Role of Cloud Applications in Organizational Development and Management: Trust Enhancement Cloud Consumers Perspective

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Abstract

Cloud computing is an amalgam of techniques and technologies that provide software, infrastructure, platform, and storage services that are packaged to pro-vide a new paradigm of scalability, agility, cost-effectiveness, availability, and flexibility for the benefit of the public at large. Along with the provision of useful services, there is also a huge concentration of risks, which cloud users are facing. These risks include security, integrity, authenticity, transparency, trust and au-

theorization. Information security companies provide cyber security solutions to guard different organizations from cyber-attacks. They establish policies and measures for providing secure services but there are still many risks that security companies are facing. These risks are associated with keeping sensitive data on the cloud. People have a lack of trust due to these issues. Many studies have been conducted previously in which the trust deficiencies on the public side for the cloud are addressed due to the sensitivity of data, difficulties faced by information security companies while providing cloud services and recommendations were provided to resolve the issue. In this paper, the reasons for the lack of trust in a cloud environment are addressed. As most of the trust issues are stemmed be-cause of security problems. The solutions for enhancing trust in the cloud computing environment are provided by carrying out the quantitative study. Data gathering is conducted through a questionnaire by targeting different cloud services consumers. Data is analysed using SPSS and results have provided the measures that can be taken to resolve the issues.

Key Words: Cloud Computing; Trust Enhancement; Security; Integrity; Information Security

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1. Introduction

Cloud computing has a great impact on the Information technology industry. Google, Amazon, Microsoft are well-renowned organizations that are providing cloud ser-vices. Many organizations are following their footprints and striving to reach at a point where they can provide up to the mark cloud services to their customers to gain a technological competitive advantage for attaining a strong market position. Even the customer's purchase decisions are based on many factors like features, price-quality (Aziz, 2018), atmosphere (Bashir, 2017), brand image and consumer preferences (Qureshi & Riaz, 2018). But Cloud computing provides many attractive features for business investors and customers to adopt new technology that will enhance profitability for investors and enhance the decision-making power of customers. In the current era, everyone is relying on distributed systems. Data and applications are spread and stored in different geographical regions on different data centers and accessed through remote servers (Almorsy et al., 2010). These attempts have been made to engage users with software applications more instead of hardware applications (Drissi et al., 2013). Cloud computing provides on-demand services that are packaged into ‘X’ as a service (XasS) comprised of infrastructure, application and platform (Firdhous et al., 2012).

Whenever any new firm establishes, its biggest challenge is to develop its ICT infrastructure because they have to pay a very high up-front amount, hire highly qualified professionals which increases their operational cost, this reduces the margin of scalability but these issues can be eliminated by adopting cloud computing because no upfront charges are required neither highly experienced IT professionals are re-quired and scalability can be enhanced according to the need (Habib et al., 2011).

Today the biggest and foremost concerns of cloud computing are security and trust management issues while sharing data and applications on the cloud because no one knows where the data is stored, how the data is stored, who is receiving that data and how data integrity is maintained. The security companies aren't handling these issues properly especially managing private information on the public cloud. If these issues are handled properly then the security companies can generate more revenue by increasing their clients and more organizations can get cost-effective cloud ser-vices (Habib et al., 2012). The purpose of this paper is to address the trust issues that people experience while using cloud services and the customer resistance that cloud service providers face. By solving these issues information security companies shall be able to improve the services that will help them in organizational development. Moreover, the results of this paper will contribute towards improvement in the infra-structure of cloud computing as per the demands and needs of consumers. Further-more, section 2 of this paper presents a literature review, section 3 illustrates the methodology, section 4 will provide the inferred results, section 5 is of the conclusion of this research.

2. Literature Review

A multifaceted trust management system architecture is proposed (Harbajanka & Saxena, 2016) for supporting the customers in identifying trustworthy cloud providers. The identification of trustworthy cloud providers is made based on three attributes that are security, performance and compliance.

Hashemi, (2013) provides a landscape of incentives that are required by cloud service providers to attract people to adopt cloud services and resistance in potential customers due to which they avoided the usage of cloud services. To resolve these issues a trust-aided unified evaluation framework is used to determine the trustworthiness of cloud providers. In this framework quality of service, parameters are integrated with trust and then applied to the existing cloud application domains to measure the performance and efficiency of the framework. A novel trust model (Low et al., 2011) is introduced to evaluate cloud resources with respect to infrastructure as a service by means of a trust resource broker. The resource broker selected the cloud service providers based on customer requirements. Because the customers are a key tool for competing and survival (Aslam & Najaf, 2017). This model also integrates the quality-of-

service parameters in the framework. Results have shown that the model chose reliable trustworthy cloud providers. Security, privacy and trust issues that occur in cloud computing are assessed (Manuel et al., 2011) and are discussed differently in ways through which these issues could be addressed in cloud computing. The data security issues, data protection issues and other risks associated with cloud computing are also addressed (Manuel, 2015) while deploying in enterprises. To resolve these issues, it is recommended to make a proper contract, improve communication lines and improve proper security while storing data on the cloud.

Various security factors that are required to be resolved through security auditors (Nalavade & Lomte, n.d.) are raised. They also discuss a level at which an organization could trust cloud service providers. The security issues related to cloud computing are raised by (Noor et al., 2013) and highlighted the security concerns of cloud computing by providing a security perspective to manage these issues. The new technology namely cloud computing attracting researchers of both sectors of industry and academia, offering different opportunities by providing a variety of services range for the organizations (Pearson & Benameur, 2010). Entrepreneurs and large organizations have widely used this technology and their issue needs to be solved. Trust management and security component are one of the major issues in cloud computing. The purpose of this paper is to examine the trust and how trust is applied in distributed system environment. The security model is proposed for the different distributed environments. The management of trust under cloud computing is investigated and emphases on their capability and heterogonous environment and then the system is compared with each other with set of parameters.

Trust issues have become one of the hot issues in the field of cloud computing (Ramgovind et al., 2010). Cloud computing adoption resulted in many well-known benefits. From its early time, many issues are evolved especially security issues. Privacy and trust management are on the top list. Proliferation is also required main attention in trust management in cloud computing. The purpose of this paper is to conduct a survey on the cloud computing trust management model deal with the collaboration agreement. The main limitations of this study are outlined and possible improvements are suggested. The authors propose systems which are enhancing trust and reputation. They have used user feedback as a

source for the understanding of trustworthiness. The malicious user is one of the main issues and the proposed system can detect the malicious user. The credibility model is integrated with the availability model to increase robustness. They have also established future work which is the management of trust issues through which reputation and recommendations may increase result accuracy.

In the cloud computing era, the main and challenging issue is trust management. In different studies, many techniques are proposed to addresses the trust management of cloud computing. Despite many studies following trust management issues such as identification, privacy, personalization, integration, security, and scalability which are neglected and need to be addressed before this technology is fully implemented. In this paper, the authors overviewed the current cloud services model, main techniques and prototype that support efficiently the trust management of services in the cloud environment. The authors present the analytical framework that analyses the existing trust management and research prototypes in cloud environments and related areas using the set of evaluation criteria. We also discuss the open research issues for trust management in cloud computing.

There are three different models in Cloud Services Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), all three models were based on the Service Level Agreements (SLAs) between customers and the service providers. Cloud Service Deployment Models: It depends on Service Level Agreement (SLA), all three models can be provided in four different models: the current risks related to cloud computing were surveyed (Zhang et al., 2010) and identify the future threats that are associated with the current risks.

The factors that influenced the organizations for the adoption of cloud technologies are investigated by (Zissis & Lekkas, 2012). Data is gathered through questionnaires from 111 firms. The results show that top management has a very crucial role in adopting cloud computing because it is necessary for organizational development. A detailed security problem of cloud computing is introduced by (Aziz, 2018). The problems from the perspective of architecture,

stakeholders and firms are analyzed and relevant recommendations are provided (Khan & Khan, 2018).

The above-mentioned studies are based on theoretical surveys, models and frame-works. None of the studies (Sarwar & Amin, 2019; Aslam & Najaf, 2017) analyzes the problem by using quantitative analysis. So, the novelty of this study is that it utilizes a quantitative approach to get knowledge on what consumers want from information security companies for the adoption of cloud computing solutions.

3. Research Methodology

This research is ontological and cross-sectional in nature. It is conducted in a quantitative manner. The survey is conducted on primary data and the data collection tool is a questionnaire along with the sample size is 206 respondents. The data is gathered from all the cloud service consumers to check how they impact on cloud organizations by using cloud services. Following are the hypothesis of the research.

H0: security is the main factor that affects the development of cloud service provider organizations.

H1: organizations not using cloud computing have minimal use of IT in their operations.

H2: organizations not using cloud services have a major use of IT in their operations.

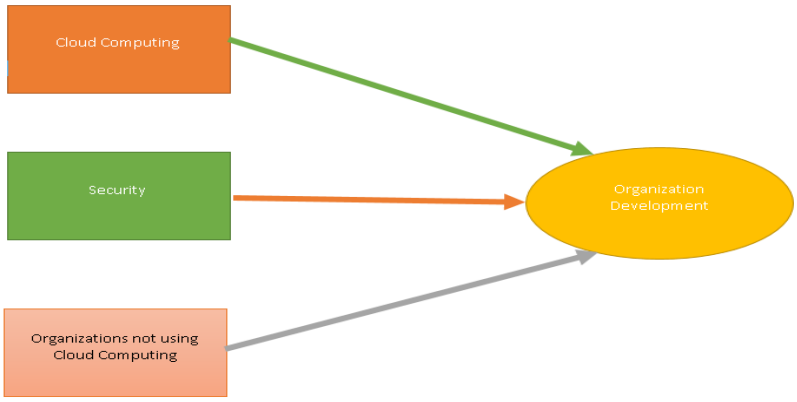
H3: security is not the main factor that affects the development of cloud service providers.

H4: trust issue on security affecting the organizations in selling their services.

The data analyzing tool is SPSS on which psychometric tests, correlation, regression and factor analysis are applied to gather the results. The conceptual framework of the model is mentioned below. There are four variables on which the study is conducted, three independent variables and one dependent variable. The independent variables are cloud computing, security and organizations not

using cloud computing whereas organization development is the dependent variable.

Fig-1: Conceptual Relationship between the Variables



4. Empirical Results

After collecting the data from 206 different respondents, the data is entered in SPSS and initially, the psychometric tests are performed to check the reliability of the computed items of the questionnaire. The Cronbach's alpha value is 0.76 which is according to the defined standards and it shows that the data is reliable. Table 1 below shows the results of psychometric tests.

Table-1: Cronbach's alpha value for constructs.

Cronbach Alpha	Cronbach Alpha Based on Standardized Items	Number of Items
.766	.774	4

Now to check the adequateness of sample size factor analysis is done using KMO and Bartlett's as per the standards of the benchmark of KMO which is more than 0.6 and in the current research, it is 0.773. The value shows that the sample size is adequate to run the other tests. Table 2 shows KMO and Bartlett's results.

Table-2: KMO and Bartlett's Statistics.

KMO	Approx. Chi-Square	Degree of Freedom
. 773	204.56	4
P-Value = 0.000		

The correlation among two variables is applied and the results are highly significant according to the hypothesis showing that security has a very significant impact in the organizational development along with cloud computing services on cloud providers whereas those companies which are not providing security features to their customers are unable to develop their organizations according to the set standards. Due to a lack of trust in security people are not willing to utilize cloud services so organizations are also facing financial crises. Table 3 is showing the correlation results.

Table-3: Correlation Statistics.

	OG	CC	SEC	NUCC
OG	1			
CC	.476***	1		
SEC	.502***	.438***	1	
NUCC	.408***	.469***	.479***	1

The regression between the variables is checked to identify the impact of independent variables on the dependent variable according to standards the value of R square in linear regression should not be less than 0.10 which is equivalent to 10%. When the regression between cloud computing and organization development is tested. It shows that the R square value 0.227 which is equal to 22.7% and it is significant which means cloud computing contributes 22% in enhancing the development of an organization as shown in the table below.

Table-4: Relationship between cloud computing and organizational development using OLS.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.476[a]	.227	.223	.60868	.227	59.879	1	204	.000

a. Predictors: (Constant), CC

The regression between security and organizational development is 0.252 which is equal to 25.2% which shows that if security is enhanced in cloud services, then people will more likely to move towards the cloud as shown in the table below.

Table-5: Relationship between security and organizational development using OLS.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.502[a]	.252	.248	.59887	.252	68.590	1	204	.000

a. Predictors: (Constant), SEC

The regression between organizations that do not use cloud computing and organizational development is 0.166 which is equivalent to 16.6% it shows that if organizations start using cloud services that can enhance their performanc16% approximately as shown in the table.

Table-6: Relationship between cloud computing and organizational development using OLS.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.408[a]	.166	.162	.63202	.166	40.748	1	204	.000

a. Predictors: (Constant), NUCC

5. Conclusion

Cloud computing is a very essential necessity in our life. Companies that are utilizing cloud survives are spending more on organizational development rather than the companies not utilizing cloud services. These firms are spending money on infrastructure and they require more human resources. The reason behind the resistance of companies not availing cloud services is a lack of trust and security issues due to which cloud service providers are going in loss. The results have proved that issues arise because neither people are accepting change due to trust in security nor service providers are improving security standards to avoid risks. Another important factor is that people are unaware of the proper utilization of cloud services, which should be addressed by giving them proper education.

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