

IoT on E-Commerce, Present and Future: A Review of Alibaba Case Study

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Abstract The world's technology is increasing dramatically whereby people's consumerization of these technologies are also increasing, and this happens due to the rapid replication of the smart devices that make our daily activities easier and accurate. Basically the form of communication over the internet is human-human, Human-Things and now we are focusing on the communication between thing-thing (Also known as Machine-Machine or M2M). With the advent of this technology, it will transform the internet to become the Internet of Things (IoT). In the near future objects would have a unique way of identification and these objects would be addressed so that every object can be connected with internet so as to enable the communication among them. By looking at the impact that the internet brought to our economy, society and to the world at large, in terms of information sharing through the use of smart devices has significantly contributed towards the development of our lives and our businesses. The advancement in technology related to data collection such as the devices that are embedded and RFID technology that had immensely contributed in increasing the number of devices that are connected to the internet and allowing them to transmit data continuously and in real-time. This paper aimed in discussing the present and future aspect of Internet of thing (IoT), with a case study of China's Giant of e-commerce (Alibaba). To accomplish the aim and objectives of this paper, we used an approach of Literature Review (LR), by applying both present and future review on IoT. In a fairly recent review on internet of thing (IoT), we used an Alibaba case study conducted by (Yao, Yen, & Yip, 2015)

Keywords: Internet of Things, e-commerce, Challenges, Alibaba Case studies.

1. INTRODUCTION

Internet of Things (IoT) also known as Internet of Objects connects billions of objects, which include buildings, air conditioners, coffee machines, washers,

cars, Air planes, animals and people as well. According to Cisco (2015). The IoT connects things and people on an unprecedented scale; Cisco predicts that, although so far in 2015 more than 99% of things in the physical world are not connected, by 2020 the number of internet-connected devices and objects will reach 50 billion. With the mixing of physical world and information world together. The future technology can be predicted that the communication is not going to be people communicating to people; it's not going to be people accessing information. It's going to be all about using machines to talk to other machines on their behalf. We are moving towards a new era of ubiquity in terms of technology, we are entering the Internet of Things era in which new forms of communication among human and things, and between things themselves will be recognized (Tan, 2010).

One of the biggest breakthroughs of the Internet of Things is transforming the physical world and information world together. Sensors play a very vital role in bridging the gap between the physical world and information world. Sensors collect data from their environment, generating information and raising awareness about context. So that the change of their environment can be monitored at a glance and the corresponding things can make some responses when needed (Margery Conner, 2010). According to Stankovic, (2014). If our vision is correct regarding the future technology, many IoT applications will be based on a deployed sensing, actuation, and communication platform (connecting a network of things). In these deployments, it is common for the devices to know their locations, have synchronized clocks, know their neighbor devices when cooperating, and have a coherent set of parameter settings such as consistent sleep/ wake-up schedules, planned power levels for communication, and pair-wise security keys.

1.1 History of IoT

In the mid-1990s, Kevin Ashton, the father of the term "Internet of Things," was a brand manager at Procter & Gamble (P&G) London. When he visited P&G's

cosmetic retail stores, he found out that one type of lipstick always appeared to be out of stock. This was a paradox, because, although P&G's inventory system showed that a lot of the lipstick was in the retail stores' warehouses, no one could find it. About the same time, Ashton met a manufacturer of a tiny radio-featured chip, an early implementation of the radio frequency identification ("RFID") chip. Ashton had the idea of attaching the tiny chips to products, thereby allowing sales staff to identify both the presence and precise location of an item in inventory by using a wireless RFID reader. P&G sponsored Ashton in establishing a research center, the Auto-ID Center, to explore how the RFID technology might enhance inventory management. In one of his P&G presentations in 1999, Ashton coined the term "Internet of Things" (Maney, K. 2015).

2. LITERATURE REVIEW

IoT applications are proliferating dramatically, this will make these applications to become more sophisticated, many of these new applications will intimately involve humans human and things will operate synergistically. If we look at the existing smart devices example, Smartphones, Smart Cars, Smart homes, Smart Cities etc we can strongly predict that the future technology will transform our daily activities to handle by machines. This paper will focus more on Alibaba case study on examining the effect of Internet of Things on E-commerce.

3. METHODOLOGY

This paper followed the principle of Systematic Literature Review (SLR). The main purpose of this paper is to examine the effect of Internet of Things on E-commerce by reviewing the current state of IoT on E-commerce from recent studies. To achieve this aim, a qualitative research was conducted from many researchers that talks about the effects of IoT on E-commerce, in which among these papers, an Alibaba of China case study was given more emphasis.

4. E-COMMERCE

According to Kenneth Laudon and Carol Traver (2015). In their latest defined e-commerce, as commercial transactions conducted over the internet, by using websites and mobile applications to facilitate transactions among manufacturers, merchants, retailers and customers. The major e-commerce trends in 2014 and in 2015 are mobile and social e-commerce; mobile e-commerce platforms and social networks that provide search, advertising and payment services will create another e-commerce revolution (Kenneth Laudon et al. 2015).

5. IoT INITIATIVES IN ALIBABA

Alibaba of china is the world biggest e-commerce company, Alibaba started its IoT initiatives as early as 2014. It partnered both with appliance makers, such as Midea and Royal Philips, and with the automotive manufacturer SAIC Motor. It also launched open IoT

platforms. In 2015, Alibaba established two business units to facilitate the adoption of the IoT in e-commerce, moving forward toward new business opportunities generated by the booming IoT development trend (Want China Times, 2014).

In March 2014, Alibaba signed a strategic cooperation agreement with Midea, a leading Chinese electrical appliance maker, initiating this Chinese e-commerce giant's IoT trials. Under this agreement, Alibaba and Midea would jointly build an open IoT platform in China, based on AliCloud (Want China Times , 2014).

This newly-established platform would enable electrical appliances to connect to the internet, route communications, and allow users to control the appliances remotely and receive operational reports through applications installed on their mobile devices. At the same time, Midea launched its first "smart" air conditioner, which embedded a network adaptor, making it an internet-connected smart device. Midea selected Tmall, Alibaba's B2C e-commerce platform, as the sole distributor of its smart air conditioner. In the launch ceremony, Midea announced that in the coming three years more than 50% of its air conditioners it made would be connected (Want China Times, 2014).

According to Want China Times (2014). Customers could send instructions to an air conditioner to start or shut down, or adjust temperature settings by using a Midea mobile application installed on their mobile phones. In the meantime, air conditioners could record operational data such as elapsed time, utility usage, fine particulate matter (PM2.5), temperature and humidity, and transmit this data to the open IoT platform hosted by Alibaba Cloud. Customers could then check operational reports through the Midea mobile application at any time anywhere.

Alibaba IoT initiatives could also enables the Customers to use Alibaba's mobile chat application Laiwang, which means "association with friends," which was launched in April 2014, to control the air conditioners. In the future, Laiwang would enable manufacturers to diagnose their products remotely and provide after-sales services. It would also allow customers to communicate in real time with customer service representatives, ask for technical support, make maintenance appointments and pay for services via Alipay, Alibaba's on-line payment In the future, Alibaba and Midea would open their unified communications standard and provide an application programming interface (API) for third-party applications. This would create a huge, open IoT platform, connecting billions of devices and providing data storage and analytics services (Want China Times, 2014).

5.1 An Alibaba IoT Platform for business Start-Up

Alibaba launched its IoT platform for start-up businesses in June 2014, a platform aimed at reducing the barriers for entrepreneurs that are wishing to start using smart hardware businesses (Aliyun , 2014). The newly

introduced IoT platform would integrate Alibaba's marketing resources, cloud computing, big data analytics, information security solutions and other technologies in order to minimize smart-hardware manufacturing costs and enable accelerating IoT industry development. The Internet of Things Platform for Start-Up Businesses included five elements which are:

- Taoxiang sharing and marketing platform,
- Cloud computing platform
- Developer platform,
- Data platform
- Interconnection platform

By providing this basic IoT infrastructure, Alibaba permitted its business partners to focus on business innovation, and allowed these innovations to be extended to targeted customers more quickly (Aliyun, 2015).

5.2 Alibaba Internet-Connected Cars with SAIC

Alibaba also reached an agreement with the Shanghai Automotive Industry Corporation (SAIC) in July 2014, a Fortune Global 100 company and Chinese state-owned automotive manufacturer, to develop internet-connected cars (Bao, Z. 2014). The new cars would include elements of Alibaba Cloud operating system., Alibaba's online music service platform (Xiami), an automatic navigation system and AliCloud computing services. The main idea was to connect cars to the internet and allowing drivers and passengers to use Alibaba's online services, the services include online digital entertainment, maps and navigation, news and financial information. The project goal was to construct a network linking tens of thousands of cars to an integrated system that enabled information-sharing among cars, drivers and other users of the road, this will enhance the traffic management and even achieving auto-pilot driving (Bloomberg, 2015). These internet-connected cars were introduced into the market in August 2016.

5.3 Alibaba and Philips' IoT Platform in China

Royal Philips the Dutch electronics manufacturer, announced that it made an agreement with Alibaba in October 2014, to use AliCloud to host its IoT platform in China for healthcare and smart products (Business Cloud News 2014). Alibaba would provide data communications, data storage, data security, and big data analytics services for Royal Philips' new IoT devices by providing a wireless communication infrastructure. Philips introduced its first Health Suite device in that same month into China. The device's name is Philips Smart Air Purifier and its mobile application were connected to Alibaba Cloud. This smart air purifier is capable of monitoring indoor air quality with an internal sensor. When the sensor found that air quality had reached unhealthy levels, it would send an instant message to Alibaba Cloud. AliCloud would then send a real-time alert message to the customer's mobile devices (Philips IoT platform 2014).

As was the case with Amazon's Dash Replenishment Service, which could automatically make online refill orders for laundry detergent, coffee and ink cartridges, the Philips air purifier would know when a filter would fail and send real-time replacement requests to its customers. Philips could acquire operational data on its products, automatically gathered by the air purifiers and sent to Alibaba Cloud. AliCloud could help Philips in transforming this data into knowledge to be used for improving the products and energy efficiency enhancement (Business cloud News 2014).

Another product that Philips would like to introduce to the Chinese market in the future is internet-connected LED lighting. Global urbanization has accelerated the demand for more lighting and therefore energy, pushing the requirements for energy-efficient lighting solutions. Comprised of IoT components such as a wireless-network adaptor, sensor and controller, a connected light could automatically manage its energy efficiency or be controlled remotely by an application or in a control center. In fact, Philips had already introduced intelligent street lighting solutions in Europe and the US (CIOL, 2014).

5.3 An Alibaba Milestone

According to Computer business Review (2015). Announced that in April 2015, Alibaba had established two new business divisions, the automotive business unit and the smart living business unit, that is representing a milestone for Alibaba's IoT initiatives. Alibaba Cloud will power these new business divisions and their IoT initiatives.

The automotive business unit will utilize the advantages of Alibaba's big data on customers, which include online purchasing history and product preferences. Alibaba would conduct big data analysis and provide financing services and marketing support to car manufacturers and dealers. Alibaba will also allow car manufacturers and dealers to upload their catalogues to its e-commerce platform. This would offer financing deals to the potential customers and creating an innovative model for generating revenue. In April 2015, Alibaba had also partnered with around 50 car manufactures, which including BMW, Toyota and Volkswagen, and with more than 10,000 car dealers and 20,000 car service providers in China (Davies, A. 2015).

According to Shanghai Automotive Industry Corporation (SAIC) said that "it would invest US\$161 million to jointly develop internet-connected cars with Alibaba (Computer Business Review, 2015). At the same time, Alibaba's Tmall would use knowledge gleaned from big data analytics and cloud computing to match buyers and dealers and recommend the right cars to the right buyers and provide loans to people purchasing cars" (Bao, Z 2014).

The smart living business unit will integrate Taobao's and Tmall's electronic appliance sections to create a new

smart home-appliance category. The new e-commerce platform will enable small businesses to raise their capital online. It will also enable manufacturers and merchants to promote selling of their products with built-in internet components. Moreover, Alibaba will continue to provide cloud computing and data analytics services to customers, merchants and manufacturers after the completion of online purchases, expanding its business scope beyond that of current e-commerce firms (Bao, Z 2014).

6. Challenges of Internet of Things

As we have seen some benefits of Internet of Things through the “Giant of E-commerce” Alibaba of China, in order hand we had to look at some issues that are attached to these innovations. Technology is advancing dramatically; consumers needs are increasing and information privacy challenges are increasing as well. Technology has simplified our daily activities whereby some of the physical activities are now handle by machines. Therefore, we have look at the possible challenges that these innovations might bring to our lives. In this study we categorized the challenges that this technology might bring to our society locally and globally which are: (i) Security (ii) Unemployment and Dependency.

6.1 Security

When discussion about online activities challenges the first thing that would come to your mind is security. Because there is no organization providing online service that will guarantee you a 100% security, this is due to the availability of people’s information that is moving everywhere example on social media. Therefore, in Alibaba case study I found some issues of privacy which need to be given some priority. Here are some of the challenges and solutions provided by different scholars regarding the IoT challenges.

The overall security and resilience of the Internet of Things is a function of how security risks are assessed and managed. Security of a device is a function of the risk that a device will be compromised, the damage such compromise will cause, and the time and resources required to achieve a certain level of protection. If a user cannot tolerate a high degree of security risk as in the case of the operator of a traffic control system or person with an implanted, Internet-enabled medical device, then she may feel justified in spending a considerable amount of resources to protect the system or device from attack (Baldini, Peirce, & Botterman, 2012).

According to Baldini (2012). There is always an increase in number of connected devices. Internet of things will combine and store huge amount of personal information, these data is attractive to hackers and nowadays, hacking became a main problem to many growing sectors. Analysts warned that many new gadgets lack the basic protection against hackers. Providing privacy to the personal information against hackers is the most important issue concerned with IOT.

6.2 Unemployment

Employment is one of the key to the development of society or country. Public and private organizations do employ people to participate in the achieving goal, organizations pay salary to the employee in replace of labor. This salary is what employees used to sustain themselves and their families.

In fact, the advent of IoT would result in dramatical challenge to unemployment, because machines would be used to replace the labor that some employees do manually. Therefore, when introducing the machines in replace with employees, the employees labor which is manually would be terminated. Examples a Robot machine that can handle the duty of 200 employees. Moreover, among these employees it’s not all that has the knowledge of modern technology, so that they can be transfer to another unit.

6.2 Dependency

Nowadays, people rely on network that is the reason why it becomes an integral part of our lives. When there is no network you would see business and people’s activities stop as well. This shows that when IoT become ubiquitous that time you would see people and business processes become highly dependent on internet, people will not have any other alternative because our entire life would be overwhelmed by internet. Therefore this could be a great challenge ahead in terms of feature IoT.

7. Solution

Solutions for IoT are the major challenges that researchers are facing. Ideally, for a quick response, given the real-time nature of many IoTs, the detection, countermeasures, and repairs must run in real-time as part of a runtime self-healing architecture. Sometimes, healing requires reprogramming, e.g., when an unanticipated attack occurs. In these cases, healing instructions need to be securely (with authentication and attestation) delivered to the appropriate nodes and then the node’s running programs need to be amended by the runtime architecture. It is likely that significant hardware support will be necessary for providing encryption, authentication, attestation, and tamper proof keys. Even if new devices are security-aware, dealing with legacy devices will prove difficult (S. Ravi et al. 2004).

A future Internet of Things should be able to integrate stakeholders who will be affected by the Internet of Things, such as citizens, small and medium enterprises, governmental institutions and policy makers, to meet and match key societal and economic needs.

Users shall be empowered to access more information about things (e.g., Where has an item been produced? – Who owned it previously? - What was it used for?) instantly at their fingertips, subject to compliance with privacy regulations.

8. Conclusion

The effort made by the Chinese e-commerce giant Alibaba, as well as Amazon and other e-commerce firms worldwide, has contributed immensely in the exploitation of potential IoT business opportunities in year 2014 and 2015. This trend will be fully expanded in few years to come. By linking things that are offline in the current e-commerce business model, the advent of IoT will be replaced by the current e-commerce. The IoT would generate an unprecedented amount of data. E-commerce firms would jointly build IoT ecosystems which will be partnered in various industries, and would be continuously transforming the data into valuable knowledge, and this will cause IoT's economies of scale to expand beyond the e-commerce sector. Moreover, the advent of big data is also one of the trends that will dominate the current e-commerce system, by blending huge amount of data into a single and consolidated information. Also, the advent of smart devices are increasing dramatically this would enable the e-commerce system to be accessible both locally and globally, by considering the diversification of internet connectivity in local areas would create more advantages on the future IoT in e-commerce.

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