Comparative Analysis of Cloud ERP and Traditional ERP
Saumya Agarwal¹, Sanjay Ojha²
¹² School of IT, Centre for Development of Advanced Computing (CDAC),
B-30, Institutional Area, Sector 62, Noida-201307, Uttar Pradesh, INDIA

Abstract: This paper aims to discuss about the comparison between cloud ERP and traditional ERP. ERP is important business software used in all major enterprises and is a useful tool to coordinate all the activities required to complete the business process whereas cloud ERP helps medium and small enterprise according to their requirements and lead to more efficient business process.

Keywords: Cloud Computing, Cloud ER , ERP, SaaS, IaaS.

I. INTRODUCTION
Emergence of cloud computing is conceived as a revelation in the Computing industry. The success of Google and Amazon EC2 lead to many vendors adopting and providing cloud computing resources for the business applications such as CRM, ERP, Payroll, Sales Measures etc [7]. To manage all these contents we need integrated software which can manage contents and information together with a single user interface. The educational ERP software available in the market today does not provide these facilities in fact they are more costly and need more infrastructure and maintenance throughout the academic year [13].

II. CLOUD COMPUTING
Cloud computing is the fusion of distributed computing, parallel computing, grid computing and virtualization technology[7], and it is the result of technology, service patterns and application development. In other words, Cloud computing is an Internet-based IT service delivery model to provide dynamically scalable and virtualized resources. Currently, it is the most fundamental step toward the trend: Internet of Services [5].
E.g. CloudShare is a cloud computing provider which enables users to create, replicate and share IT environments in the Cloud. It helps in combining certain aspects of web conferencing, virtualization and cloud computing and also provides Saas (software as a service) solution for delivering IT to partners, clients colleagues and customers and [4].

A. Characteristics and Advantages of Cloud Computing
• Scalable: Cloud computing provides users dynamically scalable service/information resources. For users, they can purchase service/computing resources in the cloud at anytime and anywhere, also can release of these resources according to demand at any time to save costs [5].
• Concentrated Resources Center: The cloud computing resources (including networks, servers, storage, applications, and services) are concentrated in an integrated virtual resource pool, and use the multitenant model to offer shared resources to consumers [5].
• Dynamic Resource Allocation: Implementation of cloud computing uses virtualization technology to achieve directly loose coupling of different resources. Thereby it can improve the resource dynamic configuration capabilities [5]

III. TRADITIONAL ERP SYSTEMS
Enterprise Resource Planning (ERP) systems are designed in order to fasten communication among the departments and helping their employees in making better business decisions with the help of data [3].
E.g. SAP system which was introduced as an Enterprise resource planning (ERP) software designed to coordinate the activities required to automate the business process [1].
They are built on an assumption of how a business functions by organizing activities and work through pre-defined business processes. Unfortunately, there is often a gap between business requirement and the business logic of packaged software, which can lead to negative business outcome [10, 15]. Alignment between an ERP system and a business is sought either by customizing the system or by reengineering business processes or through a mix of both [14].
A. CHALLENGES OF ERP ADOPTION

Despite the many business values of ERP systems, implementation of this application is being plagued by failure. This is as a result of certain factors which make for successful implementation being disregarded. Vilpola et al [12], states that this is largely due to gap between the business processes and ERP system logic. Considerable research has been carried out to investigate the critical success factors pertinent to the adoption of on premise ERP solutions in organizations. These factors if followed could result in increasing the number of successful ERP implementation [6]. Certain critical success factors which could be used by the organizations when considering ERP implementation are:

- Project management
- Vendor selection
- Dedicated resources
- Top management support
- Change management plan
- Training and education
- Technological readiness
- Organizational culture
- System design and configuration

However these factors focused solely on traditional ERP systems. A recurring theme identified from the review of past research is the importance of management support and the implementation of an effective change management strategy [6]. Eliminating the gap between the ERP system and the business processes within the organization is also necessary in ensuring successful implementation.

Other factors such as user training, lack of dedicated resources and over customization of the application have also been found to hinder successful implementation. Without proper training, the users will not know how to properly use the system, which would result in low buy-in or the users simply deciding not to use the application. ERP systems tend to be somewhat firm as they only permit a certain level of customization [10]. Organizations who insist on customizing the application to suit business processes often report failed implementation, due to an unwillingness to implement changes within the organization [6]. Therefore these factors must be taken into consideration by organizations for the successful implementation of the application.

IV. CLOUD BASED ERP SYSTEMS

Cloud-based ERP Systems is nothing more than hosted ERP on a cloud provider. By answering the following questions, we can find out why cloud-based ERP systems are important for organizations. How we can improve organizations capabilities to use ERP systems? How we can reduce ERP systems implementation cost? To answer these questions, first, we should find out what is the cost of ERP systems implementation are, these costs include software, hardware, advisor, training, implementation and maintaining [2]. These costs can be reduced by reducing the IT infrastructures cost of the organizations. These infrastructures include software, hardware, storage, network and other infrastructures. We can outsource hardware and software by providing IT infrastructures needs from some company outside the organization. The hardware and software are provided by
companies outside the organization, and these companies do all works of maintaining and managing these services. Organizations can access these services using VPN connection over the internet or by using lines offered by telecommunication companies. These companies who are providing these ERP services are known as “Cloud Provider” or “Customer Service Provider (CSP)”. There are two kinds of cloud-based ERP systems

A. ERP ON SAAS

ERP system is presented as a collection of software in the Software as a Service (SaaS) term. These services are called “ERP on SaaS”, and because it has low investment cost [2]. SME’s having financial troubles can use ERP on SaaS. On the other hand, we should also consider the limitations of this kind of services. Organizations are faced with limitation on business process re-engineering in organization or even customization of ERP systems. It is highly recommended to do business process re-engineering by using cloud provider expertise and standards to ensure a successful business process re-engineering. Also the cloud provider has access to all organizational data, which bring us to the security and privacy issues in this approach [2].

B. ERP ON IAAAS

ERP system is implemented on the cloud infrastructure, which it is a service that the cloud provider provides in the Infrastructure as a Service (IaaS) term. These services are called “ERP on IaaS”. Now unlike ERP on SaaS, it is the cloud provider responsibility to provide IaaS to organizations, but it is the organizations responsibility to get the ERP system package and ERP system license and then implementing the ERP system on the cloud IaaS that the cloud provider provided to the organizations as a service [2]. Also unlike ERP on SaaS, organizations are not going to face any limitation on business process re-engineering in organization or even customization of ERP systems. On the other hand, we should consider the high investment cost that the organizations will do for this service, unlike ERP on SaaS low investment cost [2].

V. COMPARISON BETWEEN TRADITIONAL ERP SYSTEMS AND CLOUD ERP SYSTEMS

<table>
<thead>
<tr>
<th>Factors</th>
<th>Traditional ERP Systems</th>
<th>Cloud-based ERP Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment</td>
<td>Local Server</td>
<td>Cloud Server</td>
</tr>
<tr>
<td>IT staff reduction</td>
<td>None</td>
<td>High</td>
</tr>
<tr>
<td>Implementation costs</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Customization</td>
<td>Easy</td>
<td>Hard</td>
</tr>
<tr>
<td>Support costs</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Integration</td>
<td>Easy</td>
<td>Hard</td>
</tr>
<tr>
<td>Licensing costs</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Data availability</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Attacks</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Web security issues</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Privacy</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

TABLE I. COMPARISON BETWEEN TRADITIONAL ERP AND CLOUD ERP [2]

VI. CONCLUSION

The paper presents a comparison between the traditional ERP systems and cloud based ERP systems and present all the advantages and the disadvantages factors for both the systems. It also provides three alternative approaches (Traditional ERP Systems, ERP on SaaS and ERP on IaaS) for the organizations to select so that the adopting process of the ERP system is going to be successful for the organization.

VII. REFERENCES

VIII. Acknowledgements
This paper is a collective effort of a number of people who are responsible in bringing out this paper in its current form. I would first of all like to extend my gratitude the entire management at CDAC Noida for supporting and providing me with the opportunity to utilize such a platform. I would also like to thank all the respective faculty members, my friends and family members for their constant support and guidance.