CENTERIS 2012 - Conference on ENTERprise Information Systems / HCIST 2012 - International Conference on Health and Social Care Information Systems and Technologies

# A Successful ERP Implementation in an Ethiopian Company: A case Study of ERP Implementation in Mesfine Industrial Engineering Pvt. Ltd.

Abiot Sinamo Boltena[a,*], Jorge Marx Gomez[a]

[a] Carl Von Oisietzky University of Oldenburg, Ammerländer Heerstr. 114-118, 26129 Oldenburg, Germany

**Abstract**

The implementation of enterprise resource planning (ERP) systems has been known to be much more difficult than the development of a computer application supporting a single business function. In this article, the researcher presents a case study of an ERP system implementation by a medium company in Ethiopia. Mesfine Industrial Engineering (MIE) Pvt. Ltd. is a vast unrivalled metal construction and electromechanical engineering in Ethiopia, and has recently adopted and implemented an ERP system. The paper examines key dimensions of implementation of ERP system within MIE and takes an in-depth look at the issues behind the process of ERP implementation by focusing on business and technical as well as cultural issues at the heart of the MIE implementation. The case study also looks at the implementation risks and reports how MIE coped with the typical challenges that most medium organizations face when implementing an ERP system.

*Keywords*: Enterprise resource planning, Case study, Implementation, Mesfine Industrial Engineering (MIE) pvt. Ltd

* Corresponding author. Tel.: +49 (0) 441 / 798 - 44 70; fax: +49 (0) 441 / 798 - 44 72.
*E-mail address:* abiot.sinamo.boltena@uni-oldenburg.de

## 1. Introduction

Firms around the world have been implementing ERP systems since the 1990s to have a uniform information system in their respective organizations and to re-engineer their business processes [1]. ERP system implementation process involves a wide range of complicated resources and issues. With no plan or supporting procedure, companies may spend tons of money, resource, and time on ERP implementation but not enjoy a bit of the benefit ERP system should have brought out [2-10]. A successfully implemented ERP system has the advantages of reduced cost and high system quality [11]. It can also yield benefits to its customers not only because they can purchase products or goods at low prices resulting from the cost savings but also because they share the data of the production line in real time [12]. The benefit of ERP systems is highly dependent on the success of its implementation. In order to get the best out of ERP system the implementation must be managed as a program of wide ranging organizational change initiative rather than as a software installation effort [13]

Many business organizations that adopted ERP systems attained the benefits they sought [14]. After ERP systems were successfully implemented, companies could set up standards on financial management and operating procedures like managing inventory systems [15]. However, not all adopters had successful implementation, and some organizations failed because ERP system implementation was much more complex than just developing a computer application for a single business function. More than 90% of ERP implementations have been delayed and required additional budget amounts due to numerous changes in the original plan [16]. Even when a company realizes that its ERP implementation is not going to be successful, it is usually impossible to cancel the effort [17]. Such IT driven initiatives require change of the organization's socio-economic system, which is intertwined with technology, task, people, structure, and culture [18].

A quick review of ERP research revealed different strategies for implementing ERP successfully. Aladwani [19] stated that past ERP implementation research may be described as factor research, which involves identifying the factors or variables that are critical for implementing ERP successfully. Although factor research is valuable for advancing our understanding of ERP implementation success, it adopts a rather static view, which limits its adequacy in explaining the dynamics of the implementation process. Thus, factor research alone is not adequate for explaining successful ERP implementation. Unlike factor research, process research helps us understand how ERP implementation efforts have happened; it therefore gives a moving picture about how we got from time 1 to time 2.

Most literature on ERP implementation has focused on large enterprises that were considered to be appropriate for ERP systems [20]. However, the cost of ERP systems is rapidly decreasing to let small- and medium-sized enterprises (SMEs) adopt the system [21]. For example, the application service provider (ASP) for ERP is an attractive source of support for SMEs that have a few IT professionals [22, 23]. Considering the importance of ERP in SMEs, an attempt has been made in this paper to analyze the implementation issues of ERP in a medium Ethiopian company. The paper takes an in-depth look at the issues behind the process of ERP implementation via a case study methodology. To benefit from both factor and process research perspectives the case study explains the reasons behind the successful ERP implementation practices of MIE such that companies of similar nature will get a practical exposure in managing such complex implementation projects.

In reporting the case study this paper is organised as follows. In Section 2, the reasons why MIE adopt ERP system and the organizational representation of the ERP project team is presented. The phases followed in implementing the ERP system has been presented in section 3. In section 4, risks of the project and how these risks were managed is presented. Finally, summary is provided together with the conclusions in section 5.

## 2. MIE's ERP Implementation

Mesfine Industrial Engineering (MIE) was founded in 1992 and is a vast unrivalled metal construction and electromechanical engineering complex in Ethiopia. MIE used over 5 systems before the ERP project was started, many of which were developed by local vendors and internally by MIE over the last decade. These legacy systems were expensive to operate and difficult to maintain and develop. They did not provide accurate, consistent and accessible data that was required for good and timely decision-making and performance assessment (e.g. delivery performance, quality metrics). These ageing systems often did not lend themselves fully to a modern manufacturing environment. The last major manufacturing system to be developed and implemented by MIE was MERLIN, which stands for mechanized evaluation of resources, logistics and inventory, the system was basically a scheduling system, and, although it was capable, it was prone to manual manipulation. One particular down fall of the system was the lack of communication between individual sites. Work in progress was often transferred between sites and could not be tracked accurately; often causing inventory and stock take problems. An additional system named corporate cost accounting (CCA) was used to financially monitor transactions, which covered pipeline inventory and inter-site transport. MIE also had a range of individual systems for controlling and monitoring commercial, financial and procurement functions, these systems had problems interfacing with each other, as they had different databases and file formats.

The legacy systems did not allow MIE to establish direct, on-line communication with customers, partners and suppliers. In fact, these systems did not support significant growth of the business and were not sufficiently agile to keep pace with the changing business environment. At this point MIE recognized that the adoption of ERP system was the most significant factor that could enable the company to overcome the challenges and led to business success. In selecting the ERP vendor, MIE took into account traditional factors as financial situations, history, success/failure cases, and people. Within the project team are specialist internal managers and staff that have vital knowledge of cross-functional business relationships and experience of the old internal systems. In conjunction with this team each operational business unit (OBU) has its own ERP planning team, which is responsible for implementing, working on changes and training. MIE's ERP project team was organized as shown on figure 1(a) below.
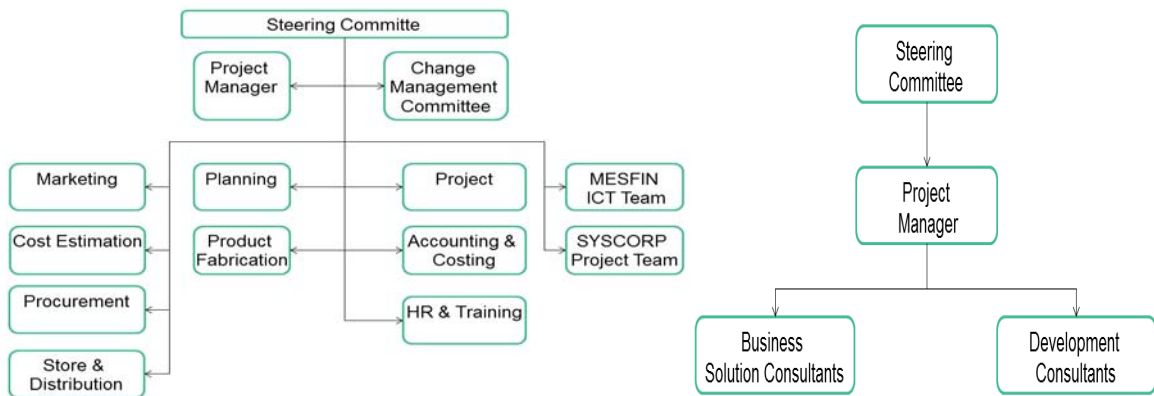


Fig. 1.　　(a) Organizational structure of MIE's ERP project team;　　　　(b) Organizational structure of Syscorp's ERP project team

The ERP project consists of a management team of specialists from the external consulting company Syscorp. Syscorp was chosen because of their substantial experience within the manufacturing industries.

Syscorp also have the specialized talents of Microsoft Dynamics SL consultants and took responsibilities of coaching and facilitating the project. The project team from Syscorp side was organized as shown in figure 1(b) above.

MIE decided to adopt and utilize the Microsoft Dynamics SL solution offered for project-driven small- and medium-sized enterprises. There were several problems the implementation project faced and they are grouped into three areas of cultural, business and technical difficulties.

## 2.1. Cultural Problems

The implementation project team expected a high acceptance of the system in areas that provide just as good or better functionality than the old system. However some functions and processes might not get the full appreciation the legacy systems once had. The project team decided to resolve this by illustrating the improvements made to the company as a whole, thus breaking the traditional segregation of OBUs and departments. The original implementation plan was increased in an attempt to address training and cultural changes.

## 2.2. Business Problems

Microsoft Dynamics SL requires a fairly rigid business structure for it in order to work successfully. The participants of cross-functional workshops soon understood that their working practices must be adjusted in order to fit Microsoft Dynamics SL, ultimately changing the way MIE does business. They achieved this by using an internal business process reengineering (BPR) program. The program consisted of four steps, the first involved drawing and mapping the current processes. The second step involved identifying any problems or issues raised from the mapped process. The third step involved applying some of these issues to a demonstration of Microsoft Dynamics SL, to identify potential problems within the new system. The fourth step involved the re-mapping or modification of the processes in line with Microsoft Dynamics SL.

## 2.3. Technical Problems

The main technical problems that MIE has encountered have been with the accuracy of data. The new system requires the retrieval of old data from the legacy systems that has to be normalized, screened and stored in a sensible data format within the new systems data repository. The duplication of data was a major concern that MIE had to address. In some special areas the old systems were kept running until such time as they could be phased out by the new systems, and to do this the IT department built interfaces between the systems. The CAD system used by MIE remained the same, as the process to alter the file formats would be too expensive and require use of valuable resources that are needed for the core implementation.

MIE has twenty one principal business processes, which when taken together describe everything the company does. Figure 2 below depicts the schematic representation of the business processes.
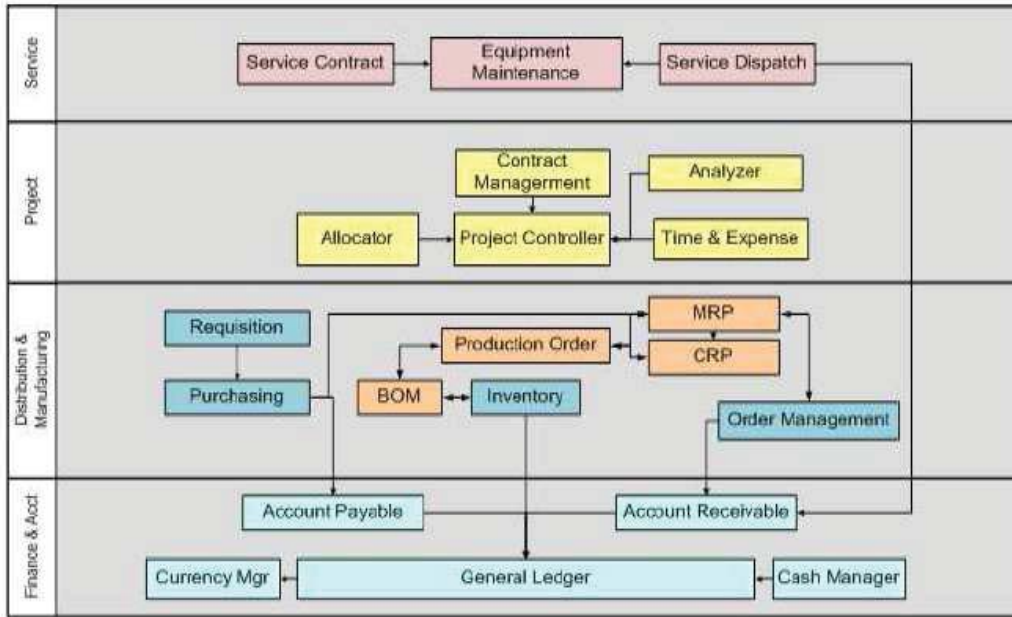
Fig. 2. Schematic representation of MIE's business process and the interfaces

MIE has required over 50 Microsoft Dynamics SL licenses for users across all the business. The server was provided by Sun Microsystems and in excess of 2 Terabytes of disk space. The system required almost 15 weekly manufacturing resource planning (MRP) runs cascaded by plant. A UNIX server bridges the data from legacy systems and testing and training required an NT server.

## 3. MIE's ERP Implementation Phases

MIE's ERP implementation project goes through several phases. The detail implementation model plan with project time scale is shown in Figure 4 and Table 1 respectively.
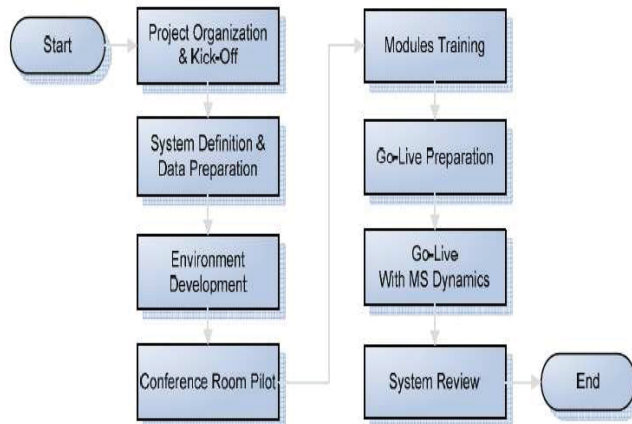


Fig. 3. ERP implementation model

Table 1. The project time scale

| Tasks | Days | Start Date | End Date |
| --- | --- | --- | --- |
| Phase 1. Project Organization & kick off | 2 | 17-Mrz-2008 | 18-Mrz-2008 |
| Phase 2. System Definition & Data Preparation | 31 | 19-Mrz-2008 | 23-Apr-2008 |
| Phase 3. Environment Development | 27 | 24-Apr-2008 | 22-Mai-2008 |
| Phase 4. Conference Room Pilot (CRP) | 17 | 29-Jul-2008 | 19-Aug-2008 |
| Phase 5. End-User Training | 11 | 20-Aug-2008 | 02-Sep-2008 |
| Phase 6. Go Live Preparation | 10 | 01-Sep-2008 | 12-Sep-2008 |
| Phase 7. Go Live to MS. Dynamic | 16 | 11-Aug-2008 | 30-Okt-2008 |

## 3.1. Phase 1:- Project Organization and kick off

The first phase of the project was a short intensive study to set the scope of the project and provide an outline plan and costing. A steering committee was formed to administer the financial guidance of the project and an 'ERP Core Team' was formed to control and oversee the actual implementation process. Goals have been established and the implementation plan has been developed at this phase. The deliverables obtained out of this phase includes system implementation process, project team, roles & responsibilities of project team, project objectives, project Plan, project scope, project tracking process and implementation schedule.

## 3.2. Phase 2:- System Definition (Blue Print)

In this phase the scope of MIS's Microsoft Dynamics SL implementation has been defined and which leads to the creation of the Business Blueprint. The Business Blueprint was a detailed documentation of MIE's requirements in WinWord format. Activities carried out during the second phase of the project included reviewing information flow, defining external system interface, developing prototype of modules, and defining new policies & procedure. The expected deliverables of this phase were specified business process, system interface process, customization requirement, report requirement, the support of finance and staff work booking, and new policies & procedures. During phase two the projects core structures were identified. Integrated program management (IPM) was also adopted for research and development and would eventually cover the whole business. A significant change was also made from the original timing of phase one, the completion of wave one was deferred for about 6 months. This has resulted in a knock-on delay to wave two by a corresponding amount. The change in schedule was possible without a significant increase in cost because the problems were addressed early enough in the program.

## 3.3. Phase 3:- Environment Development

This phase was concerned with the physical implementation of the system and its architecture, and also with changing working practices within the company. It was too large to implement in one go, and thus was divided internally in to two 'waves'. The first wave was concerned with the replacement of legacy systems. IPM was also introduced for new production projects during wave one. The new manufacturing execution system, known as shop floor data management (SFDM) was also introduced in the same phase. The ultimate end to wave one was a Microsoft Dynamics SL pilot project at one of MIE facility. The pilot laid the foundation for the full 'go live' throughout the company after 9 months. The first wave had the ultimate aim of providing new capabilities for production order operations. The second wave was approximately 1 year in

duration, and was not operational until end of the first wave. The second wave was concerned with implementing requisition, purchasing, inventory, and order management within the project. By this time the legacy systems were switched to 'view only' as Microsoft Dynamics SL becomes the executive system. Once the new system shows a positive response the older systems were phased out. IPM completely covered the whole business by the end of the second wave.

### 3.4. Phase 4:- Conference Room Pilot

A small-scale pilot of the system was run for 3 months and throughout this period, a facility known as production shop became the central focus of attention for the whole company. This facility was chosen for the pilot run because the facility only produced 100 parts, and material flowed into the facility at low volumes from external suppliers and internal operational units. The purpose of the pilot was to demonstrate: business principles, processes, procedures, role definitions and behaviors, and software, hardware and data transfers. A second pilot was also carried out for nonproduction purchasing. The second pilot ran executively, covering Derby-based purchasing of ground support equipment. A third pilot also was run by the requisition section. The third pilot was nonexecutive, but designed to specifically explore the interplay between the legacy system and Microsoft Dynamics SL.

### 3.5. Phase 5:- End User Training

The objectives of this training were to enable users get a better picture of global system's features, to enhance the capability and confidence of user in running system, and to enhance the ability of user to relate the system with daily operation. Accompanying users in their learning curve was found very important to bring users in to the desired level of skill and understanding. The training covered finance modules, HR modules, distribution modules, manufacturing modules, project modules, service modules, and system training.

### 3.6. Phase 6:- Go Live Preparation

The final phases of implementation, typically known as "final preparation" and "go-live," can be among the most stressful periods of the project. This is where the proverbial rubber-meets-the road, where months of hard work are put to the ultimate test—production uses of the software. Final preparation and go-live entail number of issues requiring the careful attention of the project team. The main activities considered in MIE's ERP project were data live preparation, data reconciliation, and live database initialization. Production Database is the ultimate deliverable of this phase.

### 3.7. Phase 7:- Go Live to Dynamics SL

As the main 'Go Live' of the new system was planned, the most difficult part of the cut over process was in transferring the data from legacy systems. The sheer volume of data that has to be transferred is far greater than any normal transaction load that will be carried out by the system thereafter. In order for this process to be successful the data must be kept in a 'stable' state for a period of roughly 10 weeks. The initial data to be transferred includes some transaction data and master data, for example, lists of suppliers. If any changes occur to the data on the old systems after the transfer, they are logged and then passed through to the new system. The remaining data was loaded in after the 'Go Live'. The next step during the 'Go Live' process involved running the MRP system to initialize the whole system. Purchase orders and purchase requisitions

was not transferred from the old system, instead the MRP run should create them fresh. The whole 'Go Live' process took roughly 2 weeks to complete, and during this time the new system was 'off the air'. Immediately after the 'Go Live' the existing legacy systems was switched to view only mode. The view only mode enabled comparisons to be performed between the old and new systems. However, the legacy systems ceased to be executive.

## 4. Project Risks

The ERP Project at MIE covers many different departments and many different topic areas, all of which have associated risks. The ERP implementation team used risk analysis method (RAM) in order to identify the most essential risks and their probability in the company context. The risk list is formed out of 21 questions or statements dealing with ERP implementation. In order to address and take positive action to avoid failure or potential errors the ERP implementation team maintained and recorded in a great detail, a risk register. Every issue within the company, which involves risk has been catalogued and continuously reviewed. The risk register is very large; however the MIE ERP Intranet page offers a brief summary of some of the major risks:

- The possible failure or inability to align goals through conflicting directions within the organization.
- The non-delivery or non-availability of reliable IT hardware and infrastructure both before and during implementation.
- The possible failure of providing inadequate and ongoing support after implementation, from both MIE and Syscorp.
- The resistance of change to new process methods by management and supervision.
- Management and supervision may treat the project as merely an IT implementation, rather than change in process methods.
- Inadequately educating the workforce to operate the new system properly.
- Possible failure to cut over to the new system through an inability to load data.
- Possible failure to cut over to the new system through the inappropriate systems testing of volume, stress and data conversion.
- Possible failure to give ERP adequate priority due to the number of existing and ongoing business improvements.
- Maintenance difficulties may occur on bridged legacy systems.
- The project may impact on company interim and end of year accounts.
- The PDM project may not be sufficiently positioned in time with the ERP project.
- Possible changes to kitting demand during 'go live' may stretch the new system and those operating it on a learning curve beyond capacity.

The project team applies characteristics analysis method (CAM) to find out the manageable size of the ERP project of MIE. The CAM analysis was formed out of 30 questions dealing with the ERP project. The CAM provides recommendations on what management aspects should be put more attention to successfully manage ERP project (management of a project as a whole, management of integration, project scope management, time management, cost management, quality management, human resource management, management of communication, risk management, management of purchase). The result analysed by CAM is presented in Figure 4 below.
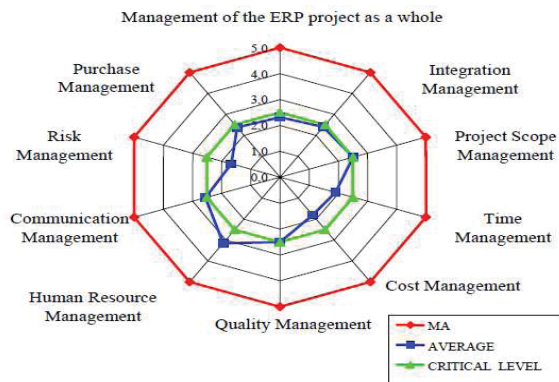
Fig. 4. CAM diagram of MIE.

According to CAM, 'Human resource management (HRM)' is the management/leadership field that clearly exceeds the critical level. MIE gave direct special attention to this factor in ERP project management. In addition, several other management/leadership fields, such as 'Communications management', 'Purchase management', 'The project as a whole', 'Integration management', 'Project scope management' and 'Quality management' are right at the critical level. Only 'Cost management' and 'Time management' and 'Risk management' are clearly under critical level. On the basis of the CAM, MIE had a clear view of the costs caused by the ERP project, the time spent for it, as well as the technical and operational risks involved. Then, based on the recommendation provided by CAM the project team divided the ERP project into manageable sub projects and put more attention on those critical management aspects and successfully managed the project.

## 5. Summary and Conclusion

This study presents experiences that are obtained from a successful ERP implementation project in MIE. MIE has understood the business, cultural and technical difficulties of such a large project, and has developed a solid core implementation team. The team has used the specialist skills of consultants and the partnership with the consultant has produced a sound architectural framework for the project. MIE considered an ERP project risk analysis method and characteristics analysis method as good tools for risk management.

The system will deliver its full benefit when it became at its executive level. The benefits of lower IT cost will be visible when the system become stable and users have had time to adjust to new working practices. An immediate benefit that will be achieved by the system will be the ability to promise and then deliver to the customer on time. This was something that the older systems could never achieve. The ability to deliver on time will improve customer satisfaction and also improve customer confidence, which should lead to an increase of orders in the future. The system will also improve the relationship in the supply chain, as transactions will be made easier via the use of electronic communications. The future of the project will eventually lead to the need for a data warehouse. The data is stored centrally and is extracted from operational, historical and external databases. The database continually absorbs new data and integrates it with the previous data.

As a conclusion, studies towards reporting successful ERP implementation projects should be encouraged. 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.

## Acknowledgements

The authors are very grateful to Ato Tesfay Yihedgo, Head of ICT department of MIE, for devoting his valuable time in providing the required information and for all his kind cooperation.

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