Improvement of E-Commerce Quality through Cloud Computing Benefits

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Abstract
The Cloud computing, which, could be used by people as well as corporations, due to its many favorable features is growing at a remarkable rate. It brings about a new opportunity for e-commerce companies, as, there would be no need to waste more resources. Therefore, this article will introduce a model "The cloud computing benefits and e-commerce quality". The data collection performed by a group consisted of 190 experts in cloud computing and by applying "Structure Equation Modeling" (SEM) plus Factor Analysis, the relationships between benefits of cloud computing and quality of e-commerce examined. Findings of the present study indicated that The Cloud Computing benefits proved effective in more than 60% on e-commerce quality improvement.

Keywords: Cloud computing, E-commerce, Cloud computing benefits, Quality of e-commerce, SEM.
1. Introduction

At the present time, the growing of IT innovation led the organization to make a decision to accept new technology to solve the organization computing requirements, to support their services, products and to satisfy their commerce operation need to build a large infrastructure (Abdulkader and Abualkishik, 2013), developing e-commerce needs to advance resources in hardware, software system established by the person with a certain expertise to run and keep. Cloud computing lets customers and businesses to use applications without installation and access their personal files or data at any place of the world with Internet access (Roy and Sinha, 2014). Cloud technology provided by a cloud company infrastructure, it does not need to be created by the company that uses the cloud (Aljabre, 2012). It is a new and emerging innovation of information technology which brings the concept of virtualization, data storage, local area network (infrastructure) and software (Roy and Sinha, 2014).

Cloud computing is a resource available to help companies to meet needs and goals. Especially in small businesses, cloud computing technology is a great tool that can benefit the business. All businesses need to respond to competition and provide incentive to make better use of Internet services higher than competitors. Cloud computing can help business change their focus to developing good business applications which will carry true business value (Aljabre, 2012).

This paper will discuss about usage of cloud computing and how cloud computing benefits focuses on delivering value to the e-commerce. Section 2 will provide a definition of cloud computing and how it is currently being used. Section 3 will talk about e-commerce. Section 4 will explain the benefits and Influence of Cloud Computing on E-Commerce. Section 5 will focus on proposed Model on improving Quality of E-Commerce with Cloud Computing. Section 6 will talk about methodology that we use Structure Equation Modeling (SEM) and Factor Analysis the relationships between cloud computing benefits and improvement of e-commerce quality is examine. Section 7 will focus on data analysis and results. Finally conclusion will explore which one of cloud computing benefit have more influence on e-commerce.

2. Cloud Computing

Cloud computing is a rapidly growing technology that has established itself in the next generation of business and information technology industry (Hashem et al., 2015). Cloud computing is revolutionizing the IT industry by adding flexibility to the way it is consumed, enables organizations to pay only for the resources and services that they use. In an effort to reduce the capital and operating costs, organizations are using the cloud to provide the resources needed to run applications. Clouds on specific technologies and their implementation are significantly different, but often offer infrastructure, platform, and software resources as services (Assunção et al., 2015).

Cloud computing, a rising concept, has a lot of attention in both commercial and academic field. Firmly talking cloud computing is not a new concept, it can be traced back to 1997, when the first period mentioned, but only recently has it become a fashionable term (Lin and Chen,
In simple terms, the cloud computing is a kind of service delivery model, in which IT services are obtainable as a service to consumers and billed as per usage. The service can be accessed at any time and from anywhere, using a thin client such as a web browser, via the Internet. The cloud computing architecture has the following basic characteristics (Pichan et al., 2015; IEEE, 2014):

- **Elasticity**: According to customer requirements, the ability to scale up or down computing needs.
- **Connectivity**: The ability to connect at any time and from anywhere with access to the services.
- **Multi-tenancy**: The ability to host multiple tenants to share physical storage, memory and network on the same physical resources.
- **Visibility**: The ability for consumers to have complete visibility and control parameters for cloud deployment, usage and cost.
- **Measured service**: The ability to measure service and billing based on per usage (Pichan et al., 2015).

Cloud computing has a number of favorable features to address the fast growth of economies and technological barriers. Cloud computing presents total cost of ownership and allows organizations to focus on the core business without upsetting about issues, including infrastructure, flexibility, and availability of resources (Aceto et al., 2013). In addition, the combination of utility model of cloud computing and a rich set of computing, cloud storage infrastructure and services offers a very attractive environment where scientists can conduct their experiments (Hashem et al., 2015).

### 2.1 Cloud Computing Service Model

Cloud service models usually consist of PaaS, SaaS, and IaaS. Each type of service serves different purposes and targets different customers, they portion a common business model that they rent the use of their computing resources such as services, applications, infrastructures, and platform to customers (Lin and Chen, 2012).

**Infrastructure as a Service**

Is a model of software deployment whereby provided a service based on demand of fundamental computing infrastructure of servers, software and network equipment, based on a platform for the development and implementation of the program can be deployed (Pichan et al., 2015). It is a single layer cloud wherever cloud computing vendor’s dedicated resources are shared only with contracted clients based on payment per use (Roy and Sinha, 2014). Customers of IaaS avoid purchasing, housing, and managing basic hardware and software infrastructure ingredients; rather than to obtain these resources as virtual objects can be controlled via an interface (Pichan et al., 2015).

**Software as a Service**
It is a model of software deployment thereby one or more applications and computing resources to run them for use on demand is offered as a turnkey service, available using a thin client (Pichan et al., 2015). This is a costing model on pay-per-use basis where software applications are leased out to contracted organizations by SaaS sellers. The software has limited functionality, it can be easily customized based on the demand that will be billed accordingly (Roy and Sinha, 2014). An example of this is the online alternatives of typical office applications like word processors.

Platform as a Service
It is a model of software deployment thereby the computing platform is provided as a service on demand upon which applications can be developed and deployed provided (Roy and Sinha, 2014). Platform functions as a service cloud layer is similar to IaaS cloud services with the addition of the rent functionality. PaaS services are expensive than IaaS and SaaS. The use of virtual machines in cloud computing PaaS layer to act as a catalyst (Roy and Sinha, 2014).

3. E-commerce
Electronic commerce definition, any operation of online contract and selling products between organization and any third party it deal with its e-commerce, it can be categories as:

1) Business-to-Business (B2B): its mean the e-transaction among businesses.
2) Business-to-Consumer (B2C): its mean directly selling of enterprises to the consumers.
4) Consumer-to-Consumer (C2C): its mean the business transaction between consumers or users. The users sell products among them via internet (Abdulkader and Abualkishik, 2013)

Economic reasons also motivate consumers to prefer e-commerce. Online shops have lower costs and present better prices than traditional retailers. also, Internet allows consumers to compare prices from different retailers simply (Chaparro-Peláez et al., 2016) and gathering quick, costless, and effortless information (Chang et al., 2010).

E-commerce came into being since late 1970s. It was thought to provide how business transactions are built electronically through electronic data interchange (EDI). Exchange traded fund (ETF) cloud computing and e-commerce are both usually used because of their cost effectiveness. The cloud computing allows organizations to perform business without having to develop and retain IT infrastructure. E-commerce provides the flexibility for business to sell products online without having to physically rent an office. These days, many more e-commerce companies obtain advantage of the profit of cloud computing (Nevin, 2015).

E-commerce is made up two layers: a) technical architecture contains hardware and software, and b) the similar transactions that are based on technical architecture. Laudon and Traver (2001), states that the base of e-commerce is the technical architecture. In addition, the business forms and marketing techniques can be used only through this. It is essential that the technical architecture for online services and products maintain security. It is anticipated that cloud computing will have a significant impact on the technical architecture of e-commerce. Cloud computing makes everything easier for e-commerce business since these businesses can simply
rent the required hardware and software instead of buying them. As a result, businesses also do not need to have physical space to hold these objects that brings the cost down even more considerably. Through the ease of use, e-commerce business can only focus on the core business processes (Nevin, 2015).

4. Cloud Computing and E-Commerce

Today, cloud computing and e-commerce are two common words. They are general because both of them are affordable. Cloud computing saves organizations IT infrastructure costs, while e-commerce allows merchants to do business without renting or buying a store entity. Cloud provides positive opportunities for e-commerce, but before its adoption, companies must have a trade-off (Abdulkader and Abualkisik, 2013). E-commerce and cloud computing can be explained as follow by several researchers:

1. The rapid growth of the global economy, causes acceleration the development of web-based online business transactions.
2. Online shopping is becoming a new common trend as it is more appropriate comparing to traditional way of shopping.
3. The technologies of information security are developing quickly.
4. According to this the Level of training and information technology skills of consumers have been upgraded.
5. The development of telecommunications infrastructure speed up the development of e-commerce industry worldwide.
6. Cloud computing provides an opportunity for small and medium companies to move to Internet with less effort (Jignesh, 2014).

4.1 Influence of Cloud Computing on E-Commerce

The rapid development of networking, business enterprise data also deal with the threat of future viruses and guests black. Cloud computing can provide data security and business safety-critical business do not need to suffer. It will be easier if the company's business network frame and application procedure in a cloud environment simply by clicking on the network browser (Roy and Sinha, 2014). With cloud computing, most users will need not to purchase hardware and software, even does not need to know who is providing the service, as long as focus on the resources or services that they really need. Business enterprise rented IT infrastructure for its purpose (Roy and Sinha, 2014). If the cloud-based e-commerce service called cloud e-commerce, based on the basic application form, we can describe the overall picture of infrastructure of the cloud e-commerce, as shown in Figure1.

4.2 Benefits of Cloud Computing for E-commerce

The cloud computing and e-commerce get benefit a lot from the Internet. Cloud computing lets consumers and clients to use services, computational resources and storage in a apparent way. E-commerce on the other hand, allows consumers to purchase services or products from just about anywhere in the world and anytime. The cloud computing for e-commerce has several benefits
cloud computing helps businesses to significantly reduce the costs in various areas such as purchasing hardware, security, privacy, energy, and maintenance (Nevin, 2015).

Table 1: Benefits of Cloud Computing for E-commerce criteria

<table>
<thead>
<tr>
<th>Benefits set</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost saving</td>
<td>Business organizations with cloud computing can reduce IT resource consumption, implementation and installation.</td>
<td>(Abdulkader and Abualkishik, 2013), (Jignesh, 2014), (Nevin, 2015)</td>
</tr>
<tr>
<td>Scalability</td>
<td>Cloud services enable the quick adaptation of IT to changing business requirements.</td>
<td>(Nevin, 2015), (Abdulkader and Abualkishik, 2013)</td>
</tr>
<tr>
<td>Availability &amp; Mobility</td>
<td>Larger cloud providers can propose high availability due to their ability to scale e-commerce benefits of cloud computing by allowing its customers access products and services from anywhere and anytime through mobile devices. If the users travel all around the world, they can still have access through their smartphones.</td>
<td>(Abdulkader and Abualkishik, 2013), (Jignesh, 2014), (Nevin, 2015)</td>
</tr>
<tr>
<td>Efficiency &amp; Innovation</td>
<td>With the efficiency availability of IT organizations can focus on its core business and capitalize on innovative research and development. This can be achieved through implementation of cloud computing. Compared with traditional information technology services, cloud services can be provided only in the few hours instead of weeks or months.</td>
<td>(Abdulkader and Abualkishik, 2013), (Jignesh, 2014)</td>
</tr>
<tr>
<td>Easy management</td>
<td>A process that maintenance of the infrastructure, hardware or software is simplified.</td>
<td>(Abdulkader and Abualkishik, 2013), (Jignesh, 2014)</td>
</tr>
<tr>
<td>Disaster Management</td>
<td>In the case of disasters an off-site backup is always useful. Keep important data backed up using cloud storage services needed for access within a short time for most of the organizations.</td>
<td>(Abdulkader and Abualkishik, 2013)</td>
</tr>
<tr>
<td>Trust and Security</td>
<td>Security is an important concern for data stored in the cloud. Many users of cloud computing on the importance of transparency in matters of trust</td>
<td>(Nevin, 2015)</td>
</tr>
</tbody>
</table>
in cloud computing agreed. Business must clearly see that service providers actually adhere to security standards and best practices.

The above advantages obtained by the cloud can influence many business organizations to decide on the adoption of cloud computing (Jignesh, 2014). The potential benefits of adopting the cloud computing can be both financial savings and the perspective of resource management is evaluated. It can enable businesses, and consumers to access on-demand resources from resources pool and uses more flexibility and lower costs for computer resource management (Lin and Chen, 2012).

4.3 Quality of E-Commerce

Review of literature found in the scientific literature shows that no common way to assess the quality of e-commerce is universally accepted. Moreover, in most of essays there is no sign of how to improve the e-commerce system after quality evaluation (Guseva, 2010). Analytical basis for identifying criteria e-commerce quality assessment was inspired by the publications’ network principle (Guseva, 2011). In order to maintain the quality of e-commerce, computer services must be scalable, reliable and flexible of access to goods and services from anytime and anywhere all over the world. Many cloud service providers have their data centers around the world in order to guarantee the reliability of access to cloud applications in cases of failures (Nevin, 2015).

E-commerce quality element presented in Table 2 choosing from literature review and interviews with experts, we choose some of them that have been associated with cloud computing.

Table 2: Quality of e-commerce (Guseva, 2011)

<table>
<thead>
<tr>
<th>E-commerce quality element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>The originality, relevance to the field, reliability, cleanness of the information provided and its ability to meet customer expectations content</td>
</tr>
<tr>
<td>Safety of transactions and personal data</td>
<td>The ability to make sure data safety which is chiefly important in online payment</td>
</tr>
<tr>
<td>Loading time (speed)</td>
<td>Technical features of an e-shop, revealing through the e-store displays speed and page loading times</td>
</tr>
<tr>
<td>Delivery</td>
<td>The quality of delivery regarding time, manner and form</td>
</tr>
<tr>
<td>Online support</td>
<td>The Possibility of receiving online help, efficiency and speed of resolving problems</td>
</tr>
</tbody>
</table>
5. Proposed Model

As the benefits of cloud computing features improve quality of e-commerce, it helps firms to attract new customer or keep old customer loyalty. This paper aims at introducing a model based on improving quality of e-commerce with cloud computing and to explore the relationship among them (See Figure 1).
To build the measurement scale for the model variables various studies were consulted and a list of 13 items to measure these variables was drawn up (see Tables 1&2). This scale is validated empirically in the following subsections.

6. Methodology

6.1. Questionnaire

In this paper, we used the data from the Information technology department of Iranian banks. A survey was used for this study with modified questions for testing of the defined model (Figure 1) that contain 23 questions, which are divided into seven groups. Five-point Likert scale was used for analyzing the questionnaire responses (1=totally disagree, 5=totally agree). In this way, respondents expressed their views and thus obtained baseline data on which further analysis was performed by using the software package SPSS v. 19 and LISREL v. 8.8.

6.2. Sampling and collection of data

The target population for the empirical study consists of Information technology department of
Iranian Banks that randomly recruited 200 employees from Iranian banks. The respondents firstly being informed about the cloud computing and e-commerce, aim of the study and questionnaire itself. 190 papers were properly filled (meaning that the respondents answered to all questions in the questionnaire). It represents 95% of the total number of distributed questionnaires, which can be considered as representative sample for the population in which the study was conducted.

7. Data analysis and results

We used a reliability coefficient the Cronbach's Alpha to analyze the reliability of the scale. This coefficient evaluates the consistency of the entire scale, and is the most commonly used measure.

The value of Cronbach's Alpha and Item to total correlation is assumed to examine the internal stability and credibility of all factors. For high reliability, the value of Cronbach's Alpha should be more than 0.7; reliability is incredible if its value is less than 0.3. For high reliability, the value of Item to Total correlation should be greater than 0.6; reliability is low if its value is less than 0.3. The Cronbach's Alpha is 0.872 for all the variables, which confirms the scale reliability.

Table 3: Reliability statistics

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>N</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.872</td>
<td>190</td>
<td>13</td>
</tr>
</tbody>
</table>

For experimental validation of the theoretical model in general, this paper used the SEM (structural equation model), (Miloševic et al., 2015) that consists of two stages. The first step involves the evaluation of the measurement model to examine whether the model fits with the data collected on the basis of satisfactory results. Then, secondly, evaluating the fit of the structural model.

A confirmatory factor analysis was carried out to refine the measurement scale definitively. This analysis resulted in a scale consisting of 13 indicators, which shows higher levels of validity and reliability than the scale proposed initial. In order to test the proposed model, a structural equation methodology was applied to evaluate the appropriately of the theoretical model under analysis with respect to the empirical data, and examine the significance it. Lisrel 8.8 software was used to estimate the SEM model.

First an introductory model which contained only the direct effects of the variables benefits of cloud computing for e-commerce was estimated. Secondly, with the aim of improving the model the variables that shown the effect of benefits of cloud computing on quality of e-commerce were introduced. Table 4 summarizes the measures used and the overall fit of the improved model.
RMSEA measures the average of difference between observed data and modeled data, and refers to the mean square error.

Finally, evaluating the fit of the structural model, it was observed that all the coefficients estimated in these equations were significant in this case. Figure 2 shows the estimations of the standardized regression coefficients. All the t-values (critical ratios) exceed the reference value of 1.96 (figure 3) for a significance level of 0.05, which means that the estimated coefficients were completely significant (robust statistics were used in these calculations). Moreover, the coefficient of determination quality of e-commerce to 0.61, which means that 61% of the variability of them was explained by the improved model.

Table 4: Indicator's goodness of improved model

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
<th>Recommended Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMSEA</td>
<td>0.05</td>
<td>&lt; 0.1</td>
</tr>
<tr>
<td>RFI</td>
<td>0.94</td>
<td>&gt;= 0.9</td>
</tr>
<tr>
<td>NNFI</td>
<td>0.98</td>
<td>&gt;= 0.9</td>
</tr>
<tr>
<td>AGFI</td>
<td>0.9</td>
<td>&gt;= 0.9</td>
</tr>
<tr>
<td>CFI</td>
<td>0.99</td>
<td>&gt;= 0.9</td>
</tr>
<tr>
<td>NFI</td>
<td>0.95</td>
<td>&gt;= 0.9</td>
</tr>
<tr>
<td>GFI</td>
<td>0.93</td>
<td>&gt;= 0.9</td>
</tr>
<tr>
<td>X2/df6</td>
<td>1.48</td>
<td>&lt; 3</td>
</tr>
<tr>
<td>T-Value</td>
<td>7.37</td>
<td>&gt;+1.96 &amp; &lt;+1.96</td>
</tr>
</tbody>
</table>
Figure 2: Estimations of the standardized regression coefficients
**Figure 3: Estimations of the t-value (critical ratios)**

Ranking Claude computing benefits indicators based on amount of T.value in Figure 3 as shown in Table 4.

<table>
<thead>
<tr>
<th>Benefits set</th>
<th>T.value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost saving</td>
<td>8.1</td>
<td>3</td>
</tr>
<tr>
<td>Scalability</td>
<td>9.82</td>
<td>1</td>
</tr>
<tr>
<td>Availability &amp; Mobility</td>
<td>9.82</td>
<td>1</td>
</tr>
<tr>
<td>Efficiency &amp; Innovation speed</td>
<td>8.1</td>
<td>3</td>
</tr>
<tr>
<td>Easy management</td>
<td>2.33</td>
<td>5</td>
</tr>
<tr>
<td>Disaster Management</td>
<td>9.7</td>
<td>2</td>
</tr>
<tr>
<td>Trust and Security</td>
<td>7.17</td>
<td>4</td>
</tr>
</tbody>
</table>

8. Conclusion

The Internet is an essential shopping channel that grows constantly both in number of users and turnover. Cloud computing services can support and provide opportunity to Enterprises and E-commerce, due to the lack of IT-resources and infrastructure. However, cloud computing can be make benefits to them. The emergence of cloud computing is creating a new service ecosystem which will integrate all the E-commerce resources and facilitate the new service modes. For the E-commerce providers, cloud computing is creating the good opportunities while threatening their existence.

The adoption decision of cloud computing by Ecommerce will make significant changes in the business enterprises. The aim of this research article is to offer the model about benefits of cloud computing and improvement of the quality of e-commerce.

Results of the empirical test of the model confirm the fundamental role of these factors in the improvement of the quality of e-commerce.

The Availability, Mobility and scalability of cloud is well-suited for e-commerce, Cloud computing can be considered while developing strategies for current and future global expansion of e-commerce industry. The e-commerce product contents could be readily available to customers in the world through the use of cloud computing. Cloud computing can also assist to handle numerous e-commerce businesses specific to customers within many different countries. It have great influence on e-commerce quality improvement. Disaster Management in Cloud based systems improve agility, When natural disasters occur, Due to the use of cloud computing because of the use of site backup and data in the cloud, data access problem will be resolved.
quickly and this has a significant impact on improving the quality of e-commerce. As the e-commerce industry grows with the increased data growth, the need for the computer hardware and software resources increase and cloud services can be provisioned with just a few hours rather than weeks or months. As a result, costs associated with maintenance of equipment and operations will need to be taken into consideration. If the enterprise use cloud computing it can be cost saving and make Efficiency for them. They can focus on their core business and it have impact on its quality.

At the customer interface, cloud technology can help ensure a smooth and glitch-free online experience for customers. As a technology renowned for its scalability, cloud is flexible enough to cope with unexpected peaks. In an ever more demanding and competitive retail market, cloud-based technology can help retailers give customers what they want, while getting more from them. Only when the E-commerce enterprises involve cloud computing in the business strategy and establish the core competencies, can they realize the sustainable development
References


