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Users Satisfaction and ERP Implementation Success

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Abstract: An Enterprise Resource Planning (ERP) system encompasses the mechanisms and inklings conducted for the solidified management of enterprise as all-inclusive from the discernment of consequential exertion of management expedients to embellish the expedience of the business. Several organizations have implemented ERP system but none of them has claims the desire results. User satisfaction is considered as central indicators of ERP project success. This study was conducted in Pakistani industry with the purpose to indentify and ensure potential success factors of ERP implementation. On the bases of extensive theoretical underpinning, measurement constructs of success factors of ERP implementation were identified. Survey instrument was developed from those success factors. Total three hundred and fifty questionnaires were distributed randomly to ERP users working in Telecom, engineering, Oil and Gas and Government sector. Out of distributed questionnaires two hundred and twenty eight (N=228) questionnaires were retrieved back. The responses were systematically entered, cleaned, and screened in statistical package for social science (SPPS). The core statistical techniques used in this study are regression and correlation analysis. The study finds that user satisfactions have positive and significance relationship with perceived usefulness of ERP system, Perceived ease of use of ERP, Internal support and compatibility of ERP system whereas as results demonstrability of ERP system is found to insignificantly related to ERP user satisfaction. The study further investigates that perceived usefulness, perceived ease of use, internal support, and compatibility of ERP system is perceived as important factors for ERP success. The findings suggests that all those interested in better business results and reliable business solutions should consider proper procedure review of software capabilities with confined focus on results demonstrability before embarking on ERP system implementation.

Key words: *Enterprise Resources Planning, Success Factors, User Satisfaction*

1. Introduction

Enterprise Resource Planning (ERP) is all about planning of resources within the organization in order to produce optimum results. Here, resources may include investment/ capital, human resources, data, machines, building etc. Management of all resources manually or by semi-computerized system is cumbersome task and needs efforts. So, in 1960 after failure of MRP1 and MRP11 this crude concept of resources management evolved. Upon having futuristic vision and after detailed need assessment, German programmers brainstormed this idea and came up with SAP in 1990. Meanwhile, Oracle has also introduced Oracle Financial in competition of SAP. Later, companies faced lots of issues pertaining to real-time business processes. It has been figured out that real-time data enables quick management and financial decisions.

ERP works under umbrella of BI (Business Intelligence). Enterprise Resource Planning (ERP) arrangements are changeable intellects and information system (IS) compendiums that adheres numerous enterprise objectives. An indubitable Enterprise Resource Planning (ERP) structure can synchronize stock data with sales, financial, and human resources data, apportioning firms to cost goods, elicit financial statements, and grasp financial, human and material domains imperiously (Markus *et al.,* 2000). ERP system implementation is a mechanism of capacious cabalism, with bulky circumstances and evocations imaginably enticing the execution. These caveats can have certain consequences on results of ERP development, whereas their non-existence can induct dilemmas throughout implementation. After winning global success, ERP has attracted interest of the researchers from both business and IT fields specially accounting and finance. This global success of enterprise resources planning has shifted the theme of computerized information system from information technology domain to business domain including ERP configuration, Mapping and design, and results generation. Sumner (1999) and Stefanou (2001) observed that management efforts have confined their attentions on ERP system implementation

rather on system design. Though ERP implementation requires keen consideration and care but on the other hand, system design has relatively much more importance.

In contemporary era, the appropriation, instrumentality and use of Enterprise Resource Planning systems have become a conventional component of most local and multinational businesses in Pakistan. Major public and private sectors of economy have implemented ERP systems for smooth business processes, but unfortunately none of these sectors have claimed desired results from ERP system implementation.
ERP System's performance was disappointing in many aspects that brought a feeling of despair in IT community. In the light of all prevailing studies and research work, it has been identifies that one of the biggest dilemmas with exerting ERP is travesty what ERP is all about and misjudging what it acquires to employ it imperiously. Due to lack of structured methodology and disregarding of ERP system by management, ERP system often fails in Pakistan. Though, there are many other factors involved in facing this failure but still higher management look upon gaining desired results. The need of identifying failure factors has been felt strongly and for this reason, study has been conducted. The main purpose of this study is to formulate framework for successful Enterprise resources planning (ERP) systems and to identify success factors. Ultimately, the design structured methodology will be discussed based on success factors.

2. Literature Review

Extensive literature is cited on Enterprise resources planning (ERP) system success and failure. During last decade, numerous studies have been performed to determine the elements influencing ERP implementation attainment and collapse. Rockhart (1979) was one of the first scholars to analyze cavilling ascendancy success factors of Information Technology (IT) expediencies. Some of the literature studies on potential success factors of Enterprise resources planning (ERP) system are described below. (Markus et al., 2000) stated that because of high breed of managerial and technological abstruseness colluded through the formulation and expediency of information system, the mechanism may confound technological and administrative decisions. Due to this hindrance, many firms acquire their Enterprise resources planning (ERP) systems as an alternative of developing it in-house. During acquiring this third-party solution, many issues are faced. All-too-common in-house deficits of either schedule or distinguishing aptitudes, vendors, and suppliers can comport important fill-in positions (Willcocks and Sykes, 2000). Thus, businesses frequently capitulate, with the Enterprise resources planning (ERP) developer or an extraneous Information system service provider having idiosyncratic Enterprise resources planning (ERP) instrument information, to allow a curator action that suits the firm's desires without adhering to assimilate the convolutions and intricacies of the Enterprise resources planning (ERP) system.

The effect of employing Enterprise resources planning (ERP) implementation in a firm does not though, coherently ascertain prosperous. Many capacious firms have ensconced an Enterprise resources planning (ERP) implementation but had to abdicate their instrumentality (Soh *et al.,* 2000). In envy of the dilemmas, many midsize businesses are now also dawned to touch ERP. However, due to the obscurity of system instrumentality, the action may be exorbitant. Therefore, management of organization is presumable to an evaluation of system. Client acceptance of technology can be view as important success factor in information system implementation. User appeasement is revered as a good alternate earmark of information system furtherance (Seddon and Kiew, 1994).

User atonement is the degree to which users assent the information system obtainable to them congregates their advocacy compulsions (Ives *et al.,* 1983). Additionally, it is amassed that patched endeavour will mechanically eventuate if the inference congregate information desires. This does not insinuate that contentment drives presentation. Performance and user penance are both brought adjacent the calibre to which in-exorabilities are met (Gelderman, 1998). Hence, Abdinnour-Helm *et al.,* (2003) acknowledged that client's approaches were consequential to Enterprise resources planning (ERP) implementation concert. They also exerted user redemption as a central apportion of ERP performance. Jen and Yu (2006) stated that Enterprise resource planning (ERP) is currently enumerated to survive the cost of foyer for breakneck an industry. Although, ERP programs are abstruse and exorbitant, and the choice to embed an Enterprise resources planning (ERP) system accommodates an alternative of approaches for substantiating whether Enterprise resources planning (ERP) is coveted and, once implemented, whether it is progressive. User atonement is one assessment discipline for ascertaining system furtherance. Several researchers have identified the reasons for adoption of ERP solutions. There

are many behavioural aspects associated with the phenomenon of using Enterprise Resource Planning (ERP) systems. It has been pragmatic that an organization invests huge amount on implementing such systems in an organization, whereas, there are very less number of potential users who will use that system.

Rita *et al.,* (2007) considered technology acceptance as service in which much of service is sustained by Information Technology (IT), the excellence of the service frequently depends on how the technology is used. Infarct, most employees only use a portion of the functionality obtainable on their desktop. While, other people do not even bother to explore available features. This tendency may also depend on their behaviour. Therefore, research is carried out on association of behaviour and technology approval. Nevertheless, this study has also combined several factors into a single model. It has been focused that several personality traits effects technology acceptance. This study has revealed critical aspects that have never been focused earlier in qualitative domain as proposed model consists of optimism, innovativeness, discomfort, and insecurity. All of these soft skills have proved significant impact on ERP implementation and usage. The investigation exposed that behavioural characters had the accepted impact on user observations. Amazingly, innovativeness was negatively linked to effectiveness. Authors have mentioned implications of this study in many business environments as indicator of success of any implementation and managers should keep in mind about these causes and effects.

Boo and Mirosław (2007) postulated that the rising trend of adopting integrated business solutions has brought up many advantages. This setup has also encountered many issues as compared to some fields as in production. Therefore, it requires special consideration while planning to undertake a big implementation in an organization. Authors have combined several existing models and proposed a new ERP success model. Those success factors are briefly discussed which are critical in ERP success. Authors supported this study by means of a survey. However, it is important to examine the factors prior to any implementation and decision makers can take maximum benefit from this. Adel (2001) pointed one of the major aspects in any organizational environment as handling change. In any working environment, most of the employees are reluctant to adopt changes quickly. While implementing ERP systems, its basic responsibility to check how to manage expected changes? There is high level of hindrance faced by end users regarding implementation issues and all those need to be handled effectively. By adopting a proactive approach, there are less chances of ERP systems failure. Authors have discussed change management strategies by discussing a framework. Apart from this, a model related to successful implementation is being elaborated and proposed. This framework consisted top management responsibilities to manage change according to several aspects. Each phase consists of relevant procedures for adoption.

Alan *et al*., (2008) have focused on software development life cycle and stated that ERP follows a specific life cycle that is called software development life cycle (SDLC). In this cycle, certain stages are common and pre-defined for software development. These stages are requirement gathering, analysis, plan, coding, implementation, trying, and feedback. However, these phases may vary from project to project. Their research paper focused on complete life cycle that is followed for ERP projects specifically. In addition, it consists of four stages as training and guidance, presentation and effectiveness, evolution and continuance. By focusing on this suggested phased model, success rate of ERP implementation may increase significantly. Davis (1986) conceived the Technology Acceptance Model (TAM), modulating the Theory of Reasoned Action (TRA), characteristically adjusted for modelling client approval of information systems. The goal of Technology Acceptance Model (TAM) is to describe the determinants of computer accession accompanied to user action across genuine amplitude of end-user computing technologies and user incumbents. In appurtenance, TAM allows a compulsion for charcoal the impact of estranged variables on internal creeds, attitudes, and purposes. TAM was constructed with aim to apprehend these agendas by disinterring a small number of aboriginal variables recommended by earlier study apportioning with the cognitive and sentimental determinants of information system acquiescence, and using TRA as a theoretical background for modelling the theoretical associations among these variables (Davis 1989). Results demonstrability and software compatibility in terms of data conversions and data mining is considered to be equally important with perceived usefulness ease of use and internal support to execute and implement ERP system in organizations.

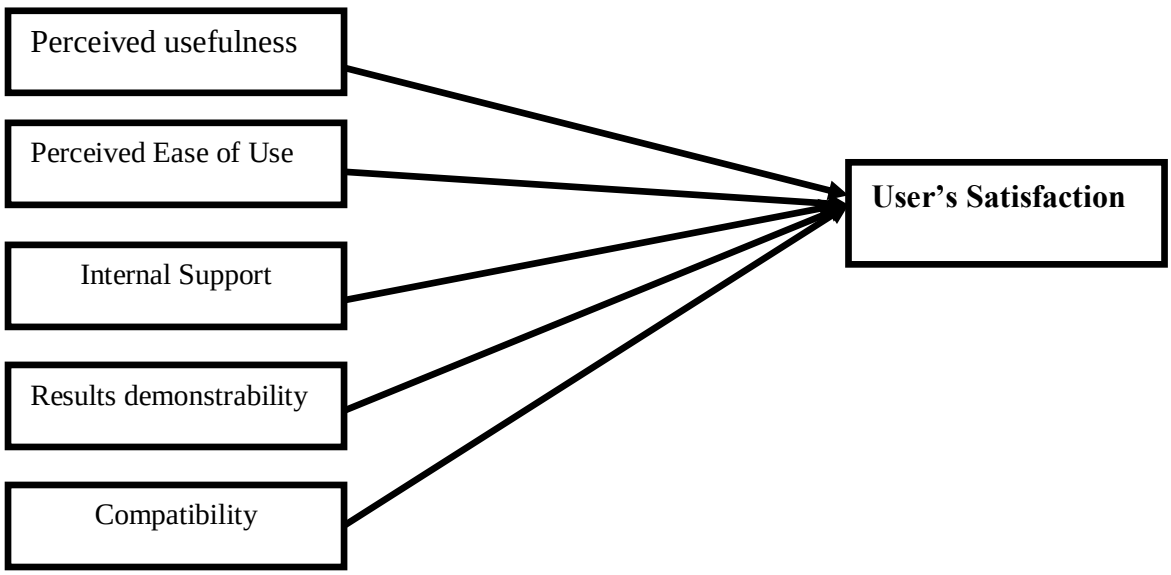
Zviran *et al.,* (2005) noted that contemplated usefulness empowers employer satisfaction in ERP systems. Gympah and Salam (2004) showed that training and project assertion mandate apportioned certitudes about endowments of technology and these certitudes clout perceived usefulness and ease of use of the

technology. Job connotation, output intensity, and result demonstrability denotationally led user acceptance. End-users' contrariness or disinterestedness to choose or exercise the topically employed ERP system is frequently cited as one of the core reasons for ERP collapses (Krasner, 2000, Nah and Lau, 2003; Wah, 2000). Perceived compatibility and conceived ease of use adhering both admonish and circumstantial effects on integral adoption of enterprise resources planning system, while contemplated convenient and perceived usefulness enfranchisement integral adoption by being fully accommodated accomplished attitude (Wah 2000).

Zairi and Sinclair (1995) ranked leadership facilitator of large transformation efforts. ERP implementation can only be accomplished when senior management is totally committed to the initiative. Management commitment and support is the ultimate strategy that will secure the necessary conditions for successfully introducing the change brought by ERP into the organization. The commitment of top management should be emphasized throughout an organization. This is the first step of ERP implementation.

With the reverences of above context, this study explored a different potential success factor which drives user satisfaction and hence, formulates success strategies for successful implementation of ERP system for those organizations who have implemented ERP systems or those have intention to implement ERP system in near future. Those factors are visualized in proceeding section of conceptual model. This study is unique in number of aspects. First, earlier studies on success factors have been carried out for developed nations whereas; this study is indented to carry out for emerging market with strong focus on Pakistani industry. Secondly, broadening segments at the existing age has been appeared towards those decision making and strategic contexts of exercising analogous mechanisms, whereas this study focuses on indentifying and validating the success factors for management before embarking on decision making and strategic contexts of exercising analogous mechanisms. The core objectives of this study are to provide insight of Enterprise resource planning successful implementation, to develop a mechanism for management for ERP success considerations before and after implementation, to ensure that user satisfaction can be achieve vide mentioned factors discussed in conceptual model. The main objective of the study is to find out possible relationship between user satisfaction and perceived usefulness of ERP, perceived ease of use, internal support, results demonstrability and compatibility of ERP system. Other objective is to ensure that ERP user satisfaction can be achieved through a specialized approach on focusing on core dimensions of ERP success factors.

Research Model and Hypothesis: Conceptual Model of Successful Enterprise Resource Planning (ERP) System implementation



Research Model: The below model for successful framework of Enterprise resources planning system is developed based on extensive theoretical underpinning. This model comprises of five predictors of user satisfaction. These facets include perceived usefulness, perceived ease of use, internal support, result demonstrability and compatibility of ERP system. Earlier, different studies have found considerable

relationship of the above mentioned success factors with each other and with user satisfaction, which is infact core element of successful implementation of enterprise resource planning system. On the basis of extensive literature review and conceptual model, the following hypothesises need to be verified during this study.

H1 : There is positive relationship between perceived usefulness of ERP and user satisfaction
H2: There is Positive relationship between perceived ease of use of ERP and user satisfaction.
H3: There is positive relationship between Internal Support and user satisfaction
H4: There is positive relationship between Results Demonstrability of ERP and user satisfaction
H: 5: There is positive relationship between compatibility of ERP system and user satisfaction.

3. Methodology

Sample: Target population was ERP users of Rawalpindi – Islamabad. The sectors choose for the target populations were Oil and Gas, Engineering sector, Telecom and Government sector. These sectors were chosen because of their ERP implementation and these sectors faced major issues in ERP implementation. Three hundred and fifty questionnaires were distributed to the target population. Of those two hundred and twenty eight questionnaires were collected back. Questionnaires were distributed randomly to end user of ERP. Questionnaire consisted of two Parts. First section comprises of demographic information of ERP users and second part comprises of measurement constructs of user satisfaction of ERP. The data was screened and analyzed in statistical package for social sciences (SPSS) version 17.0

Instrument and Measures: This research study is constituted purely through primary data source. Different scales of potential success factors of ERP were adopted from the research study of Chug and Miroslaw (2007) and Walczuch *et al.,* (2007). The survey instruments consisted of six constructs of ERP system success. These six constructs includes perceived usefulness of ERP, perceived ease of use, internal support for ERP system, results demonstrability of ERP system and compatibility of ERP system. Five point Likert scale of 1 for strongly disagree and 5 for strongly agree was as used to capture the response of ERP system users.

Reliability and Normality: The reliability and internal consistency of the constructs were checked by means of Cronbach's alpha. The results of alpha are encouraging and presented in the proceeding discussion. Normality of data was check through different statistical methods like skewness, kurtosis, Q-Q plots, and outlier's detections techniques and few outliers were identified in data set. Those outliers were deleted and missing responses were filled by "Taking series mean" method.

4. Results and discussion

The response rate of sixty five percent was reported as out of total distributed questionnaires two hundred and twenty eight responses were collected back. The data report gender, qualification, and work experiences of the respondents. The demographic statistics in Table-1 reveals that survey captured only 10.5 % of female and 89.5% males ERP users. The table further demonstrates that majority of the ERP user qualifications are reported as bachelor degree and professional qualifications. Likewise on average work experiences of ERP user reported is between 4-6 years.

Table -1 Demographic Statistics of Survey Respondents

		Frequency	Percent
Gender	Male	204	89.5
	Female	24	10.5
Education level	Bachelor	119	52.2
	Master	37	16.2
	Professional education	72	31.6
Work Experiences	Less than 3 years	22	9.6
	4-6 years	132	57.9
	7-10 years	74	32.5
	Total	228	100.0

Table -2 Descriptive Statistics of User Satisfactions measurement constructs (N= 228)

Variables	Mean	SD
Perceives usefulness	3.9123	.67767
Perceived ease of use	4.0526	.70670
Internal Support	3.7807	.46477
Results Demonstrability	4.0263	.55468
Compatibility	3.9956	.59733
User Satisfaction	4.1667	.68870

The table-2 divulges respondent's preferences in term of agreement and disagreement toward particulars success factors of ERP system, mean, and standard deviation. Table -2 further reports that majority of the survey participants are tends toward agreement regarding perceived usefulness , perceived ease of use , Internal support, results demonstrability and compatibility of ERP system with the mean and standard deviation of (3.9123, 0.67767),(4.0526, .70670), (3.7807, .46477),(4.0263, .55468) and (3.9956, .59733). Table -2 further demonstrates that survey respondents profess perceived ease of use and results demonstrability more as compared to other success factors of ERP implementation.

Table-3 Regression Analysis of ERP success factors with ERP user Satisfaction

Dependent Variable: user Satisfaction (US)

	Constant	PU	PEU	IS	RD	CP
Co-efficient	.300	.222	.134	.130	.171	.467
Std.Error	.374	.068	.062	.063	.069	.086
t-statistics		(3.271)	(2.183)	(2.065)	(.247)	(5.417)
P-value		*.001*	*.030*	*.040*	*.805*	*.000*
F- statistics	50.023					
P-value	.000					
R-Squared	.530					
Adjusted R-Squared	.519					

Level of significance = 5%

Table-3 depicts the result of multiple regression analysis. The results cover predictors of user satisfaction (regression co-efficient), standard error, t- statistics with associated significant values, model fix index (F-statistics) with associated probability values, R-Square and adjusted R-square. The results of table -3 further reveal that regression model is significant (F=50.023) (P<0.05) with adjusted r-square value of (.519) with divulges that user satisfaction predictors (i.e. perceive usefulness, Perceived ease of use, internal support, results demonstrability and compatibility of ERP system) accounts 51.9% variations in target variable (user satisfaction). Table further depicts that perceived usefulness of ERP system is sensitive to user satisfaction and brings 22.2% change in user satisfaction (β=.222) likewise, perceived ease of use brings 13.4% change in user satisfaction which is less as compared to perceived usefulness of ERP System. Table-3 further demonstrates that results internal support and compatibility of ERP system brings 13% and 46% changes respectively (β=0.13) (β=0.46). Result further divulge that perceives usefulness, perceived ease of use, internal support and compatibility of ERP system is perceived as significant factors of user satisfaction (t= 3.271) (t= 2.183) (t= 2.065) (t= 5.417) whereas results demonstrability is perceived as insignificant factors (t=.247).

Table -4 Reliability Statistics and Correlation Analyses of ERP success factors with User Satisfaction

	PU	PEU	RD	IS	CP	US	Alpha
PU	1						0.963
PEU	.525**	1					0.852
	.000						
RD	.093	.049	1				0.693
	.164	.464					
IS	.369**	.356**	-.029	1			0.801
	.000	.000	.666				
CP	.706**	.668**	.060	.333**	1		0.802
	.000	.000	.367	.000			
US	.617**	.561**	.060	.369**	.687**	1	0.806
	.000	.000	.370	.000	.000		

**. *Correlation is significant at the 0.01 level (2-tailed)*

Table-4 portrays correlation statistics of perceived usefulness, perceived ease of use, internal support, results demonstrability, and ERP system compatibility with the user satisfactions. Table further indicates that perceives usefulness of ERP system have positive significant relationship with user satisfaction that is (0.617). This positive relationship of perceived usefulness of ERP system with use satisfactions is consistent with the study of Zviran *et al*. (2005) in which they articulates that perceives usefulness empowers employer satisfaction in ERP systems. Similar perceptions have been documented by the study of (Seddon and Kiew, 1994). They have their point of view that user acceptance of technology can be view as important success factor in information system implementation. User appeasement is revered as a good alternate earmark of information system furtherance. Table -4 further signifies that perceived ease of use of ERP system (.561), internal support of colleagues and management for ERP implementation (0.369), and compatibility of ERP system (.687) are significant and positively related to user satisfaction. These results are in line with the perceptions of earlier researchers like Zairi and Sinclair (1995) and Zviran et al, (2005). The only factor which is found insignificant with user satisfaction which is results demonstrability which contradicts with the earlier studies. Earlier studies have demonstrated that result demonstrability of ERP system is coherent predictor of ERP system implementation.

5. Conclusion and Recommendation

This study indentified five potential success factors of ERP successful implementation based on extensive theoretical underpinning. These factors are modeled for influential predictiveness with ERP user's satisfaction. Regression and correlation analysis is executed to check the relationship between the ERP success predictors and users satisfaction. The result the study concludes that perceive usefulness of ERP, perceived as of use, Internal support and compatibility of ERP system have significant and positive relationship with user satisfaction and these factors as considered as significant predictors of ERP users satisfaction, whereas the study finds that results demonstrability of ERP system is lacking in selected organization those who have implemented ERP systems. The results of this study are consistent and reliable with the perceptions of earlier researchers study like (Zviran *et al.,* 2005; Seddon and Kiew, 1994 ; Boo and Mirosław, 2007).

Choosing an ERP solution that meets specific business requirements will enable organization has a smoother implementation, if the organization chooses ERP software that fit into the environment of business process. The study suggests that before implementing ERP solutions, proper procedures review of software capabilities in term of results demonstrability, usefulness, ease of use and compatibility of ERP solutions with in organization should be considered. This study strongly recommends that results demonstrability of ERP system is critical factors which should be consider particularly and extensive review of other procedures should be executed in all those organization who want encouraging business results.

This cross sectional study is conducted in Pakistan with key focus on Oil and Gas, Telecom, Engineering and Government sectors. Other sectors of the economy have also implemented ERP solution for their

business but due to resources constraints other sectors have not been incorporated in the study. This study did not incorporate the impact of success predictors on individual and organization. However, this study encourages researchers that individual and organizational impact of this success predictor can be incorporated to extend the success model in future.

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