

# International Journal of Innovative Research in Science, Engineering and Technology

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## A Case Study of an Automotive Industry on Product Quality by Implementing of ERP Software

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**ABSTRACT:** The Enterprise resource planning systems are often assumed to be a deterministic technology, since organizations have to align their organizational structure, business processes and workflow to the embedded logic of the ERP system. The impact of ERP systems would be of great importance from both theoretical and practical perspective. The purpose of this paper is to analyze the impact of ERP on product quality. A case study has been done in Eicher Motors Ltd.

**KEYWORDS:** ERP, Planning, Inventory, Product quality

### I. INTRODUCTION

For a firm to be competitive it must produce quality goods. Quality become strategic over-night, involves all, both in and out of the firms, in management of its interface with customer and environment. To gives Quality, Company must aware of mutual relationship and inter-dependency to which they are subjected, so that they will be able to function's a coherent whole. This involves customer relationship and problem, organizational design issues, engineering design options, monitoring and control approach and also monitoring and controlling the multiple elements which renders the company a viable quality producing and profit. To realize the benefits of quality it is imperative that the company design product to be compatible with market needs, market structures competitions side by side company must aware of customers test and also with manufacturing technology that are continuously emerging. It is very important to integrate company shop floor with management and also with customer, suppliers, and technology and with business functions in order to get quality product, profit and remain in competition. The ERP system provides all the facilities that are discuss above. Many firms that implement ERP systems strive to reduce redundancy and inconsistency in data through the creation and maintenance of a central database of corporate information. Errors are reduced and employees have access to current information for decision-making. The ERP architecture integration all the department across the organization and facilitate information sharing across business processes and also supporting concurrent and automatic updates, without the need for manual intervention. The organization gets much benefit if the proper implementation of ERP should be done throughout its life cycle.

A case study of, EICHER Motor limited. Is done to find out the impact of ERP implementation on quality. For finding out the problems in their legacy system interview taken to the higher level of management. Based on interview and analyzing the new system questioners are prepared and again interviews are taken to fined out the percentage improvement or decrement in their product quality.

### II. LIFE CYCLE OF ERP IMPLEMENTATION

An ERP integrates all departments and functions across an organization onto a single computer system that aims to serve practically everyone's particular needs. It eases the exchange of data and facilitates communication among

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departments. ERP systems run on client-server networks—personal computers connected to more powerful servers that feed them data.

ERP Implementation Strategies: ERP research revealed different strategies for implementing ERP successfully.

Organizational Strategies: For promoting ERP implementation include change strategy development and deployment, change management techniques, project management, organizational structure and resources, managerial style and ideology, communication and coordination, and IS function characteristics.

Technical Strategies: That have been proposed to determine ERP success include technical aspects of ERP installation, ERP complexity, adequacy of in-house technical expertise, and time and cost of implementation.

Marketing Strategies: The strategic marketing view usually suggests several general steps to be followed by an organization to secure its long-term survival. These phases can be abbreviated as follows:

- An organization identifies objectives and develops strategies to achieve them.
- An organization implements the identified strategies; and
- An organization evaluates if it has achieved what it wanted to achieve.

Change Management Strategies: For ERP Implementation: ERP implementation, commonly involve change. Hence, responsiveness to internal customers is critical for an organization to avoid the difficulties associated with this change.

Knowledge Formulation: To identify and evaluate the attitudes of individual users and influential groups. This analysis should address such questions such as: Who are the resisting individuals and/or groups: What are their needs? What beliefs and values do they have? What are their interests? The answers to these fundamental questions may offer a good starting point in determining the sources of employees' resistance to the ERP system.

Strategy Implementation: Management can use the knowledge regarding potential users from the previous stage to set up strategies that can best overcome users' resistance to the ERP system, and to convince as many users as possible to adopt it. In an attempt to change the attitudes of potential users of ERP, management must first try to affect the cognitive component of users' attitudes. A major strategy for achieving this goal is communication.

The status evaluation: The status evaluation phase provides feedback information to top management in a dynamic manner. In order to be useful, the feedback should be timely, accurate, and systematic.

Training: Training (before and throughout the project) is a must for keeping ERP implementations on the right track. Even after projects have become derailed, training is seen as a key ingredient in the salvage operation. For each stage, a suggested training plan is offered. The following stages were,

1. Pre-sales stage – At this stage The Executive Steering Committee gave knowledge about ERP so that it can make an informed decision on how to proceed in forming an ERP project team and in selecting an ERP product.
2. Planning and design stage – The project team, process owners, and the Training Department all need guidance on how to plan a project as large as an ERP implementation, and how to disseminate all the necessary knowledge, skills and attitudes to every level of the organization
3. Build stage – As the re-engineering work proceeds, the project team will give course designers specific details and general information that should be presented to each target audience. Power users will divide their time between assisting in BPR and course presentation
4. Post-Rollout stage – The moment ERP goes live is when the processes the system manages are most vulnerable. Much of the training that will be given during the post-Rollout stage will be ad-hoc in nature. Some groups may need additional training, or may need retraining, to optimize the way the system is used.

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5. Ongoing – After post-Rollout issues have been resolved, the ERP system should be operating normally. However, training will be necessary to support the ongoing needs of the ERP system.

Tailoring: The way ERP packages are designed, some tailoring is always required to get them up and running. But the extent of the tailoring can vary from one organization to the next, based on a number of factors. The following types of tailoring can be done:

**Table:** Typology of ERP Tailoring Types

Tailoring Type	Description	Examples	Layer Involved
Configuration (Customization, In SAP parlance)	Setting of parameters (or tables), in order to choose between different executions of processes and functions in the software package	Define organizational units; create standard reports; formulate available-to-promise logic; use of a standard interface to an archive system	All layers
Bolt-ons	Implementation of third-party package designed to work with ERP system and provide industry-specific functionality	Provide ability to track inventory by product dimensions	All layers
ERP Programming	Programming of additional applications, without changing the source code (using the computer language of the vendor)	Create a program that calculates the phases of the moon for use in production scheduling	All layers
Interface development	Programming of interfaces to legacy systems or 3rd party products	Interface with custom-build shop floor-system or with a CRM package	Application layer and/ or database layer
Package code modification	Changing the source-codes ranging from small change to change whole modules	Change error message in warning; modify production planning	Can involve all layers

**Post Implementation Stage:** The post-implementation review (PIR), analyzing the project to determine what was successful and what needs to be improved with regard to the system or with regard to the implementation process itself. The post-implementation is a feedback device that systematically monitors the progress of a running project by comparing actual performance with goals developed when a project was originally evaluated. The primary focus of PIR was therefore to identify and possibly abandon any poorly performing assets, and also to provide feedback in order to improve any moderate to well performing assets and enhance the quality of future plan and decisions.

**Maintenance of an ERP:** ERP projects do not end with its implementation. It is a continuing effort that must address new and/or changing requirements associated with, User assistance, Changes to system, Management of different input and output requirements, Documentation, Training, and Maintenance and update of software.

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## Case Study

Today is a world of competitions transformation of one technique to others is so fast that it is unbelievable. The competitions is so high that one technique is come deployed and after some time getting some problems in them and introduce the new technique or the advance version of that is come for example in past industries are using quality control techniques but in order to remain in competition the company R&D departments think logically and deeply analyze there systems in order to continuously improve there existent system hence the quality control (QC) systems is improve to total quality management (TQM).In my analysis I followed the same techniques and approaches as the company R&D departments follows and found some critical problems in EICHER Motor ltd. Which may force the company to adopt the ERP system.

Company quality policy:

- Total employees' involvement
- Quality circles
- Statistical tools in quality controls
- Quality functions deployments
- 5-S campaign

Quality Techniques used by company:

- Control charts for variables and attribute such as P-charts,  $\sigma$ -charts, and X-charts
- Pareto diagrams.
- Flow charts.
- Statistical Process Control.
- Design control
- Process control
- Inspection and testing

## Company Profile, Methodology & Data Collections: -

Eicher Motor was founded in 1982. The unit manufactures & markets commercial vehicles with gross vehicle weight (GVW) ranging from 5-25 ton. Eicher Motors is one of the leading manufacturers of commercial vehicles in India with a 33% market share in 7 – 11 ton segment. In 1986, Eicher Motors entered in to a technical and financial collaboration with Mitsubishi Motor Corp. of Japan to manufacture the CANTER range of vehicles. The technical assistance agreement with Mitsubishi ended in Mar 1994. Eicher Motors has a wide range of commercial vehicles to meet varying customer needs. As the variety in the products increased they are facing various difficulties with their SQL based system like limited reporting, heavy programming, tedious coding and un-coding and integration problems on the other hand with their legacy system the whole organization wishes to compete in the market by providing higher quality at minimum cost, aggressive delivery, much lesser lead time, greater integrations among internal departments as well as with suppliers and customers with greater level of product differentiation. After extensive analysis the senior management decided to opt SAP for their solutions and implemented SAP on 15/05/1999.

## Researches, Methodology and Case Study:

I had analyzed the legacy system by interviewing different persons involved in managing legacy system as well as the new system that is ERP (SAP R/3) of EICHER Motors Ltd. And found out the basic problems in their quality of products that face the company in their legacy system and these problems I had discuss in this chapter. I had collected the data by preparing the questioners and ask this question to the quality departments. To supplement the questioner, I had also interviewed some managers and ERP users. Problems are as follows:

P. In legacy system the quality of product increases but the company did not satisfy with this because the quality of product increases up to a certain limit and saturation come. If they want to be survived in a competition environment they have to find alternatives.

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P. If the plan has to be change in between the processes it will take lot of time in order to make new plans and implement them. Which create excessive production loss and also it de-motivates the employees.

P. Company getting problem about they're products they analyzed that their product sails did not increasing much then they are expected. They made a survey and found that their product quality is lagging the customer demand this is due to the flow of information is not proper. The company made their product on the bases of speciation which are 2 to 3 years back.

P. Inaccurate quality records lead to a problem in a company that is the production of company will affect in an assembly line area and cause the time, material, and rework costs and also leads to delay in production.

P. The company using SQL system to check their quality as well as storing information and if some modification is to be done then they have to make a complex programming which is very lengthy and time consuming and also the storage data may be misplace.

P. The company using decision support system which has very less inputs variable hence they have to take many points in order to get desire quality of product and all this they have to done manually which is very lengthy and time consuming they take weeks or even month to make a single decision.

P. The information flow in departments is not proper and not up to date this will cause delay in production because the information flow from one department to other is done manually which taking time and also the feed back of information is late and hence in order to convert the written information in to a practical form will be delayed. This affects the company target and reputation in the market, which leads the company to be out of competition.

P. When a quality department creates products for a customer, the direct connection of quality department with the customer leaves little doubt about the satisfaction level of the costumer. However, modern manufacturing methods and the complexities of today's wide variety of services prevent many employees from having direct contact with ultimate end users of their organization's product and services. For this reason, the employees cannot meet the need and expectation of their ultimate customer without supports from other areas of organization. Valuable customer information must be made available to employees in a format that are useful to them. In order to create customer value, employees must familiar with how meet the quality, cost, and schedule requirement of job impact customer value perception. Regular communication must be there between the employees and customer in order to have satisfactory results.

P. Strategic plan of organization is diverting from main goals. Developing a strategic plan require taking a systematic look at the organization see how each part of it interrelates to the whole. Strategic plan focuses on the key organization goals that support the vision and mission. Strategic plans enable an organization to advance from wishful thinking the customer is number one to take action changing corporate behavior and the action of employees in order to support a focus on customer. A strategic plan defines the business the organization intends to be in; the kind of organization it want to be and a kind of economic and non economic contribution it will make to its stakeholder, employees, customer, and community. The strategic plans concentrate on the critical success factor for the organization, providing plans for closing the gaps between what the organization is currently capable of doing versus what it needs to be able to do. Using indicator or performance measurement, the organization will monitor its progress towards meeting the short term, middle term, and ultimately long terms goals. All these elements are either not working properly or the gapes are filling due to lack of coordination of departments and lack of coordination of information's.

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## III. RESULT CONCLUSION AND DISCUSSION

In this case study of EICHER motor limited pithampur I had found that impact of ERP on quality modules is excellent. The organization found out that the ERP system integration all the departments and there is much faster flow of information in the organization and also provide the centralized data base management system which enables to retrieve the information easily and help the managers to know where the organization is standing and what to do next and the organization get benefited in their quality programs and increases the product quality. The following results were given in the table that gives the information about impact of ERP on quality before and after implementation.

**Table** Percentage Wise Representation of Impact After ERP Implementation on Quality

S. No.	Items	Percent Change
1	Tightens to the specification of quality	40% increases
2	In Process production quality	10% increases
3	Market research cost in discovering quality	30% increases
4	Time saved in inspection and testing	60 % saving in time
5	Documentation of quality	70% reduces
6	The complains of customer	10 % reduces
7	Cost of training the quality module	15% increases

## IV. DISCUSSION

The main nine problems that I found out in the legacy system of EICHER Motors lit. is successfully solved by ERP implementations. Here I discuss that how the ERP solves the problems that are present in legacy system.

In legacy system the quality of product increases but the company did not satisfy with this because the quality of product increases up to a certain limit and saturation come. If they want to be survived in a competition environment, they have to find alternatives the best alternatives is ERP. The ERP software uses the best practice methods that have been proven in real world, which improves the quality of products further.

If the plan has to be change in between the processes it will take lot of time in order to make new plans and implement them. Which create excessive production loss. Because the system has to be modified with the plans and but the ERP is much flexible and also supports enterprise application integration (EAI).

Company getting problem about they're products they analyzed that their product sales did not increasing much then they are expected. They made a survey and found that their product quality is lagging the customer demand this is due to the flow of information is not proper. The company made their product on the bases of speciation which are 2 to 3 years back. Because of this centralized data source, ERPs provide online and real-time information and facilitate intra- and inter-organization communication and collaboration.



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Inaccurate quality records lead to a problem in a company that is the production of company will affect in an assembly line area and cause the time, material, and rework costs and also leads to delay in production. In the ERP systems the data are up to date and this data can be checked any time, which helps the assembly line to run properly hence this saves the time because recent information can be seen within no time this also helps to save material because what the management decide that is if there is any change in specification the information will flow in no time to shop floor hence they immediately change the specification of machines to desired one.

The company using SQL system to check their quality as well as storing information and if some modification is to be done then they have to make a complex programming which is very lengthy and time consuming and also the storage data may be misplaced. The ERP System provides flexibility in programming which facilitates the modification.

The company using decision support system which has very less inputs variable hence they have to take many points in order to get desired quality of product and all this they have to do manually which is very lengthy and time consuming they take weeks or even month to make a single decision. ERP provides vast information, as the system is based on database management system, which stores many years of information and provides various variables and alternative methods to top management when needed.

The information flow in departments is not proper and not up to date this will cause delay in production because the information flow from one department to other is done manually which takes time and also the feedback of information is late and hence in order to convert the written information into a practical form will be delayed. This affects the company target and reputation in the market, which leads the company to be out of competition.

ERP system is an integrated system which integrates all the modules of company as well as the other branches of company and provides seamless flow of information this helps to save time and improves the feedback information and improves the quality and production of product.

When a quality department creates products for a customer, the direct connection of quality department with the customer leaves little doubt about the satisfaction level of the customer. However, modern manufacturing methods and the complexities of today's wide variety of services prevent many employees from having direct contact with ultimate end users of their organization's product and services. For this reason, the employees cannot meet the need and expectation of their ultimate customer without support from other areas of organization. The ERP provides valuable customer information because it integrates all departments and made available this information to employees in a format that is useful to them. ERP system runs on client-server network which facilitates regular communication between the employees and customer in order to have satisfactory results, create customer value and also familiar the employees to how meet the quality, cost, and schedule requirement of job impact customer value perception.

In a legacy system strategic plans are full filled up to 40 to 60 percent and remaining plans are diverted from main goals. The ERP system forces the company to do BPR which eases the flow of process and information's and this is the key factor of strategic plans to be implemented hundred percent. ERP facilitates the high-quality feedback system which enables the managers to judge where the gaps are present between the plans and their execution. ERP system integrates all the departments of company and centralizes it hence there is proper coordination and all departments think as a single unit and hence help in proper implementation of strategic plans step by step.

### **V. FUTURE WORK AND SHORTCOMING OF PAPER**

This case study is done on one of the modules of organization (i.e. quality). Like-wise study of all module can be done which will help in generating more strategically justified information regarding ERP implementation by covering the requirements of all modules. All the information of modules will help implementation team to modify the implementation strategy where they are lagging and helps organizations which were thinking to implement the ERP system.

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In this paper single automobile manufacturing firm is cover to find out the impact but if many such firms were cover the out put of that will be much more precise and effective.

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