

TO STUDY THE FACTORS AFFECTING THE ERP IMPLEMENTATION PROJECT: ERP CONSULTANTS PERSPECTIVE

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Abstract:

Purpose: The Purpose of this study is to understand the several factors which affect the ERP project Implementation within the industries. Though ERP Systems have made business organization functions smooth but the ERP systems implementation project are not smooth, as the success rate is very less. Hence, we are studying the various challenges faced during the ERP project implementation.

The Literature Review was done to define the Critical success factors for ERP Implementation. Data was collected through Questionnaires from the Technical and Functional consultants working in various industry having experienced and Contributed in the ERP Implementation project. The Study in this paper highlights four factors out of the many factors which contribute to the success of ERP implementation as per the ERP consultants.

Keywords: ERP, ERP implementation, Critical success factors of ERP, Project, ERP Project Management, Project management.

1. Introduction:

ERP or enterprise resource planning is a software solution making life easier for large businesses, dealing with humongous data and supply chains in the world. To rightly define ERP systems in the layman terms, it is a place where all the data of an organization be can be centrally accessed and worked upon. We can say it's a database or collection of databases which helps all the modules of a business to interact with each other, supported by a user interface to do so.

When talking about the ERP systems in the business world, it is highly sought-after information system for its ability to unite various modules together and help generate a simpler picture of complex business in the real time scenario (Hilletoth, 2017). So, all the information could be accessed by various departments of the companies like Purchasing, Sales, Planning, Human Resource, CRM, SRM, Finance, Inventory management and much more. There are countless number of ERP software available in the market to name a few like Oracle ERP, JD EDWARDS, SAP S4 HANA, SAP ERP, SAP ECC, Sage Intacct etc. companies can select any of these with respect to their needs, functionalities and budget. ERP systems can actually expand the efficiency of management decision-making process and operations planning by increasing the flexibility to

react to changes in business needs (Zheng, 2000). This is often done by integrating key business activities at all levels to achieve a competitive advantage over others (Al-Mudimigh, 2001). But ERP Implementation is a gigantic task with huge investment of money, time and resources to bring it all together. Many big organizations have failed miserably and the business have shattered for not able to implement the same successfully for it being complex, expensive and very laborious task to be achieved (Huang, 2004). Hence choosing a right ERP System catering to the needs of the organization and then implementing it successfully is a very intricate Objective for any organization. The failure rate can be as high as around 60%. All around the world, it is still a discussion to find various factors that can be focused to increase the success rate of the ERP implementation project.

2.Literature Review:

2.1 ERP Implementation life cycle:

ERP Implementation Life cycle focuses on the ERP processes which is applied to make the ERP systems functional and working for the organizations. Like Any other projects, ERP Projects also undergoes various stages. Various phases of ERP lifecycle are:

ERP Decision Phase: This Phase deals with the question of why ERP systems is need and to address what challenges of the business and how it can be beneficial to the organizations.

ERP Acquisition phase: This is phase where selection of the right ERP system of the organization is done, out of the many ERP systems present in the market. This is done on the basis of, what is company allocated budget estimation, how much customization is required, or much labor will be needed to install the system and what amount of time period is need for the same.

ERP Testing and Implementation Phase: This is the phase which is achieved with the help of ERP consultants competent in the ERP systems. It can be simply explained as rolling out of the systems into the business. It deals with providing an action plan for implementing the ERP system, then the application of the software package, users training and finally the execution process (Flávia Campos Fernandes Leandro¹, 2017).

ERP maintenance Phase: In this phase once the system has been rolled out, the system is checked for any disruptions, defects and whether the systems are producing the desired results of what it is expected of and then the changes are done accordingly. In the Maintenance phase, one must know the business process scenario, functionality and the usability to make corrections.

ERP evolution Phase: As the business grows, there can be need of much more capabilities and functionalities in the system with the evolving times. This phase works on enhancing the current capabilities to the new requirements of the business organizations.

ERP Retirement Phase: This is the phase when the current technology becomes obsolete to the new challenges or the need of the organization or there is some better technology in the market offering much better solutions. Then the company may take the decision to Substitute it with the better one and retire the same. (Jose M. Esteves, 1999).

2.2 How ERP benefits in businesses and supply chain management:

Several Papers and studies have highlighted the enormous advantage of ERP systems in the business organizations to summarize a few:

- In the world of huge data and so much of data, it is essential to get a system which help us store it, process it, access it and also work upon it.
- Every business has different departments which coordinates with each to get the best results. They also need to work interdepend with each other to produce the results which becomes more effective by ERP systems.
- In the decision-making process at any place and at any time we really need to access the real time scenario of the company's business which is again served by ERP.
- Better everyday operations.
- Automate some of the critical yet repetitive functionalities in the organization.
- Smooth Strategic planning through the real time reports and data available on the resources of the company (Dimitrios Maditinos, 2012).

Still there is so much commotion about ERP implementation because, it is a huge investment that any company is making in order to generate revenue out of it. But risking its failure even after spending so much time, money, efforts and resources is not a chance an organization would like to take upon. It's not just that a successful implementation that guarantees what is actually needed by the company. On several occasions, the clients are not satisfied with results of what is implemented and the results obtained. Though it works technically fine but if the people using it find it unsatisfactory to their expectations then it's not worth the money and pain. Hence researchers and consultants are working and analyzing all the aspects and the factors that could help us in implementing a successful ERP system and to reduce the gap between expectations and the reality.

The factors which contributes to the successful ERP Implementation are called Critical success factors. In this paper we will be focusing on the factors which affect the ERP implementation with respect to the ERP consultants. We are working on this because the ERP consultants are the one who work closely with the Clients, they understand their expectations and Business needs. The consultants also understand the Software as they are trained in it and hence, they can well explain the client what all goals can be achieved through the ERP systems and which system can be suitable for their business goals. ERP consultants hence being educated about the software can help the user to get the hang of systems and use it effectively too. So, they are the best people to bridge this gap between the system-client-user. Having being the middle man here they can be the best person to understand what all factors are needed to get the implementation right.

2.3 Project Success criteria:

Many researchers have defined the criteria which can determine the success rate of a project. Some of the factors are time, budget and quality, feasibility, performance and Stake holder's criteria satisfaction. The time period of execution of the project and the commitment to finish the same rarely happens when it comes to Implementation of ERP system. There could be various reasons behind this. Say difference in customer expectation, barrier in communication between the project team members and the customer, Unrealistic goals set by the customer because of lack of knowledge etc. So, a project might be really unique when coming to its results but if not executed on time can be considered unsuccessful. A similar thing is true for Budget. Most of the times the allocated budget overshoots the actual expenses of the ERP project, which is not appreciated when comes to project planning and estimation. Now when it comes to quality, it can be perceived as the reliability of the system and its conformity with the desired standards as per the user specifications and the need. If any of this is not fulfilled, then it is not considered as a

Successful system. If it does not produce the desired results and stands up to the expectation of the customers and hence it is of no use, despite of being of whatsoever high standards and updated technology (Phil Nixon, 2012).

3. Research Methodology:

This Study to analyze different factors of ERP System Implementation project , this study is based on the perspective and experience of the people who have already worked or are currently working in the ERP systems Implementations. The research study is divided into 2 stages: first, Literature review and then Survey Study. The literature review was done by referring the generic papers on the “ERP Implementation”. The keywords used were “CSF for ERP implementation “, “ERP Implementation “, “ERP”, “Concept ERP”, “Project Management”, “ERP Management”. This was done to form a fundamental on which the research can be carried out and to set out the stage for further discussion.

3.1 Measure and Data Collection:

In the Next stage, a Survey was conducted with the help of questionnaires. The sampling Technique used here in the survey is the Purposive sampling technique which is quite understood as we are trying to gage the factors which contributes the most with respect to the people who has already done the real time work in ERP Systems Implementation. We have followed the Criterion Purposive Sampling technique as the criteria for the survey was focused on the views and expectations of ERP consultants who are currently working in any of the various ERP systems in any industry as they are competent of technical knowledge and the Scenario of the ERP systems.

The Questionnaire was divided into 2 stages. The first stage focused on the personal information of the respondents and if they fulfill the criteria of having worked in implementation of ERP systems. The Second stage focused on the responses of the candidates on factors affecting the ERP implementation Project. A five-point Likert scale was used in section 2 of the questionnaire where 1 represented “Strongly Disagree” and 5 represented “Strongly Agree”. The range of scale was used for the ease of understanding as well as give a variety of Scalable response to improve the data analysis.

3.2 Sample of the study:

A total of 236 Respondents participated in the study, who are ERP Functional consultants, ERP Technical consultants, ERP Project Lead, ERP Project Manager, ERP Techno-Functional Consultants from various industries like IT, Manufacturing, Banking, Educational, Health care and Hospitality, Food and beverages, automobile and Finance Sectors. Their experience varied from 0-15 years in the field of ERP Implementation Projects and in various modules of ERP like Purchasing or Material Management, Warehousing, Logistics, Suppliers Relationship Management, Sales and distribution, Human resource Management, ABAP, Process Integration, Planning and Forecasting, supply chain Management, warehouse Management, Production Planning, Planning and Forecasting and finance and accounting. All the respondents have worked for projects in India.

3.3 Factors of the study:

In this Study, the focus is on the chosen 15 variables by studying the literature available regarding the ERP implementation projects. Listing out the 15 factors below:

- Understanding client
- Cross – Competence
- Negotiation Skills
- Motivational Skills.
- Logical Decision Making
- Inclusive Communication
- Project Team Involvement
- Effective Delegation
- Ethical
- Effective Planning
- Time management
- Leadership and Guidance
- Manage Conflict
- Information Sharing
- Work - freedom.

We have chosen Factor Analysis tool to narrow down the major factors out of the many variables. As factor analysis is the data reduction tool which will help in narrowing the factors with utmost importance. we have used the IBM SPSS statistics 21 software for the statistical Analysis. This technique extracts maximum common variance from all variables and puts them into a common score.

4. Data Analysis:

4.1 Reliability and Validity:

Factor Analysis plays a very substantial role in research study. It is a Tool which is used to study the major factors behind out of the many variables impacting the hypothesis, basically a reduction technique from large number of variables to the lower no of variables. It's a Flexible tool that helps us in wide range of research design and to variety of data. The analysis helps to extract covariance from all the considered variables and analyses them to give the variables a common score. Its Mathematical structure is related to commonly used techniques such as multiple regression, variance and analysis of variance. It is thus capable of integrating many of the diverse findings theoretically. In this paper we have taken 15 of the variables are studied using the IBM software, in order to find the suitable factors through factor analysis followed by varimax rotation, which is discussed subsequently.

Also, to check the reliability of the data Cronbach alpha test is also performed on the variables.

4.1.1 Cronbach Alpha – Test of Reliability:

Cronbach Alpha reliability testis performed on the factors. It actually measures the Internal consistency between the items in the scale. So, when we ask questions to the respondents, they are responding to it, ranging from strongly Disagree to Strongly Agree on Likert scale from 1 to 5. so, check the reliability of the response we do this test. As consistency in response of respondents is good.

So here, we put all the factors together and check what is the consistency of measurement in all the factors. Ideally it should be in the range from 0 to 1. The higher the value, higher is the

consistency. Any value more than 0.7 is acceptable value and is appreciated. Please refer below table for the results of this study.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.798	.813	15

Table 1. Cronbach Alpha Test of Reliability.

In this case the Cronbach Alpha value is 0.813 which tells that the strength of internal consistency of the factors is very good. Hence, we can go ahead further with the data analysis.

4.2 Data Analysis of the responses:

The KMO measure of sampling adequacy and the Bartlett's test of Sphericity for judging the appropriateness of factor model. KMO statistic compare the magnitude of observed correlation coefficient with magnitude of partial correlation coefficient. High value of this statistics indicates the appropriateness of factor analysis.

Bartlett's test of sphericity tests hypothesis whether the population and correlation matrix are an identity matrix. The existence of identity matrix puts the correctness of factor analysis under suspicion.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.719
Bartlett's Test of Sphericity	Approx. Chi-Square	1707.988
	Df	105
	Sig.	.000

Table 2: KMO and Bartlett's Test

The above table no.2 shows that, chi square statistics is 1707.015 with degree of freedom 105 and its value is significant at 0.00 level. The table also shows that KMO statistics is computed as 0.719, this value falls in the acceptance region of factor analysis model. The value that is desirable of the KMO statistic should be higher than 0.5. Hence both the results, that is, the KMO statistic and Bartlett's test of sphericity, indicate an appropriate factor analysis model.

4.3 Variance Explained by the Factors:

This indicates the proportion of variance that is explained by each factor. In simpler words, it means out of the various factors here which factors represents the maximum of the total variance. The eigen values of factors are reducing in their magnitude as we move from the factor 1 to 15. In this approach, only factors with eigen values greater than 1.0 are retained; the other factors are not included in the model. An eigenvalue represents the amount of variance associated with the factor. Hence, only factors with a variance greater than 1.0 are included.

The first factor is accounts for the largest variance and also has the highest eigen value and the next factor is accounted with as much of the remaining variance as it can, and so on. The total variance accounted by all 15 factors in 100%.

The total variance accounted by the first 4 factors is 65.334% as shown in the table 2 below. Here the first factor accounts for $(4.598/15) \times 100 = 30.655\%$ of variance.

Second factor accounts for $(2.259/15) \times 100 = 15.061\%$ of variance.

Similarly, the third factor which is third factor is accounted with 12.482% of variance,

And last the fourth factor is accounted with a variance of 7.136%. The next factor's eigen value is less than 1 and hence keeps on reducing so the rest factors are dropped from the study. Since first four factors accounted for a combined variance of 65.334% of the total variance and hence, they are considered. Let us observe the same in the table 2 below.

Total variance Table:

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.598	30.655	30.655	4.598	30.655	30.655
2	2.259	15.061	45.717	2.259	15.061	45.717
3	1.872	12.482	58.198	1.872	12.482	58.198
4	1.070	7.136	65.334	1.070	7.136	65.334
5	.996	6.642	71.977			
6	.824	5.494	77.470			
7	.739	4.924	82.394			
8	.613	4.084	86.478			
9	.513	3.422	89.900			
10	.439	2.928	92.828			
11	.311	2.070	94.898			
12	.275	1.836	96.734			
13	.223	1.485	98.219			
14	.153	1.021	99.240			
15	.114	.760	100.000			

Table 3. Total variance Explained.

The Above table shows the total variance explained by the first four factors is 65.334% which falls under the acceptable range.

4.4 Rotation of the Variables – Component Matrix:

The Varimax Rotation helps in determining what exactly does the components represents. There are various rotations tool available for rotations but varimax rotation method is widely applied for its simplicity and easy to interpret results.

Varimax Rotation Table:

Rotated Component Matrix				
	Component			
	1	2	3	4
UNDERSTANDING_CLIENT	.012	-.140	.678	-.414
CROSSCOMPETENT	.046	.055	.732	-.090
NEGOTIATION_SKILSS	.292	.857	.012	.068
MOTIVATIONAL_SKILLS	.026	.949	.057	-.017
LOGICAL_DECISION_MAKER	.051	.931	.087	-.008
INCLUSIVE_COMMUNICATION	.131	.028	-.227	.698
PROJECT_TEAM_BULDER	.854	.046	.058	.134
EFFECTIVE_DELEGATION	.235	.220	.699	.329
ETHICALITY	.405	.202	.213	.414
EFFECTIVE_PLANNING	.430	.140	.567	.274
TIME_MANAGEMENT	.805	-.003	.249	.074
GUIDANCE	.620	.314	.117	.174
MANAGE_CONFLICT	.789	.090	-.011	.194
INFORMATION_SHARING	.251	.006	.328	.545
WORK_FREEDOM	.132	-.059	-.011	.751

Table 4. Varimax Rotation matrix

The main objective of rotation is to produce a relatively simple structure in which there may be a high factor and a low factor loading on all other factors. In this tableno. 4, we consider all the values which are greater than or equal to 0.7.

The cutoff point is = 0.7. So, the variables which account for high factor loadings that is more than 0.70 are highlighted.

So, from the above table we observe that:

In the Component 1 which is the first factor, the variables with high factor loading are:

Variable Name	Loading value
TEAM BUILDER	0.854
TIME MANAGEMENT	0.805
CONFLICT MANAGEMENT	0.789

Table 4.1 First Factor

In the Component 2 which is the second factor, the variables with high factor loading are:

Variable Name	Loading value
NEGOTIATION SKILSS	0.857
MOTIVATIONAL SKILLS	0.949
LOGICAL DECISION MAKER	0.931

Table 4.2 Second Factor

In the Component 3 which is the third factor, the variables with high factor loading is:

Variable Name	Loading value
CROSS COMPETENCE	0.732

Table 4.3 Third Factor

In the Component 4 which is the fourth factor, the variables with high factor loading is:

Variable Name	Loading value
WORK FREEDOM	0.751

Table 4.4 Fourth factor

4.5 Identification of the Factors:

From the above identified high factor loading variables we can identify the factors. As per the Table 3, we have come to the conclusion that we have 4 factors fulfilling the criteria. The 4 factors are identified as mentioned in the above tables (table 4.1, 4.2,4.3,4.4) and will be named as a constituent of respective loaded variables. These factors are discussed in detail below:

The First factor identified is **Team Planning**. This factor consists of variables as Team Builder, Time management and Conflict Management with loadings 0.854,0.805 and 0.789. This tells us that all the variables are hinting at Team Planning as it will help in optimize the limited time in hand and bring the team to work and collaborate everyone together without any disturbances towards the ERP implementation project.

The second Factor identified as **Leadership Skills**. This factor consists of variable as Negotiation skills, motivation Skills and Logical Decision maker with the loadings as 0.857, 0.949, 0.931 respectively. All the variables are pointing at a strong administrative skill which is a combination of all the variables.

The Third Factor identified is **Knowledge**. This factor consists of a single variable that is Cross Competency with the loading of 0.732 respectively. Here the cross competence means the knowledge about various modules in the ERP system implementation.

The Third Factor identified is **Autonomy**. This factor consists of a single variable that is Work Freedom with the loading of 0.751 respectively. Here the work freedom indicated the freedom to be able to work flexibly and hence gives more opportunity to growth and better performance. No other factors are identified further for their loadings being less than 0.70.

5. Discussions:

From the above analysis in the research paper, we have identified 4 factors Team Planning, leadership Skills, Knowledge and Autonomy. This factor is a result of using Statistical tools that is factor analysis.

When we talk about the success factors in the ERP project implementation, we can come across many factors that do play a vital role in this. But we have to focus our work towards the most critical factors so that the chances of Successful implementation increases. So when working on the ERP implementation project, the Project Manager or the top management can give much more emphasis these factors.

The first factor is Team Planning. A project manager should be able to plan the goals and objective for the ERP systems with respect to time and efforts. He should be able to understand the project expectations and then bring the whole team together to draw a clear picture of the same. Since ERP systems are integrated systems, many of the departments have to work together to get the desired output and environment of collaborative work should be motivated with mitigation of conflicts. Several times, the ERP project are unsuccessful because of its more than expected time lines or unable to collaborate together which can be curbed using team Planning.

The Second factor identified is leadership Skills. Every leader is expected to have negotiation, motivational and decision-making skills. Many Previous research have highlighted the importance of Negotiation skills. It is the role of the project lead or the manager to negotiate with the clients and get the deals done. Not only this once the negotiation is done the team members are to be motivate to achieve those goals which can be very challenging sometimes. But the Project needs to be run within stipulated time and cost goals. So effective communication, right planning of work can be done and a logical decision making needs to be used to plan the best for the ERP Implementation.

The third factor is Knowledge. One cannot lead an ERP project with basic managerial skills. Since ERP systems are different and unique than the normal projects, it is very much expected that the people who are taking decisions must have a deep knowledge about the systems, modules and functionality. It is therefore necessary that people working in the project must be cross -skilled as they better grasp of the system, which enhances the chances of successful implementation of ERP project.

The last Factor is Autonomy. This factor is associated with the freedom of working and freedom to take decisions in their area of responsibility. often it is observed that employees feel constrained by the limitations put on them. It is therefore necessary to assign them their role of responsibility and power to make changes and decisions. This will engage employees in performing to their best of potential and expertise. It is necessary to take the judgement of the

person who is expert in his own field. As ERP system is huge and vast, although people can be cross-skilled but there is always a single knowledge area which their forte. Hence by having an environment of autonomy creates an environment for exceptional performance and growth opportunities which will work in the favor of ERP systems Implementations Projects.

5. Conclusion and Future Scope:

The Research survey conducted here was done in regards of the perspective of people involved in the ERP implementation only, that is the ERP consultants but there are also other departments associated with the ERP Implementation project like the technology department, the Testing Department, the User perspective and the client perspective. In future, a study could be conducted aligning the clients, Users and the consultants and pass them the same questionnaire to do a comparison study and draw a conclusion on integrated perspective.

Also, Implementation of ERP systems is done in various stages like the pre-implementation stage, the actual implementation and post implementation as mentioned above in the literature review. We can also do the detailed study of the exact factors critical for all the stages in various stages ERP Implementation project.

Again, This Survey is also limited in terms of geography where the respondents had only worked for India. So, the study can be mapped further to different geographical location and the critical factors outside India. So, the next involved in this study is to send out the questionnaires to the people involved in ERP implementation outside India. This could help us in comparing the other study which might have a different outcome. Then a qualitative research can be done if proposal of any new Factors is brought into the picture and why is it so.

The main contribution of the study is made in the view of ERP consultants and experts who are the people most familiar about the ERP systems and its implementation projects in different industries. Hence the Success factors as highlighted by them cannot be ignored by a Project manager working on any ERP Implementation project.

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