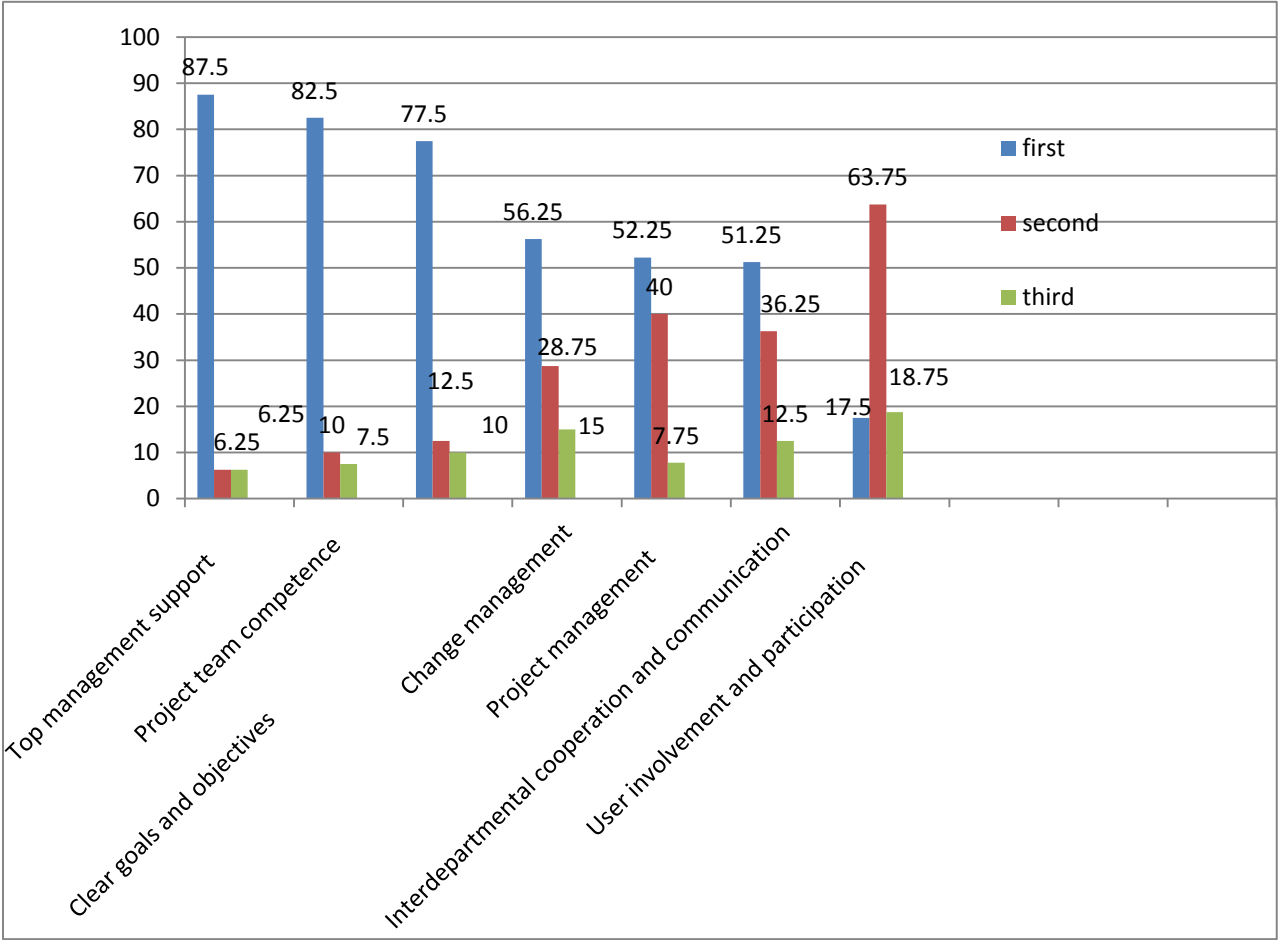
Table 14 Attitudes or Views of the Respondents after ERP implementation

Attitudes or Views of the Respondents	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
ERP can support improved business processes	5%	5%	2%	65%	23%
ERP Has enhanced primary users knowledge and skills	9%	9%	4%	35%	43%
ERP has made MIS more accurate and accessible?	10%	12%	3%	45%	30%
ERP has facilitated improved services to customer and suppliers	13%	10%	6%	31%	40%
ERP has resulted decreased work load in various departments	8%	7%	5%	45%	35%
ERP made it easier to take advantage of new technology	12%	9%	-	55%	24%
ERP Has reducing costs, reducing operations time,	15%	6%	3%	34%	42%
ERP Has increased information integration, better information quality, and increase in customer satisfaction	10%	13%	4%	43	30%

Table 14 illustrates about the attitudes of the respondents which activities can be supported by the implementation of ERP implementation. The result shows that from the total number of respondents, 69.1 % to 78.9 % (i.e. the highest percentage) disagree and strongly disagree though ERP is implemented to facilitate their day to day activities, to reduce workload, to increase information

integrations in between departments and to reduce cost, operation time and finally to make the organization more competitive, through unsuccessful implementation of ERP they didn't get all those benefits.. However, less than 3.3 % of the respondents strongly agree that even if it were successful implemented, the implementation of ERP could not give any support on their day to day operation. On the other hand, from 4.8 % to 11.4 % of the respondents have no awareness about the benefits they got from ERP implementation? From this it would be clear that though companies invest a great amount of resources on ERP projects expecting a return they expect from their investment, unsuccessful implementation of ERP has made users to have a negative views and attitudes about the benefits of ERP. In addition, it can cause the business to lose the advantages of ERP systems.

Chart 5 summary of the importance of CSF in ERP



The above table and chart illustrates that above 75% of the respondents' rank Top management support, Project team competence Clear goals and objectives at first whereas near to 50% rank change management ,project management and Interdepartmental cooperation and communication as first and few of the respondents' rank User involvement and participation at first. This shows that though

different users has different perspectives on the degree of importance of critical success factors, they all strongly agree on the advantage of CSF for the successful implementation of ERP software.

The table also shows the importance of critical success factors in each ERP implementation stages. As was described in chapter two the implementation process of ERP passes different stages before deployed and put in to practice. As it was found from respondents response, in each implementation stages of ERP the role of critical success factors may vary. Even though critical success factors are critical for the successful ERP implementation, their importance at each stages of implementation differs as a result it would be necessary to identify which factor most influence in which stage of ERP implementation.

3.2 Focus group discussion

Focus group discussions were used to obtain information informally from a small number of individuals who have a common understanding and knowledge about the ERP implementation software practices. The focus group discussion incorporates both information system experts and system developers who thoroughly involved in the ERP implementation process. From the discussion vital and core information's about ERP software implementations were gathered and the idea was integrated with qualitative analysis.

3.3. Qualitative Study

3.3.1 Response Rate

The findings from interviewees are presented in two main parts, the findings concerning the general overview of ERP Implementation practices of the factories is presented first. Then, interviewees regarding the impact of strategy, people, organizational and soft Factors in the implementation process are followed. Thus, the information gathered from the respondents is analyzed in detail using their own words. Records (notes) were taken during the interview. The notes were reviewed and summarized accordingly. The total numbers of interviewees were 14. Seven of the interviewees were chosen from the management group of Mughar Cement Factory and two was selected from the project Manager of Information and Network Security Agency. Four interviewees were from Derba Cement Factory who has detail knowledge about the SAP software implementation process of the factory. One from National Cement factory and the last one interviewee was from the Dhangote Cement Factory. Out of the total 15 interviewees 13 were available and interviewed as per a schedule. As a result the response rate is 87%.

3.3.2 Interview results analysis and Discussion of Findings

3.3.2.1 ERP Implementation practices.

The interviewees reported that though the status is not the same they are passed through the process of implementing ERP software and have practiced ERP implementation for the purpose of Building an ERP system in order to have proper and structured ways of business handling in their existing activity and future plans.

According to the interviewees only Mughar Cement factory was made an agreement with a local software designer. Derba cement factory were also started to customize the SAP software developed by the German company. National Cement factory choose Techno Brain Company which is a multinational company, head quartered in Nairobi, Kenya. Mossobo Cement factory has introduced an ERP system originated in Microsoft Corporation and its implementation is managed through SYSCORP Company. From this it would be recognized that most factories prefer well known software providers than using local software designers. As MCE is a government owned factory, it was the only cement manufacturing factory that uses local software developer.

The interviewees also answered that there are various benefits of ERP software in factories. It is used to collect, manage and distribute information across functional boundaries. Additionally it helps to increase quality, reduced time-to-market, shortened lead times, higher productivity and lowered costs which can help to improve customer service and increase sales and market share as well as margins. The result identified that though ERP software requires a large amount of investment, if they are properly managed and implemented, the return on investment is high and factories may get numerous benefits as a result.

There are many challenges that were provided by the interviewees of the survey. Majority of the respondents said that the main challenges in implementing ERP software are poor requirement gathering processes, lack of top management involvements, Organizational Changes, Flexibility of ERP Software System and lack of user involvements. As the findings point out that, a number of challenges would occur during the implementation of ERP software. The success of ERP depends on avoiding or controlling those obstacles that appear during the pre-implementation, implementation and post implementation phase of ERP systems. As a result it is necessary to apply critical success factors and eliminate those challenges attached to ERP during the implementation of ERP software.

3.3.2.2 Impact of strategy Factors in the implementation process

According to the interviews, even though the Top management provided the necessary financial resource for successful implementation of ERP, their involvement and support in the project was not significant. As it was identified from the questionnaire and interview, the ERP implementation practice of MCE has been surrounded by a number of problems including absence of Clear goals focus and scope of the project, top management commitment and training. There was not follow a clear strategy and direction. Besides, The business processes or the legacy system of the factory were not clearly reengineered before ERP project is started, the implementation approach was not a step-by-step, the majority of employees were not ion well trained, which makes the implementation process to take more time and money. The structure and business process of the legacy system was changed twice a time after the project is implemented. Therefore, the amount of technical and organizational changes was high.

An ERP implementation is considered to be a success if it achieves a substantial proportion of its potential benefits. Before making a decision to implement any software, clear goals and objectives need to be set. Coming to Derba Cement Factory, it was before 5 years ago that derba cement factory planned to customize its business process and struggle to implement the SAP software .Even though the necessary financial resources were provided by the owner, the implementation was not successful .unable to set clear goals and objectives, functional fit with the Company's business processes, degree of integration between the various components of the ERP system, flexibility and scalability, complexity, lack of user friendliness, were the major problems of the customized software.

3.3.2.3 The impacts of People Factors on the implementation process

According to the responses, after the requirement gathering step is over the software developer company INSA was design the system and deploy each module of the system. It was after the deployment of the system that end users were allowed to know and use the deployed software. End users were not involved in the progress of the ERP project. As a result their participation and involvement in either the requirement collection phase or in defining the company information system needs, the system development and implementation process was insignificant. In addition during the implementation process, no project team (implementation team) has been announced by the vendor which is responsible for managing and controlling the progress of the project. One big problem after the implementation process was, though a number of comments have been forwarded from end users of

the system, whether the comments are vital or not, they all were send to the designers of the system directly and the deployed system was updated using the incoming comments. As result the final system was too far from the RAD and SAD document. Coming to training and education, INSA was given some trainings related with the software development languages to the factory IT personnel. No formal training or educations were given to end users of the system. According to the response of Key representative of derba cement factory, the customization process was surrounded by many difficulties. Even though, an implementation team was established to take responsibilities related with the customization process, the team lack coordination and was not actively participated in the project progress. As a result it has created a great impact on customization process and for the successful implementation of the project as well.

3.3.2.4 Impacts of Organizational factors

The interviewees reported that though Project management unit and project manager is vital for the successful implementation of ERP projects, throughout the progress of the project, no recognized and accountable project management unit was not established and selected from the better employees of the factory. Hence the project lacks a planned project management unit that was taken a responsibility and the implementation plan was not clearly defined accordingly. Though The ERP system was designed to reengineer the existing business processes following the implementation process of PBR in the factory, the business processes were not analyzed to identify the potential chances of re-engineering. The implemented system was not reflected and encompasses major structural and process changes identified in the implementation of PBR Moreover, employees of the factory were not empowered, involved, participate and trained to have a knowledge on how the ERP project is going and to communicate and give their feedback on the progress of the project. All this factors have their own great impact on the successful implementation of the project. According to the key representative of Derba Cement factory staring from the beginning of the customization process up to its progress, the vendor or the software provider were not give a great attention to the factory culture. The factory has its own cultural aspect which makes it differ from other organizations. Everyone who is attacked by the software has to be participated on the process and a team work has to be appreciated. As a result of ignoring such factors, the customization process of the factory was not successful.

3.2.5 Impacts of Soft ERP Implementation Factors

It became evident from the interviewees that MCE has not given a strong attention for the project implementation process. They also reported that the company provides no incentives to encourage the employees to increase their proficiency and to push them to introduce modern techniques, such as the ERP system, into their factory. They also stated that it was after the failure of the project that both managers of MCE and INSA has turn their eyes and give an attention on issues regarding the future fate of the project. The interviewees also mentioned that it will be very important for both managers of MCE and INSA to change their direction on the experience of other similar cement factories that have been successful in ERP projects so that they can learn and got experiences on how the project is progressed, deployed and successfully practiced.

3.3.2.6 Current status of the ERP implementation

According to the interviews, after the deployment of the ERP software system in the factory, users and managers of the factory has got a trouble to use the developed system in their day to day operation and to get a consolidated report which is vital for decision making purpose. After recognizing those problems on the software the management of MCE has wrote different letters to INSA in order to fix the problem but no long lasting solution was provided by the vendor. In order to solve the problem, a committee was assigned both from MCE and INSA to identify the problems using the SDD, RAD document, and the developed system and the results was given to both the senior managers of INSA and MCE. The identified problems were also given to the Ethiopian Information Communication and Technology center to consult on how to solve the problem, but no answer and support was given from the consultant. Finally INSA has wrote a letter to MCE that unless and other wise a new contract agreement and amendments is made by the two parties, they were not interested to continue on the project and gave any support and answer questions regarding the project.

It was after this stage that an implementation team was assigned by MCE top managers for the purpose of following the progress of the project. After a number of ingoing and outgoing letters by the two parties, MCE has decided to pay additional 3.25 million Ethiopian birr to INSA and let the vendor to finish the software. Currently users of the system lose an interest on the software as well as their trust on the implementation of Information Technology projects on the factory have dropped significantly. Coming to Derba Cement Factory, the factory was tried to customize its business process using the SAP software before 5 years ago. Though a lot of efforts were done, the factory has not got the expected return from its investment. As reported from the factory managers, nowadays the factory was

not effectively use the customized software for facilitating their day to day operation and for getting the necessary reports essential for managerial decisions.

3.4. Discussion of the results

3.4.1 Objectives

This study aims at describing the current status and challenges of ERP implementation in Cement industries. Accordingly problems associated with an ERP implementation in cement industries and the factors that play a major role for the successful implementation of ERP in cement industries were identified. To this end, a combination of both qualitative and quantitative data collection techniques were employed and system users, system developers, IT professionals, Project managers of INSA, managers of MCE, representatives of National Cement and Derba Cement Factory were become the target population for the study.

Based on the review of literatures and analysis of questionnaires and interviews, the researcher tries to identify the critical success factors for ERP implementation throughout the stages of the implementation using a conceptual framework model and suggest a solution that factories should do for recovering the deployed software at hand.

3.4.2 Description and importance of the theoretical framework

In order to better understand the process of ERP adoptions, a number of researchers have developed conceptual ERP life cycle frameworks or process models. A model should go a step further to give guidelines while taking context into consideration with the aim of improving the implementation outcomes. To do so, a good model should provide a rich picture of an implementation scenario and the possible sources of influences on implementation and how these factors interact and interrelate to come up with a working acceptable relation beneficial to both the organization and the individuals. The decision to select the best strategy for an organization does not solely depends upon the individual requirements of the company and the strategy but also depends upon several critical factors like technical and organizational. For selection of the best fit one must consider the indicators and metrics also while simulating the situation of their company. As it was stated in chapter two ERP implementations represent high-risk projects that need to be managed properly.

Organizations must learn how to identify the critical issues that affect the implementation process and know when in the process to address them effectively to ensure that the promised benefits can be realized and potential failures can be avoided. Having such fact, the theoretical framework model was used that relates the critical success factors in Enterprise Resource Planning (ERP) System Implementation Stages for the purpose of identifying factors that creates problems during the ERP implementation process. As a result it would be simple to understand the impact of Critical Success Factors across the Stages of Enterprise Resource Planning Implementations. To this end, the theoretical model was used as a basis for describing and identifying the ERP implementation practices and cultural aspects of Cement industries and for formulating extensive questionnaire and interviewees forwarded to derba and mugher industries. The theoretical implementation process was identified by Ibrahim such that it is suggested that there is an explicit linkage between factors and ERP implementation stages. The conceptual model encompasses the critical success factors in each implementation stage which was vital for the successful implementation of the ERP software. The theoretical framework comprises strategy, people and organizational critical success factors (soft factors) and attempts to relate them to various implementation stages. The theoretical framework is represented by three main sets of factors.

1. **The strategy related factors:-** consists of top management commitment, clear goals focus and scope, legacy systems, and ERP strategy
2. **People related factors:-** includes training and education, users involvement, employee's attitude and project team.
3. **Organizational related factors:-**comprises of effective project management, process management, change management strategy, IT maturity, computer culture, empowerment, organizational culture, and communication. [42]

In this research paper using the theoretical framework as a bench mark and based on the results found from interviewees, questionnaires and focus group discussions factors that were become the challenges for the successful implementation of an ERP system were identified from the case study factories.

3.4.3 Evaluation of ERP implementation practices of cement factories using the theoretical framework

3.4.3.1 Strategy Factors

As was described in the review of literature the theoretical framework considers the strategy factors namely top management commitment, clear goals focus and scope, legacy systems, and ERP strategy as the main factors for successful implementation of ERP system software. [22]

As it was identified from the questionnaire and interview, the ERP implementation practice of MCE and the customization process of Derba Cement factory have been surrounded by a number of problems including absence of Clear goals, focus and scope of the project and top management commitment and training. Even though the Top management provided the necessary financial resource for successful implementation of ERP, their involvement and support in the project was not significant. In addition, they were not following a clear strategy and direction. The business processes or the legacy system of the factory were not clearly reengineered before ERP project is started, the implementation approach was not a step-by-step, the majority of employees were not well trained, which makes the implementation process to take more time and money in both factories. The structure and business process of the legacy system was changed after the project is implemented. Therefore, the amount of technical and organizational changes was high. In general, factories were missed and not considering the strategy factors described previously in their ERP project implementation process.

3.4.3.2 People Factors

With regard to the people factors the theoretical framework puts (training and education, users involvement, employee's attitude and project team as the essential success factors for ERP software implementation and failure to consider those factors creates a challenge during the implementation phase of ERP software [22].

As found from results and discussions, it was after the implementation stage that end users were allowed to involve in the ERP project. Their participation and involvement was insignificant in the early stage of the project which encompass the system development and implementation processes. Their involvement in either the requirement collection phase or in defining the company information system needs was low and the factory was not collected end user ideas regarding the ERP project. There was executive sponsorship available to give users who did not have the right skills useful

feedback about the ERP project. There was resistance to change from employees in the early stage of the ERP implementation because of the lack of awareness of the ERP system and lack of understanding of the strategic purposes of ERP project.

In addition, there was not an implementation team that has been dedicated and responsible for the progress of the project. Though a number of comments have been forwarded from users of the system, there was not handled by an ERP implementation team mixed of internal staff and consultants. No sufficient training and education has been done regarding of the ERP system which has a negative effect on the knowledge and understanding about how the system would work and how it would change the different business processes. As a result those critical factors vital for the successful implementation of ERP projects which has grouped under people factors were not identified and treated effectively.

3.4.3.3 Organizational factors

Organizational factors that comprises effective project management, process management, change management strategy, IT maturity, computer culture, empowerment, organizational culture, and communication was also identified as the main critical success factors for ERP software implementation under the conceptual framework. Ignoring such factors creates a great challenge during the ERP implementation practices. However, there are extensive challenges in the implementation of ERP systems which sometimes turn the project into a complete failure. These challenges affect the success of ERP project in the implementation stage and must be identified at the beginning of the project to avoid potential risks in latter stages. Thus, it would be necessary to assess and analyze the preparedness of an organization before initiating the project [22]

As evidenced from questionnaire's and interviewee's Project management unit and project manager, which is vital for the successful implementation of ERP projects was not established and selected from the better employees of the factory. Hence the project lacks a project management that was taken a responsibility and the implementation plan was not clearly defined accordingly. Though the ERP system was designed to reengineer the existing business processes following the implementation process of PBR in the factory, the business processes were not analyzed to identify the potential chances of re-engineering. The implemented system was not reflected and encompasses major structural and process changes identified in the implementation of PBR. Moreover, employees were not empowered, involved, participate and trained to have a knowledge on how the ERP project is going and

to communicate and give their feedback on the progress of the project. From these it would be clear that the key organizational factors which are crucial for the ERP was not considered enough.

3.4.3.4 The Company's Unique Soft ERP Implementation Factors

It became evident from the interviewees that strong attention were not given by the factories for the project implementation process. They also reported that the company provides no incentives to encourage the employees (system users) to increase their proficiency and to push them to introduce modern techniques, such as the ERP system, into their factory. They also stated that it was after the failure of the project that factories have started to turn their eyes and give an attention on issues regarding the future fate of the project. The interviewees also mentioned that it will be very important for managers of the factory and the vendor to change their direction on gathering and following the experience of other similar cement factories that have been successful in ERP projects so that they can get an opportunity on exercising the experiences they got through future progress of the project.

CHAPTER FOUR

CONCLUSION AND RECOMMENDATION

4.1. Conclusion

- The purpose of this study is to investigate and identify the challenges and current status of ERP implementation practices in some selected Ethiopian cement industries.
- As evidenced from interviews, though most of the cement manufacturing industries in Ethiopia are starting their operations recently, besides the Programmable logic control system software that was used for controlling all the manufacturing activities through providing information vital for both cement operators and managers, they are starting to implement and use an ERP software.
- As it was stated in chapter two ERP implementations represent high-risk projects that need to be managed properly. Organizations must learn how to identify the critical issues that affect the implementation process and know when in the process to address them effectively to ensure that the promised benefits can be realized and potential failures can be avoided. As it was identified from the questionnaire and interview, the ERP implementation practice in the selected cement industries has been surrounded by a number of problems challenges including absence of Clear goals, focus and scope of the project, lack of top management commitment and project manager, inefficient communication and deficiency of user involvement participation and training.
- The study indicates that factors that have a significant impact on the success of the project have to be identified and considered during the implementation process. As found from the analysis of interviews and questionnaire, People factors, strategy factors, and organizational factors were not considered and treated effectively in the factories software implementation process. In addition, the ERP software implementation and The SAP customization process of the selected factories was not successful and fully functional.
- The study uses the theoretical framework for ERP implementation process that was identified by Ibrahim. The framework comprises of strategy, people and organizational critical success factors (soft factors) and attempts to relate them to various implementation stages. It is

represented by three main sets of factors, like strategy related factors consists of top management commitment, clear goals focus and scope, legacy systems and ERP strategy, people related factors encompassing training and education, users involvement, employee's attitude and project team and organizational related factors consists of effective project management, process management, change management strategy, IT maturity, computer culture, empowerment, organizational culture, and communication.

- The result of the study shows that though ERP system was designed to reengineer the existing business processes following the implementation process of PBR in the factory, the business processes were not analyzed to identify the potential chances of re-engineering. As a result, the implemented system were not redirect and encompass major structural and process changes identified during BPR implementation process. Moreover, employees were not empowered, involved, participate and trained to have a knowledge on how the ERP project is going and to communicate and give their feedback on the progress of the project.

4.2 Recommendation

To improve ERP implementation practice of Cement producing factories in Ethiopia and to recover the ERP software of cement industries that was in trouble, the following recommendations are forwarded.

- Nowadays Cement manufacturing industries located at different areas of Ethiopia are operating in a highly competitive environment and in order to cope up with the changing environment and be a winner in the competitive market, they are in a new phase of transforming the way they handle their operations through the implementation of ERP system that promised to provide business intelligence for organizations by giving managers an integrated view of business processes. Though it requires vast investments and pass various stages, not all ERP projects are successful. As a result, both managers and employees and ERP software vendors needs to be eager and make them ready before they are going to decide and invest on the project.
- Organizations may encounter various problems and challenges through the process of ERP implementation. Insufficient training of end-users, Conflicts between user departments, Lack of effective project management methodology, attempts to build bridges to legacy applications, failure to redesign business process and misunderstanding of change requirement, composition of project team members and Failure to get user support are the main challenges. Hence it would be vital for organizations to consider such factors and take remedies before they happen and affect the successful completion of the project.

- Factors affecting an ERP implementation are complex and abundant. Critical success factors like Clear understanding of strategic goals, Commitment by top management, Excellent project management, Organizational change management, A great implementation team and Extensive education and training may ensure effective ERP implementation and a realization of the promised benefit. As a result it would be good for organization to determine and try to incorporate critical success factors in their ERP implementation.
- There is an explicit linkage between critical success factors and ERP implementation stages. Knowing such relation and determining which critical success factor best needed in which ERP implementation stage may promise organizations to successfully implement the ERP project.
- In general Both MCE and DERBA cement factories have to determine the factors that create a challenge during the ERP implementation and SAP customization process and they have to create awareness before those factors affect the software implementation process of the factory.

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40. The Integrated Budget and Finance management system design document(SDD) of Mugher cement factory
41. The portal Management system design document (SDD) of Mugher cement factory

Appendices

APPENDIX A: RESEARCH QUESTIONNAIRES

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

SCHOOL OF INFORMATION SCIENCE

Dear Participant:

My name is Kibebework Asrat and I am a post-graduate information science student at Addis Ababa University School of information science. For the purpose of accomplishing my final thesis project, I am examining the challenges and problems related with the ERP software implementation held at MCE. Because you have a good experience and knowledge on the area, you will be selected as one participant of questionnaire and the complete questionnaire are attached here.

The questionnaire will require approximately 15 minute for completing and it contains essential questions that show how your organization exercises the ERP implementation. In order to ensure that all information will remain confidential, please *do not* include your name. In addition to this your response will be used only for research purpose. To make this research more valuable for the technology community please answer all questions as honestly as possible and return within the appointed period of time.

If you require additional information or have questions, please contact me at the number listed below.

Mobile: - +251-927-43-87-56

With internal IT office extension number 303

Thank you for taking the time to assist me in my educational endeavors.

Sincerely,

Kibebework Asrat

ERP description

ERP is an abbreviation for Enterprise Resource Planning which is a vast information system that manages information about a company's products, customers, suppliers, employees, production facilities, financial balances, etc. ERP Software allows integrating all the operational units such as financing, human resources, manufacturing, sales, marketing, finance & accounting, inventory management and so on. ERP software system allows the business to achieve real time business process, increase productivity, improves delivery, reduce cost and increase profits, increase product quality, improve information and performance management. Similarly, ERP facilitates information sharing across organizational units and geographical locations. It enables decision-makers to have an enterprise-wide view of the information they need in a timely, reliable and consistent fashion.

NB. Some questions may have more than one choice.

PART I: Personal information

1) What is the name of your department?

- Sales and marketing Human resource Procurement and store Manufacturing

2) What is your educational qualification?

- Certificate and less Diploma Bachelor's Degree Master's Degree PHD
 others

5) How long is your working experience?

- Less than one year 1-3 years 3-7 years 7 years and above

6) What is your computer-related qualification?

- Certificate Diploma Degree Others

PART II: ERP related questions for only users of the system (please choose by putting ✓ mark on the rectangle)

1. Were you involved in the requirement analysis phase?

- Yes No I don't know

2. If your answer for Q1 is yes, do you feel that the full requirement is collected in accordance with the business processes and requirements of the organization?

- Yes No I don't know

3. If the answer for Q2 is No what was the reason?
 - Users weren't aware about the requirement collection phase
 - Top managers weren't give an order for the responsible person to give requirements
 - Users weren't interested to give their complete requirement
 - Top managers weren't given a high attention for the Phase.
4. Do you receive a project management support in the life cycle of the ERP project?
 - Yes No I don't know
5. Is there an ERP project team that and is there a mechanism to deal with unexpected difficulties (comments) using a regular steering team meeting?
 - Yes No I don't know
6. Does the upper management shows an interest in how the project is going on a weekly or bi-weekly basis and how the project team is engaged with the implementation?
 - Yes No I don't know
7. Have you got the right resources needed for the implementation of the project?
 - Yes No I don't know
8. Did you attend any training course during the implementation process?
 - Yes No I don't know
9. If the answer for question number 8 is yes did you feel that the training is enough
 - Yes No I don't know
10. On average, how often do you use the ERP software related with your work:
 - Once a month Once a week Hours a week 5 hours a day All the time others
11. Is there a Design Training manuals for different user group
 - Yes No I don't know
12. How often is your comment in the implementation process is fixed
 - Lately urgently
13. Do you feel that ERP has been useful or helpful for your work
 - More Efficient More complex No change

14. Please indicate the Challenges for the successful implementation of ERP at your organization

(Please choose by putting by putting ✓ mark on the rectangle)

	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of senior manager commitment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ineffective communications with users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insufficient training of end-users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Failure to get user support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of project management methodology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attempts to build bridges to legacy system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conflicts between user departments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Composition of project team members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Failure to redesign business process and misunderstanding of change requirement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. What do you think about the Current status of ERP?

- Successfully implemented and plays a major role
- Partially implemented and used together with the manual system
- It is just automation no integration between sub systems and is difficult to get integrated information
- Not used at all and worked manually

16. Do you think that ERP can support business activities after its implementation at your organization in the following ways?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Improved business processes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enhanced primary user's knowledge and skills?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More accurate and accessible MIS?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facilitated improved services to customer and suppliers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased work load in various departments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easier to take advantages of new technology?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing costs, reducing operations time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased information integration, better information quality, and increase in customer satisfaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Please indicate the importance of critical success factors for ERP implementation (Please rank it by putting ✓ mark on the rectangle)

Critical success factors	1 st (first)	2 nd (second)	3 rd (third)
Top management support			
Project team competence			
Clear goals and objectives			
Change management			
Project management			
Inter departmental cooperation and coordination			
User involvement and participation			

APPENDIX B: RESEARCH INTERVIEW QUESTIONS

1. Have you implemented ERP software in your factory?
2. Have you deployed the software designed by an in-house software developer or by others?
3. Which module of the ERP software is implemented and used?
4. Do you believe that all the requirement of the enterprise is included clearly at the requirement gathering phase?
5. Do you believe that the project achieve its intended purpose?
6. Do you believe that user and responsible managers was highly involved during the implementation of the project and take their responsibilities effectively?
7. What was the Impact of the following strategy Factors in the ERP implementation process?
 - Clear goals, focus and Scope
 - Top management commitment
 - ERP Strategy
 - Legacy systems management
8. What was the Impact of the following people Factors in the ERP implementation process?
 - User involvement and participation
 - Education & Training
 - Employees attitude
 - Empowerment
 - Project team
9. What was the Impact of the following organizational Factors in the ERP implementation process?
 - Process management
 - Change management strategy
 - IT maturity
 - Computer culture
 - Effective project Management
10. What is the current status of the software?

APPENDIX C: FOCUS GROUP DISCUSSIONS

Good morning my name is KibebeworkAsrat

We are pleased you have agreed to join us today

We are here to talk about how the ERP software is implemented and what are the challenges in deploying the software, and how to recover the failed software?

Please note that session will be recorded to ensure information or ideas are captured during the conversation

The discussion we are going to have is called a focus group. For those of you have never participated in one of this type of session. I would like to explain a little about this type of research.

Focus group discussions are used to obtain information informally from a small number of individuals who have a common understating and knowledge about a particular subject.

This discussion will provide information about how ERP is started and is going and implemented in MCE.

In focus group discussion, there is no right or wrong answers. We want to hear and understand from every in the room. We are pleased you can part of this group because we think you have important and valuable ideas regarding the ERP implementation process and how it. Don't hesitate to speak and give your ideas when you have a point or an idea you would like to talk.

I hope we have a productive discussion and from the discussion summarization of the group feelings will be followed.

The information will be confidential enough in that it will not be referred any participants name by his/her name.

QUESTION ONE

I would like to begin by going around the table and asking each of you to tell us a little about yourself and your participation on the ERP project?

QUESTION TWO

Do you think that the ERP implementation process of MCE has passed and used the necessary software implementation procedure?

FOLLOW UP; what are the procedures and steps that are used to gather the requirement, design the system and implement?

QUESTION THREE

What are the challenges you are suffering from the implementation process?

How can these problems affect MCE and at what level?

QUESTION FOUR

How satisfied have you been with your participation on the ERP software development process?

How much do you satisfied with development, and the implementation of ERP on MCE and how can you respond to changes that occurs either form the system users or employees of MCE?

QUESTION FIVE:-how do you think that the software implementation process have passed all the necessary steps and put in to an operation without any problem?

QUESTION SIX:-do you think that the software is fail or successful?

QUESTION SEVEN:-Do you think that users of the system may use the software for accomplishing routine works?

QUESTION EIGHT:-when considering critical success factors of the implementation processes do you think that major CRS are included on the implementation process?

QUESTION NINE:-do you have any additional ideas and suggestion about how the ERP software can be improved and put into operations?

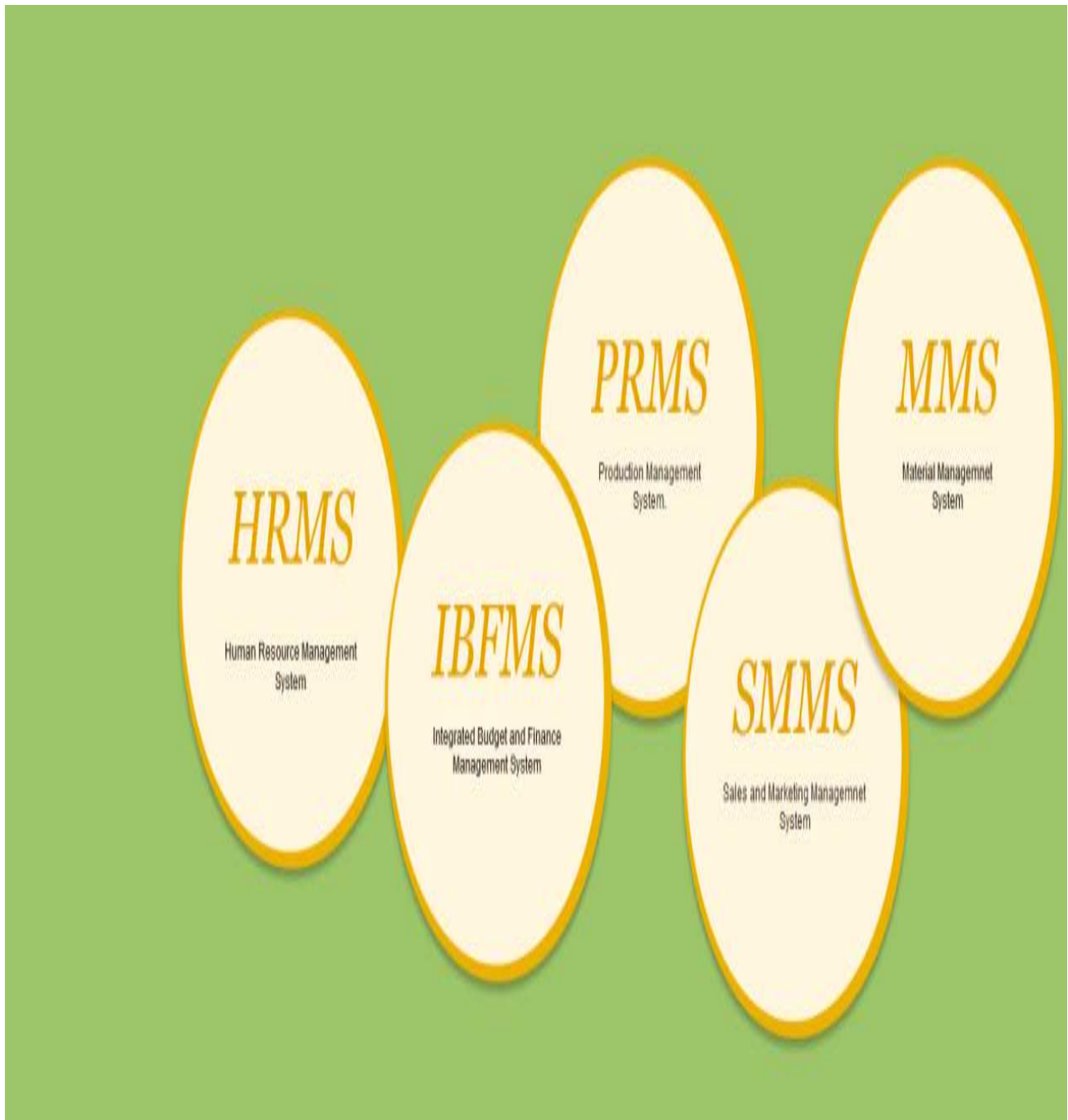
QUESTION TEN:-Have you involved in such type of ERP projects before?

QUESTION ELEVEN:-Do you have any additional suggestion about how ERP software of MCE can be improved in the future?

QUESTION TWELVE: - Is there anything that we haven't discussed yet that you think is important for?

THANK YOU SO MUCH FOR YOUR TIME!

APPENDIX D: MODULES OF MCE ERP SOFTWARE



FRONT PAGE OF MCE ERP SOFTWARE



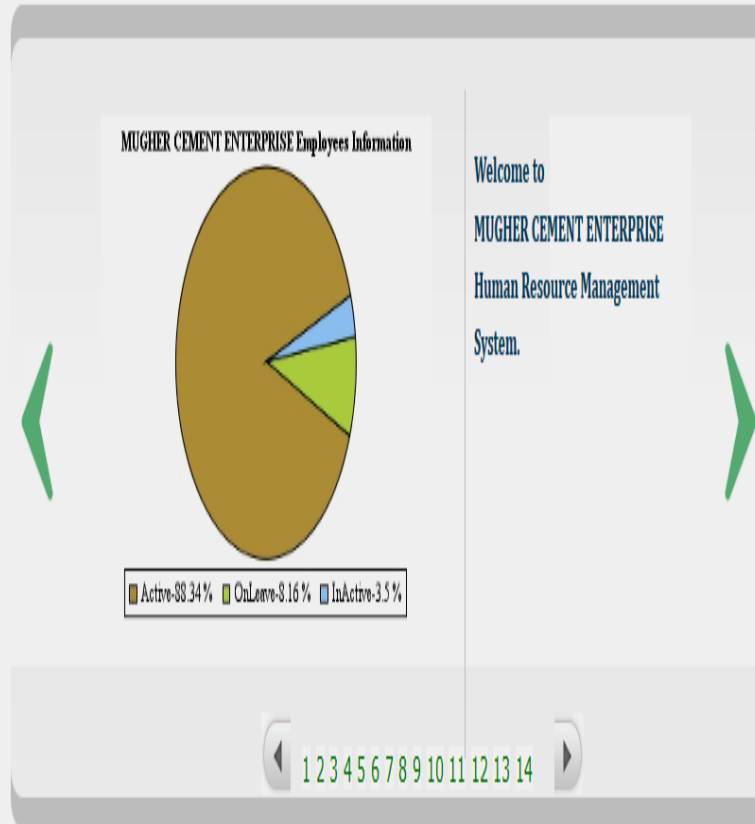
EMPLOYEE
profiles

LEAVE
leave request

OVERTIME
overtime atten..

TRAINING
training request

ADMIN
manage resource



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Human Resource management system



Customer Information Management



This module gives services like Customer Registration, Requests and Orders

Click where to go from the links listed below.

- ✓ [Customer Registration](#)
- ✓ [Assign customer Category](#)
- ✓ [Customer Registration Follow Up](#)
- ✓ [Customer Complain](#)
- ✓ [Customer Complain FollowUp](#)

1 2 3 4 5 6 7 8 9 10 11 12



MUGHER CEMENT ENTERPRISE

MATERIAL MANAGEMENT SYSTEM

[Home](#)[Rules](#)[Contact](#)[Help](#)

Material Information



This module concerned with registration of Store and its location and Material

Registration. Also it's possible to see Stock safety level of all stores or within a specific store.

Click where to go from the links listed below.

✓ [Material Information](#)

✓ [Store Information](#)

✓ [Safety Stock Level](#)

✓ [Material Dispatch Note](#)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Copyright © | [Information Network Security Agency](#) | [Project Coordinating Office](#) |

MATERIAL MANAGEMENT SYSTEM

[Home](#)

[Help](#)



MUGHER CEMENT ENTERPRISE

PRODUCTION MANAGEMENT SYSTEM

WelCome!

CEM

PBP

PBPR

PR

QA

WATS

MNT

LUB

EI

INSP

RES

Admin

PRODUCTION MANAGEMENT SYSTEM.

Here below is the description of abbreviated Navigations.

CEM ==>Cement Production

PBP ==>Paper Bag Production

PBPR ==>Paper Bag Production Report

PR ==>Production Report

QA ==>Quality Assurance

WATS ==>Water Station

MNT ==>Maintenance

LUB ==>Lubrication

EINS ==>Elec./Elect.Inspection

INSP ==>Inspection

RES ==>Residence

Admin ==>Admin Page

[« Previous](#) | [Next »](#)

PRODUCTION MANAGEMENT SYSTEM



HOME PAGE OF THE MUGHER WEBSITE

Appendix E: Declaration

I declare that the thesis is my original work and has not been presented for a degree in any other before.

Date

The thesis has been submitted for examination with my approval as university advisor.
