

Analyzing Progress And Success Factors For ERP Implementation In Indian Power Industry - A Case Study On HPPCL

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Abstract

*Organizations worldwide have been exploring ways to improve business practices to gain competitive edge. One of the most important technological innovations of the last decade has been the emergence of ERP solutions. But implementation of ERP is not just a technological challenge. It's a socio-technological endeavour, which mandates modifying existing applications and redesigning critical business processes to facilitate ERP implementation. Hence, there are organizational and cultural issues, which determine the success of ERP implementation. The main objective of implementing an ERP system is to integrate the organizations business processes and operations for improved business results. But not all organizations have been successful in the ERP implementation. The aim of this paper is to understand the importance of Critical Success Factor for ERP Implementation in **Himachal Pradesh Power Corporation (HPPCL)**. Then, the paper develops an information system success model to analyze the relationships between factors and success indicators. Finally, the paper provides recommendations for successful ERP systems based on the analysis. The derived success factors should help senior managers to make better decisions and improve their business value by implementing the most effective ERP systems.*

Keywords: Critical Success Factor, Business Excellence Models, Strategy implementation, Enterprise Resource Planning (ERP)

1. Introduction

ERP is an integrated set of software modules linked to a common database, handling basic corporate functions. It attempts to integrate all departments and functions across a company into a single computer

system that serves different departments particular needs such as planning, manufacturing, accounting, distribution, sales, human resource, inventory management, service and maintenance, transportation and e-business. ERP can be viewed as a software solution that addresses the enterprise needs taking the process view of the organization, to meet the organizational goals tightly integrating all functions of an enterprise.

Enterprise resource planning systems, also called enterprise systems (ES) are among the most important business information technologies that emerged during the last decade. While no two industries' ERP systems are the same, the basic concept of ERP systems is focused on standardization and synchronization of information, and as a result, improved efficiency.

ERP systems differ qualitatively from prior large scale Information Technology (IT) implementations in three ways :

- 1) ERP impacts the whole organization,
- 2) Employees may be learning new business processes in addition to new software, and
- 3) ERP is often a business led initiative, rather than IT led.

In the context of ERP project implementation, challenges represent major pitfalls which, if not addressed, may cause the failure of a project. Therefore, it is important to understand the real-life implementations, problems and related scenarios in detail.

The objective of this study was to identify and analyze critical factors that need to be considered to ensure successful ERP system implementation for the Power Industry. This paper identifies the factors associated

with the success and failure of ERP systems, and provides indicators to evaluate the success of such systems. The paper develops a model to analyze the relationships between factors and success indicators. Finally, the paper provides recommendations for the success of ERP systems based on the analysis of these factors. By identifying and analyzing ERP system implementation success factors that are essential for power industry, this study will help senior managers and IT managers make better decisions when considering ERP systems in their organization.

2. Case Study

2.1 Background of the Company

Himachal Pradesh Power Corporation Limited (HPPCL), was incorporated in December 2006 under the Companies Act 1956, with the objective to plan, promote and organize the development of all aspects of hydroelectric power on behalf of Himachal Pradesh State Government (GoHP) and Himachal Pradesh State Electricity Board (HPSEB) in Himachal Pradesh. The GoHP has a 60% and HPSEB a 40% shareholding in HPPCL. HPPCL is a fast upcoming power generating utility with all the technical and organizational capabilities at par with other generating companies like NTPC, NHPC etc.

2.2 Hydel Projects for Implementation

HPPCL currently executing following hydel projects :

(1) Sainj HEP , (2) Renukaji Dam , (3) Sawra Kuddu HEP , (4) Integrated Kashang HEP , (5) Shongtong Karcham HEP , (6) Chirgaon Majhgaon HEP, (7) Thana Palun and Nichli Brrri , (8) Surgani Sundla HEP .

HPPCL, apart from Hydro Power Development, intends to diversify its Power Development activities in other areas such as Thermal, renewable sources of energy mainly solar power etc. with a basic idea to have a long term Corporate Plan for planned implementation of Power Projects to meet the growing energy demand, ensuring environment and ecological balance for contributing towards the progress and prosperity of the State. For this HPPCL is to meet the challenges of dynamically transforming business and environment to build a sustainable relationship with the stakeholders for maximum benefits and economic growth by achieving performance excellence.

Mission: Development and prosperity in Himachal Pradesh through Power generation.

Aim: To come up as a major power generating company of India with good managerial and technical capabilities.

Target: To develop 3000 MW Power generating capacity by Mar 2017 and; 5000 MW by the year 2022.

2.3 Implementation Of ERP-SAP IN HPPCL

HPPCL has successfully launched Seven modules of ERP SAP (Systems Applications and Products in Data Processing) according to Big Bang theory. Sh. Deepak Sanan, Principal Secretary (MPP & Power) Government of Himachal Pradesh, inaugurated On 25-Apr-2012 ERP Go Live of HPPCL at its Corporate Office, Shimla in presence of Sh . K. Sanjay Murthy, Managing Director, HPPCL. With this, HPPCL has gone live with SAP (System Application Programming) ERP at its Corporate Office and Field Offices. All the business functions relating to Human Resource, Finance, Procurement, Monitoring of the project and Quality Management shall be done through Integrated SAP-ERP based on line IT System.

HPPCL has built its own state of art Data Center and secured network links across locations to form the hardware backbone of the ERP. The Data Center is best-in-class infrastructure. All HPPCL employees will be able to remotely connect to this Data Center over secure communication lines and make online transactions using ERP.



Figure –1 Implemented ERP-SAP modules in HPPCL

3. Research Objective

Objective of this research work

1. To identify the most Critical Success Factors for the effective implementation of ERP package.
2. To identify the impact of that most Critical Success Factors within the organisation to avoid any bottlenecks in the effective implementation of ERP package to enhance the production, productivity and effectiveness of the organisation.

4. Research Design

As Yin (1989) mentions, a research design in a case study is a technical plan that attempts to link the beginning and end of a research study, helping the researcher to get from “here” to “there”. There are five important aspects of a research design:

- (1) The study’s questions, (2) Its propositions, if any, (3) Its units of analysis, (4) The logic linking the data to the propositions, and (5) The criteria for interpreting the findings. (Ioannis Ignatiadis- Ph.D. Thesis).

Study -I	Deriving the Base Lines	
	1. Interview	AGM , Sr. Managers and IT staff
	2. Analysis of process & documentation	System handbooks , manuals & internet
	3. Derivation of shortcomings and Problem areas	Selection of critical success factors
Study -II	Detailed Analysis of selected Issues	
	Cross-Organizational Survey involving ERP professional	
Study -III	Analysis of Critical Success Factor	Findings , Conclusions & Implications

Table –1 Research Design

5. Previous Research on Information System Models and Success Factors

Previous studies on user acceptance models for information systems (IS) are helpful in understanding the success of ERP system adoption. This study is based on two models related to IS acceptance, which are the technology acceptance model (Davis 1986) and the DeLone and McLean (DM) IS success model (DeLone and McLean 1992). Previous research on project management success factors are also reviewed to identify the factors that affect ERP implementation project.

5.1 Technology Acceptance Model

Davis (1986) introduced the technology acceptance model (TAM), adapting the theory of reasoned action (TRA), specifically modified for modeling user acceptance of information systems. The goal of TAM is to explain the determinants of computer acceptance related to user behavior across a broad range of end user computing technologies and user populations. In addition, TAM provides a basis for tracing the impact of external variables on internal beliefs, attitudes, and intentions (Davis et al. 1989)

The main difference between TRA and TAM is the absence of subjective norm in TAM. Subjective norm is defined as “the person’s perception that most people who are important to him think he should or should not perform the behavior in question” (Fishbein and Ajzen 1975)

5.2 DeLone and McLean IS Success Model

In recognition of the importance in defining the IS-dependent variables and IS success measures, DeLone and McLean (1992) proposed a taxonomy and an interactive model as a framework for organizing the concept of IS success. They defined six major dimensions of IS success—system quality, information quality, use, user satisfaction, individual impact, and organizational impact.

5.3 Project Management Success Factors for ERP Implementation

Ferratt et al.(2006) grouped the best practice questions together forming four success factors for ERP implementation as follows:

1. Top-management support, planning, training, and team contributions
2. Software-selection efforts
3. Information-system area participation and
4. Consulting capability and support.

Ferratt et al. (2006) validated these success factors through the empirical study of ERP projects. They also provided five outcome questions, which were shown to be significantly correlated and, therefore, should be combined to form a single outcome factor, effectiveness. Their regression analysis showed that all the success factors can affect outcomes significantly, and we include the factors in a study of ERP implementation (Ferratt et al. 2006).

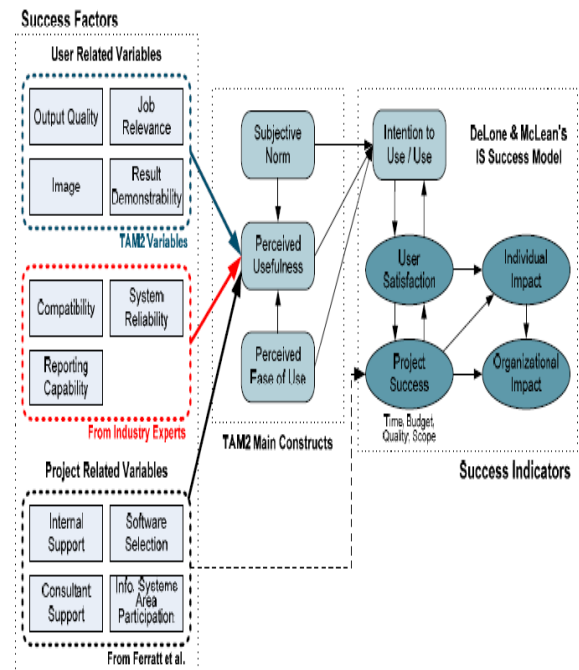


Figure-2 Shows a proposed conceptual ERP success model.

6. Conceptual ERP Success Model

As discussed in the previous sections, the success of ERP systems can be classified into two categories; the success of ERP adoption and the success of ERP implementation. For successful ERP adoption, this study adopts user acceptance models for IS, TAM, and DM IS success model as the starting point. The model hypothesizes the rationale for the relationships among variables based on these combined theoretical backgrounds and incorporates three main dimensions related to the success of ERP systems: success factors, intermediate constructs, and success indicators.

The model also considers the success of ERP implementation based on the reviews on the fundamentals of project management. The project management related success factors suggested by Ferratt et al. (2006) are included in the model. This research hypothesizes that these project management related factors directly affect perceived usefulness, which lead to ERP success or failure.

7. Data Collection and Analysis

Past studies have identified a variety of CSFs for ERP implementation, among which context related factors inconsistently appear. The case study approach attempts to capture and communicate the reality of particular surroundings at a point in time (Jenkins, 1985). According to Walsham (1995) in the case of an outside observer in interpretive case studies, interviews are the primary data sources, since this is the best way to access the interpretations and views of the respondents.

In interpretive study the data collected are mostly qualitative. If the interviews are too closely directed, important data may be lost, and hence the richness of interpretation which is very important in interpretive case studies is lost. On the other hand, over submissive, i.e. by not offering the researcher's own ideas or by not prompting with questions following a new direction taken by the interviewee, may lead to the conclusion by the interviewees that (1) the researcher is not interested in interview, (2)The researcher has no vision of his/her own regarding the subject in question.

Regarding recording of interviews, Walsham (1995) stated that tape-recording interviews can provide a full transcript of what was said, interview subjects may be reserved on the sight of a tape-recorder regarding

sensitive or confidential material. The disadvantage of full tape-recording is the time needed to write down the interviews or to extract something meaningful out of them. The alternative to tape-recording is to make a widespread note during the interview and to write them up fully as soon as possible after the interview. The data for this research are purely qualitative, collected by means of semi-structured interviews. The interviewees were asked some open-ended questions according to written interview guidance notes, but they were free to elaborate on their own thoughts.

The interviewees in HPPCL were selected according to their degree of involvement with the ERP system, as well as selecting a cross-section of users and managers from various departments. The interview questions have been based on determining the CSFs in Implementation of ERP, SAP, and the executives of HPPCL were free to ask some questions and answer the selected questions.

Somers and Nelson, have proposed a comprehensive list of 22 CSF's, associated with project/system implementation derived through a process that involved identification and synthesis of critical requirements recommended by practioners and academicians. The mean for the 22 CSFs in descending order of importance (5=critical, 4=very high, 3=high, 2=moderate and 1=low) is given below

Critical Success Factor	Mean
1. Top Management Support	4.29
2. Project Team Competence	4.20
3. Interdepartmental Cooperation	4.19
4. Clear Goals and Objectives	4.15
5. Project Management	4.13
6. Interdepartmental Communication	4.09
7. Management of Expectations	4.06
8. Project Champion	4.03
9. Vendor Support	4.03
10. Careful package selection	3.89
11. Data Analysis & Conversion	3.83
12. Dedicated Resources	3.81
13. Use of Steering Committee	3.79
14. User Training on software	3.79
15. Education on New Business Process	3.76
16. Business Process Reengineering	3.68
17. Minimal Customization	3.68
18. Architecture Choices	3.44

19. Change Management	3.43
20. Partnership with vendor	3.39
21. Use of Vendor's Tools	3.15
22. Use of Consultants	2.90

Table-2: Mean rankings of CSFs by degree of importance in ERP implementation

Source: Somers and Nelson, 2001

8. Conclusion

The most CSFs identified by executives in Department of personnel , Finance , Civil , Electrical & IT and considered significant for the success of ERP implementation in HPPCL Corporate Office and Field Office is tabulated in table no.-3(Appendix-A). This describes the weightage of Critical Success Factors.

As per above available data from the HPPCL Corporate Office , among top ten vital Critical Success Factor namely Top Management, Change management, Vendor support, User training and Education, Customization, Careful package selection, Project team competence, Business Process Reengineering, Use of consultants and Interdepartmental communication and cooperation , Change Management was mostly emphasized by the executives.

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Appendix –A

S.No.	Critical Success Factor	Executives							Rank
		1	2	3	4	5	6	AVE in %	
1	Top Management Support	100	100	90	90	100	95	95.83	2 nd
2	Change Management	100	100	100	100	95	100	99.17	1st
3	Vendor Support	90	100	90	100	100	95	95.83	3 rd
4	User Training and Education	95	90	95	90	95	90	92.50	6 th
5	Customization	95	90	95	80	90	90	90.00	8 th
6	Careful Package Selection	100	90	75	90	85	90	88.33	9 th
7	Project Team Competence	100	95	90	95	95	95	95.00	4 th
8	Business Process Re-engineering	90	95	95	95	95	95	94.17	5 th
9	Use of Consultants	80	75	85	75	95	80	81.67	10 th
10	Interdepartmental Communication and Cooperation	85	90	100	90	90	90	90.83	7 th

Table-3 Identified Critical Success Factor's for HPPCL ERP Implementation