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# An Architectural Framework for the implementation of ERP using Cloud Computing in SMEs: A Literature Survey

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**Abstract:** ***Cloud computing has become one of the fastest growing segments of the IT industry in the present scenario. In the wake of this, cloud based Enterprise Resource Planning (ERP) systems have emerged as an alternative to traditional ERPs. These systems require low upfront investments and can rapidly be deployed, as they are provided over the cloud. In this study we seek to unravel cloud ERP adoption by identifying and classifying opportunities and concerns often associated with cloud ERPs with respect to company size. Our results show that SMEs, and in particular small companies, can best exploit cloud ERPs as many of the benefits are more relevant for them. ERP implementation and its critical issues, success factors and implementation problems have been investigated in the past but they are not filtered comprehensively in terms of the selection of the best CSPs. This paper presents a new feature based taxonomy which facilitates the process of cloud product selection by prioritization. It proposes a new mechanism for the selection of the cloud which sorts the cloud products according to the customer's needs and requirements.***

**Keywords:** ERP; cloud computing; CSPs; SMEs; QoS

## 1. Introduction

Cloud based ERP is one of the advanced paradigm in Information and Communications Technology (ICT). It is a blend of technology and business process. According to the Wikipedia definition, ERP includes a wide range of different activities that lead to improved performance of an organization and all data and processes of an organization are collected in a single system. Now a days, organizations have three ERP deployment strategies: on-premise, hosting and on-demand (SaaS). The different tools available under the cloud computing provides the lowest cost working environment and is suitable for the developing economy. The huge amount of research is going on to integrate the ERP with cloud. In the present scenario many organizations today are turning to the cloud based ERP systems in their business. There are many reasons of choosing the cloud based ERP. Some of these reasons are:

- Becoming more complex, and challenging to manage the ERP.
- Not to buy the servers, in-house software development and not to hire the skilled IT professionals.
- Top management doesn't want to spend it on traditional ERP system.
- Organizations have complex ERP system need something easier and more economical.

Cloud based ERP systems are the hardware and software systems that support the core processes in the business process. Cloud services have been recently the ultimate solution for companies seeking to achieve both efficiency and cost cutting. The pool of Cloud Service Providers (CSP) largely available globally. Now, it becomes a challenge for the SMEs to select a suitable CSP that meet the requirements of the organizations. Building high Quality cloud applications becomes an immediately required research problem in cloud computing technology. Non-functional performance of cloud services is generally described by Quality-of-Service (QoS). To acquire QoS values, real-world usage of service are generally required. At this time, there is no framework that can allow users to estimate cloud services and rank them based on their QoS values. The aim of the present paper it to build a framework and a mechanism that measures the quality and ranks cloud services for the users.

## 2. Enterprise Resource Planning (ERP)

ERP (Enterprise Resource Planning) is the information system about the management of the enterprise, which is developed on information technology and systematic management thinking, decision-making for businesses and employees to run the means to provide decision management platform, and it can integrate all resources of enterprise. It is an integrated computer based application used to manage internal and external resources, including tangible assets, financial resources, materials, and human resources. By ERP software, we can integrate the material, production, supply, marketing, financial and related logistics, information flow, manage flow, cash flow, value flow, and others, to achieve resource optimization & sharing. ERP is suitable for all the three levels of Management i.e. strategical, tactical and operational level. Now a days, ERP can be applied to any type of organization, operating in any kind of field.

### Cloud Computing

Cloud Computing is a new computing paradigm. It is an online service by which hardware and software services are delivered to customers depending upon their requirements and pay as an operating expense without incurring high cost. Basically cloud computing is a set of services that provide

Infrastructure resources using Internet media and data storage on a third party server. It has three dimensions which are:

- IaaS (Infrastructure as a Service)
- PaaS ( Platform as a Service)
- SaaS (Software as a Service)

Infrastructure as a Service (IaaS), delivers computer infrastructure, typically a platform virtualization environment as a service customers buy their needed infrastructures, one can own and purchase the software and virtual power to execute as needed. This service is a running virtual server on a virtual environment. One pay for the usage as per his/her own requirement.

Platform as a Service (PaaS), platform of integrating the operating systems, middleware, application software or an environment development which encapsulates the services. It is based on virtual machines and provided by web browsers or client software which is provided by cloud providers using internet. Software as a Service (SaaS), deliver software as a service over the Internet, eliminating the need to install and run the application on the customer's own computers and simplifying maintenance and support.

**Cloud ERP**

Cloud - based ERP system aims to construct common, open features, to meet the integrated requirements of manufacturing, and to support network applications. ERP systems can support enterprise customization and the rapid implementation with the new cloud based system. The cloud is owned and managed by a Cloud Service Provider (CSP) who offers services to consumers on a pay-per-use basis. Private cloud's infrastructure is owned and used by a single organization. It can be managed by the organization itself or by a third party internally or externally. In community cloud, infrastructure is shared between many organizations with common concerns such as security, policy, mission, and compliance. These clouds are managed and hosted internally or externally through a third party. Hybrid cloud is a combination of two or more cloud infrastructures that remain unique entities, but are bounded together to provide advantages of multiple cloud structure.


**Moving to Cloud ERP**

## 3. Literature Review

A literature review is a method for gathering knowledge from the existing literature. The literature review in this paper is based on a narrative review approach and is analyzed in the tabular format. The research procedures are comprehensive and systematic. This approach is characterized by adopting explicit procedures and conditions that minimize bias. The review papers are from reputed published journals. The search process was narrowed down through the criterion that the articles needed to be published in peer-reviewed journals or conference proceedings.

**Table 1:** List of Topics Analyzed and Corresponding Usable Publications

| S.No. | Topics Searched | Papers |
|---|---|---|
| 1. | Integration of ERP and Cloud Computing in SMEs | [1], [2], [4], [5], [6], [9], [10], [11], [12], [13], [14], [16], [18], [21], [22], [26], [28] |
| 2. | Identification of Critical Factors by integrating the ERP with Cloud Computing in SMEs | [6], [7], [8], [15], [17], [27], [29], [30], [31], [32], [33], [34], [35] |
| 3. | Review the criteria related with selection of Quality of Services (QoS) | [24], [36], [40], [41], [42], [45] |
| 4. | A Framework for measuring the priority in selection of cloud services | [3], [19], [23], [25], [37], [38], [39], [43], [44], [45], [46] |

**Table 2:** Summary of Reviewed Papers published in various journals with their conclusion

| Author | Year | Paper | Journal | Conclusion |
|---|---|---|---|---|
| G., Fathima Haseen Raihana, Jamal Mohamed | 2012 | Cloud ERP-A Solution Model | IRACST - International Journal of Computer Science and Information Technology & Security (IJCSITS), ISSN: 2249-9555 Vol. 2, No. 1, 2012 | It attempts to find how external cloud services (SaaS) can make ERP at low cost working..It also identifies the scope and benefits of cloud ERP. |
| Saini, S.L. et.al | 2011 | Cloud Computing and Enterprise Resource Planning Systems | Proceedings of the World Congress on Engineering 2011 Vol. I WCE 2011, July 6 - 8, 2011, London | The reviews for the development of Low cost ERP Solution to Indian industries on Mobile using latest technologies such as Mobile computing, SaaS, Cloud Computing etc. is made. |
| Fengze Zhong, Dr.Max | 2014 | Cloud Computing and ERP: A Framework of Promises and Challenges | 25th Australasian Conference on Information Systems 8th -10th Dec 2014, Auckland, New Zealand | The aim is to evaluate and the challenges of cloud-based ERP systems from a review of the literature. It propose a framework for the researchers to assess the key promises and challenges of cloud environments for ERP systems. |
| Appandairajan, P. et.al | 2012 | ERP on Cloud: Implementation Strategies and | Proceedings of 2012 International Conference on Cloud Computing, Technologies, Applications & | Cloud based ERP was studied and analyzing the strategies for implementation. With the understanding of the strategies and challenges, Organizations can |

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| | | Challenges | Management 978-1-4673-4416-6/12/©2012 IEEE | successfully implement Cloud ERP for their business applications. |
| Sharma, M. et.al | 2010 | Scope of cloud computing for SMEs in India | Journal Of Computing, Volume 2, Issue 5, May 2010, ISSN 2151-9617 | The comparison of the cost and the level for adaptability of using the traditional ERP solution and the cloud computing modeled SaaS based ERP systems is made using the qualitative technique. |
| Somani, R.K., Dadhich, R. | 2013 | Design of Cloud Computing based ERP model | International Journal of IT, Engineering and Applied Sciences Research (IJIEASR) ISSN: 2319-4413 Volume 2, No. 6, June 2013 | By integrating the cloud and ERP, will improve the utilization efficiency of enterprise IT resources etc. To maintain a stable business network support, Initial cost reduction in IT and lower fixed investment, Up gradation & Maintenance, Scalability will prove trustworthy. |
| Amini M. et.al | 2014 | The Role of Top Manager Behaviors on Adoption of Cloud Computing for Small and Medium Enterprises | Australian Journal of Basic and Applied Sciences, 8(1) January 2014, Pages: 490-498 | The data was analyzed through Partial Least Square (PLS). Top manager behaviors and the factors that affect on top manager behaviors influent directly and positively on adoption of new information technology like cloud computing. |
| Tripti Negi Mahara | 2013 | Indian SMEs Perspective for election of ERP in Cloud | Journal of International Technology and Information Management Volume 22, Number 1 2013 | The framework was designed to find possible benefits and threats based on the three enterprise perspectives Economical, Technological and People. The framework is evaluated in the context with the Indian SMEs, |
| Li, A., Yang, X., Kandula, S and Zhang, M | 2010 | CloudCmp: Comparing Public Cloud Providers | Proceedings of the 10th Annual Conference on Internet Measurement, Melbourne, Australia | A systematic comparator of the performance and cost is established, Cloud Computing measures the elastic computing, persistent storage, and networking services offered by a cloud along metrics that directly reflect their impact on the performance of customer applications. |
| Nimitha Rai D, Pallavi K N | 2014 | ERP System Integrated with Cloud Services for Small and Medium Business in India | International Journal of Advanced Research in Computer Science and Software Engineering Volume 4, Issue 12, December 2014 | Cloud computing service based ERP systems provide required IT resources with reasonable cost. The study of this research provides a cloud based SaaS model pay per use ERP system to the SMEs in India. |
| Elias Fathi Kiadehi, Shahriar Mohammadi | 2012 | Cloud ERP: Implementation of Enterprise Resource Planning Using Cloud Computing Technology | Journal of Basic and Applied Scientific Research ISSN 2090-4304 | Different aspect of traditional ERP and Cloud ERP is compared. Cloud Computing has lots of problems in security. Cloud ERP has advantages and security problems that affect the organization decision to implement Cloud ERP. |
| Hedau, V. et.al | 2013 | Cloud Based ERP for Small and Medium Scale Enterprises | International Journal of Engineering Research & Technology (IJERT)Vol. 2 Issue 11, November – 2013 ISSN: 2278-0181 | Cloud based ERP systems provide the right computational solutions with a cost effective manner. To manage and maintain the functioning of SMEs, cloud based ERP is the most suitable that can eventually lead their unmatchable growth and development. |
| Singh, G. et.al | 2013 | A Study of Impact of ERP and Cloud Computing In Business Enterprises | Proceedings of the World Congress on Engineering and Computer Science 2013 Volume I WCECS 2013, 23-25 October, 2013, San Francisco, USA | Cloud Computing involves the delivery virtualized IT resources as services over the Internet. Cloud Computing services are delivered in a scalable and secure manner from a remote data center on a 'pay as you use' basis. |
| Ahmad Rabay'a, Mohammad Dweib, Yousef Abuzir | 2013 | Implementing Cloud Computing in ERP | Journal of Emerging Trends in Computing and Information Sciences Vol. 4, No. 10 October 2013 | The purpose of this research was influenced by the potential benefits of using cloud computing technology to implement ERP systems with less time, cost and failure risk consequences, how ERP as cloud service could ease ERP implementation and reduce required resources from both customers and vendors. |
| Duan J. et.al | 2012 | Benefits and drawbacks of cloud-based versus traditional erp systems | Proceedings of the 2012-13 Course on Advanced Resource Planning W.J.H. van Groenendaal (ed.) | The advantages of cloud-based ERP as lower upfront costs, lower operating costs, scalability, access to advanced technology, and improved disaster recovery may be considered as more relevant or pertinent for SMEs than for large enterprises. |
| Purohit G.N. et.al | 2012 | Challenges Involved in Implementation of ERP on Demand Solution: Cloud Computing | IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 4, No 2, July 2012 ISSN (Online): 1694-0814 | Large organizations are more comfortable with SaaS model. Technology updating, easy adoption, scalability, data security is the main obstacle for the SaaS industry. |
| Guo Chao Alex Peng and Chirag Gala | 2014 | Cloud ERP: a New Dilemma to Modern Organisations? | Journal of Computer Information Systems | Economical, technical are the benefits and legal, technical complexity are the barriers has been evolved in this research paper. |
| Moussa Ouedraogo and Haralambos Mouratidis | 2013 | Selecting a Cloud Service Provider in the age of cybercrime | Elsevier, Computers & Security, Volume 38, October 2013, Pages 3–13 Cybercrime in the Digital Economy | A new well-defined approach, Complete-Auditable-Reportable or C.A.RE helps to determine the adequacy of a CSP sponsored security. The information is shared with the concerned Cloud Service Consumer (CSC). A |

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| | | | | level of assurance is associated to each of the C.A.RE parameters in order to help determine the overall trustworthiness of a CSP. |
| Gerard Conway, Edward Curry and Brian Donnellan | 2014 | Cloud Computing Adoption: An SME Case Study | 17 th Annual Irish Academy of Management Conference | The framework provides mainstream to assess their capability and plan for each phase of their growth and development. It can be achieved by assessing their critical capabilities across the key areas of the business, developing improvement roadmaps and reassessing their maturity. |
| Rajeev Sharma, Dr. Bright Keswani | 2014 | Study of cloud based ERP services for small and medium enterprises | Revista de Sistemas de Informação da FSMA n. 13 (2014) pp. 2-10 | The cloud based web services are predicted to grow in the future. The trepidation and the economic crises have halted the momentum of cloud based services deployment. |
| Iñaki Bildosola, Rosa Río-Belver, Ernesto Cilleruelo and Gaizka Garechana | 2015 | Design and Implementation of a Cloud Computing Adoption Decision Tool: Generating a Cloud Road | PLoS One. 2015; 10(7): e0134563. Published online 2015 Jul 31. doi: 10.1371/ journal.pone.0134563 | Cloud computing is especially beneficial for startup companies, SMEs, entrepreneurs and companies that need to make new investments or do not have a stable infrastructure. |
| Shruthi Shirur, Annappa Swamy D. R. | 2013 | A Cloud Service Measure Index Framework to Evaluate Efficient Candidate with Ranked Technology | International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064 Index Copernicus Value (2013): 6.14 \| Impact Factor (2013): 4.438 | By making use of QoS matrices it's quite easy to find out which service provider is best in the market. So it will implement the 'Ranked Voting Method'. This ranked voting system clearly find out which provider is efficient one, it can also be possible to add or remove the inefficient cloud service providers from the list. |
| Liqiang Chen | 2012 | Integrating Cloud Computing Services Using Enterprise Service Bus (ESB) | Business and Management Research Vol. 1, No. 1; March 2012 | The proposed universal integration architecture in which any system or services can easily be integrated through the ESB. It can serve as foundation for streamlining BPM across multiple disparate platforms including cloud computing, ERP and other on-premise systems. |
| Ashish Seth, Himanshu Agarwal, Ashim Raj Singla | 2012 | Integrating SOA and Cloud Computing for SME Business Objective | WSEAS TRANSACTIONS on COMPUTERS, E-ISSN: 2224-2872, Issue 3, Volume 11, March 2012 | The principles of SOA-Cloud is to create an overall strategic plan and focus how architectural context support the use of cloud computing. This integrated model is ideal for medium and small sized enterprises both in terms of cost and adaptability. But security is still not the added value of Cloud Computing in the present paper. |
| Ming Hock Yew, Jenson Chong-Leng Goh | 2015 | An SME's Adoption of a Cloud Based Integrated Management System (IMS) When Certifying against Management System Standards (MSS) | Australasian Conference on Information Systems 2015, Adelaide | It is the case study in which four step approach was introduced for the adoption of cloud based integrated management system. In this quality and environmental performance improvement, cost savings and productivity gains enjoyed by the SMEs. |
| Khamis Haji Salum, Mohd Zaidi Abd Rozan | 2015 | Barriers and Drivers in Cloud ERP Adoption Among SMEs | Journal of Information Systems Research and Innovation 9(1), 9-20, February 2015 | The paper extracts the barriers and drivers in cloud ERP adoption. The barriers and drivers are grouped under the headings of technology, the environment, organizational factors, economic factors, innovation, business model, human factors when evaluating the decision to adopt cloud ERP. |
| Björn Johansson, Amar Alajbegovic, Vasileios Alexopoulos, Achilles Desalermos | 2014 | Cloud ERP Adoption Opportunities and Concerns: A Comparison between SMEs and Large Companies | Pre-ECIS 2014 Workshop 'IT Operations Management' (ITOM2014) , Lund University Publications (Conference paper) | A hybrid solution, where the most critical and resource-demanding modules are kept on-premise or hosted in a private, single-tenant cloud, while less critical ones are deployed on a public cloud, were identified in our study as the most appropriate solution for large companies, Contrariwise, SMEs are anticipated to be increasingly prone to adopt fully cloud-based solutions, as awareness of implications of cloud ERP will increase. |
| Salauddin Dhali | 2015 | A study on cloud computing adoption of small and medium enterprises | Master Thesis project, Malmo University, Department of Computer Science | SMEs cloud adoption approach is mainly cost savings, flexibility, rapid deployment and scalability. The major barriers that resist SMEs for cloud adoption the privacy, security, legal issues, vendor lock in, loss of data and interoperability issues. |
| Shima Ramezani Tehrani | 2013 | Factors Influencing the Adoption of Cloud Computing by Small and Medium-Sized | Thesis for the Degree of Master of Management Science, Toronto, Ontario, Canada | Based on two dominant theories in the field of diffusion of innovation, a conceptual model is proposed. To determine the factors influencing the cloud computing adoption by Small and Medium sized |

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| | | Enterprises (SMEs) | | Enterprises (SMEs). |
| Siti Aisyah Salim | 2013 | Cloud ERP Adoption-A Process View Approach | Information Systems School, Queensland University of Technology, Australia | The attempt is to explore which factors are relevant to the distinct phases of cloud ERP adoption. The factors are classified as 'necessary' or 'sufficient'; where 'necessary' factors need to exist in order for the firm to move to the next stage, while 'sufficient' means assisting in the movement. It assists the ERP and cloud vendors in prioritizing and upgrading their business quality at any point in time during the adoption process, which would thus increase the likelihood of cloud-based ERP adoption among SMEs. |
| Moutaz Haddara, Ahmed Elragal | 2013 | ERP adoption cost factors identification and classification: a study in SMEs | International Journal of Information Systems and Project Management, Vol. 1, No. 2, 2013, 5-21 | This research explores the direct and indirect cost factors that occur in ERP adoptions in Egyptian SMEs. Also, this study investigates the influence of some SME-specific contextual factors on costs. Moreover, the paper provides a ranking of cost factors according to their impact on total adoption costs. |
| Ezer Osei Yeboah-Boateng, Kofi Asare Essandoh | 2014 | Factors Influencing the Adoption of Cloud Computing by Small and Medium Enterprises in Developing Economies | International Journal of Emerging Science and Engineering (IJESE) ISSN: 2319–6378, Volume-2, Issue-4, February 2014 | The different factors influencing the adoption of cloud computing are cost reduction on IT infrastructure and maintenance, improved communication, scalability and business continuity as the main drivers of cloud adoption, whereas lack of knowledge, poor internet connectivity, security of cloud services, lack of trust and interoperability with existing systems were identified as barriers to adoption. |
| Nazli Sadat Safavi, Mahyar Amini, Seyyed AmirAli Javadinia | 2014 | The Determinant Of Adoption Of Enterprise Resource Planning For Small And Medium Enterprises In Iran | International Journal of Advanced Research in IT and Engineering ISSN: 2278-6244 Vol. 3 \| No. 1 \| January 2014 | The various factors are considered as the most determinants of ERP by combining both DOI theory and TOE framework. These factors are relative advantage, complexity, compatibility, Trial ability, technology readiness, top management support and competitive pressure. |
| Tripti Mahara | 2013 | PEST-Benefit/ Threat Analysis for selection of ERP in Cloud for SMEs | Asian Journal Of Management Research Volume 3 Issue 2, 2013 | PEST framework analyzes Political, Economical, Social and Technological factors. These factors should be addressed by the SME before selecting ERP in Cloud environment. |
| Yuvarani, Sivalakshmi | 2014 | Ranking Accuracy Using Cloudrank Framework For Cloud Services | IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661, p-ISSN: 2278-8727 PP 16-22 | The present paper developed an efficient and effective utilization of cloud services access from the cloud providers. It is useful for the cloud users that decide the best cloud services. |
| Preeti Gulia, Sumedha Sood | 2013 | Dynamic Ranking and Selection of Cloud Providers Using Service Level Agreements | International Journal of Advanced Research in Computer Science and Software Engineering Volume 3, Issue 6, June 2013 ISSN: 2277 128X | It makes the work of selection quite simple for a user by automatically selecting the best cloud for a user as per his requirements and priorities. |
| Princy Bathla, Sahil Vashist | 2013 | A Sophisticated Study of QoS Ranking Frameworks in Cloud Computing | International Journal of Advanced Research in Computer Science and Software Engineering Volume 4, Issue 7, July 2014 ISSN: 2277 128X | In this research the different framework have been compared by ranking. The main goal is to compare the frameworks and giving information about the various techniques for selecting the cloud service according to the requirements. |
| Leyli Mohammadkhanli, Arezoo Jahani | 2014 | Ranking Approaches for Cloud Computing Services Based on Quality of Service: A Review | ARPN Journal of Systems and Software ©2009-2014 AJSS Journal. VOL. 4, NO. 2, March 2014 ISSN 2222-9833 | In this the ranking of cloud computing services and its analysis is described. The challenge is to choose the best cloud computing service for a specific application. Ranking prioritizes services for selecting the most appropriate services is used. |
| Chang-Ling Hsu | 2014 | A Cloud service selection model based on user-specified quality of service level | Natarajan Meghanathan et al. (Eds) : ICAIT, ICDIPV, ITCSE, NC - 2014 pp. 43–54, 2014. © CS & IT-CSCP 2014 | The aim of this study is to propose a cloud service selection model, CloudEVAL method is to evaluate the nonfunctional properties and select the optimal service which satisfies both user-specified service level and goals. |
| Mohammad Reza Ahmadi, and Davood Maleki et.al | 2016 | A Novel Taxonomy and Comparison Method for Ranking Cloud Computing Software Products | International Journal of Grid and Distributed Computing Vol. 9, No. 3 (2016), pp.173-190 | This paper presents a new feature based taxonomy which facilitates the process of cloud software product selection. It proposes a new evaluation mechanism which sorts the cloud products according to the customer's needs and requirements. |
| R.Navinkumar , M.Raghul | 2016 | QOS Ranking prediction for cloud service | International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 03 Issue: 03 \| Mar-2016 | With the increasing variety of Cloud products, it opens the opportunity to control the almost unlimited calculating sources of the Cloud. To select suitable several Cloud companies, clients ought to have the method to recognize and also evaluate the results |

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| | | | | empirically by using the matrices.The choice of metrics has been known as being essential within the evaluation of computer systems. |
| M. Subha, M. Uthaya Banu | 2014 | A Survey on QoS Ranking in Cloud Computing | International Journal of Emerging Technology and Advanced Engineering Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 4, Issue 2, February 2014) 482 | It is very difficult to make a decision on choosing the cloud services depending on QoS requirements. So, Optimal Service Selection is needed to obtain high quality cloud applications. This paper presented a widespread survey on QoS Ranking in Cloud Computing is done with respect to their Limitations and Inferences. |
| R.Yuvarani, M.Sivalakshmi | 2014 | Achieve Ranking Accuracy Using Cloudrank Framework for Cloud Services | International Journal of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Vol.2, Special Issue 1, March 2014 | This work, have developed an efficient and effective utilization of cloud services access from the cloud providers. It is useful for the cloud users that decide the best cloud services. It recommend a personalized QoS ranking prediction framework for cloud services, which need no additional service invocations when making QoS ranking. |
| MUHAMMAD-BELLO BILKISU LARAI | 2015 | A Review of Service Selection in Cloud Computing | 4th World Conference on Applied Sciences, Engineering & Technology 24-26 October 2015, Kumamoto University, Japan | The research findings show that current research in the area of service selection in cloud computing have concentrated on mainly the quantitative criteria in their evaluation and selection process. This paper also contributes to summarizing the body of knowledge in the area of service selection in cloud computing and directs effort for future research in the area. |
| Garg, S. K., Versteeg, S and Buyya, R | 2011 | SMI Cloud: A framework for Comparing and Ranking Cloud Services | Fourth IEEE International Conference on Utility and Cloud Computing | The approach Cloud Service Measurement Index Consortium which purposed a frame work based on common characteristics of Cloud services. The aim of this consortium is to define each of QoS attributes given in the frame work and provide a methodology for computing a relative index for comparing different Cloud services. |
| Mouratidisa, H., Islama, S., Kalloniatis, C and Gritzalis, S | 2013 | A framework to support selection of cloud providers based on security and privacy requirements | The Journal of Systems and Software 86 (2013) pp 2276– 2293. | A modeling language provides a structured framework that supports security and privacy requirements. There is selection of a cloud provider based on Security and privacy cataloguing, Security and privacy analysis, Selection analysis. |

## 4. Conclusion

This review paper presented an overview of the research papers associated with the study to explore a list of factors that lead to cloud ERP adoption, and discusses the preliminary findings of research attempting to identify the best CSP among the pool of CSPs available globally. In this context, this work presents the systematically compare the performance and cost of cloud providers along with other dimensions that matter to customers. The findings show that most of the primary studies have focused on IaaS, and different frameworks have been developed based on different mathematical techniques .The focus of majority of the past studies has been on objective cost performance analysis and benchmark testing while the subjective assessment of the actual cloud users haven't been given adequate attention. The results also show that currently, there are no unified or defined metrics/evaluation criteria for comparing cloud service providers. In conclusion, current research in the area of service selection in cloud computing has concentrated on mainly the quantitative criteria in their evaluation and selection process while the qualitative criteria are yet to be adequately considered.

For future work, firstly, we seek to identify the selection target, clear selection goal and clear solution for the problem of selection of cloud Service provider. Secondly, propose framework for SMEs in decision making on Cloud ERP selection. Thirdly, we seek to develop a prototype based on the proposed framework, capable of addressing the problem of choosing suitable Cloud ERP providers for the SMEs. This framework is expected to be validated via tangible evidence which includes real case studies and expert reviews, to afford it more applicable when it comes to the industrial environments.

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