ENTERPRISE RESOURCE PLANNING SYSTEM USING VIRTUALIZATION

Nuzhat F. Shaikh[1], Neha Balsaraf[2], Bhagyashree Patil[3], Radha Sable[4], Jinal Bafna[5]
Department of Computer Engineering
Modern Education Society college of Engineering
Pune, India.

Abstract: Enterprise resource planning systems, a type information system innovation, have strategic relevance because their integration into core business processes or strategies can directly impact firms' performance. Thus, many firms have formulated strategies underpinned by ERP systems. One study estimates the firms' annual revenues are spent on ERP implementation. However, while some firms achieve successful out comes with regard to their ERP adoption, more firms fall victim to the long, costly, unsuccessful adoption process and find the promising benefits far beyond reach. For example, only 10 to 15% of the surveyed firms have achieved expected performance improvement; the remaining firms are experiencing significant discrepancies between goals and results in ERP operations. Given the high spending and low success rate, it is urgent for researchers to unlock the mystery of benefit realization in ERP adoption and theorize the important predictors' effects on ERP implementation practices. Enterprise resource planning (ERP) systems are very complex and comprehensive software designed to merge the business processes and functions. Instead of having difficulties and risks, the ERP systems are expanding rapidly.
Keywords: ERP Systems, Virtualization, Information Integration, Quality of Service (QoS)

I. INTRODUCTION

Enterprise resource planning systems, a type of information system (IS) innovation; they have strategic relevance because their integration into the business processes or strategies can directly impact firm's performance. Thus, many firms have formulated various strategies of by ERP systems. One study estimates that between 1.5 and 6.0% of firms' annual revenues are spent on ERP implementation. However, there are some firms which achieve successful outcomes with regard to their ERP adoption, more firms fall victim to the long, costly, unsuccessful adoption process and find the promising benefits far beyond reach. For example, only 10 to 15% of the surveyed firms have achieved expected performance improvement; the remaining firms are experiencing significant discrepancies between goals and results in ERP operations. The high spending and low success rate, it is urgent for researchers to unlock the mystery of benefit realization in ERP adoption and theorize the important predictors' effects on ERP implementation practices. Enterprise resource planning (ERP) systems are very complex and comprehensive software designed to merge the business processes and functions. Instead of having diffi-

culties and risks, the ERP systems are expanding rapidly. The industries are making benefits from the large investments in the information systems expecting better results. However, industries are facing serious challenges in implementing the new technology. In this paper the suitability of current ERP systems for these enterprises will be explained. The question arises that which opportunities a company has to support its processes with IT, the advantages of flexible systems are elaborated. Besides the focus on flexibility, specific criteria for support and maturity are worked out. Then some ERP projects are reviewed and classified according to these criteria. The virtualization of the ERP can be achieved by deploying the ERP system on the cloud.

A. What is ERP?

"An enterprise resource planning (ERP) system is an attempt to create an integrated product that manages the majority of operations in a company. What is different about ERP systems is that they integrate across functions to create a single, unified system rather than a group of separate, insular applications". To further differentiate ERP systems from general application frameworks and other standard software, accounting functionality is required. ERP is a software architecture that facilitates the flow of information among the different functions within an enterprise. Similarly, ERP facilitates information sharing across organizational units and geographical locations. It enables decision-makers to have an enterprise-wide view of the information they need in a timely, reliable and consistent fashion. ERP provides the backbone for an enterprise-wide information system. At the core of this enterprise software is a central database which draws data from and feeds data into modular applications that operate on common computing platform. With an ERP system, data needs to be entered only once. The system provides consistency and visibility or transparency across the entire enterprise. A primary benefit of ERP is easier access to reliable, integrated information. A related benefit is the elimination of redundant data and the rationalization of processes, which result in substantial cost savings.

B. Growth of Enterprise Software Industry:

Competition in the enterprise software business is fierce, with hundreds of software producers fighting for market share. The market has both companies that offer an integrated suite of applications and those that address specific business process.
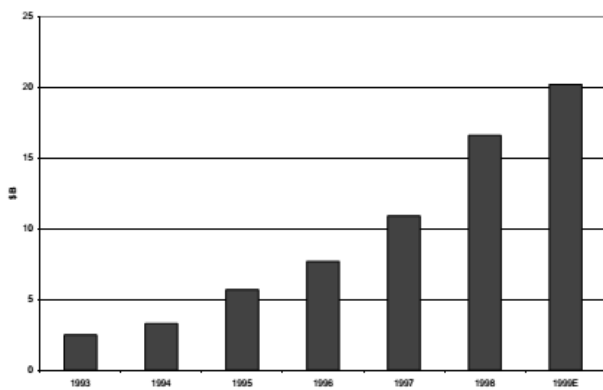
II. PROBLEM STATEMENT

Despite the popularity of ERP, the failure rate of ERP implementation remains high [1]. Reports indicated that ERP failure rates remain in the 67%–90% range [2, 3]. 35% of ERP implementations are canceled, with the remaining 65% of them resulting in cost and scheduling overruns averaging 178% and 230%, respectively. According to another survey, 70% of ERP implementations fail to deliver anticipated benefits [4]. Some surveys show that failure is an integral part of ERP projects and success cannot be guaranteed even in best desirable situations [5]. There are so many reports that ERP projects have failed in some well-known companies like Hershey, FoxMeyer, Nike, etc. Also ERP failure could lead businesses to bankruptcy or jeopardizing their core operations. However, there is no unique definition for failure or success in ERP system implementation. Some today success may be tomorrow failure or vice versa. The effect of globalization for ERP systems is worth analyzing. The profound difference appears in the form of the ownership and the structure of subsidiaries of international enterprises. The typical trans-national or multi-national company in the country is a subsidiary of large international enterprises, the headquarters or centers are usually outside of the country, in some cases regional centers are operated within the country. These are the problems which ERPs do face:

- What is the standardization level of *ERP systems* required by international enterprises?
- Which architecture models fits best to ERP systems reflecting the effect of globalization taking into account the continuum of enterprise and IT architecture?
- What are the business processes, functions or activities where the effect of globalization for *ERP systems* can be perceived in the form of changing of basic enterprise and IT architecture?

The title (Helvetica 18-point bold), authors' names (Helvetica 12-point) and affiliations (Helvetica 10-point) run across the full width of the page – one column wide. We also recommend e-mail address (Helvetica 12-point). See the top of this page for three addresses. If only one address is needed, center all address text. For two addresses, use two centered tabs, and so on. For three authors, you may have to improvise.

III. LITERATURE REVIEW

ERP is a widely used and implemented system to enhance the efficiency of communication between the internal and the external business network, also to connect and share the information and also to enhance the decision-making process. The major importance of this system is to connect the various business processes to minimize the information-sharing time. In addition, ERP systems also achieves

- Better uniform manufacturing organization structure,
- Better operations and customer-driven business processes, and
- Firm-wide information visibility and consistency for improved decision making.

Also various problems come with these benefits. In spite of the popularity of ERP, the failure rate of ERP implementation remains is high. ERP failure rates range from 67%–90%. According to the surveys, 70% of ERP implementations fail to deliver expected benefits. Also ERP failure can cause bankruptcy to businesses or jeopardize their corporations. The ERP running well today may fail tomorrow or vice versa. ERP. The major challenge lies in the fragmentation of data and obtaining consolidated information. Also it is difficult to deal with the inconsistency of redundant data stored on different systems. ERP solves these problems by aggregating the business processes in one integrated system and makes the information available in real-time. Hines (2001) mentioned that about 70% of ERP system projects fail after three years' implementation. Problems that occur during ERP implementation include: the difficulties in configuring ERP systems to match with actual business processes, data conversion/ clean-up from legacy systems, users' reluctance to accept changes in performing daily tasks(Yusuf et al., 2004), unrealistic project objectives, insufficient technical support, people factors (Wickramasinghe and Gunawardena, 2010), frequent changing requirements, over-customization (Yu, 2005), challenges associated with organizational change, integration of the respective supply chains (Themistocleous et al., 2004), and lack of education and training (Rothenberger and Srite, 2009). Externally, companies installing the ERP systems may also encounter resistance from their business partners to share information (Kelle and Akbulut, 2005). WeilingKe, Kwok Kee (2007) Wei mentioned in their paper the information about how leadership affects ERP implementation by incorporating the desired organizational culture. ERP implementation is positively related to the various concerns regarding the power sharing, support and collaboration and tolerance for risk and conflicts. Amin Hakim, Hamid Hakim (2010) mentioned in their paper that the companies still hesitate to decide about establishing ERP systems in their structure. This hesitation will itself result in the projects to go in vain. They took into consideration the lack of successful prior experience of implementation of ERP implementation. There are various failures that behave as obstacles for the decision-makers to work towards the establishment of the system. The overall schema of the model and also the evaluation results in the company have

been in incorporated in the results of this paper with the intention to reduce the decision-making risks and, hence, success of these types of projects .Paula Serdeira Azevedoa (2012) said that ERP is a solution to tackle the organizations resources in an integrated way. The ERPs has brought considerable benefit to the industries but they don't cover all the processes from all the industries. The ERP Systems in the industry solves the challenge of integrating information spread through several heterogeneous information systems. BálintMolnár (2011) says that competition on the marketing forces companies to adapt to the changing environment. The economic and financial crisis accelerates the changes of both business and IT models of enterprises. The forces of globalization and internationalization motivate the restructuring the business processes then consequently IT processes in order depict the changes in a unified framework, The research carried out up to now mentions the typical structural changes, the models for internal business networking and their modification reflects the centralization ,decentralization and various other hybrid approaches .Based on the results achieved recently by investigation future research program are drawn up to deepen our understanding the trends within the world of ERP systems. Yuji Wada (2010) in his paper describes that his research objective is to develop a database virtualization technique so that data analysts or other users can apply data mining methods to their jobs. They can use all ubiquitous databases in the Internet as if they were recognized as a single database, thereby helping to reduce their workloads such as data collection from the Internet databases and data cleansing works. Jun Sawamoto(2009) said in his research objective is to develop a database virtualization technique so that data analysts or other users who apply data mining methods to their jobs can use all ubiquitous databases in the Internet as if they were recognized as a single database. It helps to reduce their workloads such as data collection from the databases and data cleansing works. In this paper we examine XML schema advantages and put forth the database virtualization method by XML database are useful. It consists of the high-level concepts of distributed database can also be of a transparency feature. S.Rouhani (2012) says that Enterprise Resource Planning system (ERP) has been pointed out as a new information systems paradigm. However, achieving a proper level of ERP success depends on a variety of factors that are related to an organization or project environment. Here, the idea of predicting ERP post implementation success that is based on the organizational profiles that has been discussed. An expert system has been developed Artificial Neural Network (ANN) method to make a relationship between some organizational profiles has been discussed. The expert system role is in preparation to obtain data from the new enterprises that wish to implement ERP, and to predict the probable system success level. To this end, factors of organizational profiles are recognized and an ANN model is developed. Then, they are validated with 171 surveyed data obtained from Middle East-located enterprises that experienced ERP. The trained expert system predicts, with an average correlation coefficient of 0.744, which is respectively

high, and supports the idea of dependency of ERP success on organizational profiles. Besides, total correct classification rates of 0.685indicates good prediction power, which can help firms predict ERP success before system implementation.

A. Benefits of implementing ERP systems

ERP has been implemented in many fields to improve the communication with in internal and among external business networks, it also manages the transactions and processes in the logistics pipeline, it helps to connect and share the information from the suppliers to the customers, it also enhances the decision-making process. It's most important benefit of the ERP is its ability to manage and integrate business processes across various organization functions so as to minimize the information sharing time and streamline the business processes, and in return it also enhances the company's competitive advantage. Other advantages can be categorized as tangible benefits (such as inventor reduction, order management improvements, financial cycle improvements, and transportation, etc.) and intangible benefits (such as information visibility, customer responsiveness, standardization, flexibility, globalization, and legacy systems). ERP systems manage to provide information for companies to identify the causes of uncertainty that leads for delivery delays that the companies can tackle to the right areas for business improvement. In addition, ERP systems can also achieve the following benefits:

- More uniform manufacturing organization structure,
- More efficient operations and customer-driven business processes, and
- Firm-wide information visibility and consistency for improved decision making.

B. Reported challenges and critical success factors (CSFs) of implementing ERP systems

We have already discussed the benefits of the ERP systems. So the ERP systems are flooded in the market. Many companies are launching their own ERP systems. But many of the projects result into failure. Many of the ERP projects fail after about 3 years of implementation. Problems that commonly occur during ERP implementation include:

- Difficulties in configuring ERP systems to fit with actual business processes,
- Data conversion from legacy systems,
- Users' unwillingness to accept changes in performing daily tasks
- Unrealistic project objectives, insufficient technical support, people factors, frequent changing requirements, over-customization, challenges associated with organizational change, integration of the respective supply chains and lack of education and training.

Externally, companies installing the ERP systems may also encounter resistance from their business partners to share information. In the light of these challenges, many

researchers have identified various critical success factors (CSFs) for ERP adoption. These CSFs mainly refer to the fact that ERP systems should be implemented in a carefully planned, progressive manner with substantive communication and training across the organization. In particular, reveal that manufacturing infrastructure, which includes the dimensions of workforce, quality management, process re-engineering, production planning and control, organizational policies, and rewarding systems, plays a crucial role for the success of the ERP system implementation project.

To be specific, they find that implementing new information systems often requires significant changes in business process, employee skill requirements, and measurement systems. Thus, the related manufacturing infrastructure preparation is necessary for the implementing firms to benefit from the ERP system. The ''education and training'' related staffing aspect is another most important factor that attributes to the success of an ERP implementation project (Sun et al., 2005; Laudon and Laudon, 2012). Davenport (2000) states that amongst the three main areas that ERP system implementation costs are incurred (namely: software, hardware, and personnel), most companies pay the least attention to the personnel aspect, which is the most expensive and ''difficult to quantify aspect''. Many researchers suggest that appropriate organizational culture and leadership strongly facilitate ERP adoption. Subjective culture within an organization also influences the users' utilization of the ERP system.

IV. COMPARISON

There is a large number of open-source ERP's in market. It is difficult to compare all the ERP systems. Various ERP systems have tools for gathering necessary, relevant and reliable information. The generation and distribution of the information within the information system in the technology requires gathering of the data from various sources. This information so acquired from different sources as input can be sorted. Various calculations and transformations are done on it so that it can be used for complex systems. This particular data in this complex form can be distributed and presented to the end users. In this survey paper we will try to introduce the notion of ERP system and we will present comparison of the modern solutions based on the collected data. In this paper we outlined top most significant solution.
The main 3 integrated information systems (ERP systems) are:

- SAP
- Oracle
- Microsoft Dynamics

All mentioned integrated information systems are almost similar and understanding each of these requires long previous work experience. With that in mind the description of individual solutions is skipped and reader is advised to focus \on shared characteristics described in this survey.
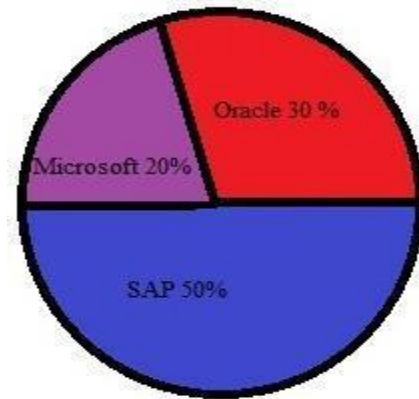

Figure 2: ERP comparison

V. THEORETICAL MODEL

While previous research has acknowledged the critical role of leadership in successful ERP implementation and the importance of the fit between organizational culture and ERP's management philosophy, there is still a lack of study on the integration of these three important constructs. More specifically, it is necessary and imperative to study how leadership can influence organizational culture and foster the culture conducive to ERP implementation .Thus, our intent is to propose explicit relationships between these three constructs. We do not attempt a comprehensive or exhaustive discussion here. Rather, we offer initial direction and propositions to spur research efforts. Among the extant literature on ERP, ERP implementation success is mainly measured by whether the system is implemented on-time and/or within budget .This measurement is not directly related to the realization of ERP's potential benefits, ERP assimilation—the effective application of ERP in supporting, shaping and enabling firms' business. The term ERP originally implied systems designed to plan the use of enterprise-wide resources. It incorporates all basic functions of an organization, regardless of the organization's business. ERP's main goal is to integrate data and processes from all areas of an organization and unify it for easy access and flow of work. It aims to improve and streamline internal business processes, which typically requires reengineering of current business processes. The boundary of an ERP system is usually smaller than the boundary of the organization that implements the ERP system. Integration is an extremely important part to ERP. ERP accomplishes integration by creating one single database that employs multiple software subsystems providing different areas of an organization with various business functions. In the absence of an ERP system, a large enterprise may find itself with many software applications that do not communicate to each other and do not effectively interface with one another.
The three most basic model of the ERP system are:

A. Human Capital Management
ERP HCM is used for managing all aspects of the employee lifecycle. From attracting and hiring employees, training and

ongoing personnel and event transactional management, to payment and termination, the ERP HCM solution is a unified suite for all people-related processes. The ERP HCM provides a comprehensive and global solution that can be utilized by companies of virtually any size, geography, or industry. The various ERP HCM components can be implemented together, or they can be implemented independently or sequentially one after another. ERP HCM having four sub modules.

- Employee database
- Attendance management
- payroll management system
- Recruitment system.

B. Project Planning
In ERP project planning managing all the project of company. Manage an unlimited number of projects and tasks with as many sub-levels of hierarchy as you need. Projects can be structured in any level of sub projects and "project tasks". Projects and Sub Projects allow assigning access permissions to project members, while "Project Tasks" serve to track the project advance and to log the dedication of employees.

C. Customer Relationship Management
CRM is an application that enables companies to make the move towards being a customer cantered organization by putting the customer at the centre of all the information that relates to them and allowing authorized people within the organization to access the information. The CRM database is capable of storing details of emails, conversations, quotations, customer names, addresses, telephone numbers and contact personnel for all your customers.
The system so prepared provides the following features:
Reliability: Software reliability is an important facet of software quality. It is defined as "the probability Of failure-free operation of a computer program in a specified environment for a specified time". The system is reliable as far as basic software and hardware environment requirements are being met.
Usability: The system is easy to use as the GUI used is easy to understand to the user. It is practical and convenient to user.
Availability: The system will run only on-demand when the user chooses to run it.
Maintainability: Propensity to facilitate updates to satisfy new requirements. The software is maintainable. As it can update the database after withdraw of money.
Portability: The software is highly portable and compatible with most machines as it is online and easy installable.

a) Use of Cloud:
Cloud computing is pay-per-use model for enabling available, convenient on-demand network access to a shared pool of configurable computing resources such as networks, servers, storage, applications, services that can be rapidly provisioned and released with minimum management effort or service-provider interaction.

Cloud solves a lot of problems such as:
- It increases the capacity or adds capabilities to their infrastructure dynamically without investing money in the purchase of new infrastructure.
- We don't need to conduct the training for new personnel.
- We don't need to license for new software.

b) Storage on Cloud:
Cloud storage is the virtualized storage on demand over the network based on a request for a given QoS. There is no need to purchase storage or in some cases even provision it before sharing the data. You only pay for the amount of storage your data is actually consuming. Cloud storage is basically a model of the networked online storage where data is stored on the virtualized pools of storage which are generally hosted by third parties. The data center operators virtualizes the resources according to the requirements of the customers and expose them as storage pools, which the customer can themselves use to store files and data objects. The resource may span across multiple servers. The services stored on cloud may be accessed by an API a cloud storage gateway or through a web based user interface.

c) Advantages of the Cloud Storage:
- The organizations need only pay for the storage they actually use as it is also possible for the companies by utilizing actual virtual storage features like thin provisioning.
- Companies do not need to install physical storage devices in their own data centres or offices.
- Storage and maintenance tasks like the backup, data replication and purchasing additional storage devices are offloaded to the responsibility of service provider, allowing organizations to focus on their core business.
- Cloud storage provide the users with a immediate access to a broad range of resources and applications hosted in the infrastructure of other organization via a web service interface.
- Cloud storage can be used for copying the virtual machine images from the cloud to on-premise locations or to import a virtual machine image from an on-premise location to the cloud image library.

d) Window Azure Service platform:
The Windows Azure is the Microsoft cloud platform used to build, host and scale web applications through Microsoft data centers. Windows Azure is thus classified as the platform as a Service and forms the part of the Microsoft's cloud computing strategy along with their Software as a Service offering, Microsoft Online Services. The platform consists of the various on-demand services hosted in Microsoft data centers and commoditized as three product brands. These are the Windows Azure i.e. an operating system providing scalable compute and storage facilities. The SQL Azure is a cloud-based scale-out version of the

SQL server. The Windows Azure App Fabric is a collection of services supporting applications both in the cloud and on-premise. The Windows Azure platform is an application platform in the cloud that allows Microsoft datacenters to host and run applications. It provides a cloud operating system called Windows Azure that serves as a runtime for the applications and provides a set of services that allows development, management and hosting of applications off-premises. All Azure services and applications built using them run on the top of Windows Azure. Windows Azure has three components:
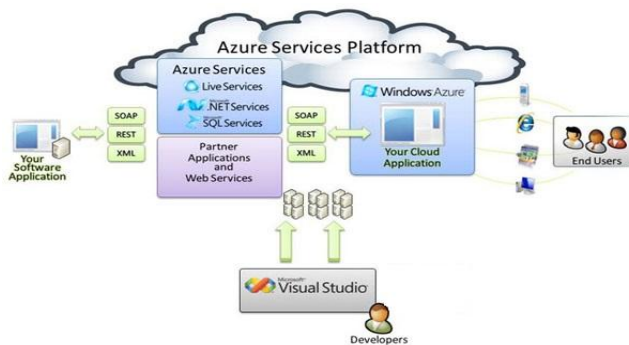

Figure 3. Azure Architecture

- Compute: It provides a computation environment with Web role, Web worker and VM role.
- Storage: It focuses on providing scalable storage for large-scale needs.
- Fabric(Windows Azure Fabric)

VI. CONCLUSION

This paper, first, elaborated on what is an ERP system and its importance. It also explains the reasons for the failure of ERP implementations. It has been observed that one of the main problems in ERP projects is focusing on technical and financial aspects of a project and neglecting to take into account the non-technical issues like, while many ERP studies indicate that failure is largely due to the organizational and social, rather than financial aspects of a project and neglecting to take into account the non- technical issues like people, while many ERP studies indicate that failure is largely due to organizational and social, rather than technical factors. Therefore, in order to appropriately deal with this problem, comprehensive studies is conducted to extract the most important ERP failure factors in the literature ERP.

REFERENCES

[1] Parr. A., Shanks. G., (2000), "A model of ERP project implementation", Journal of Information Technology.
[2] Iskanius. P., (2004) "Risk management in ERP project in the context of SME", Engineering Letters.
[3] Yuji Wada, Jun Sawamoto, (2009) "Database Virtualization Technology in Ubiquotos Computing", IEEE.
[4] Yuji Wada, Jun Sawamoto, (2010) "Virtual Database Technology for Distributed Database", IEEE 24th International Conference on Advanced Information.
[5] WeilingKe, Kwok Kee Wei, (2003). "Organizationalculture and leadership in ERP implementation", ScienceDirect
[6] Amin Amid, MortezaMoalagh, AhadZareRavasan (2012) "Identification and classification of ERP critical failure factors in Iranian Industries", Information Systems, ScienceDirect.
[7] Young HoonKwak, Jane Park, Boo Young Chung, and SaumyenduGhosh(2012) " Understanding End-Users' Acceptance of ERP System in Project-Based Sectors" ,IEEE.