Cloud Computing of E-commerce

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Abstract

Cloud computing affects on different sectors, including: E-learning, health care, and E-commerce. It offers online services in high efficiency and minimal cost which provide a high economic value. It is undoubtedly the next revolution in the Internet world as well as the business world.

Currently, more E-commerce enterprises move to Cloud Computing to achieve high practical value. This paper introduces an overview for Cloud computing in E-commerce through discussing various definitions for both concepts, highlighting the benefits and challenges for applying Cloud Computing in E-commerce, and discussing a suggested cloud computing E-commerce framework.

Keywords: cloud computing, e-commerce, ICT, Internet, SMEs

1. Introduction

There is no doubt that we are living in an era where things are getting old while they are still in the top of their modernity, the pace of technological development is accelerating, and hardly a day goes by without a witness appeared on the essential changes in all sectors, including the business sector.

In the past, to sell products you have to rent physically an office space which added different expenses, then E-commerce appeared and gave the flexibility for enterprises to sell products online without any need to rent a shop like before. These days, many more E-commerce enterprises especially SMEs (Small and Medium sized Enterprises) take advantage of the benefits of cloud computing (Mann et.al., 2008), where the growing of this innovation led them to compete with the large enterprises in   providing products and services as they have a large infrastructure despite their limited infrastructure (Abdulkader and Abualkishik, 2013).

The benefits of investment in cloud computing technology in businesses have been widely recognized (Armbrust et al., 2010) such as flexibility, reliability, enhancing the availability, and reducing the cost of E-businesses. (Tuncay, 2010).

2. What is E-commerce?

E-commerce came into being since late 1970s. Many advantages of online shops encourage consumers to adopt, like lower costs, better prices than traditional retailers, and ability of consumers to compare prices from different retailers (Chaparro-Peláez et al., 2016, Chang et al., 2010).

The Electronic Commerce Association introduced a general definition of E-commerce: "electronic commerce covers any form of business or administrative transaction or information exchange that is executed using any ICT (Information and Communications Technology)".

Raymond (2001) defined E-commerce as "The functions of information are exchange and commercial transaction support that operate on telecommunications networks linking business partners (typically customers and suppliers)".

Turban et al. (2002) defined it as "An emerging concept that describes the process of buying, selling, or exchanging services and information via computer networks".

In general E-commerce can be categorized as:

1. Consumer to Consumer E-commerce (C2C E-commerce): The E-transactions between consumers themselves

2. Business to Consumer E-commerce (B2C E-commerce): Enterprises can sell to the consumers directly.

3. Business to Business E-commerce (B2B E-commerce): The E-transactions between Enterprises.

4. Consumer to Business E-commerce (C2B E-commerce): Consumers can sell products to the Enterprises.

Actually, there are many different types of E-commerce applications, which grouped in Figure1 according to categories (Arie et al.,1995, Block et al.,1996, Soh et al., 1997, Zwass, 1998, Turban et al., 2000, Ainin,2000, Fatimah et al., 2000, Fahri and Omar,2001, Oakes, 2002, Johnson, 2003, Ainin, and Jaffar, 2003, Smith and Chaffey, 2005, Lawal, 2010).
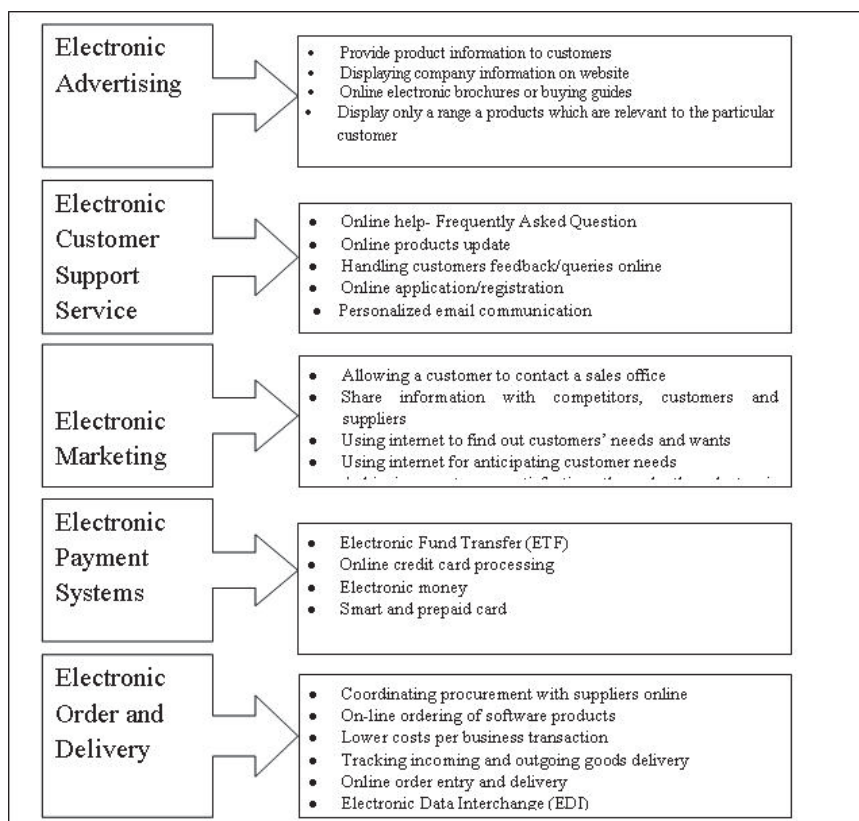

Figure 1. Applications of E-commerce

3. What is Cloud Computing?

Many governments and businesses considered it as a revolutionary term. The term of cloud computing doesn't have a unified definition at present. IEEE Computer Society defined it as (Kho, 2009): "A paradigm in which information is constantly stored in servers on the Internet and cached temporarily on clients that include desktops, entertainment centers, computers, notebooks, handhelds, etc". It is an IT tool used to deliver computing as a service not a product.

Many scientists of NIST (National Institute of Standards and Technology) defined it as follows: "Cloud computing is a model for enabling convenient to access to networks and applications quickly, common set of configurable computing resources (e.g., networks, servers, storage and applications) that can work with little or interfere with the service provider to provide or be released immediately."

Other researchers like (Paul et.al, 2010) defined it as "A style of computing where massively scalable information technology related capabilities are provided as a service across the internet to multiple external customers".

As shown in Figure 2(Arron, 2017), the cloud computing has three widely referenced service models. SaaS (Software as Service): It means that the end user will deal with the site remotely over the Internet. CRM (Customer Relationship Management), and the data center which displayed by Amazon Web Services are examples for this model. PaaS (Platform as a Service): The best example of PaaS is the Google App Store. It is primarily aimed at the developers' activities who want to deploy their applications directly in the cloud server, and they haven't an interest in the connection to the infrastructure of the servers. And IaaS (Infrastructure as a Service): It

gives developers the permission to take the highest level of direct interaction with the infrastructure of servers. It also allows them to deploy their own applications in remote environment and to control them remotely. So far, the SaaS model is the dominant model in the current industry.
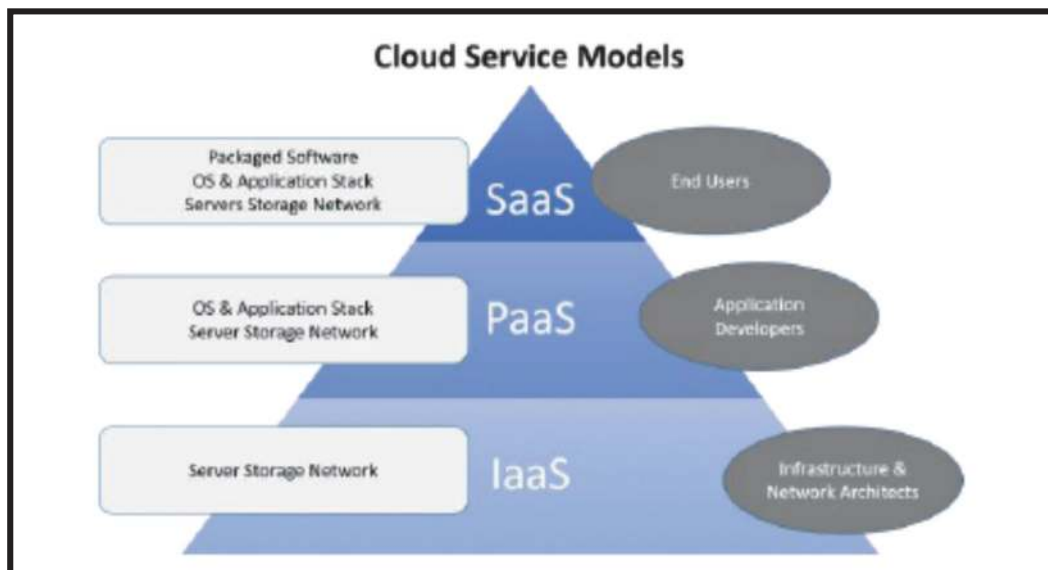

Figure 2. Models of Cloud Computing

4. Why is Cloud Computing in E-commerce?

Cloud Computing and E-commerce are now two famous terms in our daily lives. The main reason of this reputation returns to cost beneficial where cloud computing service saves enterprise's the cost of IT infrastructure, on the other hand E-commerce provides traders to do business without expenses like renting or buying a business shop.

The adoption of cloud computing and E-commerce in developing countries have been widely discussed by several researches, which showed that these innovations leveraged the developing countries in transforming into digital economy leading to global market penetration and national economic growth (Busalim and Hussin 2015; Khan et al. 2017; Nawaz et al. 2016; Rukhsara et al. 2016; Yu and Ni 2013, Dai et al. 2014; Guo and Gao 2015; Liu and He 2017; Rao et al. 2013, Neumann et.al. 2010, Talib and Alomary 2016, Goel and Goel 2017).

No one can deny that cloud gives positive opportunities and benefits for E-commerce, but smart organization should have a trade-off between costs before using it. 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, but still there are expenses related to hardware and software resources. These days, many more E-commerce enterprises obtain advantages of the profit of cloud computing (Nevin, 2015, Jignesh 2014, Abdulkader and Abualkishik, 2013) as shown in Table 1.

Table 1. Advantages of Cloud Computing in E-commerce

Advantage	Description
Cost saving	Reducing IT resources, installation, and implementation.
Scalability	The business requirements are changing constantly. Cloud computing enable rapid adaptations of IT to these changes.
Efficiency	IT organizations can concentrate on its businesses and get benefits through development and innovative research
Availability and　Mobility	Through smartphones, customers can access services and products anytime and anywhere.
Easy management	Maintenance of hardware, software, and even infrastructure is simplified.

According to Gartner Group (Gartner, 2016), as shown in Table 3. The worldwide public cloud services market is projected to grow 21.4% in 2018 to total $186.4 billion, up from $153.5 billion in 2017. The fastest-growing

segment of the market is cloud system infrastructure services (IaaS), which is forecast to grow 35.9% in 2018 to reach $40.8 billion (see Table 2). SaaS remains the largest segment of the cloud market, with revenue expected to grow 22.2% to reach $73.6 billion in 2018.

Gartner expects the growth rates of public cloud to stabilize from 2018 onward even though the revenue of it is growing more strongly than forecast, reflecting the status and maturity that public cloud services.

Table 2. Worldwide Public Cloud Service Revenue Forecast (Billions of U.S. Dollars)

	2017	2018	2019	2020	2021
Cloud Business Process Services (BPaaS)	42.6	46.4	50.1	54.1	58.4
Cloud Application Infrastructure Services (PaaS)	11.9	15.0	18.6	22.7	27.3
Cloud Application Services (SaaS)	60.2	73.6	87.2	101.9	117.1
Cloud Management and Security Services	8.7	10.5	12.3	14.1	16.1
Cloud System Infrastructure Services (IaaS)	30.0	40.8	52.9	67.4	83.5
Total Market	**153.5**	**186.4**	**221.1**	**260.2**	**302.5**

The most challenges to be faced in applying cloud computing in E-commerce (Abdulkader and Abualkishik, 2013, Nevin, 2015, Al-Jaberi et.al 2015, Babar and Chauhan, 2011, Buyya et.al, 2008) are presented in Table 4.

Table 3. Main challenges of applying cloud computing in E-commerce

Challenge	Description
Security	It is the main challenge, where data can be accessed, modified, or even destroyed during processing or transmission. Until now, it is hard to protect programs and data and there are no effective solutions.
Data Privacy	It is an important challenge, until now no technical solutions to protect the clients' information.
Data Storage	The clients of cloud services worry regarding their inability to control of stored data place.
Trust	As a definition trust is "the degree by which a target object such as software, a device, a server, or any data they deliver is considered secure." Until now, it is difficult for consumers to distinguish between good and bad E-commerce sites. This situation does not encourage enterprises and clients to move to the cloud.
Connectivity	In the cloud, to access shared information or resources the user must be connected to Internet.
Service standards issues	No available information for enterprises regarding mode of operations, technology used, and staff situation which let the clients are worrying to use cloud computing without knowing these details.

5. How is Cloud computing work in E-commerce?

The employment of cloud computing into E-commerce will bring a tremendous business change to enterprises. Figure 3 summarizes various influences of cloud computing on SME's E-commerce (Yu J and Ni J, 2013). The impacts are obvious and multifaceted in terms of deployed technology, service, and business model.
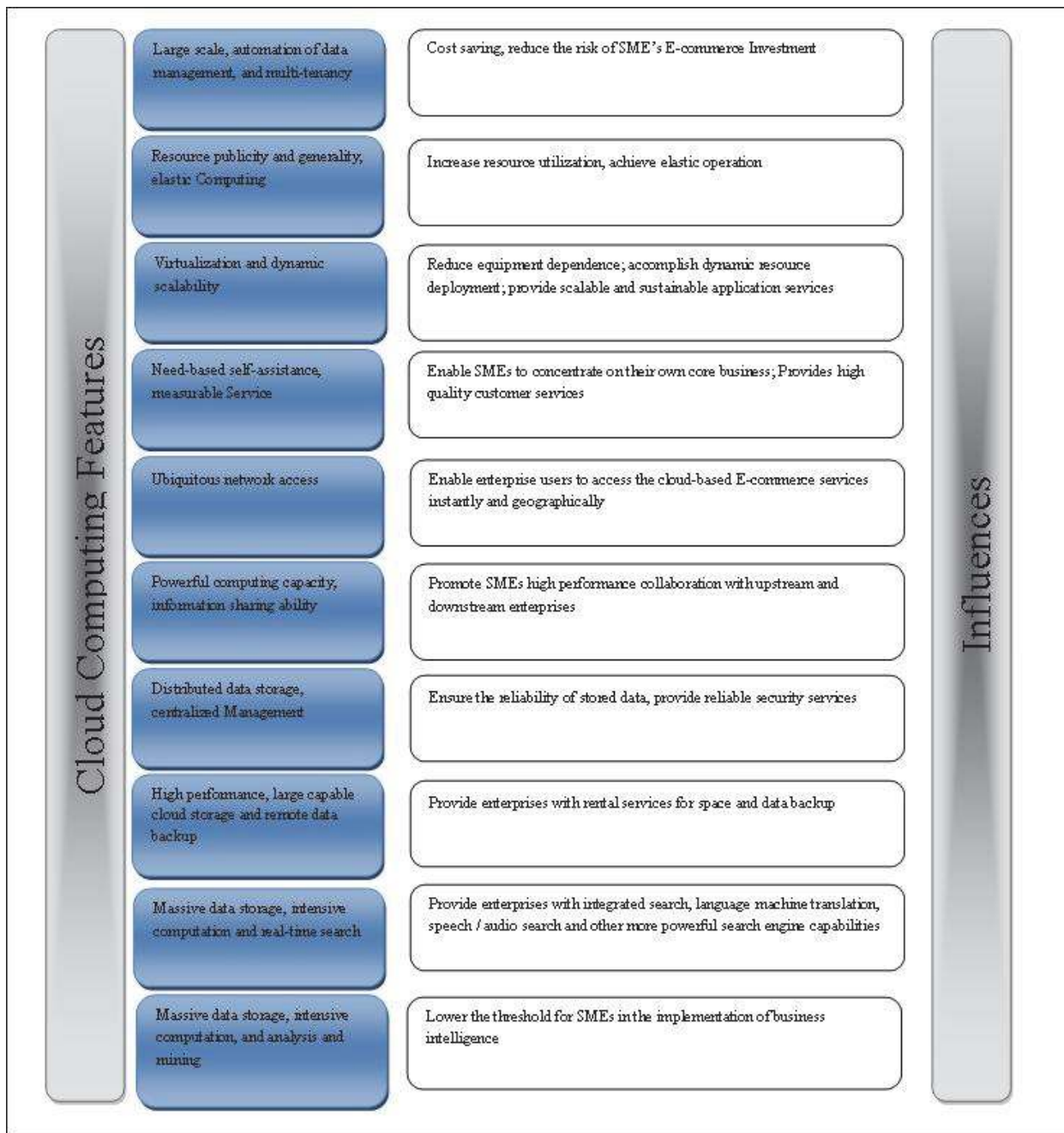
Figure 3. Cloud Computing Influences on SMEs E-Commerce

The E-commerce industry chain is composed of the hardware supplier, software developer, Internet service provider, system integrating provider, and service supplier where they exist as the backend of the enterprise and offer the technical support as shown in Figure 4 (Wang, 2013). While when the cloud computing is migrated into E-commerce, the structure of E-commerce industry chain will be changed as shown in Figure 5 (Wang, 2013).
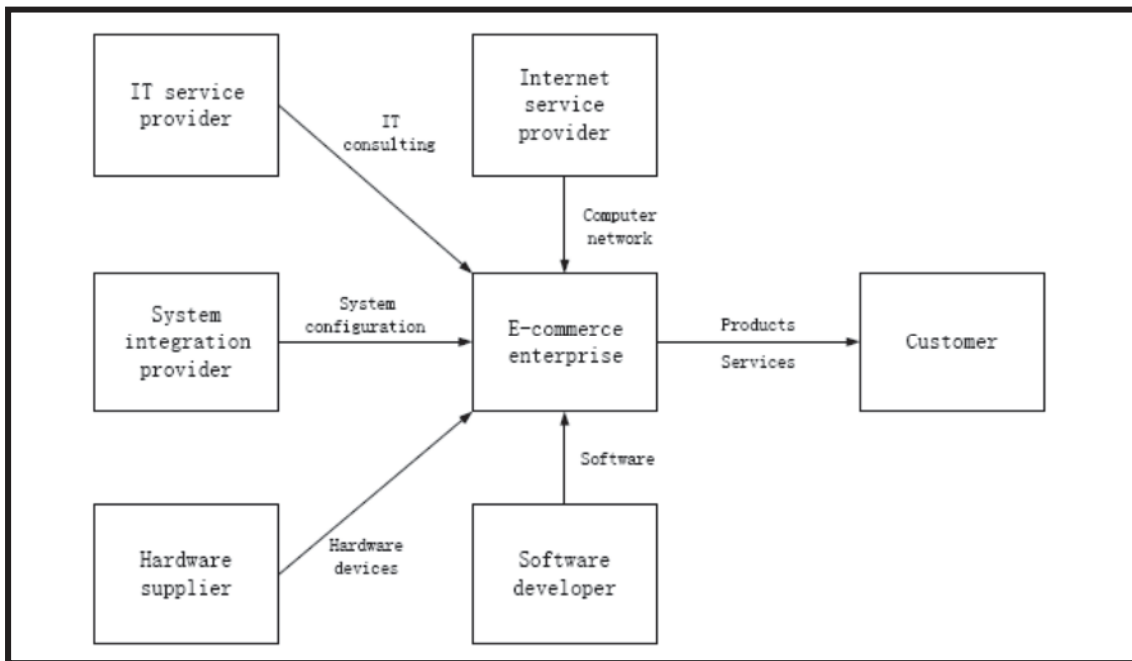
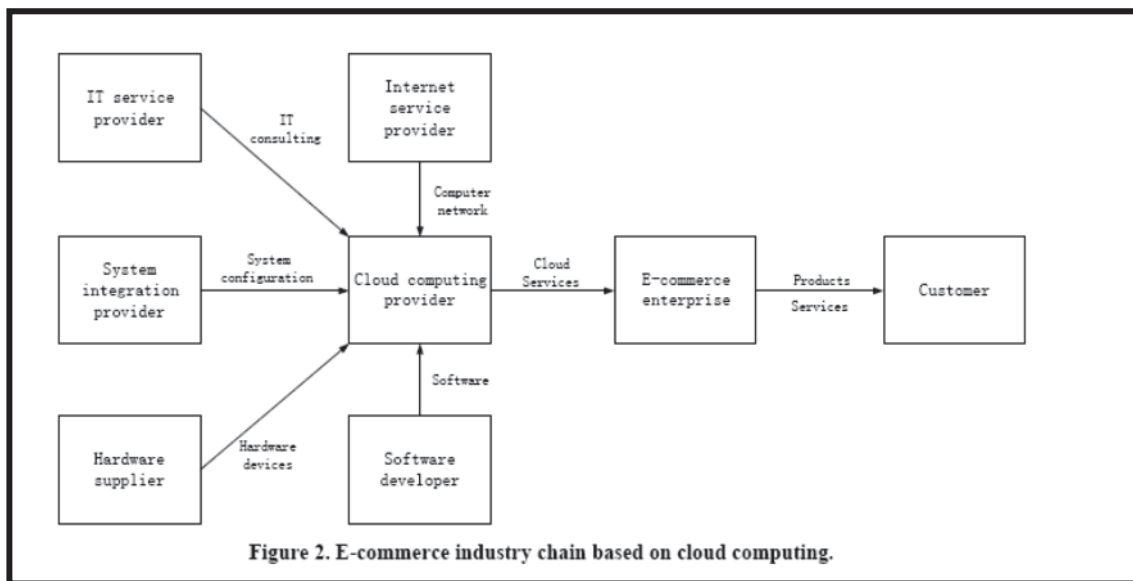Figure 4. Traditional E-commerce industry chain

Figure 2. E-commerce industry chain based on cloud computing.

Figure 5. E-commerce industry chain based on cloud computing

The researcher Akinyede in his research (Akinyede, 2018) proposed a new framework for using cloud computing in E-commerce applications to solve problems related with lack of resources and the environmental cost for developing and implementing an E-commerce system. It consists of five layers as you can see in Figure 6. This framework reduces the implementation time and cost of hardware and software. But it doesn't address other challenges like the cloud services standards, regulatory issues, and security of the applications and platforms.
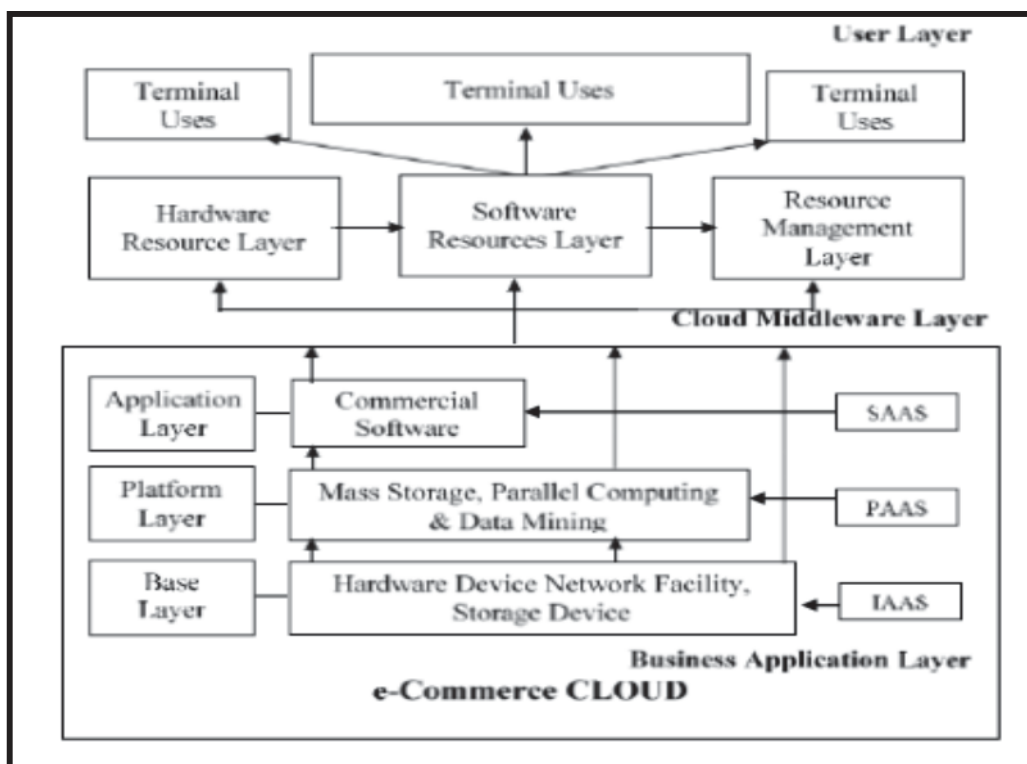
Figure 6. Proposed Cloud Computing based E-commerce Framework

5. Conclusion

The cloud computing is expanding and spreading as a business solution since it has shown effective and positive results which put it in the top-flight of ICT technologies i.e. Flexibility in the space and enormous support for infrastructure and software This innovation has many potentials that increase revenue, expand business and create new jobs that extend to large sectors not only in the business sector. It plays a vital role in the smart economy. Without doubt it will be the fifth utility after water, gas, electricity, and telephony which are always-on and paid by usage of consumer.

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