E-COMMERCE RESEARCH AND APPLICATIONS: A PROPOSAL FOR CLASSIFICATION AND AN UPDATED LITERATURE REVIEW

Ali İhsan BOYACİa* ve Kasım BAYNALb

aIndustrial Engineering, Engineering Faculty, Kocaeli University, Kocaeli, Turkey
ali.ihsan@kocaeli.edu.tr

bIndustrial Engineering, Engineering Faculty, Kocaeli University, Kocaeli, Turkey
kbaynal@kocaeli.edu.tr

Abstract

Electronic commerce (EC) is a term for any type of business, or commercial transaction that involves the transfer of information across an electronic network, primarily the Internet. EC has expanded rapidly over the past decade and is predicted to continue at this rate, or even accelerate because it allows consumers to exchange goods and services with no barriers of time or distance and it is often faster, cheaper and more convenient than the traditional methods of commerce. It is clear to see that EC is an area of importance in the field of business research, but there have been only few literature review on this area, and hardly any of them are recent study. In this paper, an updated literature review and classification framework for EC research is presented. The study is based on the analysis of a large number of publications (especially journal articles) related to EC using various electronic journal databases and printed journals. All of the papers in the review are classified according to proposed classification framework which consists of main and sub-categories based on their main focus and results of these are presented. The results of this study demonstrate that an increasing quantity of EC research has been conducted for a wide range of areas. It is to be hoped that this study will be helpful for anyone interested in EC as a source and arouse more interest.

Keywords: Electronic commerce studies, literature review, Classification of e-commerce publications.

1. INTRODUCTION

The rapid developments in the communication technologies result in crucial transformations in human life. One of these transformations is related to the changes in shopping styles. Along with the improvements in the internet, online shopping has been more popular among users. Consumers can shop from online stores that allow them to shop without physically going into shops (Dündar et. al., 2007). Nowadays, the internet has been an essential business platform for the product trade of products between organizations and consumers and even between consumers themselves (Kang et. Al. 2016; Corbit et. al. 2003).
With EC, companies can have a competitive advantage by accomplishing just in time production and distribution. EC can be basically defined as the production, promotion, selling and distribution of products and services in an online environment. Besides, EC can also be defined from several different aspects as follows (Turban and King, 2003; Ngai and Wat, 2002):

Communication aspect: EC is the distribution of products, services, information or payments via computer networks or any other electronic environment.

Business process aspect: EC is the usage of the technology by the automation of process and work-flows of companies.

Service aspect: EC is a tool helping companies, consumers or managements to decrease their costs while increasing the speed and quality of a service.

Online aspect: EC is the buying and selling of products or information with the help of the internet or other online services.

Considering the characteristics of its business operations, EC can be classified under five categories (Kang et.al. 2016; Chou, 2001; Duffy and Dale, 2002; Wu and Hisa, 2004):

Business-to-business (B2B): B2B EC, also known as inter-enterprise commerce, consists of the trade between companies by using the internet or computer networks.

Business-to-consumer (B2C): B2C EC is defined as the selling of the businesses into the general public which is the most attractive trade through the internet. Online insurance and banking can be counted under this category (Erbaşlar and Dokur, 2008).

Consumer-to-consumer (C2C): C2C EC which is defined as the electronic trade between consumers is very similar to the retail market. This kind of EC consists of the trade of the second-hand products (Kırçova, 2006). Sahibinden.com is one of the examples for this category.

Consumer-to-business (C2B): C2B EC consists of a bidding process in which consumers announce a project and the budget while companies make their bids for that project. After that, a company is selected by the consumer after examining the bids.

Business to government (B2G): In B2G EC, businesses sell their products and information to governments or government bodies through the usage of online transactions. An example of B2G is the applications and follow-up of government auctions through the internet.

The interest through EC has been increasing day by day because it allows an unlimited freedom to choose the products and shopping style as well as a 24 hour e-trade environment. Additionally, it provides products and services quickly and informs from the newest products and services, etc. Besides, entrepreneurs are interested in with this type of business since it is
more profitable compared to the classical trade due to smaller costs of storage, transportation, personnel, etc. As a result, EC volume has been increasing with an exponential rate.

The rapid increase in EC, which is realized through the internet and computer networks, has attracted academics as well as entrepreneurs. Many academics from different disciplines have been questioning why consumers want to make online shopping, how much they trust to online shops and what this trust is based on (Chaparro-Peláez et al., 2016). In addition to that, many academics study the infrastructure and reliability of electronic payment systems used in EC.

This study presents a review and classification of the papers related to EC dated from 1995 until now. By emphasizing the sub-categories and application areas in these papers, the current and future trends are identified. We aim to widen the horizons and provide a road map to entrepreneurs, academics and executives of EC.

The study comprises four sections. In the first section, the purpose of the study is emphasized along with the definitions related to EC. In the second section, we design a classification framework to categorize the studies and explain these categories in more detail. In the third section, the studies are classified according to this framework and several statistical results are obtained and analysed. The last section gives a small summary and emphasize the most important findings.

2. RESEARCH METHODOLOGY

Considering various research interests in EC such as application areas, technological infrastructure, and public policy, it is clear that EC researches cannot be classified in a narrow scope. Today, EV studies are published in various journals by researchers from different disciplines. For instance, while researches from engineering disciplines are interested in EC's technological infrastructure, researches from social disciplines dealing with public policy subjects of EC such as loyalty and trust. For this reason, various databases including publications in a variety of disciplines, especially ABI Complete, Taylor & Francis Online Journals, Science Direct, Springer Link Journals, Wiley Online Library Journals were examined.

Published articles in journals and conference proceeding papers was taken into consideration in this literature review. Master's and doctoral theses, books and articles publication process of which has not yet ended were excluded. This survey was performed using “electronic commerce”, “e-commerce” “electronic business” “e-business” and “internet commerce” keywords. Papers from a large number of journals including International Journal of Electronic
Commerce, Journal of Business Research, Information & Management and Decision Support Systems were covered. The full text of the articles were examined and those articles that were not exactly related to EC in terms of content were eliminated.

3. CLASSIFICATION FRAMEWORK

A classification framework which is shown in Figure 1 is constructed for EC studies. This framework is based on literature review, studies of existing classification schemes of Ngai and Wat (2002) and Turban et al. (2000) and other schemes built for IS in studies of Alavi and Carlson, (1992) and Barki, et. al, (1993). EC literature is classified in 4 main categories as Case and Applications, Technological Infrastructure, Public Policy and Others.

3.1. Case and Applications (CA)
Case and applications category include payment system, intra-organizational applications, training, advertising, retailing, financial services sub categories.

3.1.1. Payment Systems (PS)
Electronic payment (EP) covers the payment methods for online shopping. The most common forms of EP system are online credit card transaction, electronic wallet, electronic cash, online stored value systems, digital accumulating balance systems, digital checking payment systems and wireless payment systems (Treiblmaier et al. 2006; Junadi and Sfenrianto 2015).

3.1.2. Inter-organizational Applications (IOA)
This covers applications made among several business partners such as electronic data interchange, electronic funds transfer and supply chain management (Ngai and Wat 2002).

3.1.3. Training (TR)
This topic related to EC in the field of education and training such as publishing and selling educational and academic documents like articles, books etc. and virtual classroom applications.

3.1.4. Advertising (AD)
This include advertising applications so-called online advertising in EC. Online advertising, is a form of marketing and advertising which uses the internet to deliver promotional marketing messages to consumers. It includes email, search engine and social media marketing.
3.1.5. Retailing (RE)
This covers literature about retailing applications conducted online. A lot of things such as, consumer electronics, office supplies, sporting goods, jewellery, cars can be sold through electronic retailing over the Internet.

3.1.6. Financial Services (FS)
This contains studies related to online financial services such as, Internet banking, in other words virtual banking, on-line stock exchange and on-line insurance. Beside these, today, nearly all of the transactions can be conducted over the Internet.

3.2. Public Policy (PP)
Four sub categories related with this main category are take into consideration; trust, fraud, taxation and legal issue.

3.2.1. Trust (TS)
Trust is one of the most popular topic studied in EC researches. Especially consumer perception evaluation about trust, factors affecting trust are some of the studied subjects.

3.2.2. Loyalty (LO)
This contain publications related to customer loyalty in EC studies. According to Srinivasan et al. 2002, loyalty in EC is a customer’s favorable attitude toward the electronic seller that results in repeat buying behaviour.

3.2.3. Taxation (TA)
Taxation on commerce conducted over Internet and computer networks should seek to be impartial and fair between forms of electronic commerce and between conventional and electronic forms of commerce. Taxpayers in similar situations conducting similar transactions should be subject to similar levels of taxation. The systems for the taxation of EC should be flexible and dynamic to ensure that they keep pace with technological and commercial developments and should be clear and simple to understand so that taxpayers can anticipate the tax consequences in advance of a transaction, including knowing when, where and how the tax is to be accounted.
3.2.4. Legal Issues (LI)
This topic includes literature pertaining to legal regulations which is another important issue in EC. There exists some vagueness about whether states and local governments have a legal right to collect taxes on their sales because the EC is not adequately defined by existing laws or regulated by one government entity. Authorities seeking to apply their laws in traditional ways or to expand legal control over EC face many challenges due to the global nature of the Internet.

3.3. Technological Infrastructure (TI)
Security, network systems, technological support and methodological research sub categories are determined for this main topic.

3.3.1. Security (SE)
Privacy and security concerns are the most important reason customers are not purchasing over the Internet. Security is described as the protection of data against accidental or intentional disclosure to unauthorized persons, or unauthorized modifications or destruction (Udo 2001). This topic covers literature regarding security issues like secure sockets layer, secure electronic transactions, firewalls and proxy servers.
3.3.2. Support Systems (SS)
This sub category covers decision support systems like multi criteria decision making systems and structural equations modelling and also their applications on EC such as evaluation of EC website and improve electronic store business.

3.3.3. Methodological Research (MR)
This topic include published articles related to methodology and algorithm proposed for enhance the usefulness and security of EC applications.

3.4. Other Studies (OS)
This category include literatures regarding to general information and introduction about EC.

4. CLASSIFICATION RESULTS
After the preliminary evaluation and eliminating a total of more than 90 paper were categorized according to classification framework proposed in Section 3 as seen in Table 1. This table can be helpful for anyone looking for papers related to EC in a specific field. Reviewed papers were analysed by year and percentage of the total number of articles related to main and sub topics. According to distribution of papers by year which is shown in Figure 2, It can be clearly expressed that number of papers was increased steadily especially from 2010 to present.

Table 1: Distribution of articles according to classification framework

<table>
<thead>
<tr>
<th>Case and Applications</th>
<th>PS</th>
<th>IOS</th>
<th>TR</th>
<th>AD</th>
<th>RE</th>
<th>FS</th>
</tr>
</thead>
<tbody>
<tr>
<td>---------------</td>
<td>----</td>
<td>----------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LI</td>
<td>Hale and McNeal 2011, Gomez-Herrera et al. 2014, Kurnia et al. 2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3 (a) provides the distribution of articles by main topics. As seen in figure CA topic has the most prominent importance between main topics with rate of 39%. This is followed by PP and TI main topics with rate of 27% and 25% respectively.

In Figure 3 (b), distribution of sub-topics related to technological infrastructure is presented. Rate of 39% divulges that support systems are most outstanding field in this main topic. This is followed by security and methodological research with rates of 35% and 26% respectively.
Figure 3: (a) Distribution of papers by main topics; (b) Distribution of papers by TI sub topics

Figure 4 (a) presents distribution of case and applications sub topics. The case and applications are classified into six sub categories. PS and FS are the most prominent sub fields at the rate of 25% in this main category as seen in figure. This is followed by RE and IOA with rates of 17% and 14%. We also have to note that training sub field is seen as the least studied topics from the figure with rate of 8%. Training can be considered as a silent area in EC topics.

In Figure 4 (b), distribution of sub topics regarding public policy are presented. It is clear from the figure that, while trust is seen as the most prominent sub topic, legal issues is the least studied sub topic. Loyalty and taxation sub categories’ rate are 28% and 20% respectively in the main topic.

5. CONCLUSION

Advantages of EC like around-the-clock availability, the speed of access, a wider selection of goods and services, and international reach are make it a candidate to be one of the great
economic developments of the 21st Century. Beside this it has some drawbacks like necessitated wait time for product shipping and not being able to see or touch a product prior to purchase. Because subjects of EC are very comprehensive, studies related to EC are scattered into various journals and database. In this paper, a classification framework which consist of 4 main and 14 sub field is presented and EC literature is reviewed and categorized according to this framework. It can be concluded from the study that EC studies will increase with rising acceleration in term of number in the coming years. We also have to note that training and legal issues can be considered as a silent areas of EC. Despite the fact that this literature review is not extensive, we hope that it serves as a comprehensive base for researches interested in EC.

REFERENCES


