Impact of Merging Cloud with Customary ERP in Small and Medium Scale Enterprises in Pakistan

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Abstract
Information management system changes as system enhances. Current ERP in firms is known as a customary ERP system. In recent an innovative technology, cloud emerges with enterprise resource planning and these systems shift to the cloud. These systems are labelled as Cloud enterprise resource planning systems. Cloud ERP an effective solution of a number of problems, come across by customary ERP in terms of cost, accessibility and reliability. Cloud ERP is cost effectual in term of hardware and software. The aim of this research was to persuade that merging of cloud with ERP is an appropriate alternative to customary ERP for local and heavy data storage accessibility and impact of cloud adoption in SMEs and technology, organization, environment factors that affect the adoption and transformation on cloud a survey base investigation in applying on these factors. TOE was given a broader view of IT upgrade, adoption and transformation.
Keywords: Customary ERP, Cloud ERP, Cloud Computing, Cloud merging, TOE Framework

1. Introduction

1.1 Background

Software to manage a business process in an organization is called ERP. ERP is a combination of modules. It constructs information and emerge all information of different process in one platform. In this age of information and Technology the trends change very fast from a technology perspective. From last two Decades development of manufacturing resource planning was announced and use in an organization. Then a new term Enterprise resource planning proposed and use in organizations for fast and accurate business flows. Enterprise resource planning is a business application software and a package of integrated software's to store, manage data. ERP use in decision making, cost, marketing and manufacturing. Now ERP researchers and IT Developers improve the ERP organizations. ERP is an automation of an organization and implement through software engineering and process management. ERP implement in phases. ERP gives a foundation support to operations and primary and secondary business objectives (Wieder *et al.,* 2006). Recently, business process changes according to customers and market trends. Many information and transformation models are proposed for business adoption. An organization that adopts ERP improves visibility of data; production process and employees' data. ERP automate the business procedures for better business growth (Lee et *al.,* 2009). Word cloud computing is very shining in the field of computer sciences and information technology. It is a new one, but differs from other terms.Cloud introduces distributed frameworks, utilities, APIs and other distributed methods. Business process management is a combination of information Technology frameworks and business process. Business process management consists of business rules, management of process and information technologies. Cloud phenomena apply on ERP and ERP called as cloud ERP. Cloud environment manages the data on cloud for better access (Fang and Yin, 2010). When a firm deploy enterprise resources planning (ERP) systems organization of process, process controls and information and data flows are the elements that effects at all levels. The first milestone for an organization is to choose an ERP from a variety of customized ERP software. The business sector shows interest in information technologies for better and more flexible control of information and CEOs are in search of low cost and Effective ERP systems. The decision making of an organization also affects the ERP selection (Hidalgo *et al.,* 2011). Information systems are intermediate between technologies and humans. Enterprise Resources Planning (ERP) changes the working strategies of top management. Information processing is a key capability of ERP.Enterprise Resources Planning Business support rules, operational environment, and decision making power. It changes the whole business structure of a firm. Business re–engineering process and customization is the main ingredient of ERP.Scio-Technical challenges and issues are in deployment and development of ERPsystems. A legacy system fits in the traditional process. Instead of legacy system ERP gives a good and generous process (Matende and Ogao, 2013). Cloud computing provides a vast range of data storage and software utilities to customers and clients. Three types of the service cloud give. Software-as-Service(SaaS), Platform-as-Service (PaaS) and Infrastructure-as-Service (IaaS). Integration of cloud computing with ERP gives and Serve all departments of a firm over the internet. Cloud uses third party tools. It decreases operational costs, but risks regarding security are a major issue. (Goyal, 2013). In past cloud is a theoretical phenomenon. In recent years cloud concept applies in the real word. Many business organizations, e-business and industries inspire with cloud technologies.Now conventional business and customary ERP frameworks influence by Cloud technologies. When cloud technologies are applied to conventional business competencies are developed. Cloud reduces the system cost. Problem of resource utilization

is solved by cloud technologies. It also decreases the upgrading expenses (Wang, 2013).

1.2 Problem Statement

The current system in Pakistani industries is very old and legacy system and costly. The server operations and maintenance cost are very high. The IT infrastructure is old and not compatible internally and externally. So the industry needs to explore and merge new technologies for the betterment of the workflow of industry.

1.3 Objectives

The success rate of Cloud ERP implementation in Pakistan is very low. At baseline this research covers the local industries. The object of this research is to persuade that the merging of cloud with ERP is a good alternate of simple ERP. Explore the technological, Environmental and organizational issues and challenges of merging of cloud with ERP and impact on Small and Medium scale industries.

2. Literature Review

Software- as- Service is an alternate of traditional programming services and there is a great difference between these two terms. SaaS affect the system cost, performance and accessibility. SaaS develop set a plan for implementation of cloud in ERP. But there are some issues and challenges that affect the implementation of Cloud in ERP. For the better implementation of SaaS and cloud in ERP the key point is to analyse elements of cloud, technologies and social problems. The researcher examines the social impact of SaaSat mental level. SaaS Selection, quality and reception are the steadiest drivers (Benlian *et al.,* 2009). Merging cloud with search based software Engineering is a solution of optimizations, processing and equalizing the resources in information technology. Now experts draw cloud in software engineering context.Planning,designing, testing and managing are the phases of cloud based software engineering. So the moving to the cloud and adoption will manage in these phases. Software engineering has great impact on cloud (Harman *et al.,*2012). A study of challenges from case studies from 2008 to 2011 in the Swedish government.A firm move on s SaaS ERP model.20 to 21 from SaaS and open markets cases studies are select for research. And they also pick 5 vendors that make a new cloud platform and another 5 who want to shift on SaaS. Comparison of both vendors. Customary ERP works on delivery and SaaS works on customer values (Magnusson *et al.,* 2012). Implementation of cloud based ERP systems are very fast than other systems within less cost and these systems is very scalable. The top leadership of an organization has more control over the daily business flow and it is more secure than customary ERP. Interaction and efficiency of cloud base management systems are better than other. Basic three models are used in markets that are public, private and hybrid cloud (Elragal and Elkommos2012).Current customary systems cost is very high. Their implementation cost is very high in small and medium organizations. Customization, big budgets and firm's functionalities are the major issues of current ERP systems. The solutions of these issues are the integration of cloud with ERP. Cloud technologies give a simple platform for ERP. It decreases the development, deployment, backup cost (Aljohani and Youssef 2013). An RFID system based on cloud deployed in the real world for tracking and billing. Now supply chain management system is totally based on the RFID cloud for data filtration, data processing and maintain and management. RIFD system is integrated with the ERC system for inventory, data processing (Jamal *et al.,* 2013). Basic rudiments of virtual enterprise is cloud computing. Cloud enables venture share information in diverse regions, unusual operational environments and civilizing the efficiency of the firm. VE is a fusion of public and private cloud. VE has two parts; one is information resource sharing and cloud access frameworks. Model of virtual resources sharing plate form consists of tune, management interface and reserve layers (Wang *et al.,* 2013). Different ERP frameworks have step by step raised, and the improvement procedures of frameworks are turning out to be more adaptable. With the expanding of complex business, there will be more requests on the adaptability, common sense what's more, the versatility of the framework. Furthermore, particularly for SMEs, the administration is more customary, what's more, it leaves the weaknesses that the dominant part depends on past administration experience, have constrained capital speculation, and can't have a committed IT work force etc., Driving the utilization examples of the custom programming item past the limit of SMEs. Subsequent to dissecting the structural components of the administration, situated construction modelling and Software as a Service. An ERP framework based SOA joins SOA and conventional endeavour, administration, transport to accomplish the combination of ERP frameworks (Zhao and Ye 2014). A qualitative research for cloud based management systems, data collect from informants telephonic and email base questionnaires cloud based management system have followed functionalities. The core module contains master data, complain management system communication and association administration system. A finance module consists of metering, billing payments. Facility management consists of energy audit analysis. The major modules of the cloud management system are ERP.SCM and CRM (Mital *et al.,* 2015). Numerous Institutions of higher learning in creating nations are receiving and executing distributed computing in their endeavours to give data innovation bolster important to authoritative, instructive, and research exercises. Distributed computing conveys on the interest provisioning of IT assets on a pay for every utilization premise. The Technology Organization Framework can be utilized to guide

pioneers of learning Institutions on the particular parts of their establishments that need change keeping in mind the end goal to accomplish the innovative reception of distributed computing (Micheni,2015). Cost analysis shows the cost of data center breakdown in IT staff, software tools, energy, server, networking, data storage and recovery. The same factors affect the CBDM. Cost breakdown structure for CBDM consists of supply chain, material, Electricity cost, data center, Expert Consulting and hardware cost. Cost breakdown shows that the migration to cloud reduces the cost associated with design, engineering and manufacturing of small and medium scale industry (Wu *et al.,* 2015).

3. Research Methodology
3.1 Technology-Organization-Envoirement Framework
In this Research TOE framework elements are used. Those are Technology, organization and environment. A web and paper based survey is conducted for data gathering. And on the bases of data issues, challenges and impact of cloud adoption are explored in the context of technology, environment and organization. Data gathered from the survey are used in research. The TOE framework has following factors (Oliveiraand Martins.,2011).

- Technological factors.
- Organizational factors.
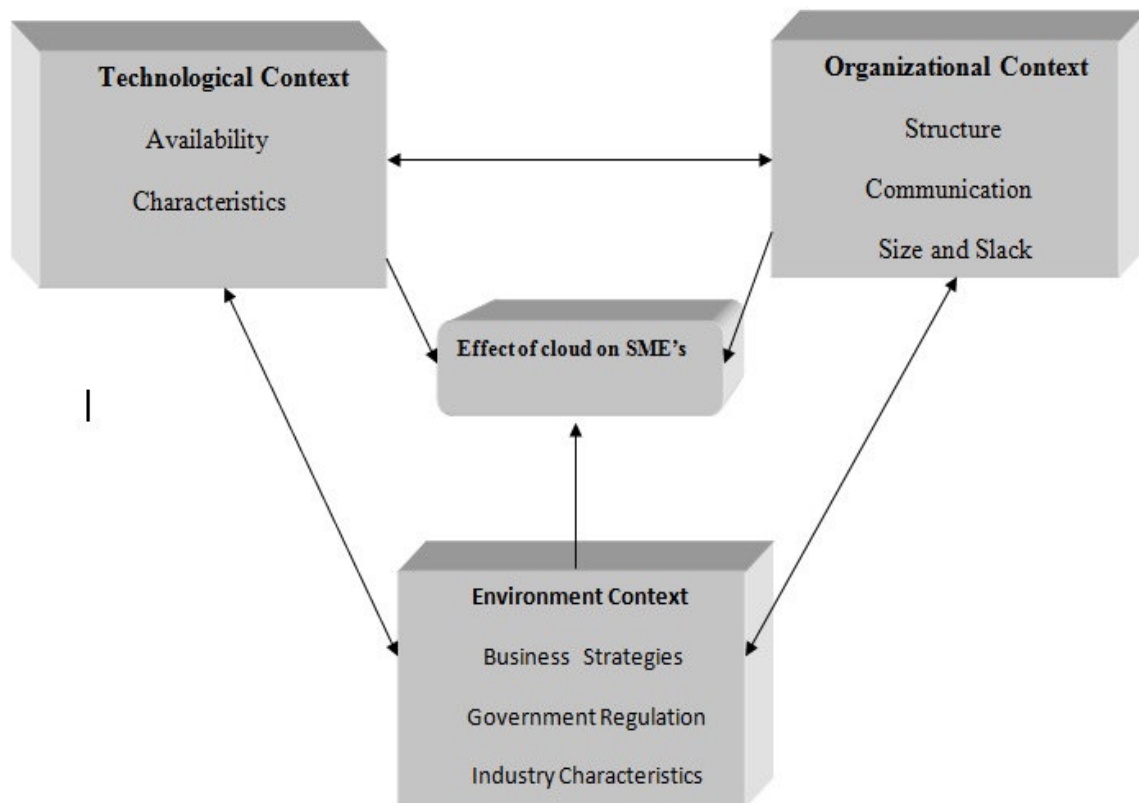- Environmental factors.

Figure 3.1: Technology-Organization-Envoirement Framework (Tornatzky and Fleischer,1990)

3.2 Research Process
In this study, a questionnaire based survey design to gather the data to examine the merging of cloud with current ERP systems in Pakistan. The merging Cloud as one factor and other factors are Technology, Organization and Environment.
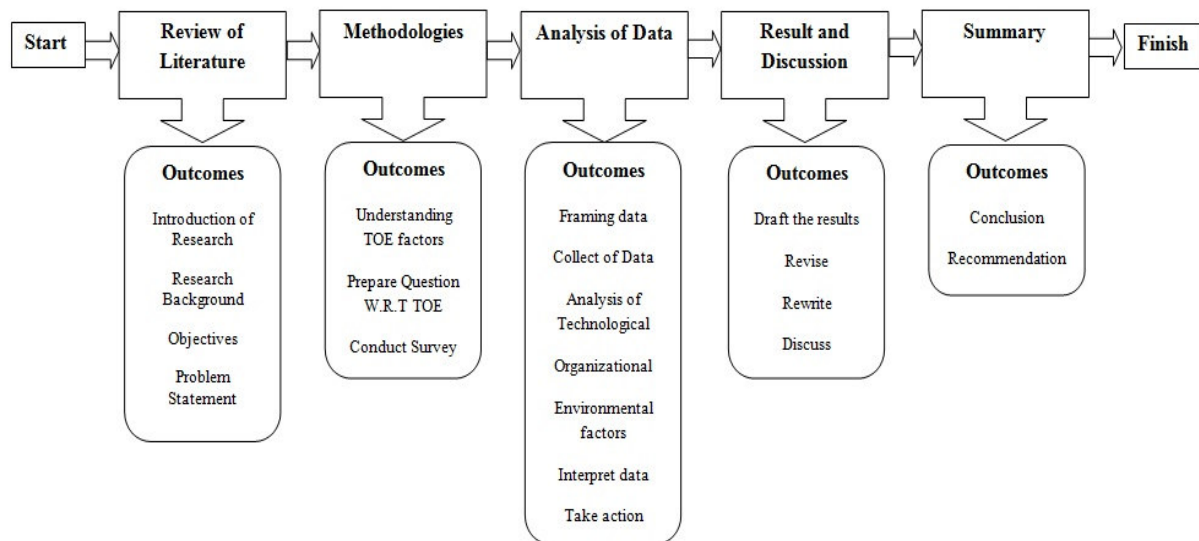
Figure 3.2: Research Process.

3.3 Research Questions

This study is based on Theoretical model of adoption Technology Organization Environment framework. The technological factor is the sum of five survey items that are Cost of operations, cost of maintained, and level of services available, internal IT infrastructure and External IT infrastructure. The Organizational factor is the sum of four survey items that are a number of staff, structure of organization, categories and communication process.The Environmental factor is the sum of five survey items that are Business rules, time frustrating, mental efforts, Bulky in use and government rules.

- *Technological Context*
1. The Cloud will allow to reduce the cost of operations.
2. The Cloud will allow to reduce the cost of maintenance.
3. Cloud with ERP provide high level services available in the organization.
4. Merging Cloud with Current ERP Compatible with internal IT infrastructure.
5. Merging Cloud with Current ERP Compatible with external IT infrastructure.
- *Organizational context*
1. Number of staff working in an organization.
2. The Structure is mainly into five categories.
3. Culture is mainly into five categories.
4. The Cloud will support the communication process in firms.
- *Environmental Context*
1. Cloud is consistent With Business strategies of an Organization.
2. Using cloud sometime frustrating.
3. Cloud services require a lot of mental effort.
4. . Cloud service is bulky to use.
5. Merging Cloud with Current ERP will work according to Govt business rules.

3.4 Area of Study

This research is based on a study of current systems of ERP in Pakistan. This research is conducted in Faisalabad and Lahore based Company that is currently operating ERP systems from Last 10 to 15 years. A survey is conducted in maximizing company and meets the I.T professional. And a web based survey was also conduct to hit the maximum I.T Professionals for the adoption and merging of Cloud Technologies in Current System implementation in their Companies. Area constrained my exploration to Faisalabad and Lahore.

4. Results and Discussion

4.1 Frequency Analysis of technological factors

The first question in web based and physical surveys asks that cloud computing reduces the cost of operations. The response from the survey is that 18.6 % professional strongly agree, 50.8% professionals are agree, 14.4% are neutral,14.4% are disagreeing and satisfy with the current system and 1.7% strongly disagree in survey. Most of I.T Professionals are agreeing with the first question. Second question in surveys asks that cloud merging with

ERP reduce the cost of maintenance   the response shows that 20.3 % IT professional Strongly agree that could reduce the cost 46.6% agree that cloud reduces the operational cost 19.5% people neutral 13.6 % are disagreeing on the reduction of maintenance cost of an ERP system based on Cloud in Pakistan. Most of I.T Professionals agree and strongly agree. In third question level availability of Cloud based system over the internet the response that 22 % IT professional Strongly agree on availability 37.3 % agree on cloud availability 29.9% people neutral 7.6 % are disagree and 3.4% are strongly disagree on availability of Cloud services in Pakistan because it is new in Pakistan. Most of I.T Professionals agree and strongly agree. On compatibility issues of cloud in Pakistan in survey 14.4 % IT professional strongly agree that cloud technologies are compatible with current systems   42.4 % agree 28.8% people neutral 14.4% are disagreeing that the cloud technologies are compatible with the current information technology infrastructure in Pakistan. On External information technology compatibility issues of cloud in Pakistan survey shows 11.02% IT professional strongly agree that cloud technologies are compatible with third party tools. 50.8 % agree 24.6% neutral 12.7 % are disagreeing and 0.8% of total survey is strongly disagreeing. Most of I.T Professionals agree and strongly agree. Representation of Technology factors shows in table 4.1

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Operational Cost	1.7%	14.4%	14.4%	50.8%	18.6%
Maintenance Cost	0%	13.6%	19.5%	46.6%	20.3%
Availability Service	3.4%	7.6%	29.9%	37.3%	22%
Internal I.T capabilities	0%	14.4%	28.8%	42.4%	14.4%
External I.T capabilities	0.8%	12.7%	24.6%	50.8%	11%

Table 4.1: Frequency analysis of Technological factor for N=118

Strongly Disagree   b)   Disagree   c) Neutral

d) Agree   e) Strongly Agree
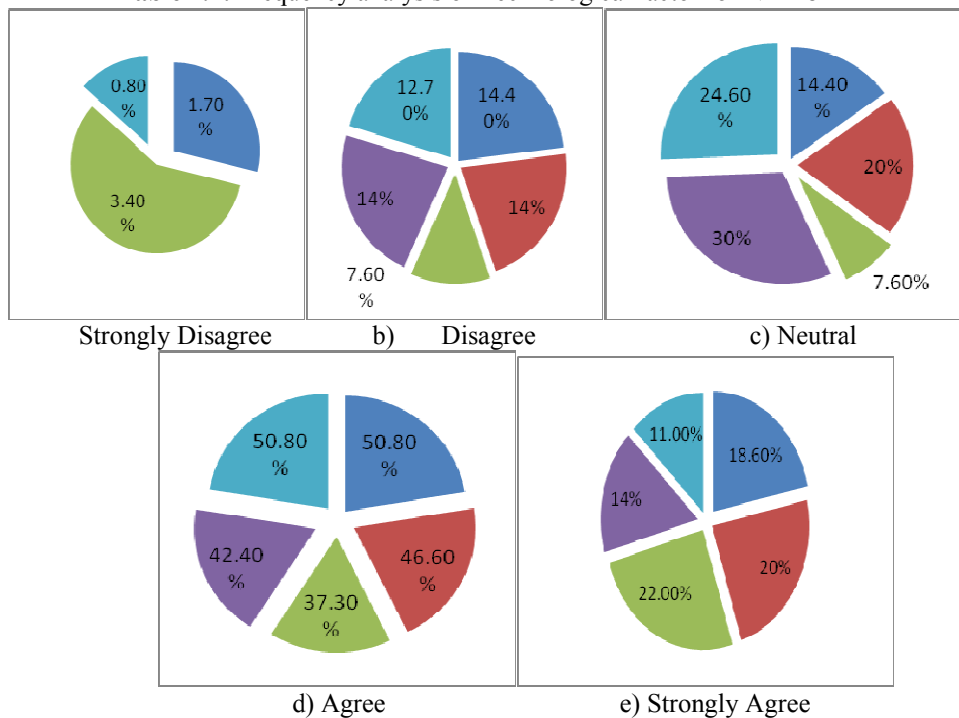
Blue : Opreational Cost**, Red :**Maintance Cost**, Green :** Availability Service
Sky Blue: External I.T capabilities**, Purple :** Internal I.T capabilities
**Figure 4.1:** Showing Responses towards Technological Factors

4.2 Frequency Analysis of Organizational factors

In this survey, 16.3% professional is working in a company that have more than 200 employees and 15.3 % work in organizations that have 100 to 199 employees 31.4% peoples belong to firms that employed 50 to 99 persons. 28.8% professional are belong to such firms that have 10 to 49 persons and 7.6% I.T personnel are from 1 to 9 employed persons. Main organizational structures are Functional, Divisional, Centralized, Multisite and other mixture. So in these researches 14.41 % professionals are working in functional structures. 32.20% works in divisional structured organizations. 24.58% work in centralized structure.18.64% is from multi-site and 10.17% are from other structures. This research focused on clan, Adhoc, Hierarchy, market base and other cultures that are adopted in organization for business work flow. 8.47% are from clan culture, 22.88% are from Adhoc culture,

33.05% are from hierarchy culture, 17.80% are from market base and 17.80% is from other cultures. On question for communication in cloud survey shows the response is below that 18.64 % IT professional Strongly agree that cloud communication process is better. 44.1% agree ,19.5% people neutral 15.3 % are disagreeing and 2.5% are strongly disagreeing on cloud communication is better for ERP system in Pakistan. The table 4.2 shows the overall responses.

Work Force	1-9	10-49	50-99	100-199	Greater than 200
	7.6%	28.8%	31.4%	15.3%	16.3%
Organizational Structures	Functional	Divisional	Centralized	Multi-site	Other
	14.4%	32.2%	24.6%	18.6%	10.2%
Organizational Culture	Clan	Adhoc	Hierarchy	Market	Other
	8.5%	22.9%	33.1%	17.8%	17.8%
Communication	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	2.5%	15.3%	19.5%	44.1%	18.6%

Table 4.2: Frequency analysis of Organizational factor for N=118
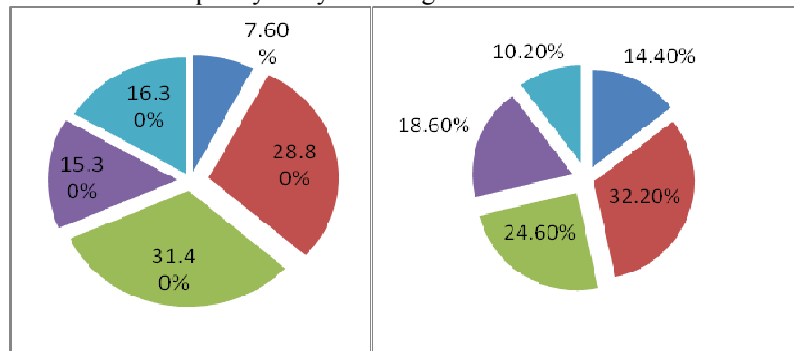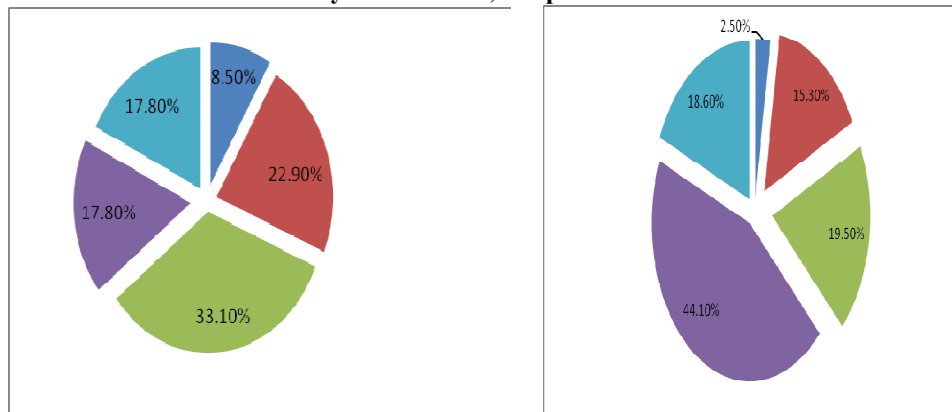

a) Work force   b) Organizational Structure

Figure a) Work force: Blue :1-9**, Red :**10-49**,Green :** 50-49, **Sky Blue:** >200 **, Purple :** 100-199

Figure b) Oragnizational Structure: Blue : Functional**, Red :** Divisional**,Green :** Centralized,
Sky Blue: Others**, Purple :** Multi-Site

c) Organizational Culture   d) Communications

Figure c) Oragnizational Culture: Blue : Clan**, Red :**Adhoc**,Green :**Hierarchy, **Sky Blue:** Market **,
Purple :**Others

Figure d) Communication: Blue : Strongly Disagree**, Red :** Disagree**,Green :**Neutral **Sky Blue:** Agree**,
Purple :**Strongly Agree

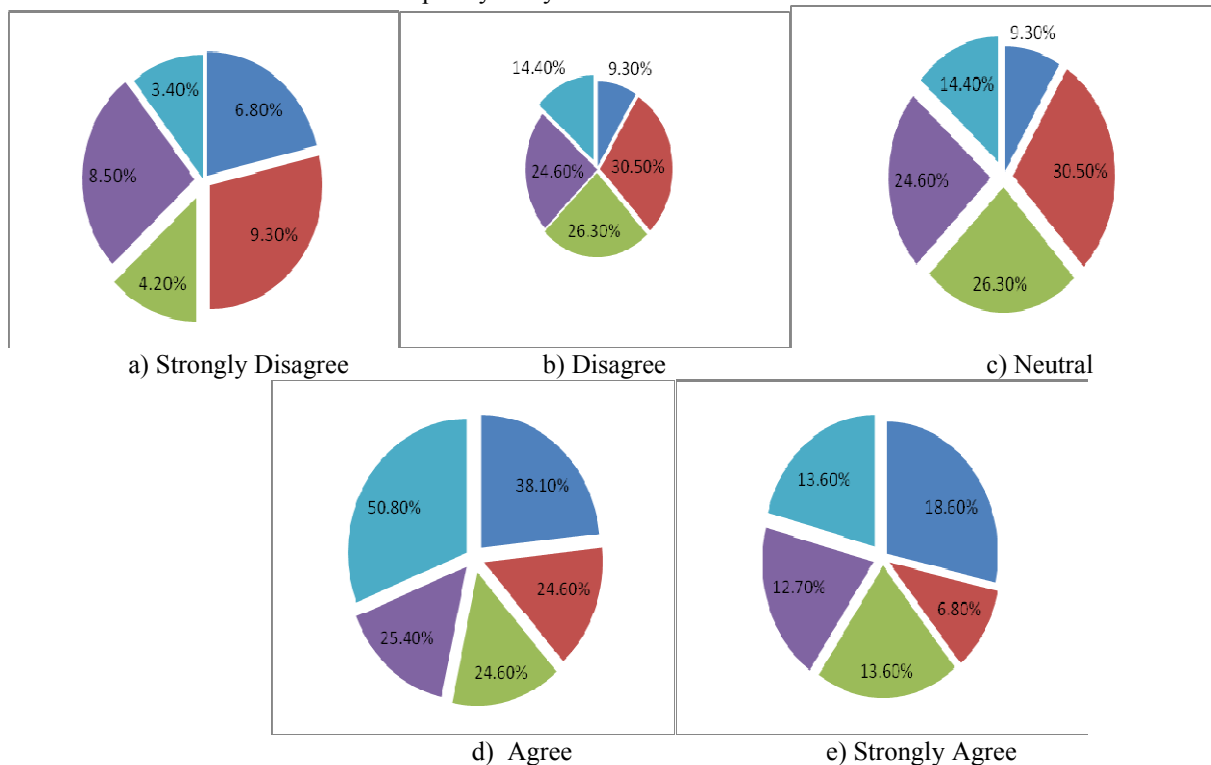**Figure 4.2:** Showing Responses towards Organizational Factors

4.3 Frequency Analysis of Environmental Factors

On consistent with organization business plan survey Shows the response is below that 18.6 % IT professional Strongly agree that could merging is according to a business plan,38.14 % agree, 27.12% people neutral,9.32 % are disagreeing and 6.78% are strongly disagreeing. Most of I.T Professionals agree and strongly agree. Response of frustration about cloud because of new technology merging with ERP in Pakistan the survey that 6.78 % IT professional Strongly agree ,24.58 % agree ,28.81% people neutral 30.51 % are disagreeing and 9.32% are strongly disagreeing cloud frustration as new technology in the ERP system. On mental efforts question in research the response is 13.56 % IT professional Strongly agreed, 24.58 % agree, 31.36% people neutral 26.27 % are

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disagreeing and 4.24% are strongly disagree from this factor. On Question in survey ask that cloud merging with ERP bulky to use in small and medium enterprises the response is below that 12.71 % IT professional Strongly agree that could be bully to use 25.42 % agree ,28.81% people neutral, 24.58 % are disagreeing and 84.7% are strongly disagreeing. For questions about the government polies effect the cloud merging in Pakistan the web response is below that 13.56 % IT professional Strongly agree, 50.85 % agree ,17.8% people neutral, 14.41 % are disagreeing and 3.39% are strongly disagreeing .

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Business plans	6.8%	9.3%	27.1%	38.1%	18.6%
Cloud Frustration	9.3%	30.5%	28.8%	24.6%	6.8%
Mental efforts	4.2%	26.3%	31.4%	24.6%	13.6%
Bulky to use	8.5%	24.6%	28.8%	25.4%	12.7%
Govt. Polices	3.4%	14.4%	17.8%	50.8%	13.6%

Table 4.3: Frequency analysis of Environmrntal factor for N=118

a) Strongly Disagree   b) Disagree   c) Neutral

d) Agree   e) Strongly Agree

Blue : Business plans**, Red :** Cloud Frustration, **Green :** Mental efforts
Sky Blue: Bulky to use**, Purple :** Govt. Polices
Figure 4.3: Showing Responses towards Envoiremental Factors

5. Conclusion

The information technology is a twofold edged sword. It can cut as free from routine exercises; however, it can likewise cut profoundly into benefits, individual protection and society as a rule. The aim of research was to explore merging of cloud computing with Enterprise Resource planning in Pakistan. The theme of this research was explored the Technological factors, organizational factors and environmental factors that influence the merging of cloud in Small and medium scale Enterprises in Pakistan. This research was conducted in Lahore and Faisalabad. The results show that the maximum IT professionals are agreeing on adoption and merging of cloud in organization but not all strongly agree
.

6. Recommendations

This study presents distinctive proposals to those organizations where the Cloud ERP framework is being actualized or they want to execute Cloud ERP framework. Additionally, these proposals are likewise helpful for Cloud ERP advisors: Organization ought to lead business process reengineering to make fit the association according to various prerequisites of the cloud ERP framework. Association ought to manage the change at individual, Workgroup and authoritative levels. Along these lines organizations ought to make a situation in which all groups can impart their ability and work to coordination. All top level and center level administration ought to

include in every period of Cloud ERP usage.

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