E-Commerce Today and Tomorrow: A Truly Generalized and Active Framework for the Definition of Electronic Commerce

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ABSTRACT

E-commerce can be viewed from different perspectives by different people. Existing e-commerce frameworks consist of rigid and specific fundamental components of e-commerce. E-commerce field is constantly facing new challenges and new situations. To deal with these challenges, an Active E-commerce Framework is being proposed. This framework consists of six important e-commerce components each composed of several instances. The components and instances of the framework are subject to the rule of Component Flexibility (CF) and Instance Flexibility (IF) respectively. The user perspective is considered as the most important and vital component in this model. By using the user perspective component as the guiding ground, different e-commerce definitions can be constructed. This paper aims at providing an e-commerce framework that can cater for different views of e-commerce as well as assist a person in constructing e-commerce definition from his own perspective.

Categories and Subject Descriptors

H.1.0 [**Models and Principles**]: General

General Terms

Management, Measurement, Design, Standardization, Theory

Keywords

E-commerce; E-commerce model; E-commerce framework; E-commerce definition

1. INTRODUCTION

The World Wide Web technology enables people around the globe to engage in commercial activities without temporal and spatial boundaries. According to Laudon and Traver [5], there are seven unique features of e-commerce technology including

ubiquity, global reach, universal standards, richness, interactivity, information density and personalization/customization. As noted, e-commerce is available everywhere and anytime. Anyone with a Web-enabled device is able to hook on to the Internet and conduct commerce electronically. Moreover, e-commerce enables potentially billions of consumers and businesses worldwide to be engaged in business activities. Since e-commerce is being practiced by different users having diverse demographic backgrounds they all define e-commerce from their own perspective. There are indeed many researchers in the area of e-commerce trying to define the meanings of e-commerce. However, as e-commerce is on the fast track of evolution, past definitions of e-commerce may not hold in this new era.

The aim of this paper is to provide an extended dynamic and generalized framework for electronic commerce. This framework differs from previous models, whereby it caters the needs for new e-commerce era and provides the flexibility to the user to describe the meaning of e-commerce that suits his background. Moreover, this paper presents the components and their instances to meaningfully define e-commerce. Finally, sample applications of the framework based on different business backgrounds are presented.

2. THE VARIOUS MODELS AND FRAMEWORKS OF ELECTRONIC COMMERCE

The term "electronic commerce" carries different meanings to different people. A Business Analyst may view e-commerce as a tool for statistics to calculate the transactions of goods and services on the Internet while a System Developer may think that e-commerce is an information system that provides catalogues of products over the World Wide Web. These very different views encourage many researchers in the e-commerce field to develop a framework of e-commerce. These frameworks are intended to provide an overview of a structure that encloses the most relevant e-commerce components. Most often, these frameworks tend to become a blueprint in any construction of e-commerce definition. One of the popular e-commerce frameworks was proposed by Zwass [13]. Zwass's framework resembles a hierarchical structure comprised of several levels, with each of the lower levels delivering a well defined functional support to the higher levels. From Zwass's

framework, we learn that e-commerce consists of three meta-levels. They are infrastructure, services as well as products and structures. The hierarchical framework resembles network layers described in the Open System Interconnect (OSI) model. The infrastructure layer serves as the base for e-commerce services layer. In turn, e-commerce services layer provides the foundation for e-commerce products and structures layers.

Molla and Licker [6] proposed another framework for classifying e-commerce views. This framework is the combination of Zwass and Riggins and Rhee's framework of electronic commerce. Molla and Licker identified the *infrastructure, services and products, and structure* components from Zwass hierarchical framework of electronic commerce and *application user location and types of relationships* components from Riggins and Rhee's electronic commerce domain matrix [8]. By integrating these components, Molla and Licker stressed that, in any definition of e-commerce, it is important to identify four basic dimensions among them are: the nature of the network archetype, the application solutions, the business functions performed or supported and the parties involved in the electronic relationships.

Molla and Licker's framework is considered comprehensive due to the fact that the framework covers most important components in e-commerce definition. However, this framework does not allow a component to be left out from the definition of e-commerce. Since e-commerce is being viewed from different perspectives, it will be difficult to require a person who wants to define the meaning of e-commerce to include each and every component of e-commerce. The advantage of Molla and Licker's framework for classifying e-commerce views is the flexibility of determining the nature of the product or service offering, the parties to the relationship and the revenue stream based on the business model. This means that different business models will have different e-commerce definitions. However, the differentiation is only focused on three components which include the product or service offering, the parties to the relationship, and the revenue stream.

Due to the rigid structure and incomplete component coverage of previous e-commerce frameworks, an electronic commerce component model (ECCM) was developed by Elsie Chan and Paula Swatman [3]. Elsie and Paula's ECCM consists of three meta-views which are *legal, services* and *infrastructure.*

Elsie and Paula model is dynamic. The width of the boundary of the three meta-view components depends on the user who makes the definition. The wider a component sits in the meta-view, the more significant it is. Moreover, each component in the meta-view consists of many objects, which can be deleted or added from time to time. The importance of each component and each object is being determined by an "absolute weight", ranging from 0.00 to 1.00. The dynamic feature of the component model is being determined by the *weighting of each component identified by the user* multiply by the *weighting of the object during the period the definition being made*. The disadvantage of the ECCM model is the high subjectivity of determining the absolute weight for each component as well as for each object under the component category [3]. Furthermore, it will be less user-friendly to define e-commerce in terms of numerical results. Besides that, the ECCM model only covers three components in

meta-view, which is considered less comprehensive than previous frameworks and models.

3. THE ACTIVE E-COMMERCE FRAMEWORK

"Previous e-commerce frameworks and models are only useful in specific circumstances and unable to provide a complete definition of e-commerce types, activities and capabilities. This complete definition is important in effective analysis of the range of e-commerce activities in both product and service terms" [3].

The preceding quotation illustrates the minor-defect-in-otherwise-perfect e-commerce frameworks. By referring to the previous discussions, an active e-commerce framework is being proposed. This framework integrates the comprehensiveness of Molla and Licker's (henceforth, "M&L") framework and the dynamic idea from Elsie and Paula's (henceforth, "E&P") model. The Active e-commerce framework builds from M&L framework due to the strong foundation of fundamental components provided by M&L's e-commerce framework. However, M&L's framework refers to Network archetype as typical and classical networks. But nowadays, consumers are able to connect to the web through the Internet as well as through mobile networks, such as Wireless Application Protocol (WAP) or General Radio Packet Switching (GPRS). WAP and GPRS are the technologies which were not known in the early days of telecommunication and are not classified as typical and classical networks. Therefore, we will use the term "Network Technology" to represent different network types.

On the other side, M&L's framework refers to Application Solutions as email, WWW, CRM, EDI, EFT etc. However, there are debates among researchers and consultants about the meanings of terms Electronic Business (E-Business) and Electronic Commerce. The term "Electronic Business" was first coined by the CEO of IBM as "E-Business is all about cycle time, speed, globalization, enhanced productivity, reaching new customers and sharing knowledge across institutions for competitive advantage" [1]. Thus, e-business essentially refers to the use of electronic networks within an organization to facilitate the decision making and support for day-to-day operations in an organization [11]. Thus, a company where every employee uses e-mail to communicate with each other is only considered as doing e-business. They are not doing any e-commerce because there are no transactions or exchange of value of goods and/or services. However, if a sales executive receives an e-mail with a bulk order of product from a client, then this is considered as doing e-commerce. Therefore, it is more accurate to add the term "transaction" to the term "application solutions" to form a new term *transaction application solutions*.

The definition of e-commerce by using M&L's framework provides some flexibility according to business models. For example, e-commerce which adopts the "Business to Consumer" and "Business to Business" model will be different in terms of the nature of product or service offered (consumer goods vs. raw materials), parties to the relationship (consumer vs. business partner) and revenue stream (large pool of potential buyers vs. dedicated co-operative business partners). In order to achieve

higher dynamicity, a *user perspective* is being introduced into the new active e-commerce framework.

As more and more users are being connected together over a network, the level of fraud, copyright and privacy crime and pirated soft goods is also increasing proportionally. The situation gets very serious that governments from different countries are trying to enforce legal laws governing the transaction over the Internet or World Wide Web. Hence, the *legal* component from E&P is considered to be included into the active framework of e-commerce definition. However, the term *legal* will be more precise to be proposed as *electronic legal matter,* abbreviated as *e-legal matter.* We adopt the *Business function* and *parties to the relationship* from M&L's framework. More precise definition of each component is described in the following section. The resulted active e-commerce framework is shown in figure 1.
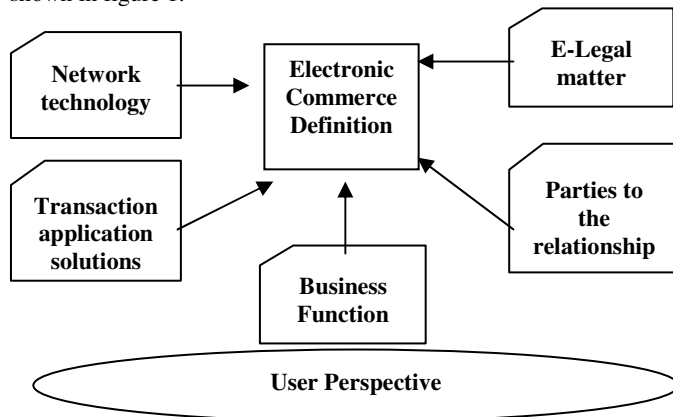

Figure 1: Active E-commerce Framework

3.1 User Perspective

For a consumer, e-commerce is anything about surfing the Internet, clicking and selecting the preferred items, safety of credit card payment and waiting for the delivery of items. On the other hand, for an E-commerce System Developer, e-commerce may be anything about site development programming language, website security, back-end databases and any other technical elements. Furthermore, many researchers have classified e-commerce into four main topics, which are *applications, technological issues, support and implementation* and *others* [7]. Thus, when defining an e-commerce term, it must be based on the background of the user who adopts our newly proposed definition framework. Therefore, *user perspective* means the mental view of a user who intends to make a definition of e-commerce. A variety of possible *user perspectives* is shown in Table 1.

Table 1: The unexhausted list of instances of each component in the Active E-commerce Framework

Component	Some possible instances
User perspective	The user can be from the standpoint of a : consumer, IT Manager, Programmer, Lawyer, Government State Officer, Engineer, Research Assistant, Electronic Data Processing Clerk, CEO, …
Network technology	Internet, proprietary, VPN, WAN, WAP, GPRS…
Transaction application solution	E-mail, Payment processing, Virtual Credit Card, Messenger, web browser, …
Business function	Customer Relationship Management, advertising, selling, purchasing, inventory management, …
Parties to the relationship	End user, consumer, student, teacher, business partner, education ministry, government…
E-legal matter	Government policy, copyright and patent, cyber law, privacy, security, claims…

3.2 Network Technology

Most of the end users would consider that they are connected to the website by saying that they are connected to the Internet. Thus, Internet is known as the network technology that connects the users throughout the world. On the other hand, a Network Engineer in a nationwide company would consider that all the branches in other states are connected through the Wide Area Network (WAN). Thus, WAN is known as another network technology that connects the branches of the company. Moreover, a lecturer in a University is able to access the Local Area Network (LAN) from his home through Virtual Private Network (VPN) to conduct some business transactions in the University community. Thus, VPN is known as the type of network that connects the lecturer and the University community. As shown from the examples, each user is being connected by different type of network technology. A network is a set of devices (often referred to as nodes) connected by media links [2]. Based on Behrouz network definition, a node can be a computer or any devices capable of sending and/or receiving data generated by other nodes on the network. The possible instances of the *network technology* component are listed in Table 1.

3.3 Transaction Application Solutions

Having computers connected to the Internet will not do much work if the user's computer does not have proper applications installed. For typical end users, they will connect their computers to the Internet, start up any web browser that they preferred and log in to the website where they would like to purchase items they like. Thus, the web browser is considered the transaction application that they use to initiate and/or complete the transaction over the website. On the other hand, the manager of a purchasing department of a company ordered inventories by sending an e-mail stating the quantity of items to the supplier and the supplier returned a confirmation e-mail to the manager for the inventories ordered. Thus, the e-mail client is considered a transaction application for the manager. Moreover, for virtual communities such as auction sites, transaction is being completed through the use of electronic cash, virtual credit cards and etc [10] through the backend payment processing system. For this scenario, the transaction application is the electronic payment method as well as the backend payment processing system. Hence, *transaction application solutions* is known as computer applications designed to support the transaction functions or processes between two or more parties. The potential instances for transaction application solutions are shown in Table 1.

3.4 Business Function

An end-user who accessed the website of Amazon has a main purpose in his/her mind. Thus, the main business function for the end-user would be buying a book. On the other hand, a car dealer company would like to sell off their brand new cars through web site. The main business function would be the advertising, selling, payment processing, delivery, and customer servicing. Accordingly, *business function* is defined as any activity that can assist a person or an organization to achieve the buying and selling of goods with moderate expectation of quality of the goods and services. This forms the scope for instances in the *business function* category as shown in Table 1.

3.5 Parties to the relationship

Even if a consumer ordered a book from Amazon, there are many parties involved in the transaction. This includes the consumer himself, Amazon as the supplier, book authors who sell their books to Amazon, intermediary, who delivers the book to the consumer and the government who laid the telecommunication infrastructures. However, different parties will view the transaction differently. From the view point of Amazon company, the transaction involves the supply chain management, payment processing, goods delivery management and other similar activities. On the other hand, the government is concerned about the proper laying of telecommunication infrastructures, taxes, legal matters and similar events. Hence, *parties to the relationship* is being defined as any user or organization that interacts upon the exchange of goods and/or services. The possible instances of *parties to the relationship* are shown in Table 1.

3.6 E-legal matter

Nowadays, Internet users are able to download new song albums by just a few clicks. While this may be considered as a "legal" activity by most Internet users, it is not the case in the eyes of a lawyer and music producer. On the other hand, issues regarding cyber laws are being discussed proactively in seminars and conferences. Different countries have different settings on legislation. For example, developed countries may pay higher attention on Internet transaction compared to developing countries. Thus, the emphasis on legal matter may also be different when making an e-commerce definition. The same case goes to the job background of a user who adopts the e-commerce definition framework. If the person who adopts the e-commerce definition framework is a lawyer, then he will emphasize heavily on the legal matter. From the viewpoint of government, e-commerce will be associated with the government policies and/or regulations governing Internet transactions. Accordingly, *e-legal matter* can be defined as any issue that is related to the lawful act of business transactions over the network. The possible instances of *e-legal matter* are shown in Table 1.

Instances shown in Table 1 are not exhaustive. The user of this framework is allowed to add in additional instances as long as the instances conform to the definition of each component. The idea of non-exhaustive list is being derived from the ever changing nature of e-commerce.

In Elsie Chan's work of dynamic ECCM, each meta-view component together with each object has an "absolute weight" at a particular period of time and this "absolute weight" can be varied as time goes on [3]. However, there is a high subjectivity of assigning an "absolute weight" on each object. Due to this problem, we decided to leave out this feature in our e-commerce framework. On the other hand, we adopted the active approach for our e-commerce framework as explained in the following section.

4. COMPONENT FLEXIBILITY AND INSTANCE FLEXIBILITY

There are two modes to achieve flexibility in the framework. The first mode is the flexibility of selecting a component that seems relevant to the user in defining e-commerce. Most importantly, the selected component must be based on the *user perspective* component. This is due to the fact that *user perspective* is the most important component of our framework. The second mode of flexibility is the freedom of adding or removing the possible instances of each component, with the condition that the new instance added to the component complies with the definition of the component itself. Hence, we name the first mode as *Component Flexibility* and the second mode as *Instance Flexibility* as shown in Figure 2.
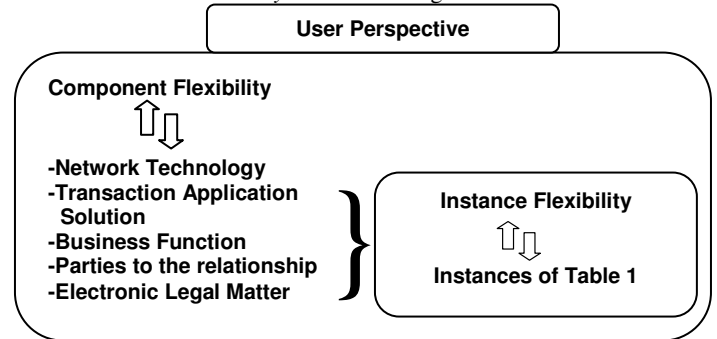

Figure 2: Component Flexibility and Instance Flexibility mode governed by User Perspective in the Active E-commerce Framework. Opposing arrows denotes the flexibility of choosing components and instances.

The steps in defining e-commerce by using the Active framework are being shown in Figure 3. Firstly, the user will have to determine the perspective that he is having in viewing the e-commerce. Then, based on the perspective, any component that is relevant will be selected. After choosing the relevant component, the user can decide the most appropriate instances based on the perspective. Finally, organizing the chosen component and instances, a formal e-commerce definition can be composed.
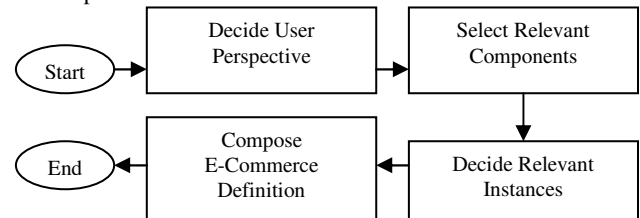

Figure 3: E-Commerce definition development process flowchart based on Active E-commerce Framework

Following are two examples of user perspectives in e-commerce definition:

- Michelle is a lawyer specializing in product copyright and piracy issue. She is famous in her court cases in helping producers to fight copyright and piracy issues. Since she is a lawyer, her *user perspective* is from a lawyer viewpoint to reduce crime rates. By referring to the Active E-commerce Framework in figure 5, the first component that strikes her attention would be the *e-legal matter.* This is followed by the *network technology* component because she would like to specify in which type of networks that the law applies. Subsequently, *business function* component is also important in defining the scope of her e-commerce. After choosing the relevant components, she decides the correspondent instances. In Michelle's opinion, the e-legal matter involves the issue of copyright and piracy of soft goods, such as the downloading and uploading of MP3 songs without the permission of the author, distributing unauthorized materials such as banned books and videos and similar items. Furthermore, Michelle has to consider the differences of government regulations and policies in each country. Moreover, Michelle thinks that the law governing the transaction over the World Wide Web is through the Internet. The activities that may perform over the Internet include the transaction of services and goods. Finally, Michelle concludes that, e-commerce for her is "legal laws, government policies and regulations governing the transaction of goods and services over the Internet to reduce frauds."
- Benito is the Chairman of Embarking on Information, Communication and Technology (ICT) Society Project in the Government Social Improvement Division. His department is responsible of improving the society with higher computer literacy rate. He concerns the overall quality of the ICT in the country to achieve the objective set by his department. Hence, Benito's e-commerce definition will be "one of the important aspects in the development of Information, Communication and Technology (ICT) that prepares the residents digitally enabled and promotes a knowledge society." Benito is seeing e-commerce at a higher level, which does not relate to *network technologies, transaction application solutions, business function* and *e-legal matter.* He prefers to look at the affected *parties to the relationship* from his *user perspective.*

As a general conclusion, any e-commerce definition must not leave the *user perspective* component. The *user perspective* component is the guiding component for the e-commerce definition to be constructed. Based on the *user perspective,* relevant components can be selected from the framework. This shows the true flexibility of the Active E-commerce Framework.

5. CONCLUSION
The proposed Active E-commerce Framework extends M&L framework to include dynamicity aspect. Among the extensions being done are the addition of new component known as "e-legal matter", refinement of the terms used for each component, and the addition of "user perspective" component that serves as the backbone of the proposed framework. As a result, the proposed framework is composed of five optional components, namely network technology, transaction application solution, business function, parties to the relationship and e-legal matter

as well as one fixed component known as "user perspective". People from different backgrounds have diverse perception on e-commerce and this shows the main purpose of the "user perspective" component. Building on the "user perspective" component, optional component that is deemed relevant to the "user perspective" can be selected from the framework to further customize the e-commerce definition. This is known as "Component Flexibility". Moreover, each component has many possible instances. These instances can be added and deleted over time as long as the instances conform to the definition of the component. This is known as "Instance Flexibility". Sample application of the proposed framework proves that the framework can be customized fully based on different user perspectives.

Finally, further research is required to attach more fundamental components onto the proposed framework to improve both the theoretical depth and practical aspect of the framework.

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