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A Comparative Analysis of International and Chinese Electronic Commerce Research

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ABSTRACT

Due to the growth of the Internet and e-commerce, both practitioners and researchers are in the midst of a social, business and culture revolution. Internet and e-commerce related research has been developed and grown up by United States, but China has become one of the most exciting research areas. This literature review consists of 1044 journal articles published between 1993 and 2003 in fourteen International and Chinese journals. The articles are classified by a scheme that consists of four main categories: application areas, technological issues, support and implementation and others. Based on the classification and analysis of e-commerce related researches, we present the current state of International and Chinese research and discuss the differences between them.

Keywords: *e-commerce, classification of e-commerce, literature review, comparative research*

1. INTRODUCTION

With the development of Globalization and IT, business and organization are radically changing. In contrast with the weak performance of several key developed and developing economies in recent years, e-commerce have continued to grow at a fast pace. The United States and European countries leading in IT and e-commerce have experienced impressive GDP growth since 1995. This output expansion has been characterized by acceleration in productivity growth, very low unemployment rates, low inflation rates and a reduction of fiscal deficits. With the booming Chinese economy, WTO accession and 2008 Beijing Olympics, China's e-commerce is also experiencing a fast development period and is becoming a new driving force for the economic development. Therefore, it is very meaningful and interesting to compare the state of International and Chinese research on e-commerce.

Ngai and Wat [3] introduced a classification framework of topics in e-commerce that consists of four main categories: application areas, technological issues, support and implementation and others. They classified the e-commerce research published in international journals between 1993 and 1999. Their classification framework was eventually adopted in this research.

This paper presents a comprehensive review, classifies the literature of International and Chinese e-commerce research published between 1993 and 2003. The scheme we used represents our views of the e-commerce literature that point out the distinguishing features of this area. A classification of e-commerce research reveals that there has been an approximately exponential growth in the number and area of published articles. The current state and direction of research topics should be of interest to researchers and practitioners.

2. CLASSIFICATION SCHEME OF E-COMMERCE RESEARCH

2.1 Research Paper Collection

According to Zwass [7], the first popular Web browser, NCSA Mosaic was introduced in 1993 and it brought people and businesses to the Web. Therefore, we believe that this year may be considered to be the starting point of e-commerce.

We exclude conference proceeding papers, master's theses, doctoral dissertations, textbooks, and unpublished working papers. We believe that academics and practitioners alike use journals most often for acquiring information and disseminating new findings and represent the highest level of research. Then we analyze articles published in International and Chinese journals between 1993 and 2003.

All journals lie in areas of Management Science and IS. Based on existing researches [4,6], the list of Chinese Social Sciences Citation Index (CSSCI) and Chinese Science Citation Database (CSCD) and a review of most of the journals, fourteen journals are selected.

Seven International journals were selected in this study, namely: Communication of the ACM, Decision Support Systems, Electronic Commerce Research and Applications, Information & Management, International Journal of Electronic Commerce, Journal of Management Information Systems, and Journal of Organizational Computing and Electronic Commerce. Seven Chinese journals were selected in this study, namely: Journal of Management Science, China Soft Science Magazine, Science of Science and Management of S. & T., East China Economic Management, Modernization of Management, Journal of Industrial Engineering and Engineering Management, and Computer Engineering and Applications.

Online databases search were conducted. For International journals' databases, we used ABI/INFORM Global (<http://www.il.proquest.com/proquest>), Science Direct (<http://www.sciencedirect.com>) and the ACM Digital Library (<http://portal.acm.org>). And we used China National Knowledge Infrastructure (CNKI) Digital Library (<http://www.cnki.net>) as Chinese journals databases.

The literature search was based on four descriptors: "EDI", "Electronic Commerce (E-Commerce)", "Electronic Business (E-Business)" and "Internet Commerce" [3] related to e-commerce, we reviewed the full text of each article. As a result of our search, we identified 1044 e-commerce articles. Although this

search was not exhaustive because of some limitations, such as online Database update time, it served as a comprehensive base for an understanding of e-commerce research.

2.2 Classification of Topics in Electronic Commerce

The classification framework was based on the literature review, the nature of e-commerce research, the works of [2,5] and existing classification schemes of IS [1] (Figure 1). The articles were classified into four broad categories: (i) applications, (ii) technological issues, (iii) support and implementation and (iv) others; and each were divided into subcategories.

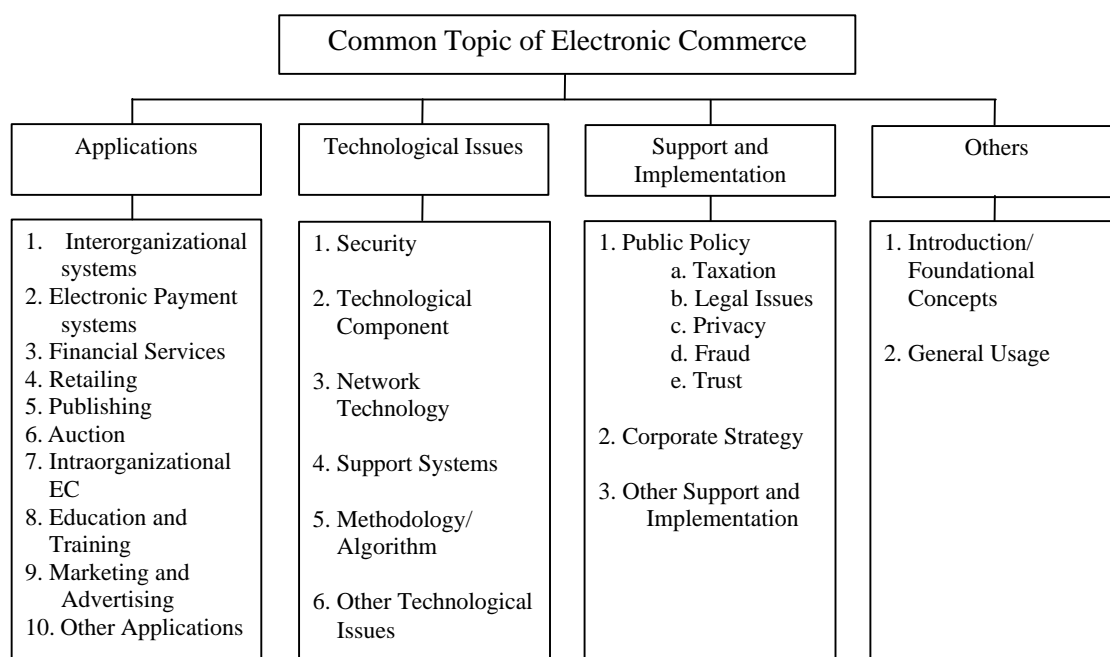


Figure 1. Classification of topics in electronic commerce.

Applications: This category covers literature on e-commerce research related to interorganizational systems (IOS), electronic payment systems (EPS), financial services, retailing, online publishing, auctions, intraorganizational EC, education and training, marketing and advertising, and other applications. IOS are automated information systems shared by more than one organization and allowing information flow across organizational boundaries. They include electronic data interchange (EDI), supply chain management (SCM), electronic funds transfer (EFT), electronic forms, electronic messaging and shared databases. EPS cover systems for online financial exchange between buyers and sellers. For examples, electronic or digital cash, electronic checks, online credit card-based systems, and other emerging financial instruments, such as debit cards, electronic benefit transfer cards, and smart cards. Financial services cover the common financial services provided in e-commerce. Retailing contains various publications associated with topics of retailing in

e-commerce, including online and electronic shopping malls. Online publishing contains publications that relate to electronic delivery of newspapers, magazines, books, news, music, videos, and other digitizable information through the Internet. Auctions contain published literature related to electronic auctions. Intraorganizational EC deals with helping a company to maintain and support internal business processes between individuals, departments and collaborating organizations. Education and training cover published literature on education or training pertaining to on-line education, virtual classrooms and online universities. Marketing and advertising consist of the application of e-commerce to marketing and advertising, including brand-name management, disseminating product catalogs, and sales information and product announcements. Other applications contain publications that discuss applications that are not among those in the above categories, such as Internet gambling, travel and tourism

service, employment placement and the job market, health care, on-line games, matchmaking, etc.

Technological issues: There are six categories pertaining to technological issues: security, technological components, network technology/infrastructure, support systems, algorithm/methodology and other technical issues. Security consists of publications that discuss issues related to data and system security, and individual security. Technological components consist of various Internet technologies, e.g. the common object request broker architecture (COBRA). Furthermore, markup languages, such as hypertext markup language (HTML), and programming languages like JAVA are the common Web software developmental tools. Network technology/infrastructure covers network technology that is at a lower-level, such as early technologies, the local area network (LAN) technology and the wide area network (WAN) technology; network protocols, hypertext transport protocol (HTTP) and transmission control protocol/Internet protocol (TCP/IP); plus network issues, like the shortage of bandwidth, quality of service (QOS). Support systems cover literature on decision support systems, negotiation support system or distributed applications. Algorithm/methodology covers technical algorithms or methodologies that assist, enhance, or improve e-commerce applications. Other technical issues contain publications that discuss other issues such as decision technologies, defense system, and virtual enterprise (organization, marketplace) technology.

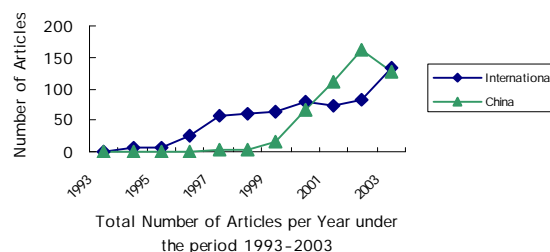
Support and implementation: The literature in this category can mainly be divided into two broad categories: public policy and corporate strategy. And public policy covers taxation, legal issues, privacy, fraud and trust five subcategories. Taxation issues contain the characterization of the transaction, the source of the transaction, the creation of a permanent establishment from the transaction, transfer pricing implications, and tax administration and compliance. Legal issues include privacy, protecting intellectual property, controlling Internet indecency, preventing fraud, establishing a tax framework, controlling gambling, determining jurisdiction, and protecting both sellers and buyers. The major privacy issues are how to protect privacy and whose responsibility it is to do so. Some literature is related to fraudulent practices in e-commerce, such as online auction fraud, Internet stocks fraud and other fraud. The published literature refers to positive trust that is shown in the consistency and assurance between what a trading partner says and actually does. Corporate strategy covers publications dealing with EC strategies/methodology used in building successful implementations. Other support and implementation contain various publications that are not mentioned in the support and implementation categories, such as modeling the structure of brokered electronic markets.

Others: This category contains publications that discuss other aspects of e-commerce, such as a general

introduction to e-commerce, foundational concept of e-commerce, etc.

3. RESULTS

3.1 Distribution of the Year of Publication



Notes: Forecast the Figure from November to December of 2003 of China.

Figure 2. Distribution of articles by year.

The distribution of articles published by year is shown in Figure 2 from 1993 to 2003. Although research outputs appear limited, yet the number of journal articles has increased substantially. International e-commerce research generally activated from 1996, and Chinese research generally activated from 1999. When it comes to 2000s, it does not show apparent difference in amount, yet there are still many gaps in width and depth of the research. It will take some time for China to bridge the gaps.

In 1995 e-commerce was just beginning and its potential was not widely recognized. Since then, B2B and B2C e-commerce has skyrocketed. During 1995 and 1999, American economy kept the 4% increase and about 2% inflation rate per year, and the unemployment rate decreased to 4%. The success of the United States made all countries and international organizations take a serious view of e-commerce. Consequently, the international researches on e-commerce were conducted robustly and kept substantial increase until 2000. The bursting of the new economy bubble late in 2000 made the research suffer a setback temporarily. Yet the increase trend is continuing, and the research will enter a new phase and become more active in recent years.

For Chinese research, the most distinguishing feature is the rapid increase speed. China's first move was the initiation of the Golden Projects. The Government initiated the "Government Online" and "Enterprises Go Online" projects in 1999, and it declared the year of 2000 to be the "Year for Chinese Businesses to Go Online". The national informatization program is given high priority in the 10th Five Year Plan (2001 to 2005). During this period, the information industry is expected to become the pillar industry to spur the national economic growth. Furthermore, the China e-commerce Association was established in June 2000. Therefore, China's e-commerce and research develop at a rapider pace while other countries temporarily suffered

stagnation of development. The research reached the peak in 2002 because of the special issue (2002, Vol.4) on e-commerce of China Soft Science Magazine.

3.2 Distribution of Articles by Topic

The distribution of articles by topic is shown in Figure 3. It appears that the most heavily published research area is in the “Technological Issues” of EC, all have more than 30% in this area(International—196 articles, 33%; China—166 articles 36%). It also shows that the International research maintains comparative equilibrium in four areas while Chinese research is not comparatively active on Applications.

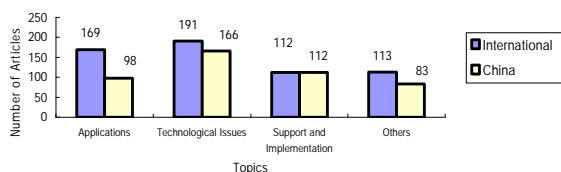


Figure 3. Distribution of articles by topic.

3.3 Distribution of Application Articles

Distribution of Application articles by year is shown in Figure 4. The international research was activated in 1996, and the Chinese research was intensified till the later half of year 1999. Since then, there appears no apparent difference in amount. It also shows that the International research increased rapidly at first, then stagnated for a few years because of the burst of the New Economy Bubble, and began to increase recently with e-commerce’s new development. Chinese research kept a fast increase trend with China’s e-commerce boom and the rapid rise of economy. Because CNKI had not updated the database during the time of our research, we are short of the data of November and December 2003, therefore it appears a sharp decrease in 2003.

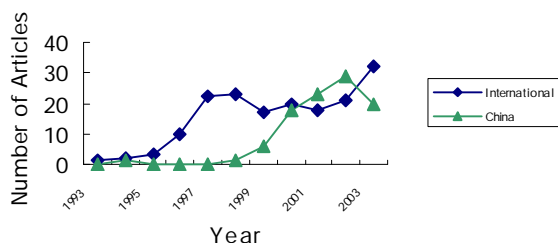


Figure 4. Distribution of Application articles by year.

From the figure of Distribution of applications articles, we can know that a large amount of this area is based on the IOS (International—52 articles, 30.8%; China—26 articles 26.5%), of which the majority is EDI systems. This is followed by topic on EC retailing

(International—30 articles, 17.8%; China—10 articles 10.2%), marketing and advertising (International—20 articles, 11.8%; China—22 articles 22.4%). Education and Training, Financial service and Auction also has increased greatly, such as the International research on Auction is 10.7% (18 articles). We can also know that International research has much more articles on IOS, retailing and auctions while Chinese research has the more on marketing and advertisements.

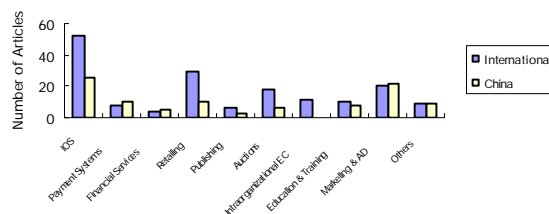


Figure 5. Distribution of Application articles.

3.4 Distribution of Technological Issues Articles

As shown in Figure 6, the research on Technological Issues is always increasing from the very beginning. This area has not been influenced by the Nasdaq Bubble generally, although the International research decreased in 2001 temporarily.

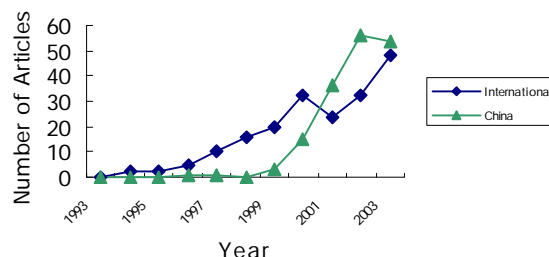


Figure 6. Distribution of technological issues articles by year.

From Figure 7, we can know that Support System is the very significant part for International (47 articles, 24.6%), and Chinese (46 articles, 27.7%) research. International research on technological component (54 articles, 28.3%) and Methodology/Algorithm (42 articles, 22%) is much more than Chinese researches. And Chinese research also has more articles on security (40 articles, 24.1%) than International researches. We can also know that Chinese research is very diverse in the area recently, and some researches are not limited to classification, therefore the research on others (39 articles, 23.5%) has a large percentage.

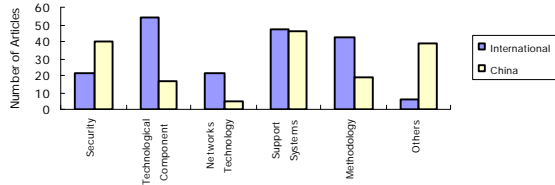


Figure 7. Distribution of technological issues articles.

3.5 Distribution of Support and Implementation Articles

As shown in Figure 8, the research on Support and Implementation is always increasing with a small range from the beginning. After the burst of dot.com bubble, Chinese enterprises and researchers are trying to find the right corporate strategy and business model that are suitable to the conditions of China. As a result, support and implementation became a matter of concern and interest, and journals published heavily on this part. At the end of 2002, research on this part had been completely conducted to some extent. Advanced research is difficult to be conducted until the research on other part of e-commerce, such as new technology. Also because of the inexhaustive data of 2003, the curve reached its flattest level in 2000s.

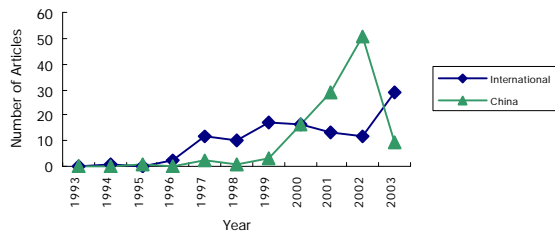


Figure 8. Distribution of support and implementation articles by year.

From Figure 9, we can know that Corporate Strategy is the most important part for International (51 articles, 45.5%), and Chinese (71 articles, 63.4%) research. E-commerce business strategy has to be re-created constantly in the ever-evolving world of cyberspace. For each enterprise, questions exist about how to develop the new business models, market strategy, what to do first, what to do next, and how to proceed. The answers are not always intuitive, and may not be reached the first time out. Therefore corporate strategy is always the focus of this part. International research on trust (31 articles, 27.7%) is skyrocketing recently, yet Chinese research still has no article on this area. Chinese research has much more research on taxation and legal issues than International research. On the other hand, it has no research on privacy, fraud, and trust.

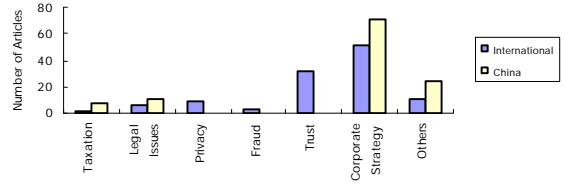


Figure 9. Distribution of support and implementation articles.

3.6 Distribution of Others Articles

As shown in Figure 10, the research on others is increasing from the beginning. And the research became inactive between 1998 and 2000.

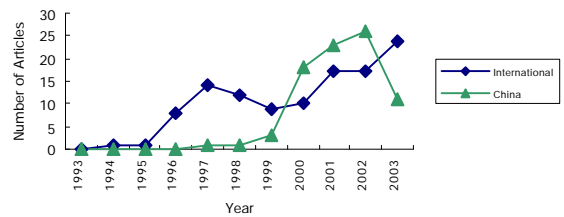


Figure 10. Distribution of others articles by year.

With the development of e-commerce, new concept, technology, and business model come up continually. International (73 articles, 64.6%) research on general introduction or about the foundation of e-commerce is more than general usage while Chinese research shows no apparent difference.

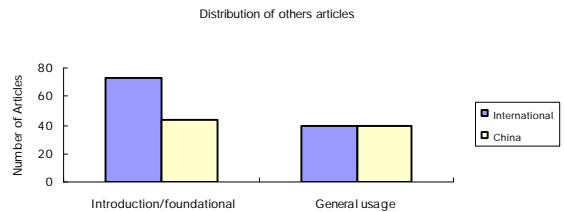


Figure 11. Distribution of others articles.

3.7 Distribution of International Articles

As shown in Figure 12, the International research increased from the beginning and Application was the most heavily published area. From 1999, research on Technological Issues ranked first and was followed by the research in the Application of e-commerce. The development and advance of technology made it impossible for e-commerce to appear and develop. E-commerce expanded its scope to more areas and showed the great impact to business and life, the research on applications had been heavily published during 1996 and 1999. Dot com and venture boom made e-commerce reach the peak and the progress of e-commerce also

required more technologies. Because of this business requirement, research on technological issues has become the focus of e-commerce research from 1999.

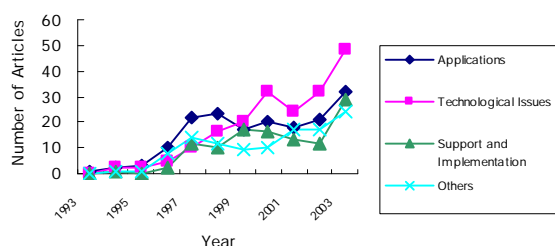


Figure 12. Distribution of International Articles

3.8 Distribution of Chinese Articles

From the figure of Distribution of Chinese articles by topic and year, we can know that although the research began later than International research, it advances more actively. The most distinguishing feature is that the research on Support and Implementation becomes more active than others. And the research on Technological Issues has ranked first from 2001 while the research on Application is inactive. The research on application is conducted comparatively less than International research; it might be the reason that the areas of application of e-commerce in China are not less widely. In order to activate the e-commerce development, it is necessary to conduct the researches on application much more widely and deeply.

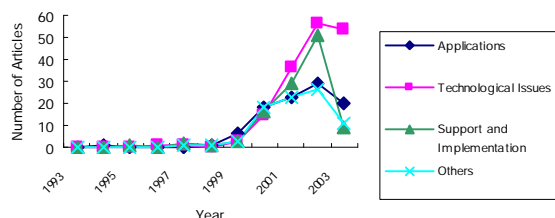


Figure 13. Distribution of Chinese articles

4. CONCLUSIONS

In our research, we reviewed fourteen International and Chinese journals and identified that 1,044 articles published between 1993 and 2003 are related to e-commerce. Although this review cannot claim to be exhaustive, it does provide reasonable insights into e-commerce. We can also get some important conclusions and implications through the comparative analysis of International and Chinese e-commerce research.

1. The e-commerce research will increase significantly in future although it might receive the influence of economic environment and other factors, because e-commerce will continue to grow at a fast pace and it

has become an important focus of public, researchers, governments, and international organizations etc.

2. Research has a close connection with the development of e-commerce. The business requirement and development of e-commerce can push the research; on the other hand, the research also can pull the e-commerce's development. The International and Chinese research and e-commerce have begun to activate with a remarkable interval. The International research and e-commerce activated from 1996, while Chinese research and e-commerce activated from later half of 1999.

3. In application area, the percentage of research on IOS keeps a decreasing trend while research on retailing, auction marketing and advertisement is increasing. This area will be more active and divers in the future with the development of online and mobile financial services, payment systems, and education.

4. Research on public policy needs much more concern. And new methods or standards should be developed for coping with problems in this area. There were not many public policy articles related to taxation, legal issue, privacy, and fraud. However, the research on trust has become a significant research area in e-commerce. And Chinese also started to conduct research on this area.

5. The differences between International and Chinese research can show the variness among e-commerce development phase, culture, and regional factors etc. to some extent.

6. China has less research on application, and it has already become obstacle for e-commerce. In order to activate the e-commerce, more researches are demanded to be done on these areas.

All reviewed articles that correspond to the classification scheme can be found at author's web site. <http://jaek.khu.ac.kr/bbs/articlebbs>.

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