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A Comparative Study Of The Alternative Organization Structures For Successful Implementation of ERP In Bhilai Steel Plant

Abstract

Although ERP is one of the most popular means of integrating the various functional units of an organization, the past performances have also shown that the rate of success of ERP is not very good. According to the literature there are many critical success factors which need to be kept in mind while one is trying to implement ERP successfully, out of which organization structures can be one of the most critical factors for the successful implementation of ERP.

The outcome of the exploratory research conducted is a comparative study of the various structural options in the light of parameters like flexibility, standardization, reporting, integration and implementation time and reveals the structure of Bhilai steel plant and its appropriateness for the implementation of ERP. The study conducted identifies the significant, factors like flexibility, standardization, reporting, integration and implementation time of structure in successfully implementing ERP. It was found that the overall structure suited the implementation of change. In spite of this, the process of implementation is delayed indicating that factors like decision making, resistance to change and inadequate amount of training are playing havoc.

INTRODUCTION

Business environment has transformed dramatically and continues to do so every day, as the global marketplace keeps pace with a shrinking world. Organizations today deal with new markets, new competition and increasing customer expectations as the technological revolution, and globalization has brought the world market at the doorstep of the customers. This has placed a huge pressure on the businesses to:

1. Lower the total costs incurred in the complete supply chain
2. Minimize their inventory
3. Decrease lead time and shorten throughput times
4. Increase product quality as well as variety
5. Provide more reliable delivery dates and higher standard service to the customer
6. Efficiently organize global demand, supply and production.

As a result, today's companies have to re-engineer their business practices, processes and procedures if they want to be more responsive to customers and competition. Organizations are using software packages to integrate all their needs and use centralized database. These packages are called Enterprise Resource Planning Systems.

ENTERPRISE RESOURCE PLANNING

Information Technology is the key driver for change and is instrumental in the creation of lean organizations where technology fully supports the implementation of quality enhancement techniques to meet the growing demands of competition. One of the most popular IT based software is ERP. "ERP systems promise to meet the information needs of organizations with an off-the-shelf solution for replacing legacy information systems" (Bradley, 2003, pp. 1023). ERP systems attempt to integrate all departments and functions across a company onto a single computer system that can serve all those different departments by seamlessly integrating the information flow at all the levels. ERP systems support multilingual, multiple currencies, and multiple platforms, thus enabling the companies to work without problems in any part of the world and thus save multiple customers.

"The target of these packages is to provide a single, integrated software system that handles a host of corporate functions, including finance, human resources, materials management, and sales and distribution (Slater, 1998). By implementing an ERP solution an Organization hopes to achieve the following objectives

- Improved decision making
- Improved resource productivity
- Enhanced organizational capabilities
- Enhanced capability to adopt new IT applications
- Improvement in Customer relationship

ORGANIZATION STRUCTURE

Organizational structure and information systems are highly interconnected with each other. Over the years, information systems architectures as well as organization structures have been changed from centralized to more decentralized forms. ERP systems, when implemented successfully, makes information more easily accessible, which helps to create decentralized communication and control in companies.

Early trends developed single business that kept overall control by vertical integration (Mukherji, 2002). Organizational structure have been changed dramatically in the last 30-40 years. The direction of these changes has been from centralized forms to decentralized forms. Companies need to continually introspect and change in order to survive competition and reap the benefits of the adopted technology. It is very important that organizations realize that in many situations a decentralized structure more effectively manages changes in the environment. This form leads organizations to be more flexible and a flexible organization is more robust and resilient to change.

Relationship Between ERP Systems and Organizational Structure

According to Terry Lister of IBM Consulting Service 52% of the barriers to ERP success are the issues of change management and communication. These two problems are directly related to the structure of the organization in terms of its communication capability and flexibility for the change management. Organizational structure plays a very important role in giving flexibility and the capability of response to the transformation and also helps the organization utilise the technology to its full capacity.

ERP systems require business process reengineering, to better the processes, and BPR is known to bring dramatic changes in the organization I (Hammer and Champy, 1999). Because of the dramatic change of the business process reengineering, ERP implementations have enormous effects on organizational structures.

The pursuit for and adoption of new organizational features, more suitable for their changing environment, is forcing the companies to go for decentralization. To be able to exploit all

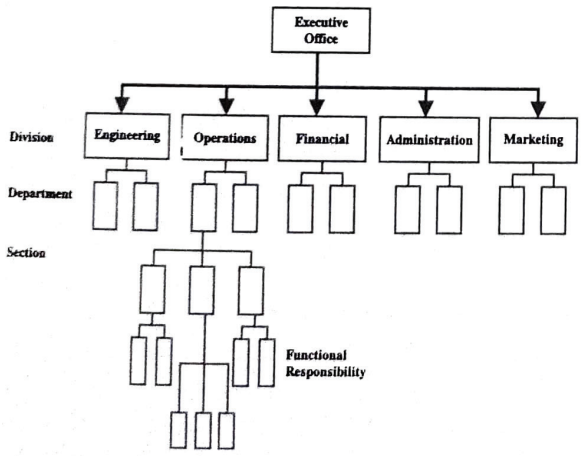
the features of the new technology, it is found in the findings of a survey taken in early 1990s that the organizations are moving a "hybrid" model that is a combination of the form of the hierarchical bureaucratic model with alternative, more flexible structure types.

Organizational Structure Types

Decentralization is still moving further and the latest structure types are in the forms of matrix, hybrid and network (Daft, 2001). Each of them will help the companies to cope with increasing turbulence in the external environment. Organizations are continually restructuring to meet the demands imposed by the environment. This can change the role of individuals in the formal and the informal organization. Recent developments in the business world, such as the change in technology and increased competitions, are compelling the organizations to take a look at their structures. No matter which organizational structure is finally selected, formal channels must be developed so that people have a clear explanation of the authority, responsibility and accountability necessary for the work to proceed (Kerzner, 2003).

Fig 1 : Functional (Classical) Structure

In this kind of structure according to Weber, positions are arranged in a pyramidal hierarchy.



Authority increase as one climbs the organizational ladder, which characterizes general bureaucracy (Robbins, 1983). According to Kerzner, the advantages and disadvantages of the classical structure are:-

Advantages

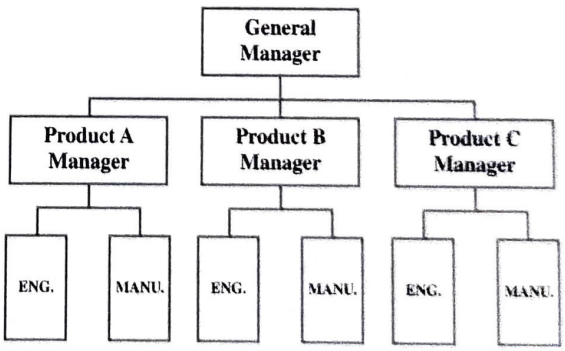
- Easier budgeting and cost control are available
- Better technical control with respect to knowledge and responsibility sharing
- Communication flows in a vertical pattern
- Quick reaction capability
- Flexibility in the use of manpower
- Clearly defined and understandable policies, procedures and lines of responsibility
- Better control over personnel

Disadvantages

- Responsibility accounting is less as no one individual is directly responsible
- No customer focal point
- Complex coordination, with additional time required for approval decisions
- Decreased motivation and innovation

Fig 2 : Pure Project Organization Structure

A pure project organization is separate from the parent system. It is a self contained unit with its



own technical staff, administration, and tied to the parent organization only by periodic reports and oversight. If projects flow continuously than work is stable and conflicts are at minimum level. The most important benefit of this type of structure is that individual maintains complete authority over the whole project (Kerzner, 2003). Pure project organization structure has strong communication abilities that result in a very quick reaction time.

The major problem of this kind of structure is the cost of maintaining the organization. As compared to traditional structure, pure project structure keeps activities on schedule with fast reaction times. But the technology is not as well developed as in the traditional structure because of the lack of strong functional groups which create technical communication in the company.

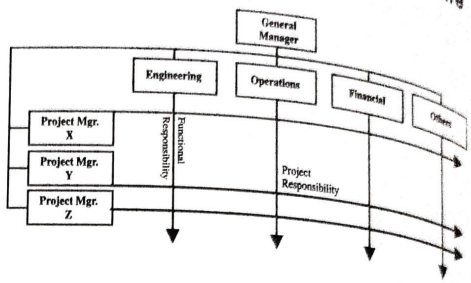
Advantages

- Provides complete line authority over the project
- Strong communication ability
- Very fast reaction times
- More time is available for upper-level management for executive decision making
- Unprofitable product line can be determined and eliminated easily
- A focal point develops for outside company customer relations
- As the unit size is smaller there is lot of scope for interface management

Disadvantages

- The cost is high to maintain this kind of form in terms of effort, facilities and personnel in companies with multiple product lines.
- Technical interchange between projects is not possible
- Technology suffers because of the lack of the strong functional groups
- A lot of effort on the side of upper-level management is needed to balance the workloads as projects start up and phase out, especially in terms of the controlling the facilities and equipment

Fig 3 : Matrix of Organizational Structure



A Matrix structure organisation contains teams of people created from various sections of the business. These teams will be created for the purposes of a specific project and will be led by a project manager. This kind of structure is developed to combine the advantages of the two types of forms, pure functional structure and the pure project structure.

Warren G. Bennis defines a matrix structure as follows, "a rapidly changing adaptive, temporary system organized around problems to be solved by groups of relative strangers with diverse professional skills." This form of structure has the characteristics of low complexity, low formalization, and decentralized decision making. It has a high degree of horizontal differentiation based on formal training. The most important strength of the matrix structure is the ability to respond rapidly to changes in the environment.

"For a matrix to function, mutual coordination and cooperation are critical factors" (Mukherji, 2002). Thus, these organizations act like project teams. They are basically, organic with little formalization. This kind of structure eliminates

almost all of the disadvantages of the traditional structure.

According to Harold Kerzner, the advantages of the matrix structure are listed as follows;

- The project manager has maximum control of the project resources, including cost and personnel.
- For each project, policies and procedures are developed independently.
- A strong technical base can be developed, and much more time can be directed to complex problem-solving.
- There is a better balance between cost, time, and performance.
- There is a fast development of specialists and generalists.
- Authority and responsibility are shared among all.
- Quick responses are available for changes, inconsistency resolution, and project needs.
- The functional groups stand mainly as support for the project.
- Due to the sharing of key people, the program cost in minimized, People can work on different problems, thus better control on people is possible.

Disadvantages

- Multidimensional information and work flow
- Double reporting
- Constantly changing priorities
- Difference between management goals and project goals is high
- Difficulty in monitoring and controlling
- Every project organization works independently. Thus, duplication of efforts does not exist
- Compared to the traditional structure, more time and effort are necessary to define policies and procedures.
- Possibility of functional manager being biased of their own priorities
- Balance between organizations and between times, cost, and performance must be monitored.
- Because of dual reporting people do not feel that they have any control over their own career graph

EFFECTS OF ORGANIZATIONAL STRUCTURE ON ERP IMPLEMENTATION

According to a research conducted by Murat Colak B.S.(2004), the following results were obtained when the three structures; functional, project and matrix structures were analysed for ascertaining the best possible structure option for smooth and successful implementation of ERP. The following results were found.

Table 1

Functional	Matrix	Project Structure	Success Factor
L (L)	H (H)	M (M)	Flexibility
No Relationship			Having the proper tools
L (L)	H (H)	M (M)	Integration
H (H)	M (L)	L (M)	Standardization
No Relationship			Ease of use of the ERP modules
No Relationship			Reporting
L (M)	H (L)	M (H)	Satisfy customer demands
No Relationship			Implementation time
M (M)	H (H)	L (L)	Total Success of the implementation

(*) Expected outcome based on literature study

There are three different perspectives that influence ERP implementation success namely organizational flexibility, organizational fit, and informational power (Wall and Seifert ,2002).

According to Wall and Seifert, "organizational structure appears to be an influence factor on the ERP system success in so far as structure influences the flexibility and innovative ability of an organization." It can be inferred from this that organic structures allow a greater capacity for independence, show a creative direction of information flow as well as a small importance of

formalization and programming. This may allow organizations to deal better with the changes brought about by the implementation of ERP.

Dahlgren stresses that organizational structure has a defining role on how information flows within an organization and, as a consequence, how well processes are performed and resources are spent. Formal organizational structures affect the organization success to a high degree. The nature of organizations determines their activities, the information support they need, the type of information system they use and the speed of information assimilation and dissemination.

The availability of quick responses to changes and the project needs makes the Matrix structure more powerful than the other two organizational structures. Impossible technical interchange and lack of strong functional groups in the Pure Project organizations makes flexibility a problem especially for handling the technical part of the projects. Functional structures have a complex coordination system which adds additional time of approvals which makes the projects go more slowly compared to the other two organizational structures.

Business process integration is achieved at high levels in matrix structures. Other structure types, the Pure Project structure and Functional structure, have lower levels of success.

Standardization is best achieved with the Functional structure with the help of easily defined and understandable policies and procedures. Hierarchical structures are characterised by standardization. High formalization with strict rules and procedures guaranteeing uniformity makes the implementation of the ERP systems easy and effective in terms of the business process standardization. Most of the time, ERP system implementation requires business processreengineering, data transformations, and redefining the old data. The Functional structure due to standardization has more advantage than the matrix structure as the matrix structures are very flexible. It can be derived when the flexibility increase, the standardization decreases.

BHILAI STEEL PLANT: ORGANIZATION PROFILE

Seven - time winner of Prime Minister's Trophy for best Integrated Steel Plant in the country, Bhilai Steel Plant (BSP) is India's sole producer of rails and heavy steel plates and major producer of structural. The plant is the sole supplier of the country's longest rail tracks of 260 metres. With an annual production capacity of 3.153 MT of saleable steel, the plant also specializes in other products such as wire rods and merchant products. Since BSP is accredited with ISO 9001:2000 Quality Management System Standard, all saleable products of Bhilai Steel Plant come under the ISO umbrella. At Bhilai IS0:14001 have been awarded for Environment Management System in the Plant, Township and Dalli Mines. It is the only steel plant to get certification in all these areas. The Plant is accredited with SA: 8000 certification for social accountability and the OHSAS-18001 certification for Occupational health and safety. These internationally recognised certifications add value to Bhilai's products and helps create a place among the best organisations in the steel industry.

Table 2

PRODUCT-MIX	TONNES/ANNUM
Semis	5,33,000
Rail & Heavy Structural	7,50,000
Merchant Products (Angles, Channels, Round & TMT bars)	5,00,000
Wire Rods (TMT, Plain & Ribbed)	4,20,000
Plates (up to 3600 mm wide)	9,50,000
Total Saleable steel	31,53,000

RESEARCH METHODOLOGY

Objectives: A study was undertaken in Bhilai Steel plant

1. To find out the present structure of BSP and
2. To evaluate whether the present structure will help implementing ERP successfully or not in BSP.

The structure was evaluated on the basis of the five parameters for successful implementation of ERP, namely- flexibility, integration, standardization, reporting and implementation time.

Flexibility – Whether the structure facilitates the organization's capability to respond to significant and unpredictable changes.

Integration – Does the structure allows keeping information in one software system and facilitates communication with other available systems?

Standardization – Does the structure allow using standardised rules and procedures?

Reporting – How does the structure help to achieve completeness and effectiveness of reporting.

Implementation time – Whether the structure will help to implement the system according to the planned time or not.

Simple random sampling was undertaken on five major departments namely, materials management, plant maintenance, purchase, finance and quality management of Bhilai Steel Plant. These departments were taken into account because these are the departments where the different modules of ERP are being implemented.

The strength of these departments is as follows:

Materials Management – 141, Marketing & SP – 18, Production Planning – 58, Finance & Accounts – 125, Research & Control Lab – 104

The respondents were picked on the basis of their personal numbers.

Sampling unit: The people who had completed 20 years in the steel plant (in the above mentioned departments) were considered. Out of the total 475 executives in the five departments into consideration, only 80 officers fitted the criteria.

Sample size : 30 Executives.

Data Collection Period: During implementation of ERP.

Statistical Instruments Used: Single factor ANOVA to test whether the 6 parameters are significantly different or not.

Variables :

Flexibility (x_1), Integration (x_2) Standardization (x_3) Reporting - (x_4)

Implementation time (x_5)

Level of Significance : 5%

Hypothesis

H0 : There is no significant difference among all the dimensions of the organization structure as opined by the employees

H1 : There is a significant difference among all the dimensions of the organization structure as opined by the employees

Findings : It was found that in Bhilai Steel Plant there are some departments where functional structures exist where as in some departments matrix structures are also prevalent.

Table 3

Functional Structure	Matrix	Success factor
Low	High	Flexibility
High	Low	Integration
High	Low	Standardization
Low	High	Reporting
High	Medium	Implementation

Table 4

Dimension	x_1	x_2	x_3	x_4	x_5
Mean	6.43	7.13	5.87	6.40	5.37
SD	1.58	1.71	1.02	2.51	2.07

Table 5 : Summary

Groups	Count	Sum	Average	Variance
X_1	30	193	6.43	2.598850575
X_2	30	214	7.13	3.016091954
X_3	30	176	5.87	.085057471
X_4	30	192	6.4	6.524137931
X_5	30	161	5.37	4.447126437

Table 6 : Anova

Source of Variation	SS	df	MS	F	F crit
Between Groups	52.428	4	13.107	3.663400128	2.37
Within Groups	518.78444	145	3.577823755		
Total	571.21244	149			

Conclusion : H0 is rejected

Inference : One or few of the dimensions of organization structure are significantly different from the other ones.

RESEARCH FINDINGS

Two factors are below the assumed average 6.0, namely, integration and implementation time. This is positive as the higher the integration the lesser the flexibility. The implementation time is less which means that the current structure of BSP is conducive for the successful implementation of ERP. There is a possibility of other factors like training, resistance, decision making hindering the implementation as the cutoff date has been extended many a times.

CONCLUSION

The literature review reveals that the best suited structure for ERP implementation is matrix structure. The study in BSP revealed that in some parts of the organization the structure is similar to the functional form where as largely the structure is matrix. Hence, in those areas where the matrix form exists it is appears that the acceptance of the new system is relatively easy but in other areas also the degree of functional structures is comparatively less and hence are not serving as deterrents but conducive for successful implementation of change.

SUGGESTIONS

In order to ensure that BSP is able to accomplish it's objectives and is able to harness the benefits of ERP through full, timely and complete implementation, there is an urgent need to pay attention to other aspects like proper end user training, addressing resistance, and quick decision making to help successful implementation of ERP. For this, the management needs to empower the functional departments to take decisions at their level. Moreover, the bureaucratic culture needs to be simplified so as to facilitate easy flow of communication and availability of information to one and all concerned. The management should also pay due importance to resistance by proper change management programmes and proper training programmes.

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