Impact of Enterprise Resource Planning Implementation on Supply Chain Efficiencies: A Case of Telecom Sector

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ABSTRACT

Enterprise resource planning implementation (ERP) is becoming foundation to be the spine of the organization in competitive environment. The wide usage of ERP in organizations covers many aspects which include decision making, the reduction of operational cost and enhancement of the management control by automating and improving the corporate basic functions such as production, human resource, and finance and supply chain management system. This study aims to investigate the impact of ERP on the supply chain management in the context of semi government organization, where the ERP is practically implemented. The questionnaire survey was conducted to collect the data from MIS/IT specialist and the executives using ERP. Results indicate that training and organizational culture to be the most important factors in making ERP an overall success. These factors impact the supply chain performance measures effectively and bring efficiency if positively implemented. The results of this study will enable the companies to understand the factors important to avoid the failure in implementation of ERP and achieve the efficiency in their supply chain management. Also, it would help in technology diffusion between companies and would encourage the other companies to follow the model.

KEYWORDS: Enterprise Resource planning, Supply chain efficiencies, successful implementation.

INTRODUCTION

The current era of globalization and cut-throat competition, advancement in information technology (IT) has gained wide acknowledgement. The businesses have diverted from the traditional practices of gaining competitive advantage. The companies have realized that they need to be integrated from the very core to the end like their supplier to their customer.

In order to get the unified whole of the business, currently mostly companies are using enterprise resource planning (ERP) to produce efficiencies by integrating several functions of an organization which includes information, flow of material, resources and financial output of a company (Hammer, 2006). ERP is basically an enterprise-wide set of management tools that balances demand and supply, links customers and suppliers into a complete supply chain, providing high level of cross-functional incorporation between different functions like (manufacturing, marketing, human resources, purchasing, new product development, finance, operations, sales and logistics), so in this way people can run and establish highest customer value and long term productivity with efficiency (Chen, 2005; Moon, 2007; Rahim & Malik, 2010). This also reduces the cost and brings improvement in business processes.

Supply chain management can be seen as one of the most important areas to gain the competitive advantage. The process of supply chain can be defined in such a way that it is the collection of entities which involves in the process of new product and service, which starts from procurement of raw material and then its transformation into the semi-finished and complete finished product and at the end delivering to the customers (Barbara & Hugh, 2001; Kazmi, 2008; Lee and Billington, 1993; Swaminathan, Smith & Sadeh, 1998).

Supply chain is not limited to one single organization but it is a system supporting various organizations at a time. Toloie–Eshlaghi, Asadollahi and Poorebrahimi (2011) describe supply chain as a combination of different organizations which co-operate in certain activities from purchase of raw material from supplier to the provision of finished product to the end users in an integrated manner.

In special view of implementing ERP for Supply Chain management (SCM), the application of ERP increases the efficiency of SCM. Shatat and Udin (2012) illustrates the relationship between ERP and SCM that there is a significant positive relationship between ERP system and performance of SCM as ERP integrates the internal business process, flow of information and collaboration with the suppliers as well as customers.

The implementation of any application of information technology is not an easy job. It needs highly considerate effort to implement successfully. Bancroft, Seip and Sprengel, (1998) elaborated the factors which are the key important contributors in successful ERP implementation starting from the top management's concerns regarding their supports in successful implementation and then proper communication with all the stake holders. It is vital to ensure that all of the users or workers are well aware and equipped with the information and communication technology and they can easily use the system of ERP.

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In Pakistan the use of information technology oriented system is low as compared to other developed countries. Now with the robustness of technology and the demands of business, its use is increasing with every day and gradual shifts have been seen in past decade from manual systems to information technology oriented systems in Pakistan. The enterprise resource planning (ERP) is one such technology oriented system. In order to cash the benefits from implementation of ERP, there are certain concerns which should be addressed before, during and after the implementation of any change driven system including ERP. This research will help organizations in Pakistan, which are in process of adopting the enterprise resource planning system to increase their supply chain management system with the information about the factors that ensure the successful implementation of enterprise resource planning.

This research endeavors to find out the impact of successful ERP implementation on the supply chain management, keeping in view the sub factors involved in both; the process of ERP implementation and the supply chain management. This research takes the focused case of ERP implementation in Pakistan telecommunication company limited (PTCL).

LITERATURE REVIEW

Enterprise resource planning has been seen as the well renowned business activity thorough out the globe. This system has magnificent fringe benefits associated with it like, it helps in improving customer services, and it helps in improving production capabilities and reduces overhead costs incurred during the production processes. With all these benefits, this enterprise resource planning system has been seen as a complex and risky system (Keskinocak & Tayur, 2001; Zhang, Lee, Zhang & Banerjee, 2003).

If defined technologically, ERP is referred to be a suite of application modules connecting not only front and back-office operations but also the internal and external supply chains. Ie-Ray, (2003) analyzed that ERP improves the SCM competencies as well as customer responsiveness and satisfaction as it is able to automate the business processes and deal with changes. ERP system has a huge impact on organizations and on businesses around the globe (Cook, Heiser, & Sengupta, 2011; Jain & Benyoucef, 2008; Janvier-James, 2011).

It has been observed that most of the organizations adopt ERP system with the goal of improving the system which includes their management, strategic accomplishment, IT and infrastructure, operations and ultimately their business (Zhang, Donk, &Vaart, 2011). There are six ways in which an ERP system can be supportive for organizations; integrated information flow between different functions of an organization and making it available to the entire organization. Davenport, (1998) integrate various primary business activities, workflows, tasks, functions, and processes, and secondary activities with primary activities. Common master data source for organizations (Rahim, 2010); provides practical implication of best practiced model (Kumar & Hillegersberg, 2000); decreasein the use of computer systems (Barki & Pinsonneault, 2005) and replace old legacy systems (Chang & Cheung, 2008); deliver functionality (Soh, Siah, Boh & Tang, 2009).

Devenport (1998) elaborated that enterprise resource planning has been considered as the most dominant element of information technology robustness. Nah and Lau (2001); Ruivo, Oliveira, Johansson and Neto, (2013); Zhou-Sivunen, (2005) highlights that this system of ERP can be considered as a software which further includes many different modules like sales and finance, production, human resource and linking all business process and provides coherence between all activities of businesses. Al-Fawaz, Al-Salti and Eldabi, (2008); Hwang and Min, (2013); Wieder, Booth, Matolcsy & Ossimitz, 2006) suggests that ERP system bridges between different aspects of the organization and provides coherence and linkages between distributors and suppliers and between customers with a shared data infrastructure.

Supply chain efficiency is one of the primary objectives of ERP Systems but supply chain has its own number of variable which may impact its efficiencies along with main impact of ERP. Malik, Saif, Gomez, Khan and Hussain, (2010); Themistocleous, Irani and Love, (2004) declares that a traditional supply chain has four tiers with numerous facilities at each level as supply, manufacturing, distribution and consumer. One of the important factors in supply chain efficiency is the measure of its performance. They also states that the supply chain performance measures are cost, activity time, flexibility and combination of cost and customer responsiveness.

Lee, Padmanabhan and Whang, (1997); Swaminathan and Tayur, (2003) state that the distorted information from one end of supply chain to the other end is declared is the cause of inefficiencies in the system. The involvement of distributors causes the variability while that at the part of retails is somewhat less fluctuating (Barbara & Hugh, 2001). This research includes the Bullwhip effect as the major reason of demand fluctuation as the order moves up to the supply chain. The research mentions common symptoms of demand variation as the poor product forecast, excessive inventory, insufficient or excessive capacity, poor customer service due to unavailable product or long backlogs, uncertain production planning and high cost for correction(Wieder, Booth, Matolcsy & Ossimitz, 2006). The research also indicates the findings of innovative companies that coordination and planning can control the bullwhip effect. It states that the information distortion can be covered by electronic data interchange. This also finalizes that the demand variability can be

reduced by using multiple forecast updates as well as the just-in-time inventory can help this situation out (Chang & Cheung, 2008; Ragab, 2009).

The main factor affecting the efficiency of supply chain as mentioned by Lee, Padmanabhan and Whang (1997) is *warehouse management*. Malik, Saif, Gomez, Khan and Hussain, (2010); Wixon and Watson (2001) target the factors affecting data warehouses success. It illustrates the concept of data warehouse, a repository of data for the purpose of decision making, has been created in the past. The data warehousing has its own suppliers responsible to deliver the data to the end users of warehouses such as analyst, operational personnel and managers. The data warehousing is adopted keeping in view the global competitive, complex & volatile environment and the changes are affecting how organizations conduct business in different fields. But these researches ignore the importance of other factors as risk and uncertainties (Attaran, 2012; Paqarizi & Hsu, 2013).
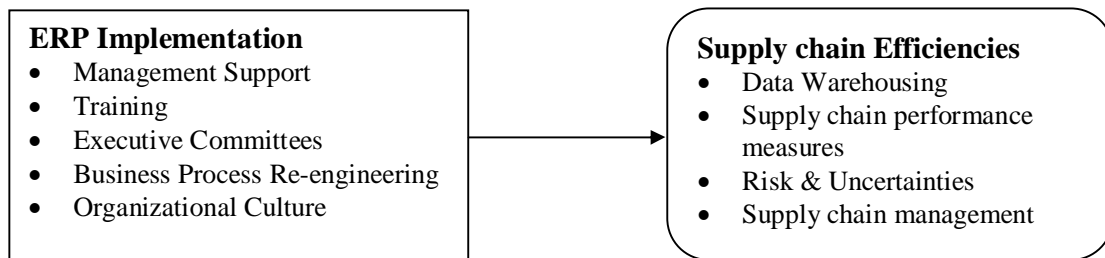
A research made on ERP and SCM by Barki& Pinsonneault, (2005) demonstrates the benefits of replacement of traditional manual systems with ERP resulting in reduced order cycle time, throughput time, and customer response time and delivery speed. The delivery speed is also an important measure of the supply chain efficiencies ignored by above mentioned researches.

ERP, moreover, reduces the overall operational capital & headcount of financial area and ensures synchronization of operational processes. About Supply chain management, the research indicates ERP's role in better operational and business planning. SCM system's real time planning capabilities react quickly to supply and demand and mitigate the bullwhip effect. The research by Arli, Dylke, Burgess, Campus, & Soldo, (2013) finds out that value destruction is avoided with reduced planning and forecasting errors.

The research model used by Cook et al., (2011) extended the ERP system to four constructs i.e. operational, managerial, strategic, IT infrastructure, and organizational benefits, and three constructs for SCM competencies as operational, planning and control, and behavioral processes.

Another research made by Chandra and Kumar (2000) indicates the common issues in supply chain integration are organizational structures and associated relationships, supply chain coordination, inter and intra-enter communication. The use of ERP as a *supply chain management system* can elaborate success for organizations. The paper has concluded the success of suppliers and customer satisfaction as both long term success for firm as well as the entire supply chain. The interrelated systems of material and capacity planning, inventory, logistics and production system are now integrated with the availability of information technologies.

The supply chain efficiencies are greatly affected by the *risk and uncertainties in supply chain*. Kraljic, (1983) has presented the risk and uncertainties related to the value of the product and service. The risk and uncertainties involved in product/service supply chain are influenced by the positioning made by buyers and sellers. In the light of existing literature following model is developed.

ERP Implementation
- Management Support
- Training
- Executive Committees
- Business Process Re-engineering
- Organizational Culture

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Supply chain Efficiencies
- Data Warehousing
- Supply chain performance measures
- Risk & Uncertainties
- Supply chain management

Research Model

ERP implementation has great potential but this process may not always be successful. The success of ERP implementation is dependent upon many factors. The role of management is one of those important factors. Positive role played by management is most probably conducive for success of ERP implementation. The research studies conducted by Liu, Wei, and Hua, (2013); Jamshidi and Jamshidi, (2013); Prajogo and Sohal, (2013) support the *role of management* as critical success factor for implementation of ERP.

The role played by management may affect directly or indirectly depending upon the integration and interdependence of organization's functions. Sharma and Yetton (2003) indicates the moderating effect of task interdependence on the role of management support in successful implementation of information System innovations. This research stresses the support from management because of resource intensive nature of IS innovations. The insufficient support of management for IT interventions can have many reasons as Zhou-Sivunen (2005) elaborates that most of the managers and leaders might fail to realize the risks, high costs, and other related changes and clashes to implement the ERP system which may ultimately result in inept backing from all stake holders and management. Chen, Sohal, and Prajogo, (2013) indicates that top management and project managers play vital role in successful ERP implementation. Moreover data conversion, business process reengineering from legacy system and employees learning and training are found as main issues in ERP implementation. In the light of literature the following hypothesis is developed.

Another important factor affecting successful ERP implementation is *User Training*. The user training is important for all Information Technology interventions as the users need to develop skill to use the IT system effectively. This is supported by the research made by Jain and Benyoucef, (2008) which emphasizes the *User training* which needs heavy investment for development of software-specific skills in users. The failure to realize the importance of training may lead to devastating effects. Xiaohui, Xin, Hongzhi and Ming, (2012), made a research and found that mostly the employees and users do not have sufficient education of ERP implementation, which further includes the information about the system, about expected changes, clashes and results and all the relevant issues which ultimately leading towards the negative and wrong impact and potential conflicts during implementation of ERP. This research demonstrates the importance of education and training about ERP system, whose failure results in incapable support from management.

Along with the importance of role of management and user training, role of steering Committee can't be ignored as the committee is mainly at the helm of affairs regarding the decision making. The research made by Zhang et al. (2002) found the importance of *role of steering committees* who participate in the team meetings and monitor the ERP implementation efforts, spend time with people and provide clear directions of the project. The significance of role of steering committee in decision making is illustrated by the research made by TouVai, Lee and Negreiros, (2012); Lin, Kuei, and Chai, (2013) stresses the consensus based decision making of committee and the delegation of decision-making authority to the project team should be based on the satisfactory results rather than traditional seniority system.

The ERP implementation brings major change in the organizations. Business enterprises working at different countries use their own styles of doing business activities and this is because of different business practices and indigenous requirements produced by local and national differences. So, the preliminary strategy had to be improved by permitting local solutions and decentralized ERP implementations, in order to avoid the clashes in processes and implementation of ERP (Boh, Sia & Soh, 2000). The research made by Ageron, Lavastre, and Spalanzani, (2013); Hammer, (2006); Tseng, Wu, and Nguyen, (2011) represents the finding that the business requires the *reengineering of the current business processes* to the best business process standards. The ERP and Business Process Re-engineering need to be coherent and integrated. Zhou-Sivunen (2005) assumes the positive impact of merging the ERP software modification and business process reengineering having an overall positive influence on ERP implementation.

Another very vital component of an organization is its *culture* which needs to be molded if some change is to be brought. No intervention can be successfully made by ignoring culture which is a very significant part of organization's being. As ERP brings change in traditional business style, so a support should be provided by the organization's culture. A research made on the *organizational culture* and ERP implementation in china has stated that the culture of the organization impacts ERP implementation, particularly to the nation like China, which is having multifaceted traditions and cultures in the business organizations. Organizational culture is extremely surrounded by the national culture (Rahim, 2010). But besides this, ERP implementations are compound activities. The rate of success in China about the implementation of ERP is at 10%, which is tremendously very low. This indicates the existence of particular characteristics in Chinese organizational culture and tradition. These are found to be quite different from the mentality exist in Western societies in ERP system, which might have an acute effect on ERP implementation (Hald & Mouritsen, 2013).

Even other than ERP, Organizational culture is known to be important in the success of all projects involving significant organizational change (Stewart & Ammeter, 2002). Ruivo, Oliveira, and Neto, (2012) finds out that one of the main reason for the failure of ERP is that we pay inadequate attention and interest to the culture of the organizations in which we work. A same exploration was made by Upadhyay, Jahanyan, and Dan, (2011) that most of the companies have found paying the price for avoiding the corporate culture just due to the urgency for implementing an ERP system. Cho, (2011) state that even though most companies are unwilling to admit it, there is often much in the corporate tenet and culture that negatively affects the possibility of success.

The support of organizational culture at every level of Enterprise resource planning implementation is must. Cho, 2011; Rahim and Malik, (2010); Wieder et al., (2006); advocates that in both stages, the preliminary level of ERP implementation and ERP upgrades, the issues of culture of the organization and all stake holder's involvement are found as the key ERP implementation constructs. Therefore the organizational culture has profound impact on ERP implementation. Jenatabadi, Huang, Ismail, Satar and Radzi, (2013) suggest that, as ERP systems drawn-out into developing countries, it is essential to be attentive of the effects of cultural suppositions implanted in ERP software and those reflected in developing country organizations.

Lin, Kuei, and Chai, (2013); Street and Chambers, (2013) explored the importance of the impact of organizational and national culture on the acceptance of westernized ERP software in developing countries in Asia, through the researches carried out in Sri Lanka. They debated that the business practices surrounded in westernized ERP software are likely to reveal US and European national and organizational cultures, and that when such systems are applied in developing countries of Asia, difficulties may be expected due to discrepancies between cultural traditions and practices implanted in the software and those in the client organizations so the following hypothesis is developed.

The following hypotheses are developed on the basis of comprehensive review of literature;
H1: The ERP implementation process has a positive impact on data warehousing.
H2: The ERP implementation process has a positive impact on supply chain measurement process.
H3: The ERP implementation process has a positive impact on risk & uncertainties.
H4: The ERP implementation process has a positive impact on supply chain management.

METHODOLOGY

Two research instruments are adopted in order to collect data from ERP users. The focus was to investigate the implementation of the enterprise resource planning upon supply chain efficiency. In order to maintain the validity of the constructs and scale used in this research, items for variables were adopted from previous researches. A research questionnaire was developed using the questionnaire of (Al-Mashari, Ghani & Al-Rashid, 2006; Bayraktar, Demirbag, Koh, Tatoglu & Zam, 2009; Davison 2002; Esteves et al., 2003; Everdingen et al., 2000; Hammer et al., 2001; Hald & Mouritsen, 2013; Kim, 2009; Loh & Koh, 2004; Li, 2012; Munkelt & Völker, 2013; Rosario, 2000; Sharif et al., 2005; Shehab, Sharp, Supramaniam & Spedding, 2004; Somers and Nelson, 2004; Sprott, 2000; Wei & Wang, 2004; Woo, 2007; Wu, Yeniyurt, Kim & Cavusgil, 2006).

Sample

The focus of this paper was to observe the efficiency brought in supply chain of telecom industry with the usage of Enterprise Resource planning system. Pakistan Telecommunication Company Limited (PTCL) is chosen as a sample organization. The questionnaires were distributed among 80 ERP users in PTCL. Simple random sampling is used for data collection from sample of population. The researcher collected 80 responses for the study. After exclusion of incomplete questionnaire, 75 completed questionnaires were processed resulting in almost 86.7% response rate. In this study ERP implementation process is independent variable whose impact is checked on the four factors of supply chain efficiencies, the dependent variable of the study.

Data Collection

The items related to ERP implementation and supply chain efficiency were rated using the five point Likert Scale. 1: No Emphasis, 2: Low Emphasis, 3: Neutral, 4: High Emphasis, and 5: Extreme Emphasis. As the successful ERP implementation is itself a function of many sub variables, therefore, the management support, training, business process re-engineering, executive committee and organizational culture were studied as sub-variables of the independent variable. The efficiency of supply chain is represented by many sub-variables, therefore, data warehousing, Supply chain performance measures, risk & uncertainties, supply chain management system are studied as sub-variables of dependent variable. Five items related to each sub-variable of the dependent and independent variables were added in the questionnaire, giving a sum of total 45 items.

Procedure

The data was collected with the help of adopted questionnaire as mentioned earlier. The questionnaires were distributed by personally visiting PTCL headquarter, Islamabad and the responses were collected over a period of 3 weeks. A few interviews were conducted with senior officials who were in any way in touch with ERP implementation process. This explained various factors specific to the ERP implementation in business environment of Pakistan. After completion of data collection process, the data was processed through SPSS. Step-wise multiple regression is used for statistical testing.

RESULT & DISCUSSIONS

The statistical analysis of the data was carried out by using the SPSS package for investigating into the research hypotheses. The descriptive statistics were applied to check the suitability of the data. To measure the reliability of both scales, the Cronbach's coefficient alpha was applied. The alphas ranges of both instruments factors were from 0.61 to 0.88, which are considered to be sufficient and indicate the reliability of data for further analysis.

Before using stepwise regression, a bivariate correlation with 2-tailed test was performed to find out whether a relationship exists between the ERP dimensions and the factors of SCE.

Table 1: Pearson Correlation between ERP Implementation and Supply Chain Efficiencies

	ERP Factors	DW	SCPM	RAU	SCMS
MS	Pearson Correlation	.237	-.064	.492**	.318**
	Sig. (2-tailed)	.005	.001	.000	.010
TR	Pearson Correlation	.258*	.325*	.412**	.285*
	Sig. (2-tailed)	.031	.015	.001	.022
EC	Pearson Correlation	.319**	.023	-.077	.053
	Sig. (2-tailed)	.010	.04	.543	.673
BPR	Pearson Correlation	.312*	.010	.244	.295*
	Sig. (2-tailed)	.011	.937	.050	.017
ORG	Pearson Correlation	.600**	.346**	.128**	.319**
	Sig. (2-tailed)	.001	.005	.002	.010
	** Correlation is significant at the 0.01 level (2-tailed).				
	* Correlation is significant at the 0.05 level (2-tailed).				

The research study emphasized the role of management and this was proved by the result of Pearson's correlation. The role of management is positively and non-significantly (0.237, 0.058) related to data warehousing in any organization. The strategies designed by management and its role in opting for the suitable software and systems impacts the data warehousing effectively which results in efficiency of Supply chain management system.

The role of management has negative and non-significant relation with Supply chain performance measure (-0.064, 0.611). This may represent the case of sample (PTCL) as the performance measures are defined different for different nature of works in a supply chain. The non-significant relationship may represent the diversified nature of decision makers in different departments of sample organization. The role of Management support has a moderate and significant relationship with Risk and uncertainties (0.492, 0.000).

The significance shows that it impacts the risk and uncertainties faced by the supply chain efficiencies while the moderate level relationship with risk and uncertainties shows the impact of external factors which may pose risks to the supply chain of an organization as supply chain is not completely an internal matter. The relationship between the management support and supply chain management system, as hypothesized in research, is positive and significant (0.318, 0.010) as the support of management is necessary to design any system within the organization.

The second important variable which impacts the supply chain Efficiencies is Training of users of ERP. The literature shows significant importance of ERP training to increase the efficiency of its use. The statistical analysis, however, doesn't show a very significant relation of training with increase in supply chain efficiencies. The relationship between training and data warehousing is positive but non-significant (0.258, 0.038) which shows that training impacts the data warehousing effectively but not all the change in data warehousing efficiency is brought by training. The factors may impact the data warehousing also. The training is weak positively and non-significantly (0.052, 0.678) related to the supply chain performance measures. This may represent the one-time training given to apprise the performance of system or the innovations in IS which may measure the performance against several measures for themselves.

These systems definitely don't need any training at all. The relationship between the training and risk and uncertainties is moderately positive (0.412, 0.001) which shows that by giving proper training about the use of ERP may reduce the internal risk and uncertainties while the external risk may exist even when training is provided. The training has weak and non-significant relationship (0.285, 0.022) with supply chain management systems as system is not trained, rather the people are trained in any organization.

The research shows significant impact of executive committees in the matters where decision making is involve like the investment in IS innovations. The data analysis shows that there is positive and significant relationship (0.319, 0.010) between executive committee and the data warehousing as it involves the investment in Information system and the decisions are made by executive committee. The EC has weak positive and non-significant (0.023, 0.854) relationship with supply chain performance measures.

This weakly positive relationship shows the nature of one-time decision made regarding a sound investment while the non-significance shows that there are other important factors which may impact the decision making other than the opinion of executive committee. The relationship between Executive committee and risk and uncertainties is weak negative and non-significant while EC has weak positive and non-significant (0.053, 0.673) relationship with supply chain management system.

The Business process re-engineering has a weak and significant (0.312, 0.011) relationship with warehousing. The relationship between BPR and Supply chain management system is weak positive and non-significant (0.010, 0.937). There is positive and significant (0.244, 0.050) relationship with risk and uncertainties as the new process may not surely bring a positive result. The Business process re-engineering involves high risks and uncertainties as shown by the data collected through questionnaires. There is positive

and significant (0.295, 0.017) relationship with Supply Chain management support. The business process re-engineering involves the entire change in systems and the data supports this fact.

The organizational culture, as the research hypothesized, is a very important variable which impacts the efficiencies in supply chain. The data analysis shows that organizational culture has strong positive relation with the data warehousing (0.900, 0.000) as the acceptability of new interventions in the existing system. the organizational culture has weak positive and significant relationship with risk and uncertainties(0.128, 0.311) which means that the culture can affect the risk and uncertainties involved in system adoption to some extent while the culture has positive and significant (0.319, 0.010) relationship with supply chain management system. After Bivariate correlation, the stepwise regression is applied to check the relationship of ERP implementation process and supply chain efficiencies.

Table 1: Stepwise regression for the Implementation of ERP impacting Data Warehousing

Model		R Square	Un-Standardized Coefficients B	Standard Error	Standardized Coefficients Beta	t-Statistics	Sig.
1	Constant		2.700	0.210		12.863	0.001
	Mgt. Support	0.504	0.281	0.059	0.406	4.740	0.000
2	Constant		2.906	0.231		12.579	0.012
	Mgt. Support		0.414	.088	0.598	4.695	0.000
	Training	0.609	0.202	.100	2.56	2.015	0.046

Dependent Variable: Data Warehousing

In Table 1, results shows the value of R^2 in the first model represents that 50.4% variation in data warehousing is brought by management support while 60.9% variation is explained by combined effect of management support and training. The value of t-statistics with 0.001 significance level shows the rejection of H_o for first hypothesis. It is also noted that *t* value for *B* coefficient is significant in all models ($p< .005$) which shows that the variations explained by the model is not due to chance.

Table 2: Stepwise regression for the Implementation of ERP impacting Supply Chain Measurement Process

Model		R Square	Un-Standardized Coefficients B	Standard Error	Standardized Coefficients Beta	t-Statistics	Sig.
1	Constant		1.042	0.486		2.144	0.003
	Mg. Support	0.325	0.559	0.0357	0.595	15.305	0.000
2	Constant		6.625	1.598		4.146	0.000
	Mgt. Support		0.562	0.036	0.598	15.587	0.000
	Training	0.445	1.654	0.452	1.40	3.663	0.000

Dependent Variable: Supply Chain Measurement Process

In Table 2, results shows the value of R^2 in the first model represents that 32.5% variation in supply chain measurement process brought by management support while 44.5% variation is explained by combined effect of management support and training. The value of t-statistics with 0.001 significance level shows the rejection of H_o for second hypothesis. This shows that there is a also significant impact of Management support and training with values (0.562, 1.654). It is also noted that *t* value for *B* coefficient is significant in all models ($p< .005$).

Table 3: Stepwise regression for the Implementation of ERP impacting Risk and Uncertainties

Model		R Square	Un-Standardized Coefficients B	Standard Error	Standardized Coefficients Beta	t-Statistics	Sig.
1	Constant		9.776	1.945		5.025	0.000
	Executive Committees	0.265	0.565	0.036	0.602	15.807	0.000
2	Constant		6.307	2.418		2.609	0.009
	Executive Committees	0.397	0.559	0.036	0.595	15.686	0.000
	Mgt. Support		1.413	0.456	0.120	3.097	0.002

Dependent Variable: Risk & Uncertainties

In Table 3, results shows the value of R^2 in the first model represents that 26.5% variation in risk & uncertainties brought by executive committees while 39.7% variation is explained by combined effect executive committees and management support. The value of t-statistics with 0.001 significance level shows the rejection of H_o for third hypothesis. This shows that there is a significant impact of executive committees and

management support with values (0.559, 1.413). It is also noted that *t* value for *B* coefficient is significant in all models (*p*< .005).

Table 4: Stepwise regression for the Implementation of ERP impacting Supply Chain Management

Model		R Square	Un-Standardized Coefficients B	Standard Error	Standardized Coefficients Beta	*t*- Statistics	Sig.
1	Constant		2.766	0.258		10.735	0.000
	Mgt Support	0.457	0.242	0.067	0.319	3.590	0.000
2	Constant		3.168	0.275		11.512	0.000
	Mgt Support		0.359	.074	0.472	4.873	0.000
	Training	0.554	0.247	.075	0.321	3.315	0.001

Dependent Variable: Supply Chain Management

In Table 4, results shows the value of R^2 in the first model represents that 45.7% variation in supply chain management brought by management support while 55.4% variation is explained by combined effect management support and training. The value of t-statistics with 0.001 significance level shows the rejection of H_o for fourth hypothesis. This shows that there is a significant impact of management support and training with values (0.359, 0.247). It is also noted that *t* value for *B* coefficient is significant in all models (*p*< .005).

In this research study, management support, training and executive committees (only in risk & uncertainties) are significantly affecting the factors of supply chain efficiencies. As the supply chain efficiencies involve the use of Information System innovations, therefore, training has proved to be the most important factor in increasing the efficiency in Supply Chain. The Information system brings change in organization, as this was the case with PTCL, and in this case the support of higher management has high importance. The regression analysis also shows the important impact of management support in encouraging the change brought by IS and in extending maximum co-operation in dealing with change. The research study made by Eslaghi et al (2011) explains the importance of ERP shows the importance of ERP in integration and clarification of information in the chain and the consciousness of decision making. This study also emphasizes the importance of management support for as the implementation of IS projects is time and money taking. The research by Shatat and Udin (2012) finds significant relationship between ERP system and SCM performance.

Conclusion

An overall analysis of research conducted to study the effect of successful implementation of Enterprise Resource Planning on the supply chain efficiency emphasizes various factors involved in making the implementation of ERP successful and bringing efficiency in the supply chain. The literature proved five factors important for successful implementation of ERP: the role of management, training, Executive committee, Business Process re-engineering and the organizational culture. This research study analyzed that training and organizational culture have more important role in success of implementation of ERP and thereby increasing the efficiency of supply. It is not surprising for these two factors to be more important as every naivety introduced in an organization which involves Information Technology needs training of the employee and the culture which is conducive to the positive change. The organizational set-up may collapse instead of getting efficient if IS induction is not properly planned. The role of management also impacts the successful implementation of ERP as the new system brings change and management has the responsibility to motivate people for the change. This is beyond any doubt that the information systems such as ERP bring efficiency in the working, lowering the risk of error and fatigue and bringing efficiency in the working mechanism.

This research study emphasizes the need of training the ERP users to exploit all the benefits provided by using technology. It is, moreover, imperative for the organization to have a culture which accepts change and can have a flexible shift from manual work to automation.

Recommendations

In order to meet the demands of this exponential era, the use of technology is getting an overarching importance in almost all the business areas. This study covered the telecom sector and tried to assess the impact brought by implementation of ERP on the efficiency in the supply chain. There is a need to elaborate the impact of ERP on other business areas. The research was carried out with relatively small sample and it can bring more revealing results if carried out with a large sample size.

It is, moreover, suggested to the future researcher to explore further industries where ERP has brought revolution and changed the business requirements. It can also be a way for the future research to suggest various areas where its usage has not yet been introduced and introducing ERP can bring overarching results for the business units.

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