CHAPTER 3

ERP – AN OVERVIEW

3.1 ABOUT ERP

An Enterprise Resource Planning [ERP] is the software application which has the potential to integrate all the functions & processes of an organization and to present a holistic & comprehensive picture about the entire business environment. It caters the seamless integration of all the information flow happening throughout the company. It also enables various departments across an organization to share information effectively & communicate with each other, using a single database setup.

Kumar et al. (2000), define ERP system as “set of information systems packages, which are configurable and capable to integrate information & information-based processes within & among all the functional areas of an organization”.

In order to stay ahead in a highly competitive & dramatically changing business environment, organizations have to enhance their business practices and operational procedures through the suitable tools of information technology such as ERP (Somers & Nelson 2004).

Hong & Kim (2002) found that the growing demands of automating the business processes have prompted more & more firms to shift their information technology adaption approaches from in-house development of information systems to purchase of application software, like ERP systems, to
ultimately enhance the operational efficiency through related synergies. The benefits of ERP are worthwhile and can be considered as a mandatory tool which could enhance business processes & operations, though adopting it is time-consuming and costly.

As per Frost and Sullivan, “ERP as a business solution aims to equip the management with the right information to take timely decisions by establishing better business practices and ERP has become the software application that no business can live without”.

3.2 WHY ERP?

3.2.1 Current Business/IT Scenarios

In general, the following are the scenarios connected with the adoption of IT and the deployment of software applications.

Islands of Information: Functions, departments & processes are functioning as silos without any interconnectivity or integration.

Difficult to get timely and accurate information: Management is not in a position to get the required information, dynamically, timely, accurately and in the required format, for decision making.

Heterogeneous Hardware and Software platforms and practices: There is no single software & hardware platform for deploying the software which are needed to automate the functions and their associated processes. Heterogeneity would obviously lead for a) disconnect among the functions and the required information cannot be obtained as expected by the Management, b) data redundancy, c) entry of same data at multiple locations, d) difficult to collate information, etc.
Poor connectivity between different organizational locations:
Collation of data being generated in the systems available at the geographically distributed locations are not being handled effectively as they are not properly interconnected through the networking solutions available now.

Sticking with obsolete technology: Still many companies are living with the technology & solutions which are obsolete, though the evolvement are very high in the IT area. So, the features & benefits cannot be reaped by them. This aspect is related to both software & hardware areas.

Resist to change: The lack of seriousness, willingness & understanding on ‘change’ is the main obstacle for adoption of new solutions under IT. This is not only applicable for the end-users but also for the Management. On many occasions, Management is driving the change, but the resistance will emerge from the employees due to fear on job or position or status loss, which they assume or expect to face, due to the adoption of new software solutions.

Lack of proven man-power to develop an integrated software: Many companies are still willing to create their own software environment by developing the same through internal or external resources, though ready-made solutions are available for adoption. Achieving an in-house ERP setup by developing & integrating all the components is cumbersome, time consuming and impractical.

3.2.2 Expectations of the Management
In general, the following are the key expectations of the Management irrespective of the size & nature of the organizations. A comprehensive software system is needed to……….
• Know, what is happening in the company, through proper data, dynamically.

• Achieve an integrated platform for better Management.

• Enable & sustain transparency of Information through single data source.

• Facilitate cycle time reduction in all the processes.

• Succeed in cost control and low working capital.

• Marry the latest technologies and come out of obsolescence.

• Shun the geographical gaps by interconnecting the business units for exchange of information in a lively manner.

• Satisfy the customers with high expectations.

• Support for maintaining the business Competitiveness and for survival.

Further, the result of various studies highlighted that there are five specific reasons why corporations would adopt ERP systems:

1. **Integrate financial information** – There can only be “one-set-of-books” through a single & unified database. Hence, the financial welfare of the companies can be easily evaluated and the related decision making will be enacted effectively. Elimination of misapplication and misinterpretation of financial information that existed with the standalone/legacy IT environment will be made viable.

2. **Integrate customer order information** – There is total visibility of each & every customer order from the order-entry stage until the order is invoiced and shipped. By this, the concerned departments can coordinate their
activities towards ensuring accuracy and timeliness in completing the related activities as well.

3. **Standardize and speed up manufacturing processes** – a) Elimination of waste caused by redundancy & inaccuracy, b) productivity increase by reducing the production cycle-time and c) quality enhancement, are possible through the implementation & standardisation of “the best practices/processes” available in the ERP environment.

4. **Reduce inventory** – The manufacturing process is able to flow more effectively and efficiently through the high visibility of each & every customer order. By enhancing the Material requirement planning, the inventory reduction will happen not only at the Work-in-Process inventory levels, but also that of the Finished Goods stocked in the warehouses.

5. **Standardize Human Resource information** – The ERP setup at the companies with multiple business units, not only be beneficial to the employees by standardizing & catering the needed information, but also enhance & support the timekeeping capabilities for payroll purposes.

### 3.2.3 ERP – The Benefits Envisaged

By implementing ERP successfully, the following benefits can be envisaged. The benefits narrated hereunder can be considered as necessary in the current competitive business scenario.

a) Facilitating company-wide information systems, covering all processes & functions in an integrated manner, using the latest hardware & software platforms. b) Providing management, the dynamic & up-to-the-minute accessibility to data/information needed to make key decisions. c) Enabling activity based costing [ABC] to track the actual costs of activities.
d) Elimination of building stand-alone data-sources and worksheets to enter, manipulate & duplicate data for reporting purposes. e) Establishing uniform processes based on industry recognized best business practices. f) Replacing ageing and non-integrated core legacy systems that are costly to support and maintain. g) Establishing a single integrated data repository that promotes information sharing with superior reporting and data analysis capabilities. h) Improving work flow and the related efficiency resulting for reduction in lead-time, cycle-time, quality-costs, etc. and i) Improving operational flexibility with suitable controls, inventory turns, resource utilization, customer satisfaction, supplier performance, etc.

The following are some of the core benefits which would directly support the Management to achieve the operational efficiency, competitive edge, etc.

**Standardized business processes:** ERP demands standardization. This implies fewer business processes to be supported, and changes in traditional functioning. The gains from this huge task are streamlined operations and tight interlinking between departments and other group companies.

**A common data repository:** In an ERP system, everyone uses the same data. This reduces data duplication and redundancy and makes data transparent and easy to compare. To those who haven't used an ERP system, it is similar to a centralized Excel sheet that all can access. As is obvious, this provides considerable productivity gains.

**Continuous change:** An ERP implementation gives most people their first experience of a major change initiative. That's also when they realize that business leadership, and not IT [Information Technology] leadership, is needed for proper implementation of strategic IT initiatives like
ERP. Moreover, an ERP project ingrains people with the philosophy that change is the only constant in today's business and, hence, top management must become flexible. And there comes the important realization among top management that everyone needs to shape up to IT or ship out. These are some of the important ingredients on which an ERP foundation is built. If properly envisioned, planned and implemented, it can offer far reaching results translating into a much-improved bottom line, which is why the slowdown hasn't hurt the appeal of ERP to companies.

Some of the enablement that can be harnessed by the tight coordination and integration afforded by the ERP systems [with specific focus to a manufacturing environment] are highlighted hereunder.

a) Streamlining of financial and administrative processes by adapting “the best practices” in the related areas. b) Quicker conversion of customer orders into material orders & production schedules by integrating production/material planning and sales order processing systems. c) The utilization of total order visibility throughout the entire manufacturing process will lead for the evolvement of an enhanced & leaner production model. d) Achievement of enhanced production scheduling by minimizing the excess manufacturing capacity. e) Reduction of raw material safety stock levels and finished goods inventory levels to their minimums. f) Improvement in Customer service due to increased responsiveness (resulting due to the integration of sales and production planning systems). g) Improvement in the suppliers’ delivery performance due to the increased visibility and understanding of future material requirements as they will provide suppliers with sufficient notice. h) ERP systems provide a transactional-backbone to the companies by facilitating to capture, process & display the basic cost & revenue elements of the associated inventories during the transition of raw-material to finished goods. Further, i) ERP systems afford in accessing the
management information related to its business activities, showing actual & real-time cost of sales, in a structured and efficient manner.

The main rationale to implement an ERP system is to fulfill the need to integrate the processes and information of a corporate towards serving all the stakeholders in their reporting & decision-making processes.

3.3 EVOLUTION OF ERP

ERP systems are not conceived, matured and familiarized in a very short span of time. It got evolved through multiple stages based on the necessity, business complexities, increased competitiveness and the technology advancement.

The following Table 3.1 would illustrate how the ERP got evolved over a longer span of time.

Table 3.1 Evolution of ERP

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tentative period</th>
<th>The evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1960’s</td>
<td>Information systems were insisted mainly for Inventory control/Management [just stock keeping]</td>
</tr>
<tr>
<td>2</td>
<td>1970’s</td>
<td>Emergence of MRP [Material Requirement Planning]. Managing inventory along with Material Planning and Procurement.</td>
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<tr>
<td>3</td>
<td>1980’s</td>
<td>MRP II [Manufacturing Requirement Planning]. Extended MRP to shop floor production operations and distribution management.</td>
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</table>
Table 3.1 (Continued)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tentative period</th>
<th>The evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Mid 1990’s</td>
<td>Birth and maturity of ERP [Enterprise Resource Planning] concept, covering all the functions/activities of an Enterprise with tight integration. Multiple products and vendors entered into the market.</td>
</tr>
<tr>
<td>5</td>
<td>2000 onwards</td>
<td>ERP II – Extended ERP with access to the external business stake holders like Vendors, Customers, Collaborators with web enabled interfaces/portals. Some reputed ERP vendors started providing the products like ERP, SCM, CRM as a suite with integration. ERP applications were released based on the business verticals [Automotive, Pharma, textile, Oil/Gas, retail, etc.]. Suitable versions of ERP software were released to suit the Small and Medium enterprises also.</td>
</tr>
<tr>
<td>6</td>
<td>2010 onwards</td>
<td>Open source ERP applications entered and started penetrating the market. Cloud/on-demand ERP approach [ERP III] started maturing with pay-per-usage model.</td>
</tr>
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</table>

3.4 OPTIONS FOR IMPLEMENTING ERP

There are four options prevailing for the organizations those wish to adopt an ERP solution.

**OPTION 1 – MAKE [Using Internal resources]:** Developing an ERP package, specific to the requirements of the organization (custom-built), with the help of the in-house IT department. Companies with a strong internal team of software developers used to go for this option.

**OPTION 2 – BUY:** Going for Tailor-made and ready-to-implement ERP packages available in the market like SAP, Oracle
applications. There are ‘n’ number of ERP packages prevailing in the universe. Companies can select an appropriate one as per the functional fulfilment, cost, software/hardware platform, scalability, support facility for implementation/maintenance, etc. There are lot of open-source ERP applications emerging in the market now and some companies are embracing the same with the support of the capable vendors.

**OPTION 3 – MAKE [Using External resources]:** Developing an ERP package, specific to the requirements of the organization (custom-built), with the help of a software solution provider. If the ready-to-implement ERP solutions are not fulfilling the expectations and there is no internal software development team, this option can be pursued.

**OPTION 4 – HIRE [pay-per-usage model]:** Accessing ERP through ‘hosted’ services. No capital expenditure. Recurring expenses based on the number of users, usage, etc. Mode of access is generally through Internet. Here, the nuances related to the internal data center maintenance also can be avoided by packaging the expenditure along with the ERP application.

As of now, Option 2 is the much sought-out one and option 4 is highly evolving.

### 3.5 ERP – THE IMPLEMENTATION PROCESS

ERP Implementation is a People oriented project and is not governed by the representatives of the Information Technology function alone. As per Michael Krigsman (2008), ERP implementation is like a soccer team, where the coach, physiotherapist and substitutes are equal, responsible & important like the main players. Here the role & involvement of Top Management are clearly emphasized.
3.5.1 ERP – Implementation phases

The major phases of the ERP implementation process along with the key activities are provided in the appended Table 3.2.

Table 3.2 Phases of ERP Implementation

<table>
<thead>
<tr>
<th>I. Project Preparation</th>
<th>II. Business Blueprint</th>
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<tbody>
<tr>
<td>▪ Forming the goal setting and strategy building</td>
<td>▪ Core team training</td>
</tr>
<tr>
<td>▪ Forming the core team</td>
<td>▪ Documenting the Business processes</td>
</tr>
<tr>
<td>▪ ERP product selection</td>
<td>▪ Requirement Specification arrival [As-is and to-be]</td>
</tr>
<tr>
<td>▪ Implementation partner selection</td>
<td>▪ Gap-analysis and resolutions</td>
</tr>
<tr>
<td>▪ Establishing the Hardware setup and connectivity between the intended locations</td>
<td>▪ Blue print sign-off</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III. Realization</th>
<th>IV. Final Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Configuration of ERP as per specifications signed off during the Blueprint stage</td>
<td>▪ End-user training</td>
</tr>
<tr>
<td>▪ CRP – Conference room pilot [testing by the core team]</td>
<td>▪ Thorough end-user testing</td>
</tr>
<tr>
<td></td>
<td>▪ Data cut-over strategy</td>
</tr>
<tr>
<td></td>
<td>▪ Parallel run [if viable]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V. Go-live</th>
<th>VI. Post go-live support</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Data migration</td>
<td>▪ Monitoring the deployment, performance, etc.</td>
</tr>
<tr>
<td>▪ Help-center formation</td>
<td>▪ Fine-tuning</td>
</tr>
<tr>
<td>▪ Go-live</td>
<td>▪ Continuous training</td>
</tr>
</tbody>
</table>

The strength of the chain lies in its weakest link. Likewise, the role and involvement of the Project team/stake holders are very important, because, they have crucial role to play during the ERP implementation. The key stake-holders comprise of Management representatives, functional heads, functional managers, end users and IT team [besides the team constituted for
the ERP implementation project]. Even the Implementation partners, ERP/hardware/software vendors and External consultants are also considered as important for the successful completion of the project.

3.5.2 ERP Implementation – Project Management

Forming an exclusive project team under an able Project Manager is a critical activity under the ERP implementation process. PMBOK - Project Management Institute Body of Knowledge (2000) recommends certain areas to be managed for the successful completion of any projects and the same are depicted in this representation (Figure 3.1) as knowledge areas.

![Figure 3.1 Project Management – Nine knowledge areas](image_url)
3.5.3 ERP – Implementation Approaches

Following approaches are being practiced for implementing the ERP.

**Big-bang implementation** – Implementing for all the business entities in a single shot irrespective of the number of manufacturing locations, marketing/sales offices, storing locations, etc.

**Vanilla Implementation** – Implementing the features of the selected ERP as it is without any tweaking or customization. Just configure and implement. This approach is applicable for newly started companies, without any legacy application or data.

**Staggered Implementation** – Implementing ERP by covering the business entities in a phased manner. Primary setup will be established and the rest of the entities will be covered in a gradual manner [called as roll-outs]. Implementing the functional modules in a phased manner is not at all recommended.

3.5.4 ERP – General recommendations for smooth adoption

ERP adoption is a complex and challenging process. Chances of delays and/or even failures are very high. Following are some of the areas or recommendations to be taken care to ensure the smooth adoption.

1. Setting the clear Objectives and Vision on the proposed ERP Project

2. Ensure the willingness of the Management to support this project throughout
3. Plan for a gradual approach for implementation, if the company has multiple units, business entities, etc., instead of a ‘big-bang’ approach

4. Estimate the overall & tentative budget with contingencies and confirm the financial readiness from the Management

5. Formation of the ERP team with the involvement of representatives of all levels and functionalities. ERP initiative should not be a surprise for the users during the project execution.

6. List down the functional requirements, pain-areas, bottle necks, system deficiencies, etc., and frame the expectations [Requirement Definition] out of the proposed ERP initiative. Brainstorm the same and formalize with overall consensus.

7. Re-engineer the processes and re-draw the scope meant for ERP adoption.

8. Select a right ERP product, so that the customization can be minimized.

9. Identify a suitable and affordable Implementation partner with solid back-ground

10. Don’t hesitate to deploy suitable external consultants during Re-engineering, Change Management, ERP product/Partner selection, Implementation, etc.

11. Form a Project team for implementation for both the Internal and external members with a firm position for the Management representatives. The resources identified should be as per the expected qualification norms associated with ERP project execution.
12. Project Managers of the internal and external teams have to be selected carefully, as they are very critical for the successful project execution and management.

13. Workout a ‘Risk Identification and Mitigation Plan’ related to People, Process and Technology, along with the Implementation partner.

14. Identify and finalize the requirements related to networking, hardware, software, etc.

15. Freeze the Project plan with week-wise milestones & deliverables along with the roles & responsibilities of all the project members.

16. ‘Change Management’ initiative have to be executed. Even specific individuals or departments can be focused with continuous monitoring during and post ‘go-live’ stages.

17. Adhere the project steps, stage-wise inputs & outputs meticulously with frequent review meetings and ensure preventive/correction actions based on the outcome of the meetings.

18. Monitor the project schedules and the cost-outlay periodically.

19. All the team members must be trained adequately in the ERP Product, implementation approach, technical aspects, etc. This training will boost the morale of the team members and also the confidence on the ERP product and project.

20. Ensure all the stakeholders of the ERP initiative are well-communicated about the activities, benefits, etc. during the project and also subsequent to the go-live stage.
21. Have a close watch on the hidden costs associated with scope creep, unscheduled training/consultancy, schedule lapses, customization, data conversion, etc.

22. Thorough testing have to be done during the parallel run stages

23. Schedule the ‘go-live’ date after obtaining the confidence level of all the beneficiaries and the transition from the legacy system to ERP has to happen seamlessly

24. Achieving the ‘go-live’ status is not the end of the ERP project. It is just a beginning of the journey. Continuous monitoring, corrective actions, value-additions, further roll-outs, etc. are mandatory after implementation.

25. Form a ‘round-the-clock-help-desk’ to support the grievances, improvements, technical-enhancements, etc. to sustain the optimism on the running ERP setup.

26. Ascertian the effective deployment of the implemented ERP at all the levels of the organization like, transaction processing, supervisory, Managerial, Executive and top level Management.

27. Monitor, measure and review the benefits and return-on-investment and report to the internal stake-holders periodically

28. ‘Post ERP implementation Audits’ have to be conducted to reconcile the expectations and fulfilments and to ensure the effective deployment of the ERP in place.
3.5.5 ERP Adoption – General Barriers & Problems

As per the data gathered during the research, the general barriers/difficulties faced by the companies during ERP adoption are compiled & depicted in the following Figure 3.2.

![Figure 3.2 Barriers of ERP adoption](image-url)
3.6 ERP ADOPTION – THE CRITICAL SUCCESS FACTORS [CSF]

Following illustration (Figure 3.3) highlights the core Critical Success Factors of an ERP adoption project. Those who are aspiring to go for ERP adoption should consider these factors towards ensuring the success & effectiveness.

![ERP Critical Success Factors](image)

**Figure 3.3 ERP adoption – Critical Success Factors**
3.7 ERP ADOPTION – THE PREVAILING MYTHS & REALITIES

There are lot of misconceptions [Myths] about the ERP, mainly among the ERP aspirants. These are the stumbling blocks which prevent the increase in the per cent of the ERP implemented companies. The following Table 3.3 will highlight the generally prevailing myths about the ERP adoption projects and the corresponding realities.

**Table 3.3 ERP related myths & realities**

<table>
<thead>
<tr>
<th>Myths</th>
<th>Realities</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP is only for Big and large manufacturing companies</td>
<td>ERP can be implemented for companies of any size, irrespective of the nature of business, production volume, turnover, no. of employees, etc.</td>
</tr>
<tr>
<td>It is costly</td>
<td>ERP applications can be selected as per the complexity of the business, financial viability, etc. as lot of ERP products are available in the market. Even open source ERP products can be tried. Cloud model ERP can help to implement the same on OPEX model w/o any capital expenditure.</td>
</tr>
<tr>
<td>Investment cannot be justified</td>
<td>The benefits of ERP cannot be quantified and like machinery the ROI - Return on Investment cannot be ascertained in months. There are tangible and intangible benefits. This is applicable for all the software applications.</td>
</tr>
<tr>
<td>Too long to implement</td>
<td>Proper planning, effective project management and a dedicated team could help to complete the implementation in the stipulated months without any time and cost overruns.</td>
</tr>
</tbody>
</table>
Table 3.3 (Continued)

<table>
<thead>
<tr>
<th>Myths</th>
<th>Realities</th>
</tr>
</thead>
<tbody>
<tr>
<td>lot of failures</td>
<td>In simpler terms, failures are the outcome of poorly planned and implemented projects without adequate involvement of the Management and other stakeholders. There are lot of companies who were successful in ERP adoption and are reaping the associated benefits.</td>
</tr>
<tr>
<td>It is an IT based project and Strong IT team is mandatory</td>
<td>ERP projects are functional oriented and not Technology based. IT will provide suitable support like hardware, networking, etc. The responsibility lies with the Functional representatives only. It is a Business project.</td>
</tr>
<tr>
<td>We are not ready for it. Let’s develop the business first and go for ERP</td>
<td>In order to achieve the business growth, ERP enablement is mandatory. Postponing ERP adoption would lead for delayed business growth only.</td>
</tr>
<tr>
<td>ERP can solve all the issues</td>
<td>ERP is not the ‘all-cure medicine’ to solve all your problems. ERP is an important enabler to handle the business effectively towards achieving the desired growth and results.</td>
</tr>
<tr>
<td>Go-live is the final phase of the ERP implementation project</td>
<td>The ERP journey really begins after the ‘go-live’ stage only. The environment has to be tuned and sustained to reap the expected benefits. Expectations vs. fulfilment audit has to be conducted and warranted corrective measures have to be taken. The end users have to be adequately supported for enhancing the effectivity on the ERP deployment. Lot of value additions can be done over the ERP platform. That is, implementing the applications like CRM, SCM, eCommerce on the ERP foundation. More and more business entities have to be brought under the ERP umbrella to achieve the Enterprise level fulfilment.</td>
</tr>
</tbody>
</table>
Table 3.3 (Continued)

<table>
<thead>
<tr>
<th>Myths</th>
<th>Realities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manpower can be reduced after ERP implementation</td>
<td>Instead of ‘down-sizing’, the manpower will get ‘right-sized’ after the ERP implementation. ERP is not an ‘Employee Reduction Programme’. Employees will be empowered to do the value added works instead of mundane activities. ERP can support minimizing the recruitments during the business growth.</td>
</tr>
<tr>
<td>ERP can be implemented in a staggered manner</td>
<td>Module-by-module implementation with adequate time gaps cannot provide the expected functional integration, which is one of the core benefits of ERP implementation. But, implementation can be done for the various business entities in a phased manner.</td>
</tr>
<tr>
<td>ERP can be customized as per the expectations</td>
<td>Customizing the ERP product is risky and should be avoided. Suitable product has to be selected to avoid customization. Product upgrades will be tough if the original product is customized. The BEST practices embedded in the ERP product would get compromised, if the product is tuned as per the expectations of the company. Of course, additional reports can be developed and added.</td>
</tr>
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3.8 ERP – MEASURING THE BENEFITS

There are many parameters or traits through which the benefits of ERP can be measured. Gable et al. (2003) analyzed the success of the Enterprise systems [ES] like ERP through ‘Priori ES Success Model’.

This model (Figure 3.4) is meant for assessing & measuring the multidimensional phenomenon of ES success. Here, five separate dimensions
of success (constructs) are followed. 1) System quality, 2) information quality, 3) satisfaction, 4) individual impact, and 5) organizational impact.

Another approach which can be considered to measure the outcome of the ERP adoption is analysing the general benefits as categorized & listed in the diagram (Figure 3.5). These traits were used to collect & analyse the details of the benefits achieved by the respondents during the research.

![Diagram of Enterprise Systems Success](image-url)

**Figure 3.4 Measuring Enterprise Systems success – Priori model**
Here the benefits are categorized as a) cost related, b) time related, c) technology related, d) efficiency related, e) manpower related and f) general benefits and the related traits are listed under each categories.

Figure 3.5 Measuring Enterprise Systems success – General approach