Chapter 7

Impact of ERP Implementation on Enterprise Productivity

7.1 Introduction

ERP is a product that helps automate a company's business process by employing an integrated user interface, an integrated data set, and an integrated code set (Mishra and Mishra, 2011). ERP solutions improve efficiency by automating business processes, furnishing integrated applications that share data to give employees instant access to the information they need, and by providing business intelligence and analytics to improve decisions and planning. ERP is actively used in the downstream part of crude oil as well as marketing and distribution of its products. Downstream operations constitute an information intensive process that deals with different pieces of data on purchasing and delivery of crude, further refining and distribution of products. Those data include crude prices, inventory, storage and transport capacity, delivery costs, sourcing options and prices, oil products throughput and mix, and delivery to wholesale and retail points of sale (Information Economy Report, 2006). Business Process

Transformation (BPT) and Business Process Reengineering (BPR) are aimed to cut out unnecessary work and to streamline workflows. Oil refineries have changed significantly as a result of this transformation. There is terminal automation, computer-assisted ordering, load generation, driver loading, automated security and the like.

ERP drastically reduces the duplication of data entry tasks. Data is captured once at the source and then propagated to all relevant modules through the ERP environment without the need for re-keying and revalidation as it passes from one module to another. Not only does the reduction in data duplication improve productivity, it also eliminates errors, conflicting data and administrative costs. In addition, entering data once means that the most accurate and up-to-date data is available to all ERP users across different functional areas at the same time. This improves productivity by reducing the need to redo work due to erroneous data. Workflow management capabilities of ERP allow organizations to automate business steps and processes that were previously manual, significantly improving productivity across the organization. Organizations can design and modify their business processes, define business rules, and automate their execution.

BPR has long been widely recognized as a required precedent step as well as a critical successful factor for the implementation of ERP systems. It is assumed that there exists a cause and effect relationship between BPR processes and ERP benefits (Cheng and Wang, 2006). The role of BPR in implementing ERP

systems is of paramount importance. A variety of approaches are used for such re-engineering as the best-fitting ERP solution can only give a maximum of 80 percent fit with the existing workflow of the organization in which ERP is being implemented (Subramoniam, Tounsi and Krishnankutty, 2009). BPR and ERP implementation go hand-in-hand. Performing BPR first ensures that business processes are optimized before software is configured and also ensures that software functionality will closely match the actual process steps. If BPR is performed in conjunction with ERP implementation, ERP consultants employed to implement the software may provide process and industry expertise that was not available during a separately performed BPR exercise.

Information efficiency and synergy in the context of ERP usage is the best possible use of the information available out of the ERP. From a business perspective, an integrated ERP solution enables organizations to reduce costs by automating workflows to streamline tasks and remove information-sharing bottlenecks so that employees can do their jobs in less time. In other words, information efficiencies and synergies as a result of ERP implementation can improve productivity many fold.

7.2 Understanding the Impact of ERP in the Refineries of Assam

Productivity is the fundamental measure of a technology's contribution. While major success stories exist, so do equally impressive failures. Research on information technology and productivity has often raised frustrating concerns

with the measures and methods commonly used for productivity assessment. Because information is intangible, increases in the implicit information content of products and services are likely to be under-measured compared to increases in materials content (Brynjolfsson and Yang, 1996). Since measurement is difficult, so is to quantify the impact.

To have an idea of the effectiveness of Enterprise Resource Planning (ERP) on Enterprise Productivity, three research questions were put up in section 2.7 which have been again reproduced below:

1. Has ERP implementation increased productivity in the refineries of Assam?
2. Has ERP implementation led to Business Process Reengineering (BPR) resulting in more productivity in the refineries of Assam?
3. Has ERP implementation brought information efficiencies and synergies leading to increased productivity in the refineries of Assam?

The analysis and the discussions done in Chapter 6 does point to a situation where the answers to the above three questions are in the affirmative. The ERP (SAP) users in the refineries of Assam do feel that the implementation of ERP has contributed to the increase in Enterprise Productivity. The overall scores in the refineries of Assam regarding the importance of SAP on various productivity parameters are in the range of 4.228 to 4.449 out of a maximum score of 5.0, which is impressive.

The SAP users in the refineries of Assam also believe that there has been significant reengineering of business processes which has resulted in more productivity in the refineries of Assam. One central tenet of BPR is to exploit IT to support 'radical change'. An awareness of the capabilities of IT can influence the business redesign process. In the context of this study, IT is ERP. The introduction of ERP not only automates existing business processes, but also shapes the business. The purpose of reengineering the business is focusing on the latter in order to secure competitive advantage for the business.

Finally, the SAP users in the refineries of Assam agree to the fact that ERP is playing an important role in collecting information and maintaining records which has had a direct impact on making the existing information being used more efficiently. Information synergy has improved with better communication and integration with other departments and teams. The effective and efficient flow of information has increased Enterprise Productivity in the refineries of Assam.

The data collected from the SAP users of the refineries of Assam reveal that ERP (SAP) has improved Enterprise Productivity in the refineries of Assam by:

- Standardizing and automating business processes—locally as well as across multiple locations—to accelerate business operations.
- Offering a fully integrated suite of business management applications that share a common dataset and extending these applications over the

Internet, allowing visibility and collaboration across departments, as well as with customers, partners, suppliers, and remote users.

- Providing flexible and customizable reporting to improve business reporting, analysis, and insight.

7.3 Conclusion

This chapter looked at the fifth objective of the present study, "To understand the impact of Enterprise Resource Planning (ERP) implementation on Enterprise Productivity from user's perspective in the refineries of Assam".

To understand the impact, we look at the effectiveness of ERP on the refineries of Assam from the point of view of the research questions that were formulated (Table 7.1). It is seen that there is no way of measuring the productivity arising out of the implementation of ERP in the refineries of Assam. A measurement framework is thus proposed which has been detailed in Chapter 5. Because of corporate policy restrictions, data was not available on how BPR has been carried out and as such, it could not be documented. It is of course, understood that with the implementation of ERP, significant BPR exercises were also carried out. The refineries in Assam have successfully implemented ERP and in the process have created corporate wide common data infrastructure. This common data infrastructure has helped the refineries in increasing enterprise productivity.

Table 7.1: Effectiveness of ERP on the Refineries of Assam

Research Question Focus	Key Feature	Status
Systematically evaluate input, processes and output	Measurement Framework	Proposed
Monitoring cost, resource allocation, purchasing and logistics	Restructuring Processes	Could not be Documented
Managing enterprise data and information	Corporate wide common Data Infrastructure	Exists

In conclusion, it can be said that ERP has been effective in increasing enterprise productivity in the refineries of Assam from the ERP user's perspective. Quantification of the productivity is an issue which the present study has tried to address. It is also seen that the reluctance on the part of the refineries to share data is a critical issue. The refineries need to come up with a data sharing policy which can help in research helping the refineries in the long run.