ENTERPRISE RESOURCE PLANNING (ERP) IMPLEMENTATION IN PAKISTANI ENTERPRISES: CRITICAL SUCCESS FACTORS AND CHALLENGES

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Abstract

ERP systems are the backbone of global supply chain, while their success and failure determines the fate of the business. With enormous competition and ever increasing challenges in boundless trading, the IT linkages and E-Business involve extensive customization. There are many researches on the implementation facilitators and barriers in all types of organizations throughout the world but limited literature can be found in work specific to Pakistan. This study brings out the critical factors that drive a successful ERP system in Pakistan and also discusses the pitfalls to be avoided in order to prevent a disaster. Through this study, the critical success factors and the main challenges for implementation of ERP in Pakistani organizations have been recognized. In this way, suggested to localize for ERP implementation in Pakistani organizations.

Key Words: Enterprise Resource Planning (ERP), Key Success Factors (CSFs), Challenges.

1. Introduction

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Enterprise Resource Planning (ERP), making the world really flat for the business (Friedman, 2005), came with both, problems and solutions. Pakistan, with its geographical location and cheap labor is a developing economy with closely knitted bonds of industrial communications, thus the need for ERP implementation was felt tremendously during the past decade.

The main focus of this study is to discover Critical Success Factors (CSFs) and the main challenges faced by Pakistan based industries during ERP implementation. CSFs were defined by Rockart, (1979) as those specific areas that make its implementation successful. Individual research on several industries exists but a comprehensive model for the Pakistani environment is required as limited research after Ehsan, et al. (2010) has been pursued in this regard. The success factors will help any industry to frame out their condition and circumstances suitability regarding implementation of ERP system.

The research area covers textile, automobile, packaging, production, and the banking sector. Moreover, ERP consultants have also been included in the research. 60 industries have been taken into account. The data was collected through surveys, both in person and online. The industries were selected on the basis of their interaction with ERP. Mainly there were two divisions; those, who have implemented it successfully, were asked what they think about the CSFs and challenges that they have faced and how critical a factor proved during implementation, and those who were in the phase of implementation were asked about the challenges they were facing and how hard it was to cope with them (by rating them).

Sherry Finney, (2007)"provided the history of the ERP starting from Rockart's work in 1979 using the concept of CSFs in the corporate world. The debate continued in 1980's and 1990's that lead to the conclusion that stakeholders of business should be asked about the right thing for their business.

Socio-cultural differences, technological barriers, economic loopholes (Huang, 2001) and infrastructure issues are additional challenges for integration of ERP culture in developing countries.

This paper covers automobile, textile, chemical, production, service, and banking sector, and ERP consultants/ solution providers. A total of 60 responses

were collected. In the survey, 32 CSFs were provided on a Likert scale of 1 to 5 and the respondents were asked to write any other factor that they consider critical. Similarly, 33 issues/challenges were listed. The respondents were asked to rate them on a Likert scale of 1 to 5. Moreover, space was provided for any other obstacle they want to mention.

The responses were collected both in person and through internet. There are some limitations attached to both methodologies. These limitations have been listed below:

- The survey cannot assure all the time that only experts provided the opinion.
- In hard copies, some respondents selected multiple options that were resolved with average rule.
- During online research, the credibility of respondent cannot be counterchecked, so it was left to the respondent.
- Any ambiguity in case of online survey filling is usually left non-conveyed as respondents do not take pain to ask the researcher, thus their responses are assumed correct on the basis of their understanding.

2. Literature Review

ERP implementation has been a dilemma from the day one. From top management to lower management, no one has succeeded in defining one golden thumb rule to have a perfect implementation of the system. ERP has its own pros and cons, but overall, it has an impact on leadership, power, organizational, inter-organizational, and systems perspectives (Boonstra, 2006), (Hung, 2010) and Finney (2007).

Keeping in view the demand of the topic, the literature review has been divided into three sections:

a) The CSFs of ERP implementation discussed in international literature excluding Pakistan
b) The issues/problems/pitfalls regarding implementation of ERP
c) Pakistan specific research on ERP implementations

3. Critical Success Factors

The CSFs were first defined by Rockart,J. (1979)as those specific regions that an enterprise requires to "get right" for successful corporate competition. Endorsing it further, Bullen (1981)defined CSFs as those limited zones where adequate results will guarantee effective competitive practices at the individual, departmental, or organizational level (Hong and Kyung-kown hong, 2002) provided an organizational fit for success factors for ERP. The best practices approach was also a preemption of the same concept. Business process models modification and Business Process Reengineering (BPR) can be helpful in making ERP a success (Scheer and Frank, 2000).

A division between strategic and tactic CSFs were listed by Holland and Light & Umble and Haft and Bradford and Florin M., Christopher P. Holland and Ben Light. (1999), (Umble,2003) (Bradforda,2003) including support from the executive Management, and a clear vision, systems, strategy, business process change, project management, training, selection of appropriate team and software customization in them. This resulted in a conclusion that a careful, evolutionary, administrative implementation process supported with cautious network relationships, change management, and cultural acceptance is necessary for a fruitful ERP implementation (Motwania, 2002 and Bernal, 2007). Provided 14 CSFs in Mexican case, where they discussed 48 SMEs. Coupled with other factors, the role of consultants can never be over emphasized (King, 2005).

CSFs are accepted globally but in China, research revealed that Western CSFs worked there despite of culture being a CSF (Woo, 2007). Moreover, 'IT infrastructure, organizational culture, BPR', and standardization of the enterprise's operational processes were listed as CSFs in China's case (Zhe Zhanga, 2005). In Saudi Arabian research M. Al-Turki, (2011) mentioned ERP implementation trends, a clear tendency for adopting ERP solutions is shown by big companies like Saudi Aramco and SABIC, where the CSFs are leadership,

change management, and training. ERP implementation trends in Malaysia discover factors under Knowledge Management, Business Process and Requirement Study, Project and Communication Management and find them all critical.

Not only first time implementations are an issue but ERP upgrade also requires very careful handling. It is like restarting the enterprise and everything requires a revamp (Robert and Williams, 2006). 'Top Management Support and Championship', 'Change Management' and 'ERP Team Composition, Skills and Compensation' were considered as crucial in an implementation and update (Nah, 2006). It has been surveyed that Chief Information Officers (CIOs) from Fortune 1000 companies' and compiled their insights about the CSFs in ERP installation in a system. (Nah, 2009) identified 5 CSFs as 'top management support, project champion, ERP teamwork and composition, project management, and change management program and culture'. Similarly, another research in Latin America provided a different perspective regarding CSFs providing distinctive cultural trends in 'Ease of Use, ERP Implementation Project Success, and ERP User Satisfaction. 'Change management' has not been considered as a CSF for SME, instead it is a CSF for large enterprises (Beltrán, 2010)**.** A critical analysis by Suprateek Sarkera, (2003) considers strong and committed leadership as an essential element for ERP success.

'Adoption initiation, building a business case, communication, planning, project management, teamwork, training, infrastructure, software configuration and institutionalization, quality assurance, problem resolution, organizational change and implementation partner selection criteria' were concluded as CSFs for public organization (Kumar, 2002).

The role of ERP project manager, champion, and sponsor is considered ambiguous but according to Esteves and Pastors (2002).The project champion is the project sponsor but they emphasize that both project sponsor and project manager are equally critical in an ERP project.

ERP implementation has an impact of operational performance indicators in an enterprise. A research by Gordana Gajic, (2010), Finney, (2007) in oil–gas sector provides specific Key Performance Indicators (KPIs) through Supply Chain Operations Reference (SCOR) model of Supply chain that shows the importance of methodology in implementation. IT infrastructure as well as ease of use has always been a critical factor. Incorporating it allows companies to define the degree of influence of CSFs of ERP implementation on business performance (PIs) through 'computerization, assimilation, and transformation of the relevant organizational practices. A case study by Kraemmerand, (2003) shows that how six propositions were assumed before an implementation and with how many tough turns they proved to be true. ERP is very unpredictable. It requires team work, patience, cooperation, and integration as provided in Table 2-1.

Table 2-1 ERP implementation: stages and types of learning, changes, and results

Phase	Activity	Learning	Changes	Results
1	Idea and selection	Exploitation	Incremental	Predictable
2	Future business modeling configuration and go-life	Exploration	Radical	Unpredictable
3	Performance tuning And changes	Exploitation	Incremental And radical	Some predictable, others unpredictable
4)	Continuous Business Improvement	Exploitation and exploration	Incremental	Some predictable, others unpredictable

4. Methodology

The main theme of this paper is to identify the CSFs essential for ERP implementation in Pakistan, providing the insight to the global scenario and its impact on local environment. The CSFs and critical issues determining practice have been used conventionally in literature within similar perspectives and objectives.

Based on extensive review of the local as well as global literature in addition to detailed observation of the ERP culture, several personal interviews with ERP consultants were conducted, and resultantly, an instrument was established that acknowledged features critical for the effective application of ERP.

A response rate of 32.5% was achieved. Keeping in view the length and nature of the questionnaire, this response rate was acceptable. With the help of the data collected so far, a database was generated and the data profiling took place. The population profile was organized with the help of MS-Excel and then the phase of data analysis was comprehended with the help of SPSS.

The study is directed to firms that either have executed ERP or are at the finishing phases of executing it. Explicitly, the survey is directed to people who are directly related to the implementation process including managers, consultants, IT professionals with designations as project leader, IT lead, senior consultant, and senior manager etc.

The information was collected from both, the public and private sector, and the manufacturing and service organizations. Moreover, people who were a part of the process or with the organization that had either implemented or was implementing ERP. The people were classified on the basis of their experience in that organization either less or more than 5 years. From the assessment of previous research concentrated on CSFs in ERP systems deployment, a list of 32 CSFs was established. Likewise, after having gone through the observant study of the literature on the topic of ERP failures and pitfalls, 33 issues were identified as critical for the implementation.

The process of selection was dependent upon the citation. The main sources considered for the CSF selection include international literature regarding CSFs Finney, (2007), Christopher P. Holland and Ben Light. (June 1999), Bullen (1981), Supramaniam, &. Ahn, (2013)" Buonanno, (2005), Elisabeth J. Umble, (2003), Ehie (2005) and Schniederjans, (2013).

Keeping in view the geographical, political, socio-economical, and technical conditions faced by Pakistan, lessons were learnt from the neighboring countries and a deep insight from surroundings helped to draw brief outlines that match to the local environment perfectly. Considering the research conducted in India, China, and Bangladesh, the issues were comprehended and an effort was made to find out similarities to look up for solutions. A. Boonstra, (2006), Khattak, M. (2013), Zhe Zhanga, (2005), Woo, H.S. (2007), Upadhyay, (2010), Nagar, S (2002).The CSFs were selected as follows in the Table 3-1.

A similar strategy was followed to select the issues that were critical, keeping in view the contributing factors in the developing economy of Pakistan. Factors responsible for ERP failure has been collected through the exemplary cases defined by the researchers. These issues have been extracted from literature round the globe Ahmed, (2006)**,** Frolick, (2003), Ehie, (2005), King, (2005), Nagar, (2002), Kumar Dey, (2013), Kraemmerand, (2003), Michael Yu Kataev, (2013), Haq, Zia (2006)", Zhenyu Huang,(2001), Yajiong Xue, (2005).

Table 3-1 Critical Success Factors

<table>
<tr><td rowspan="4">Teamwork composition for the ERP project
Business process reengineering and software configuration
ERP system selection</td><td>Tests and problem solution</td><td>Team morale and motivation</td><td rowspan="2">Customization/localization of software according to environment
Consultant selection and relationship</td></tr>
<tr><td>Vision statement and adequate business plan</td><td rowspan="2">Project cost planning and management
Project</td></tr>
<tr><td>Top management commitment and</td><td>Training and job redesign</td></tr>
</table>

	support	management	
Having external professional consultants Training and support for users	Balanced team for ERP implementation	Change management	Troubleshooting/crises management
	Building a business case	Legacy system consideration	Data conversion and integrity
Project Champion /Project Sponsor/ Project Manager Role	Existence of Communication plan	Managing cultural change	System testing
End users involvement	Empowered decision makers	Availability and facilitation of IT infrastructure Client consultation	Post-implementation evaluation
Change management plan	Implementation strategy and timeframe		Financial plan

A questionnaire was designed with items for each one of these 32 selected factors. Moreover, critical issues were selected in the same way. A total of 33 issues have been discussed in the questionnaire. For each factor, a question judges the level of importance that it possesses in the implementation process on a five-point Likert scale. The scale varies from "Extremely critical and important for the success of the implementation" to "Neither critical nor important for the success of the implementation". The reliability of the instrument was validated by pilot testing on five firms. The goal of this approach was to:

1. Identify critical success factors in the national and international literature.
2. Listing them in the questionnaire and getting them rated by Pakistani enterprises to check out which CSFs really matter to Pakistani

environment.

3. Profiling the data with the help of MS Excel and getting a clear picture of sample.
4. Analyzing the data through exploratory factor analysis and getting reduced, rotated factors.

5. Assumptions

Several assumptions were made for the questionnaire filling.

- The responses are subjected to the respondents' best understanding and it has been assumed that they got the correct meaning of the question asked.
- The information provided by the respondents has been assumed to be correct and accurate.
- The respondent was eligible for the reply if he was a part of ERP implementation team in that company and a user.

6. Analysis

The data was sorted through Excel and the population profile has been created with MS Excel. The factors were analyzed through the exploratory factor analysis in SPSS. Factor Analysis is mainly applied for reducing the data or detection of the structure. The aim of data reduction is to eliminate redundant variables that are highly correlated from the data, while replacing the complete data with less variables that are not correlated whereas the structure detection is used to study the underlying/latent relationships between the variables. This technique was selected as the factor reduction was required to determine the trend of the data.

7. Critical Success Factors

The CSFs and issues discussed in this research have been compiled after in-depth analysis of ERP literature available till now. These factors and issues have been described below.

7.1 Teamwork Composition for the ERP Project

ERP implementation teams need competent people chosen for their

efficiency, flexibility, reputation, skills, and past accomplishments. It is responsible for planning entire project, delegating responsibilities, decision making, setting targets, and achieving milestones and ensuring the availability of all the necessary resources on time R. R. H. M. M. U. Elisabeth J. Umble, (2003).

7.2 Business Process Reengineering (BPR) and Software Configuration

BPR and software configuration is the third most frequently quoted CSF according to Wei-Hsi Hung, (2010) and Sherry Finney, (2007). This may take in multiple business process change practices such as business process modeling M. B. S. Christopher P. Holland and Ben Light. (1999) or any vendor development tools including the need to augment the quality of the ERP interface and to plan technology infrastructure.

7.3 ERP System Selection

As an ERP system is entirely a new induction in a company, so it induces its own logic on a company's strategy, planning, organization, management, and culture. Thus the ERP selection decision must be steered very carefully. Disastrous failures occur in a company when the new technology's proficiencies and demands are incompatible with the existing business practices and techniques. A specific ERP package selection requires careful attention for the perfect matchmaking between it and the business processes Sherry Finney, (2007) & Yahaya Yusufa, (2004).

7.4 Having External Professional Consultants

To have or have not an external consultant affects the implementation. An unbiased approach regarding the internal systems of the company can provide a clear picture of the problems at hand. Moreover multi-dimensional knowledge and experience of externals contributes a lot.

7.5 Training and Support for Users

It is a fact that if this factor is given due importance while implementation,

it becomes a good reason for success and if it is ignored, it becomes the worst issue. Users' training and during and post-implementation support impacts the process positively Sherry Finney, (2007), Ahn (2013) Christopher P. Holland and Ben Light. (1999).

7.6 Project Champion /Project Sponsor/ Project Manager Role

A project champion is considered significant for a efficacious ERP deployment. The journey of ERP requires excellent leadership skills, exceptional business, technical, and managerial competencies possessed by the project champion as he is the driver of the ride Sherry Finney, (2007), Boonstra, (2006) & A. Esteves,(2002).

7.7 End Users Involvement

The end users are needed to be a part of implementation as they are the one who maintain and sustain the successful execution (Messersmith, 2003).

7.8 Change Management Plan

According to Davenport (2000), a well-thought-out and well-managed ERP implementation, in combination with an efficient change management program, can make a marvelous shift for the company.

7.9 Tests and Problem Solution

A pilot or test run is necessary to ensure a successful journey ahead. The teething problems are identified early and they can be sorted at initial stages, avoiding trouble. Thus the research and development (R&D) is a vital and beneficial part that cannot be neglected.

7.10 Vision Statement and Adequate Business Plan

The exact roadmap for the business and clear marking of goals before the

team distinctly provide them the path to input their best.

7.11 Top Management Commitment And Support

It is one of the most cited CSFs [M. C. Sherry Finney, (2007)]. Moreover, it emphasizes the need for management to go before any anomalies that may come Jaideep Motwania, (2002) and the requirement for senior management to get involved not only in the strategic planning, but who are also capable of technical orientated vision (YahayaYusufa, 2004), Sherry Finney, (2007). Moreover, it has been emphatically proved that strong and dedicated top management is vital for a positive ERP implementation. Successful implementations need strong leadership, support, committed stance, and involvement by top management. Additionally, the project should be led by a highly skilled, greatly valued, executive professional project champion Elisabeth J. Umble, (2003).

7.12 Balanced Team for ERP Implementation

The team composition matters a lot for a successful implementation. A team that covers the whole organization and holds equilibrium of business, management, and IT skills is a critical success factor.

7.13 Building a Business Case

The need for Implementation should be justified strongly. This concept involves building a case for implementing ERP through solid economic and strategic justifications M. C. Sherry Finney (2007).

7.14 Existence of Communication Plan

For an ERP implementation, communication among several departments/hierarchies, e.g. between business and IT personnel, is inevitable. Therefore a communication plan is required to make sure that there is open communication within the whole organization, from the top management to shop-floor employees, and with the outer world as suppliers and customers (Sherry Finney, 2007).

7.15 Empowered Decision Makers

This concept discusses the importance of empowerment of the team to make essential decisions timely, which is a must for effective timing regarding implementation.

7.16 Implementation Strategy and Timeframe

Numerous scholars stressed on executing ERP through a phased approach Sherry Finney, (2007) Jaideep Motwania, (2002). Moreover, this viewpoint also reveals significances of multi-site concerns Elisabeth J. Umble, (2003) and the scenarios of announcing green field site.

7.17 Team Morale and Motivation

This CSF compacts with the need for the project manager/champion for boosting and preserving the employee determination and enthusiasm to greater heights during the project Sherry Finney, (2007).

7.18 Project Cost Planning and Management

The management always wishes to have an exact forecast of implementation costs. Nonetheless, the volatile nature of ERP applications is such that often unanticipated frequencies escalate the overall expenses Christopher P. Holland and Ben Light. (1999) .

7.19 Project Management

Researchers Sherry Finney, (2007) also support establishing a steering team of senior management, Project Management expert and ERP end-users that should be involved in ERP selection, checking, and organization of foreign consultants. Clearly defined project objectives, scope, implementation modules and a time lined plan helps avoiding ‘‘scope creep’’ that is an alarming constraint for the ERP budget, project progress, and the Elisabeth J. Umble, (2003).

7.20 Change Management

Acquiring the sustenance of opinion front-runners, building user reception of the assignment and a positive operative approach in the organization are the key tasks (Christopher P. Holland and Ben Light.1999). Employees should be prepared through briefing about the advantages and need for an ERP system Jaideep Motwania, (2002). In fact, ERP may change the working philosophy of an organization. Only proper change management techniques can make the organization flexible enough to enjoy the opportunities offered by the new ERP system Elisabeth J. Umble, (2003), Ahmed, et al., (2006), Ziaul Huq, (2006).

7.21 Legacy System Consideration

Careful consideration of the existing legacy system in practice is necessary as it is a good pointer of the forthcoming potential problems. It has a direct effect on the technical and managerial change required Holland et al., (1999).

7.22 Managing Cultural Change

Researchers emphasize on awareness of the cultural differences and preferences from multidimensional perspectives. Therefore, it is necessary to develop an excellent conducive culture for changed business environment to fit in Chwen Sheu, (2003) Whitley, (2007), Sheua and Bongsug Chae, (2004).

Top Management Commitment is one of the most cited CSFs Sherry Finney, (2007). Moreover, it emphasizes the need for management to go before any anomalies that may come (Jaideep Motwania, 2002) and the requirement for senior management to get involved not only in the strategic planning, but who are also capable of technical orientated vision (Sherry Finney, 2007). Moreover, it has been emphatically proved that strong and dedicated top management is vital for a positive ERP implementation. Successful implementations need strong leadership, support, committed stance, and involvement by top management. The effects of stimulation, motivation, and encouragement from a leader to his team can never be overemphasized. Although it results in staff retention but still the possibility of

losing staff due to their external marketability is a great possibility. Unfortunately it is often overlooked and it is a primitive cause of project failure.

Securing the support of opinion leaders, building user acceptance of the project and a positive employee attitude in the organization are the key tasks (Christopher P. Holland and Ben Light. 1999). Employees should be prepared through briefing about the benefits and need for an ERP system (Jaideep Motwania, 2002). Effective negotiation between various political turfs by team leader also plays positive role. Usually, the existing structure and function of the organization are not well-matched with the procedures, processes, and sort of data provided by ERP systems. Even the most flexible ERP system enforces its own logic on an organization's strategy, management, system, and culture. It will result in changes among organizational systems, policies, practices, and employees. The misconception of viewing ERP as just a software system and its implementation as a technological challenge is the main reason behind issues in accepting this culture. In fact, ERP may change the working philosophy of an organization. If employees are not well prepared for the forthcoming changes, then refusal, resistance, confusion, and disorder will be expected consequences of the changed environment.

7.23 Availability and Facilitation of It Infrastructure

Assessment of current strength of IT (Information Technology) is critical to check preparedness of the organization. It includes the architecture, skills, and infrastructure regarding IT that may be required to be upgraded or revamped.

7.24 Client Consultation

Enterprises need to retain their Users apprised of their schemes and new

expansions to preclude any misapprehensions as it is observed as a vital CSF (Christopher P. Holland and Ben Light. (1999) & Sherry Finney, (2007).

7.25 Customization/Localization Of Software According To Environment

Several cases (C. Sheua and Bongsug Chae, (2004) and Chwen Sheu, (2003)) have shown that it is a critical issue in case of failure that the software was too foreign for the organization to fit in.

7.26 Consultant Selection and Relationship

Research advocates the importance of including an ERP consultant in the implementation team Sherry Finney, (2007). But it increases dependency on the vendor/consultant. Thus it is essential that knowledge transfer arrangement between the consultant and the company should be made to encourage independency.

7.27 Training and Job Redesign

Hands-on training for the development of IT skills in addition to effective planning is a critical success factor (Sherry Finney, 2007).

7.28 Troubleshooting/Crises Management

As ERP implementation is an unpredictable phenomena, so enhanced flexibility, agile approach and learning from unforeseen circumstances can help invariably. Troubleshooting and crisis management skills are an enduring necessity during the application practice (Holland, 1999), (Skibniewski, 2013) and (Esteves, (2013).

7.29 Data Conversion and Integrity

The execution practice accomplishment and finally the realization of the complete structure be contingent on the competence of the team certifying data

accuracy during the whole change procedure (Sherry Finney, (2007) & Elisabeth J. Umble, (2003).This may comprise in significant amendment as well, e.g. cleaning up of suspect data (YahayaYusufa, 2004).

7.30 System Testing

The project team should consider simulation exercises as well as test run before the system operates alive (Yahaya Yusufa, 2004).

7.31 Post-Implementation Evaluation

No project is reflected complete deprived of acceptance of certain post-evaluation (Christopher P. Holland and Ben Light. (1999). The post assessment is difficult to complete, without focused key performance measures (Umbel, 2003).

7.32 Financial Plan

It is important to have a well-structured financial plan in case of implementation to avoid last moment hitches.

7.33 Budgetary Constraints

This issue needs to be addressed by the top management in the beginning of the project or even start of the project (Nagar, 2002).

7.34 Government Regulations

The governmental policies regarding business and other issues have a pronounced influence on the execution of ERP. Any improbability in the environment in relation to the government's actions may have an impact on the multinational business approach (Nagar, 2002).

Almost all of the above factors have been proven to be critical for success at some organization. These include the toughest challenges and the hardest nuts to crack during the implementation.

8. Data Analysis

Data for the analysis has been collected through personal visits, follow-

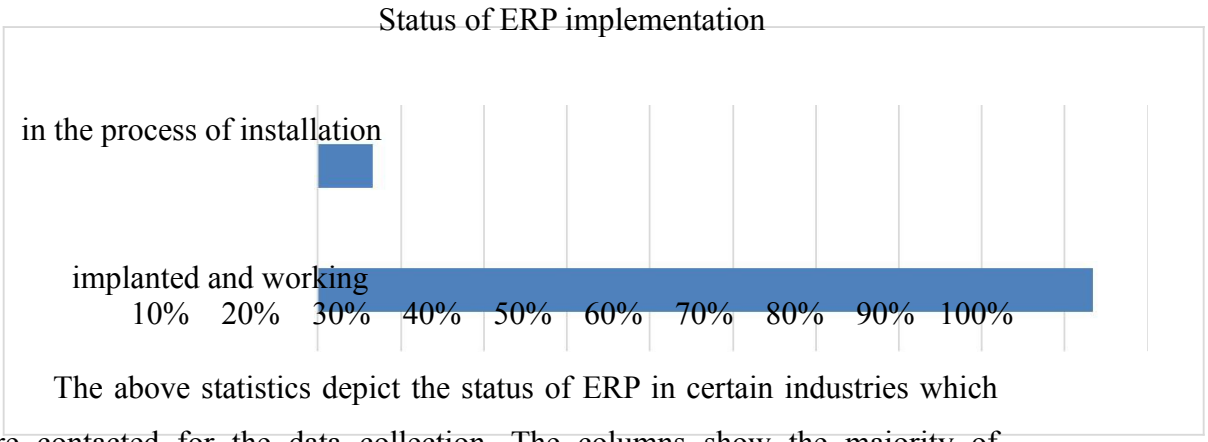
up e-mails, and phone calls. Some data was also collected through personal visits and responses were collected in print as well as online. The response rate was recorded at 32.5%. Keeping in view the length and nature of the questionnaire, the response rate received was considered acceptable. Afterwards, the collected data was arranged on a database. The population profile was organized with the help of MS Excel and then the final stage of data analysis with the help of the Statistical Package for Social Sciences (SPSS) for Windows.

A detailed profile of the population of the data is given below. Population profiling has been described highlighting the following aspects:

- Type of organization: private/public
- Nature of organization: service/manufacturing
- ERP implementation status: in the process of implementation/ implanted and working
- Experience in ERP environment
- Work experience with the current organization

8.1 ERP Implementation Status

Figure 4:1 Status regarding ERP implementation



The above statistics depict the status of ERP in certain industries which were contacted for the data collection. The columns show the majority of industries that were considered have implanted ERP and are actively working with it. However, some organizations are in the process of installation. They enlightened the research with their valuable feedback regarding the problems and issues at hand as well as the success factors that are considered critical.

8.2 Nature of Organization

The majority of the organizations that responded to the questions were private. Moreover, the ERP implementation rate in Pakistan is greater in private organization than in public organizations. That is the major reason behind the data collection profile that shows 80% private and 20% public organizations that contributed towards this research with their responses.

8.3 Organization Category

Manufacturing was recorded at 46.67% whilst service stacked at 50%. Organization that was serving any miscellaneous services falling under the any other category was considerably lower at 3.33% of the data. This shows that the major service industry has ERP installed in their organizations.

8.4 ERP Exposure

Thus the results show that majority of the cases possess experience period of more than five years in an ERP surrounding. While a good number has familiarized itself with ERP in 3 to 5 years. Even there are multiple respondents with an ERP background for 1 to 3 years. Less than one year of experience has been found only in around 6% of the cases.

8.5 Experiences with Current Organization

The experience chart showed that almost half of the respondents have more than 5 years of experience. Around eighteen percent respondents have been with the current organization for 3 to 5 years these are the cases of organizations who have implemented ERP and who are successfully running it. These respondents were the part of organization when it was installing ERP system and to date they are a part so they understand the issues and the success factors very well. More than 30% respondents have been the part of organization up to three years. Usually these are the ones who have recently implemented the ERP or they are amid installation. These responses have aided to facts regarding issues and

challenges. A few respondents have been a yearlong in their current company. And these are the particular cases where implementation is on its way.

8.6 Exploratory Factor Analysis for ERP Issues in Pakistan

This technique is frequently used in data reduction to classify a small number of factors that explain most of the variance observed in a greater number of manifest variables. First of all, the sample size adequacy was tested through the KMO and Bartlett's Test. The Bartlett's test of sphericity checks whether the correlation matrix is an identity matrix, as it indicates that the factor model is inappropriate. The KMO test proved adequacy being 0.805 as it is greater than 0.5. Similarly significance level was less than 0.05 so it also confirmed the suitability for the analysis.

Table 5-1 KMO and Bartlett's Test

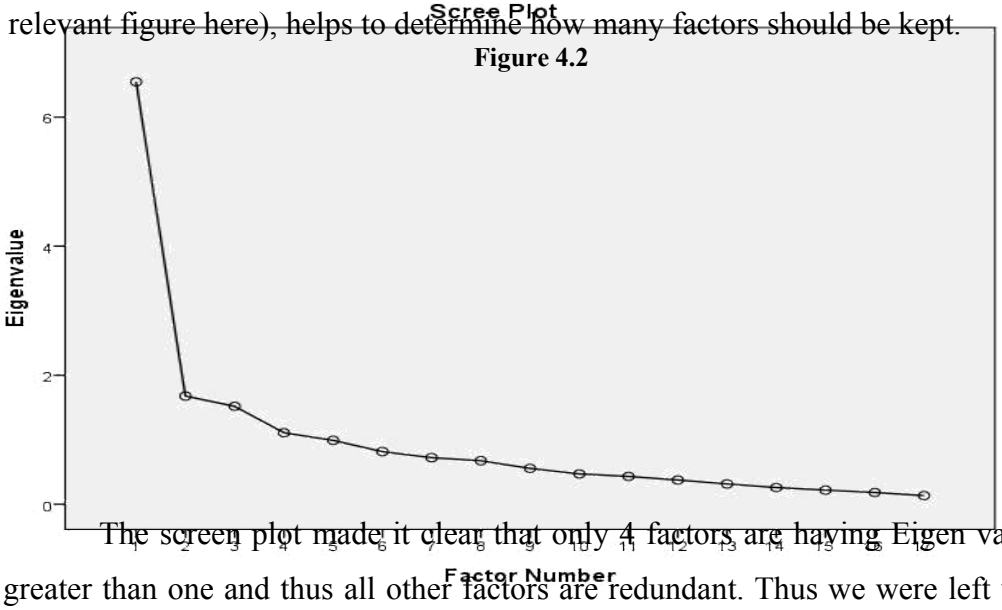
KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.808
Bartlett's Test of Sphericity	Approx. Chi-Square	466.753
	Df	136
	Sig.	.000

Next step was to specify the method of factor extraction. Principal Axis Factoring extracts factors from the original correlation matrix, with squared multiple correlation coefficients placed in the diagonal as initial estimates of the communalities. Thus the extraction method was applied. The factor loadings were used to estimate new communalities, replacing the old communality estimates in the diagonal. Continuous Iterations were done until the changes in the communalities from one repetition to the next satisfied the convergence criterion for extraction.

The initial eigen values did not satisfy the criteria for relevance. The Extraction Sums of Squared Loadings also suggested that the best method was to go for Rotation Sums of Squared Loadings.

After the rotation matrix was selected, it approved 6 factors to be selected. Further, the result was assessed with the help of scree plot of the variance associated with each factor. This plot, as shown in Figure: 4.2 (please mention the relevant figure here), helps to determine how many factors should be kept.

Figure 4.2



The screen plot made it clear that only 4 factors are having Eigen values greater than one and thus all other factors are redundant. Thus we were left with four factors. Afterwards, to determine further clarity in this regard, Factor matrix was considered. The Extraction method used was Principal Axis Factoring. With the help of this method, 4 factors were extracted. Total 20 iterations made it to the four factors.

Rotation converged in 6 iterations. The factors were rotated through Varimax method with Kaiser Normalization. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations. Finally, the rotated matrix leads to the ultimate factors selection through factors transformation matrix shown in **Table 5-2**. The factors were rotated through Varimax method with Kaiser Normalization.

Table 5-2 Factor Transformation Matrix

Factor	1	2	3	4
1	.625	.624	.417	.216

2	-.234	-.231	.222	.918
3	.733	-.508	-.422	.161
4	-.130	.547	-.774	.292

After the complete factor analysis, the following factors were selected as the main issues in ERP implementation in Pakistan.

8.7 Pakistan Specific Issues

1. BPR, Change management with empowered decision making extended to end user
2. Budgetary constraints along with Project Team work and training management
3. Implementation strategy for Data conversion and post work evaluation
4. Government regulations and client consultation for business case

These factors show that the major areas that affect the implementation process are multiple. At one end, the change management requires complete change along with IT infrastructure and robust reengineering. Similarly, data conversion and legacy system considerations have a great impact as well.

9. Exploratory Factor Analysis For Critical Success Factors

Firstly, the sample size adequacy was tested through the KMO and Bartlett's Test. Bartlett's test of sphericity checks whether the correlation matrix is an identity matrix, as it indicates that the factor model is inappropriate. The KMO test proved adequacy being 0.728 as it is greater than 0.5. Similarly significance level also confirmed the suitability for the analysis.

Through the initial solution and extraction, some factors clearly became the candidate for deletion and as the next step; total variance was calculated with the limitation of Eigen values more than one. The Extraction Method used is Principal Axis Factoring.

The percentage variance resulted in conclusion that we have to adopt Rotation Sums of Squared Loadings. This has reduced the factor to 6.

The software attempted to extract 6 factors with 25 iterations with Convergence=.002. Extraction was terminated at 25 iterations. The 6 reduced factors have been extracted through Principal Axis Factoring. Now with the suppressing limit of 0.4, the redundant factors were deleted and the factors were reduced to 4 factors. The extraction method is Principal Axis Factoring and the Rotation Method is Varimax with Kaiser Normalization. Rotation converged in 11 iterations.

The critical success factors were found to be as:

1. Motivated teamwork for strategic ERP implementation
2. Customization and Cultural change management
3. Empowered decision making through strategic Communication
4. Project Management

10. Limitations& Future Directions

The responses were collected both in person and through internet. There are some limitations attached to both methodologies. These limitations have been listed below:

- The survey cannot assure all the time that only experts provided the opinion.
- In hard copies, some respondents selected multiple options that were resolved with average rule.
- During online research, the credibility of respondent cannot be counterchecked, so it was left to the respondent.
- Any ambiguity in case of online survey filling is usually left non-conveyed as respondents do not take pain to ask the researcher, thus their responses are assumed correct on the basis of their understanding.

This research is first step in a multi-mile journey. The CSFs and main challenges scrutinized for Pakistan are providing a picture for pre-implementation plan till present day. With every passing day, new issues, challenges, and success factors emerge, so research update is an essential fundamental. Moreover, future prospects require an implementation solution in the light of these CSFs and issues in the form of a model or theory. Similarly, further bifurcation of the main

research theme in several industrial sectors can also enlighten new avenues for multi-national industrial linkages through socio-techno-economic bonds.

11. Future Directions

This research is the beginning of a wide avenue in the world of ERP implementation in Pakistan. This research has pointed out the main factors involved in implementing ERP solutions for Pakistani industries. The generalized subject matter has provided several flavors for extended work both in the breadth and the depth. The next step is to focus on the particulars. Further extensions of the research involve the solutions to these issues and prioritizing these factors. Moreover, industrial specific research can be the extended theme of research. Similar work can be carried out in size focused domain, as in case of Large versus Small and Medium Enterprises. Another research concern can be the area specific work that covers one field in its entirety. Examples include textile sector specific research, automobile, or chemicals sector specific research etc. Another food for thought is organization specific research comprising service industry or manufacturing industry focused cases. Further research should focus on how companies should take or avoid taking these decisions, how they should prevent failures, whether they require consultation or not, and the specific implications of their decisions regarding the problems and outcomes experienced later in their ERP experience cycle. Moreover, there is a need for simultaneous update in these factors as the situation changes with time. It may happen that IT infrastructure and system testing may not be the big issues after some years but new challenges emerge, so it is a continued research cycle.

12. Conclusion & Suggestions

The rapidly increasing growth of ERP environment in the world has required the enterprises to connect themselves with their customers and suppliers all over the world. This has turned the world flat in the real sense Friedman, T.L.

(2005) and this change came with both, problems and solutions. Pakistan, being blessed with distinct geographical location and cheap labor, is a developing economy, thus the need for effective and updated linking systems cannot be neglected. For these reasons, the need for ERP implementation was felt tremendously during the past decade.

ERP systems are very unpredictable. They prove to be quite challenging and risky, if not planned and implemented carefully. This research is an effort to discover the facilitators and barriers to ERP implementation present in local environment. The aim of this research was to find the critical issues that have been faced by the Pakistani industries in implementing ERP systems. Moreover, determining the critical success factors that can ensure the successful implementation was also the goal of research. This has been accomplished with the valuable contribution from experts, consultants, and managers from several Pakistani enterprises managing ERP systems.

There is no denying the fact that the implementation of ERP systems is an extremely complex undertaking as ERP systems affect the organizational performance and functioning as a whole. The local environment has its own constraints and issues. Everything from planning to implementation and test run to post implementation issues require customization according to the local environment. The measures of ERP systems success should reflect this fact. The findings show the Pakistan focused issues cover different aspects as compare to the global arena. These have been discussed below in detail.

13. Critical Success Factors

The critical success factors were found through rotated factor solution and they were found to be as:

1. Motivated teamwork for strategic ERP implementation
2. Customization and Cultural change management
3. Empowered decision making through strategic Communication
4. Project Management

13.1 Critical Issues

The research focused on the experienced responses for the problems that proved to be the hardest nut to crack during the implementation and execution process. The main issues that proved to be the greatest hindrances during the whole process were found to be:

1. BPR, Change management with empowered decision making extended to end user
2. Budgetary constraints along with Project Team work and training management
3. Implementation strategy for Data conversion and post work evaluation
4. Government regulations and client consultation for business case

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