



A Study to prioritize issues influencing ERP implementation in Indian SMEs

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ABSTRACT

Enterprise Resource Planning (ERP) is a novel business management system that integrates all facets of business. There is an increasing demand for this system in both developed and developing countries. ERP has widely used in developed countries all over the world to automate the deployment, streamline processes and for achieving process improvement and global competitiveness. Today organizations of any magnitude have implemented or in the process of implementing such systems in order to remain competitive in this global market scenario. Recent trend shows that adoption of ERP is much higher in SME sector. Although ERP systems can bring competitive advantages to organizations, the high failure rate in implementing such systems is a major concern. A number of cases exist where organizations inspite of spending high amount on ERP implementation have not been able to reap any benefits out of it. This paper thus attempts to explore the existing literature to identify and prioritize some success issues leading to positive implementation of ERP in context to Indian small and medium scale enterprises.

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1. Introduction

Enterprise Resource Planning (ERP) have emerged as the core business information systems and the enterprise backbone of organizations. Organizations of any size have implemented and are also in the process of implementing such novel business information systems. ERP is a packaged application consists of standard multifunctional, multi-language, multilegisative software modules that offer integration across an entire organization. Today one of the most mentioned information systems in research and business news is the ERP. Today in this competitive world organization whatever industry it belonged to cannot imagine their business without ERP system. Hardly an organization can be found which is running its business successfully without implementing ERP. In short, ERP can be considered as the snapshot of an organization. Some of the noted benefits that the organizations enjoy after implementing ERP are: Increase efficiency in overall business, improved decision making and planning, better resource utilization, improvement in labor productivity, organizational empowerment, Improvement in financial management, improved flexibility in information generation. There has been a significant growth in the use of ERP systems by small and medium scale enterprises (SMEs).

In recent years ERP vendors are trying to overcome the economic cultural and basic infrastructural barrier related to developing economy. For developing countries like India ERP is in its early stage. The Indian micro small and medium scale enterprises (MSMEs) are eyeing the enterprise system solutions for their business in this changing business scenario. Today Indian SME and MSME sector both have started to adopt the ERP systems. SMEs occupy an important position in any country's economy and constituting as high as 90% of all industries in any country. SMEs are considered as the one of the principal driving forces in the economic development of every nation. The small and medium scale enterprises (SMEs)

constitute an important segment of the Indian economy by contributing around 60% of GDP (Gross Domestic Product).

However implementation of ERP system in industries is quite difficult. While going through the literature it has been come to notice about the failures that the organizations had to go through while implementing such novel information systems (i.e. ERP). Some of the notable failures are Dell, Hershley, and Fox- Meyer. As cases of ERP failures have increased many researchers have to tried to identify some issues that would lead to positive implementation of ERP. This paper thus attempts to identify those factors by capturing the experience of the people who worked for implementation process. This research study has been carried out in Indian SMEs which have already completed the implementation of ERP and few are in the process of implementation.

2. Literature Review

Duchessi et al. identified certain issues related to MRP implementation which includes: Project team composition; Project management; Business plan and vision; Top management support; Effective communication and Change management program and culture [1].

Recently many authors have stressed on critical and important issues affecting ERP implementation which include: ERP teamwork and composition, change management, top management support, project management, BPR, and minimal customization [2, 3].

On the basis of research study with the objective of identifying some critical issues leading to successful implementation of ERP identified some factors which are: top management support, BPR, ERP consultants' role, ERP team composition and Proper training and morale [4].

A research study carried out in micro and small medium scale organizations and on the basis of empirical analysis the researchers identified six critical issues that ensure smooth and

positive impact in implementation of ERP systems. Those identified issues are: Proper goals and objectives of business, User education and training, Project team being competent, Change management, Assistance from vendor, External consultants role [5].

Poonam Garg. identified and validated the critical success factors empirically for ensuring successful implementation of ERP packages in the context of retail industry in India. The identified Top management commitment, Product selection, Project management, Team composition and Training and education are considered as the most important issues [6]

A research study carried out in Indian small and medium scale enterprises by Basu et al. revealed some most influencing critical factors leading to successful implementation of ERP which includes: User knowledge, ERP importance, Interdepartmental communication, Proper selection of package, ERP team composition, Project champion [7].

3. Research Objective and Methodology

On the basis of review of literature 16 issues have been identified and on further investigations 10 issues have been taken into consideration and for further analysis. This study attempts to identify critical success issues that organizations should focus and need to have careful attention. Critical success factors refer to "the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department, or organization". Here the critical issues identified (as alternatives) are: Proper 1. business plan and vision, ERP team composition, Top management support, Project management, Change management, BPR, Proper education and training, Interdepartmental communication, Vendor support, Role of 2. external consultants. The basic aim of this paper is to identify the important issues for the explanation of success leading to ERP implementation smoothly without any disruption and to prioritize the issues against the benefit criteria by applying 3. Weighted Score Method (WSM).

The researchers in this study identified and developed a questionnaire based on 10 issues. In this research a survey based on WSM is carried out in Indian manufacturing companies which are SME in nature. During the questionnaire survey it had been observed that such organizations are reaping more or less the same benefits as mentioned earlier in the literature on benefits reaping by the companies after implementing such systems. In this research study a questionnaire based on 9 point scale is developed where "1" meant strongly disagreed and "9" meant extremely agreed. During the questionnaire survey it has been observed that the organizations are deriving the benefits as mentioned more or less in the literature. Those identified benefits are: Overall increase in business efficiency (C1), improved decision and planning (C2), better resource utilization (C3), improvement in labor productivity (C4), organizational empowerment (C5) and improved flexibility in information generation (C6) [8,9,10,11,12,13,14,15,16]. The target respondents in each organizations were EDP manager, IT manager, CIO and other officials who are directly or indirectly involved in the implementation of ERP. Overall 45 responses have been taken for analysis. It was deliberate attempt on the part of the researcher not to collect any response in his presence in order to reduce any chance of biasness.

After forming a decision hierarchy the weights of the criteria to be used in evaluation process are calculated by using AHP method. In this phase, the experts in the team are given the

task of forming individual pair wise comparison matrix as per the scale. The results obtained from computations based on the pair wise comparison matrix presented in Table 1.

From the above table it can be seen that consistency ratio of the pair wise comparison matrix is calculated as 0.05 which is less than 0.01 (<10%) so the weights are found to be consistent and can be used for further analysis of this research.

4. Weighted Score Method (WSM)

Weighted score method is a multi – criteria decision making tool and is commonly used approach in selection of IS projects selection. WSM is used when it is necessary to make a complex evaluation based on number of criteria of differing importance. This approach involves assigning a relative weighting to each desirable criterion based on relative importance and allocating a score to each alternative for each criterion. The weighted score for each alternative is calculated by the following formula and the one with highest score is selected.

$$\text{Score}_a = \sum_{j=1}^n (\text{Weight}_j \times \text{Score}_{aj})$$

Where, subscript represent an alternative and n represent represents the total number of criteria.

WSM can be regarded as an effective tool while dealing with complicated requirements and can be greatly found effective in the selection of a preferred supplier when the weighted scores are being distributed widely [17].

5. Results

We take the ten issues as mentioned earlier as alternatives and Criteria as C1, C2, C3, C4, C5, and C6. We do the ranking as per WSM methodology as follows:

6. Findings:

From the above table we have found the scoring of each alternatives (issues) and thus accordingly we prioritized and ranked the following issues.

7. Conclusion

The research study put forward some issues of critical importance. The prioritized issues must be given careful attention so as to run the ERP systems smoothly without any disruption. The study provided a partial support and guideline for the explanation of success in implementing ERP projects in micro, small & medium scale organizations. To implement any information system is a complex task and hence ERP environment present several challenges. The outcome of this research study holds good for any organizations of MSME sector which wishes to integrate benefits of business processes in an organization.

For future study the researchers can use other MCDM tools to prioritize the issues by extending number of respondents and by taking different industries into consideration.

References

1. Duchessi, P., Schaninger, C., Hobbs, D., & Pentak, L. (1988). Determinants of success in implementing material requirements planning (MRP). *Manufacturing and Operations Management*, 1, pp. 263-304.
2. Nah, F.F., Zuckweiler, K.M. and Lau, J.L. (2003). ERP Implementation: Chief Information Officers' Perceptions of Critical Success Factors. *International Journal of Human-Computer Interaction* 16(1) 5-22.
3. Al-Mashari, M., Al-Mudimigh, A. & Zairi, M., (2003). Enterprise resource planning: taxonomy of critical factors, *European Journal of Operational Research*, 146, pp. 352-364.

4. Bingi, P., Sharma, M.K. and Godla, J., 1999. "Critical issues affecting an ERP implementation", *Information Systems Management*, pp. 7-14.
5. Upadhyay P., and Dan, P.K., (2008). "An explorative study to identify the Critical Success Factors for ERP implementation in Indian small and medium scale enterprises", International Conference on Information Technology, IEEE, ISBN: 978-1-4244-3745-0
6. Garg, P. (2010). Critical success factors for enterprise resource planning implementation in Indian retail industry: An exploratory study. *International Journal of Computer Science and Information Security*, 8(2), pp. 358-363.
7. Basu, R., Upadhyay, P., Dan, P.K. (2011). Factors influencing ERP implementation in Indian SMEs: An empirical analysis, *Management Science Letters*, Vol1, Issue2, pp 89 - 98.
8. Shang S., Seddon P. (2000). "A Comprehensive Framework for Classifying the Benefits of ERP Systems". *Proceedings of the 6th Americas Conference on Information Systems*. Long Beach California, USA.
9. Gupta A. (2000). "Enterprise Resource Planning: the Emerging Organisational Value Systems". *Industrial Management and Data System*, 100(3): pp. 114-118.
10. Ahmed S.A., Ahmad I., Azhar S. and Mallikarjuna S. (2003). "Implementation of Enterprise Resource Planning (ERP) Systems in the Construction Industry", *Proceedings of the 37th International Conference on System Sciences*. Hawaii. USA.
11. Mabert V., Soni. A. and Venkataramanan M.A., (2003). "Enterprise Resource Planning: Managing the Implementation Process". *European Journal of Operation Research*, Vol. 146(2): pp. 302-314
12. Shanks G., Seddon P. and Willcocks L. (2003). "*Second-Wave Enterprise Resource Planning Systems*". Cambridge University Press. Cambridge
13. Spathis C. and Constantinides S., (2003). "The Usefulness of ERP Systems for Effective Management". *Industrial Management and Data Systems*, 103(9): pp. 677-685.
14. Gupta O., Priyadarshini K., Massoud S. and Agrawal S.K. (2004). "Enterprise Resource Planning: A case of a Blood Bank", *Industrial Management and Data System*, 104(7): pp. 589-603.
15. Shehab E.M., Sharp M.W., Supramaniam L. and Spedding T.A. (2004). 'Enterprise Resource Planning: An Integrative Review'. *Business Process Management Journal*, 10(4): pp. 359-386
16. Hawking P., Stein, A. and Foster S. (2004). 'Revisiting ERP Systems: Benefit Realisation'. *Proceedings of the 37th International Conference on System Sciences*. Hawaii. USA
17. Kontio, J. (1996), "A Case Study in Applying a Systematic Method for COTS Selection", *IEEE Proceedings of ICSE-18*, pp. 201-209.

Table 1. Weightage of Criteria on the basis of AHP Results

Criteria	Weights (w)	λ_{\max}	Consistency index (CI)	Relative Consistency Index (RI)	Consistency Ratio (CR)
C1	0.08	6.34	0.07	1.24	0.05
C2	0.3				
C3	0.09				
C4	0.25				
C5	0.2				
C6	0.13				

Table 2. Results of WSM

Alternatives	Criteria						Score	Rank
	C1	C2	C3	C4	C5	C6		
Proper business plan and vision	8.57	6.95	8.68	7.7	6.09	6.9	7.59	2
Change management	7.54	6.98	6.76	7	5.45	8.23	6.73	5
Vendor support	7.43	4.73	3.73	6.53	3.53	3.6	5.15	8
ERP team composition	8.88	8.45	3.93	6.33	3.6	5.96	6.68	6
Proper education & training	8.53	6.9	6.76	8.56	5.4	8.23	7.65	1
ERP Consultant	3.43	2.87	2.66	4.21	6	6.12	4.42	9
Interdepartmental communication	5.96	2.83	2.2	2.5	2.73	6.73	3.57	10
Project management	7.45	8.21	4.32	3.89	2.78	8.5	6.08	7
Top management support	6.86	6.33	3.33	7.76	6	7.6	6.88	3
Business process change	5.7	6.4	3.7	7.4	5.6	7.8	6.78	4

From the above table we have found the scoring of each alternatives (issues) and thus accordingly we prioritized and ranked the following issues.

Alternatives (Issues)	Score	Priority / Rank
Proper education & training	7.65	1
Proper business plan and vision	7.59	2
Top management support	6.88	3
Business process change	6.78	4
Change management	6.73	5
ERP team composition	6.68	6
Project management	6.08	7
Vendor support	5.15	8
ERP Consultant	4.42	9
Interdepartmental communication	3.57	10