International Journal of
Electronic Commerce Studies
Vol.1, No.1 , pp.1-14, 2010

# Electronic Commerce Research in Latest Decade: A Literature Review

Chih-Chien Wang
National Taipei University, Taipei County, Taiwan
Email: wangson@mail.ntpu.edu.tw

Chien-Chang Chen
Hsuan Chuang University, Hsin-Chu, Taiwan
Email: cchen34@hcu.edu.tw

## ABSTRACT

This paper presents a literature review and classification for electronic commerce research. The authors examined 4,948 articles listed in the Science Citation Index Expanded (SCIE) and 2,875 articles in the Social Science Citation Index (SSCI) published from 1999 to 2008. The results revealed that electronic commerce literature can be classified into seven categories: business and management; computer and information science; industrial engineering and operation research; engineering; economics; law; and others. The study also examined the country distribution of authors. This literature review should serve as a supplemental resource for electronic commerce academics to formulate future research.

**Keywords:** literature review, electronic commerce, Science Citation Index Expanded (SCIE), Social Science Citation Index (SSCI)

## 1. INTRODUCTION

Due to the popularity and rapid expansion of the Internet and network technology, electronic commerce has become a major activity in contemporary business operations. Today, enormous business activities are conducted online. People go online to sell and buy both goods and services, and many transactions cannot be completed without Internet technology.

Electronic commerce is an emergent research discipline with a history of less than 20 years. The exploding growth of electronic commerce activities in the last decade has attracted significant attention from practice as well as academics in different fields. Academics from various fields are interested in different research topics related to electronic commerce. For example, computer science academics may pay attention to the system and technical side of electronic commerce. Business academics might be interested in management and marketing issues of electronic commerce. Law academics

may focus on the legal system and other issues relative to electronic commerce. Social science academics may be interested on the influence of electronic commerce to the whole society and human beings.

The present study examined electronic commerce research listed in the Science Citation Index Expanded (SCIE) and the Social Science Citation Index published in the last decade. Through a comprehensive review of literature during the ten-year period 1999 to 2008, the present study examined recent development trends and field distributions of electronic commerce research. In addition, to serve as a roadmap for future online auction research, the present study also pointed out the most cited literature made by and to electronic commerce by analyzing the citation records.

This study aims to provide a form of meta-review of the literature. Through bibliometric techniques, the current study points out recent developments of electronic commerce studies and reveals the publications that researchers "must" read in conducting electronic commerce research. This is accomplished by identifying the most frequently cited papers.

Bibliometric study can be used to summarize the research results of specific research topics. Previous studies have used this technique to discuss the academic development of electronic commerce [1,2] and specific topics in electronic commerce, such as mobile commerce [3] and business-to-business electronic commerce. Nagi and Wat [1] conducted a literature review and classified electronic commerce research in 2002. In the last few years, however, explosive development of electronic commerce activities has attracted significant attention from academics. A huge number of research studies have focused on topics relevant to electronic commerce. An up-to-date analysis and review of electronic commerce literature, therefore, can help academics understand recent electronic commerce research developments.

To provide a more up-to-date academic view of electronic commerce, Lee *et al.* surveyed the literature published in six electronic commerce journals in 2007 [2]. However, electronic commerce studies are by nature multi-disciplinary. Six journals are insufficient to present the diversity of electronic commerce research. A more comprehensive list of journals is thus useful for determining how electronic commerce research has developed.

The present study used bibliometric technique to create a comprehensive review of up-to-date electronic commerce literature. The present study aims to serve as a supplemental source for scholars who are interested in electronic commerce and to be useful in formulating future research.

## 2. METHODOLOGY

The present study scanned the Science Citation Index Expanded (SCIE) and the Social Science Citation Index (SSCI) to identity papers that discussed electronic commerce. The keywords used to search articles included electronic commerce, e-commerce, electronic business, and e-business. Only articles published between 1999 and 2008 were evaluated.

This study found a total of 4,948 articles listed in SCIE and 2,875 articles listed in SSCI using the above-noted keywords. The present study then analyzed the research fields, the publication years, countries to which the authors belonged, and journal names to track how electronic commerce research has developed.

In addition to counting the published electronic commerce articles, the present study also investigated citation records made to the searched electronic commerce articles. The citation records were useful in determining the most cited electronic commerce articles, which may also be most important articles.

## 3. CLASSIFICATIONS OF E-COMMERCE RESEARCH

### 3.1 Electronic commerce and conventional academic fields

Research on electronic commerce articles fell into seven categories: business and management; computer and information science; industrial engineering and operation research; engineering; economics; law; and others (see Figure 1). SCIE listed electronic commerce articles is different with those articles published in the SSCI in conventional academic fields. Figure 2 depicts the percentage of electronic commerce research by fields and sub-fields in SCIE. Figure 2 shows that most research into electronic commerce was computer and information science oriented, which contributed 71.99% of the SCIE-listed electronic commerce articles. The other articles were from the fields of industrial engineering and operation research, business and management, engineering, and others. Among the computer and information science field, as Figure 2 indicated, information system was the largest sub-field, which contributed 29.61% of electronic commerce articles, following by theory and method, artificial intelligence, and operation research, and management science.

Figure 3 illustrates the percentage of SSCI-listed electronic commerce articles by fields and sub-fields. As figure 3 indicated, the two biggest electronic commerce fields were computer and information science, which contributed 51.55% SSCI-listed articles, and the business and management field, which contributed 49.08% of the articles. The industrial engineering and operation research field occupied in the third rank of 17.46% articles. Figure 3 also indicates that management was the largest sub-field, which contributed 31.36% of electronic commerce articles, following by the sub-fields of information systems, business, and information science and library science.


Figure 1. Electronic commerce articles and conventional academic fields.

## 3.2 Electronic Commerce research change over the past decade

Table 1 and Figure 4 depict how electronic commerce research has changed over the past decade. The number of SCIE-listed articles reached the highest quantity in 2005 and descended from 2006 to 2008. In contrast, SSCI-listed articles increased continuously over the past decade. Table 1 lists articles in SCIE, SSCI, and the rate of change found in each database. The article quantity in SSCI increased three times from 129 articles in 1999 to 369 articles in 2008. The average growth rate was 13.77% for SSCI listed electronic commerce articles and 6.55% for SCIE articles.

The ratio of SCIE articles over SSCI articles decreased from 2.295 to 0.965. This decreased ratio reveals that research in electronic commerce has changed from technology oriented (SCIE) to management oriented (SSCI). This decrease may also be interpreted that technology in electronic commerce has matured and scholars now pay more attention to managing electronic commerce activities.

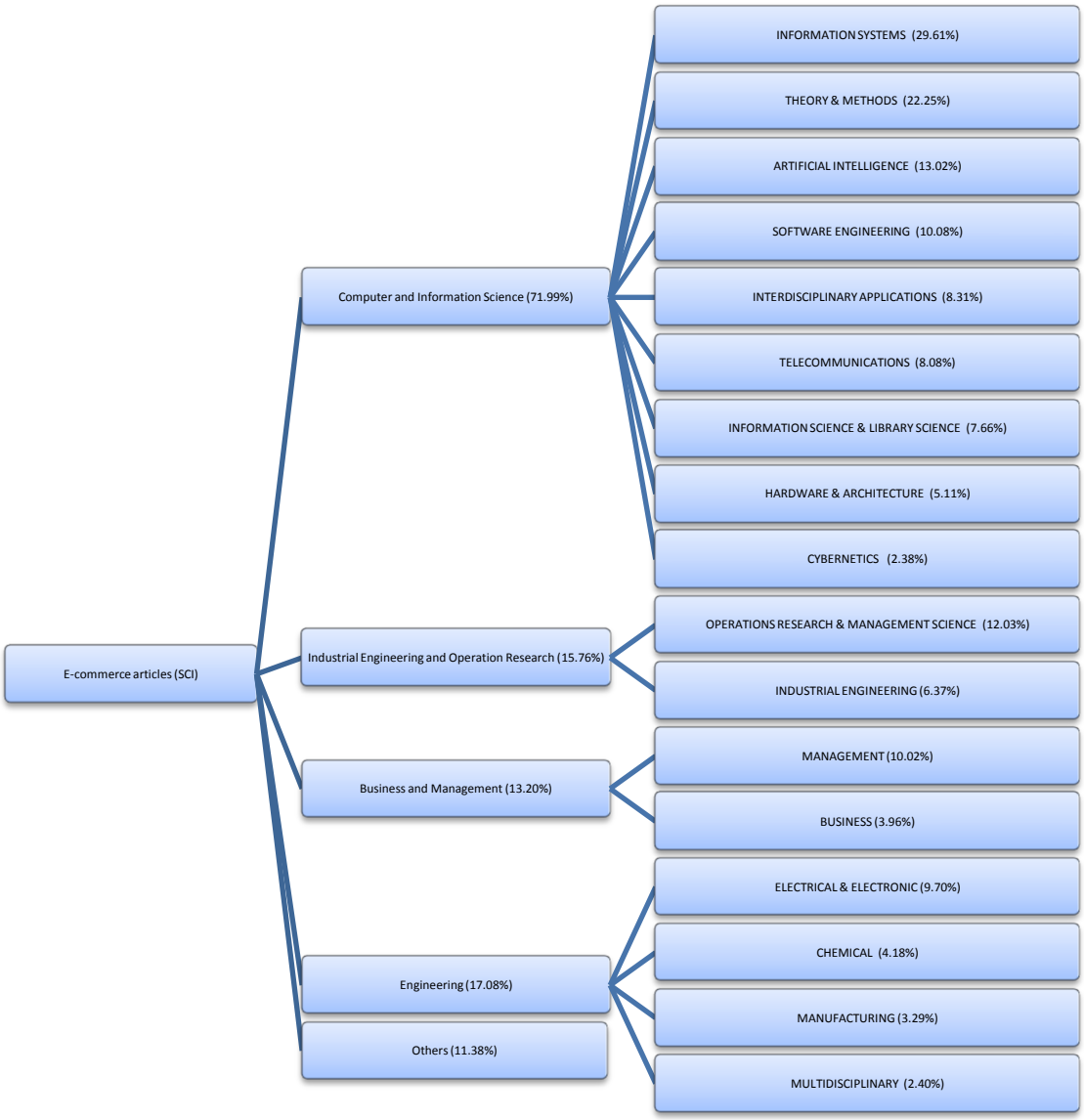


Figure 2. Electronic commerce articles in SCIE by fields (1999-2008).

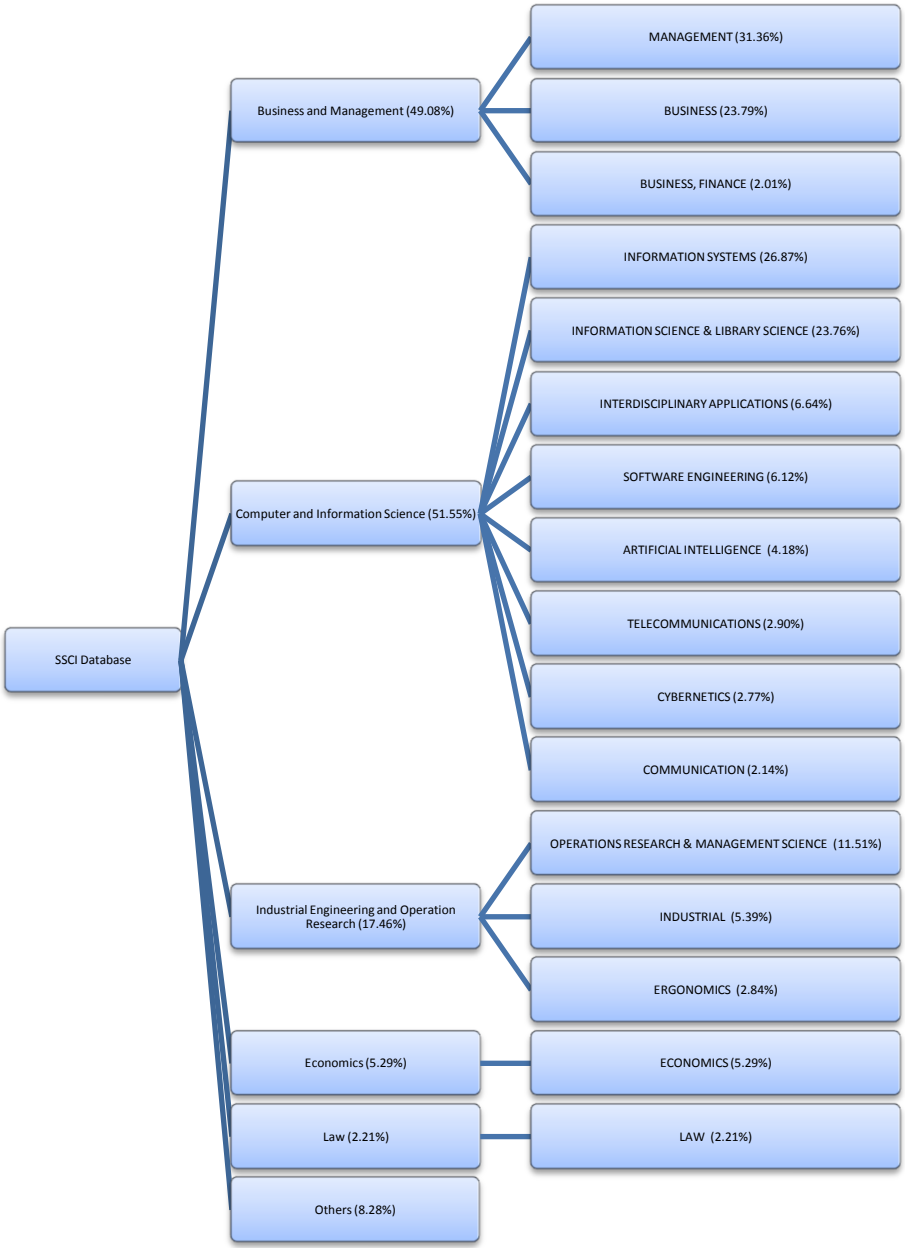


Figure 3. E-Commerce articles in SSCI by fields (1999-2008).

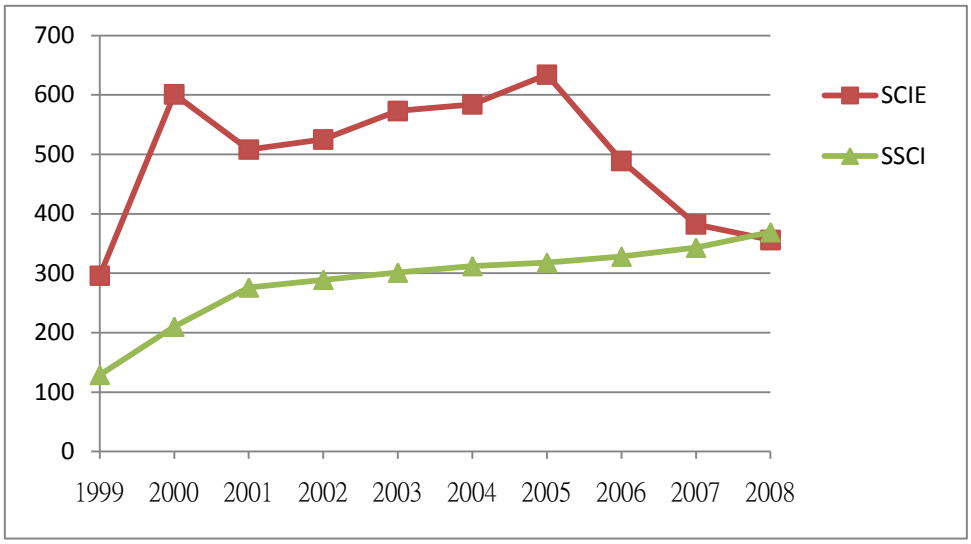


Figure 4. Electronic commerce articles by year.

Table 1. Ratio of SCIE/SSCI listed electronic commerce articles.

| Year | SCIE | SSCI | SCI/SSCI ratio |
|---|---|---|---|
| **1999** | 296 | 129 | 2.295 |
| **2000** | 601 | 210 | 2.862 |
| **2001** | 508 | 276 | 1.841 |
| **2002** | 525 | 289 | 1.817 |
| **2003** | 573 | 301 | 1.904 |
| **2004** | 584 | 312 | 1.872 |
| **2005** | 634 | 318 | 1.994 |
| **2006** | 489 | 328 | 1.491 |
| **2007** | 382 | 343 | 1.114 |
| **2008** | 356 | 369 | 0.965 |
| **Average Annual Growth Rate** | 6.55% | 13.77% | |

## 3.3 Electronic commerce research by country

Table 2 displays the distribution of authors' countries for any country that produced more than 100 electronic commerce articles in the year 1999 to 2008. In the ten-year period, United States scholars published 35.42% electronic commerce articles, which was in top rank. England was in the second rank with 7.67% published articles, followed by Germany, South Korea, and Taiwan, which published 5.22%, 4.74%, and 4.68% articles, respectively. Countries in the sixth to tenth ranked positions were Canada, Australia, Hong Kong, China, and Netherlands. The high percentage of United States articles reflected two phenomena: 1) the high popularity of electronic commerce activities in the United States; and 2) the arguable situation that most SCIE/SSCI indexed journals were

dominated by academics from the United States.

Table 2. Electronic commerce articles by countries.

| Country | SCIE | SSCI | SCIE +SSCI | Percentage |
|---|---|---|---|---|
| USA | 1,668 | 1,468 | 2,397 | 35.42% |
| England | 352 | 293 | 519 | 7.67% |
| Germany | 304 | 95 | 353 | 5.22% |
| South Korea | 288 | 112 | 321 | 4.74% |
| Taiwan | 266 | 151 | 317 | 4.68% |
| Canada | 226 | 148 | 293 | 4.33% |
| Australia | 187 | 107 | 239 | 3.53% |
| Hong Kong | 201 | 114 | 223 | 3.30% |
| Peoples R China (not include Hong Kong) | 175 | 42 | 188 | 2.78% |
| Netherlands | 132 | 74 | 168 | 2.48% |
| Spain | 127 | 54 | 150 | 2.22% |
| Italy | 118 | 34 | 143 | 2.11% |
| Japan | 135 | 14 | 140 | 2.07% |
| Singapore | 95 | 53 | 108 | 1.60% |
| Greece | 98 | 22 | 104 | 1.54% |
| France | 80 | 38 | 100 | 1.48% |

Note: Only countries that published 100 or more electronic commerce articles are included in this table.

## 3.4 Electronic commerce research by journals

Table 3 displays the journals that published more than 1% of electronic commerce articles in SCIE over the ten-year period from 1999 to 2008. In Table 3, Lecture Notes in Computer Science and Lecture Notes in Artificial Intelligence are proceedings of international conferences. *Chemical Week* looks like a magazine and most of the electronic commerce articles in this publication were news reports.

*Decision Support Systems*, therefore, was in the top rank of the number of articles listed in SCIE journals, publishing 2.95% of electronic commerce articles. This was followed by *Industrial Management & Data Systems* (2.04% of the articles) and *Information & Management* (1.96% of the articles).

Table 3. Electronic commerce articles by journals listed in SCIE.

| *Journal* | *SCIE* | *Percentage* |
|---|---|---|
| Lecture Notes in Computer Science | 814 | 16.45% |
| Lecture Notes in Artificial Intelligence | 176 | 3.56% |
| *Decision Support Systems* | 146 | 2.95% |
| *Chemical Week* | 104 | 2.10% |
| *Industrial Management & Data Systems* | 101 | 2.04% |
| *Information & Management* | 97 | 1.96% |
| *International Journal of Electronic Commerce* | 86 | 1.74% |
| *Journal of Management Information Systems* | 82 | 1.66% |
| *Internet Research-Electronic Networking Applications and Policy* | 80 | 1.62% |
| *Journal of Organizational Computing and Electronic Commerce* | 77 | 1.56% |
| *Journal of Computer Information Systems* | 69 | 1.39% |
| *Electronic Commerce Research and Applications* | 68 | 1.37% |
| *Expert Systems with Applications* | 68 | 1.37% |
| *Communications of the ACM* | 60 | 1.21% |
| E-Commerce and Web Technologies, Proceedings | 52 | 1.05% |

Note: Only journals that included 1% or more of electronic commerce articles are included. Lecture Notes in Computer Science and Lecture Notes in Artificial Intelligence are conference proceedings. *Chemical Week* is a magazine.

Table 4 displays the journals that published more than 1% of electronic commerce articles included in SSCI during the ten-year period from 1999 to 2008. According to Table 4, *International Journal of Electronic Commerce* published 4.80% electronic commerce articles and was thus the top ranked Journal in terms of article quantity, following by *Information & Management* (3.37% of the articles), *Journal of Management Information Systems* (2.85% of the articles), *Decision Support Systems* (2.71% of the articles), and *Electronic Commerce Research and Applications* (2.37% of the articles).

Table 4. Electronic commerce articles by journals in SSCI.

| *Journal* | *SSCI* | *Percentage* |
|---|---|---|
| *International Journal of Electronic Commerce* | 138 | 4.80% |
| *Information & Management* | 97 | 3.37% |
| *Journal of Management Information Systems* | 82 | 2.85% |
| *Decision Support Systems* | 78 | 2.71% |
| *Electronic Commerce Research and Applications* | 68 | 2.37% |
| *International Journal of Information Management* | 67 | 2.33% |
| *Industrial Marketing Management* | 46 | 1.60% |
| *Information Systems Research* | 44 | 1.53% |
| *Industrial Management & Data Systems* | 42 | 1.46% |
| *International Journal of Operations & Production Management* | 37 | 1.29% |
| *Journal of Organizational Computing and Electronic Commerce* | 37 | 1.29% |
| *Internet Research-Electronic Networking Applications and Policy* | 36 | 1.25% |
| *Journal of Computer Information Systems* | 36 | 1.25% |
| *Journal of Information Technology* | 35 | 1.22% |
| *Management Science* | 33 | 1.15% |
| *MIS Quarterly* | 33 | 1.15% |
| *European Journal of Information Systems* | 32 | 1.11% |
| *IEEE Transactions on Engineering Management* | 32 | 1.11% |
| *Supply Chain Management-An International Journal* | 32 | 1.11% |
| *International Journal of Technology Management* | 31 | 1.08% |
| *Online Information Review* | 31 | 1.08% |

Note: Only journals with 1% or more of their articles focusing on electronic commerce are included. Some journals are listed both in SCIE and SSCI.

## 3.5 Most cited electronic commerce articles

To determine the most highly influence electronic commerce articles, the current study checked the number of citations made to electronic commerce articles published from 1999 to 2008. Table 5 displays the most cited 10 electronic commerce articles. These articles may be the most influential SCIE-listed electronic commerce articles.

The most frequently cited literature was Rahm and Bernstein [4], which was cited by 505 articles. This article was classified to the fields of hardware & architecture and information systems. Table 5 shows that four of the 10 most frequently cited references were classified into the fields of information systems (i.e., Rahm and Bernstein [4]; DeLone and McLean [5]; Gefen, Karahanna, and Straub[7]; Ba and Pavlou [12]). The fact that the most frequently cited references were classified in the information systems field means that information technology played the most important role in electronic commerce research.

Table 5. Most cited electronic commerce articles in SCIE.

| Authors | Times Cited | Fields |
|---|---|---|
| Rahm and Bernstein [4] | 505 | Hardware & Architecture; Information Systems |
| DeLone and McLean [5] | 362 | Information Systems; Information Science & Library Science; Management |
| Christopoulos, Skodras, and Ebrahimi[6] | 356 | Electrical & Electronic; Telecommunications |
| Gefen, Karahanna, and Straub[7] | 352 | Information Systems; Information Science & Library Science; Management |
| Lee, So, and Tang [8] | 297 | Management; Operations Research & Management Science |
| Burke [9] | 256 | Cybernetics |
| Cody, Laramee, and Durst [10] | 208 | Analytical |
| Liu, Yun, and Morkoc [11] | 194 | Electrical & Electronic; Materials Science, Multidisciplinary; Condensed Matter |
| Ba and Pavlou [12] | 183 | Information Systems; Information Science & Library Science; Management |
| Gefen [13] | 182 | Management; Operations Research & Management Science |

Table 6 lists the 10 most cited SSCI indexed electronic commerce articles. The most frequently cited literature was DeLone and McLean [5], which was cited by 362 articles. The fields of DeLone and McLean [5] are classified include information systems, information science and library science, and management.

Nine of the top 10 frequently cited references (except Lynch and Ariely [18]) belong to the field of management. This reveals that management plays the most important role in the SSCI listed electronic commerce articles.

Table 6. Most cited electronic commerce articles in SSCI.

| Authors | Times Cited | Research fields |
|---|---|---|
| DeLone and McLean [5] | 362 | Information Systems; Information Science & Library Science; Management |
| Gefen, Karahanna, and Straub [7] | 352 | Information Systems; Information Science & Library Science; Management |
| Lee, So, and Tang [8] | 297 | Management; Operations Research & Management Science |
| Amit and Zott [14] | 237 | Business; Management |
| McKnight, Choudhury, and Kacmar [15] | 229 | Information Science & Library Science; Management |
| Wenger and Snyder [16] | 194 | Business; Management |
| Ba and Pavlou [12] | 183 | Information Systems; Information Science & Library Science; Management |
| Gefen [13] | 182 | Management; Operations Research & Management Science |
| Reichheld and Schefter [17] | 179 | Business; Management |
| Lynch and Ariely [18] | 165 | Business |

Note: DeLone and McLean [5], Gefen, Karahanna, and Straub [7], Lee, So, and Tang [8], Ba and Pavlou [12], Gefen [13] are both listed in SCIE and SSCI.

## 4. Discussion

The current study found 4,948 and 2,875 electronic commerce articles in SCIE and SSCI databases, respectively. These articles were analyzed by research fields, the number of articles per year, the author's country, most important journals, and most cited articles. Data from these two databases show significantly differences.

The research results of the present study reveal that based on the number of articles, the most important research field of electronic commerce in SCIE is computer and information science. However, business management is the most important field in SSCI database. The proportion of electronic commerce articles in SCIE and SSCI shows that the research tendency has moved from technology to management over the past decade. Electronic commerce research in techniques, as included in SCIE, has matured since 2005. Likewise, research in the management field, as included in SSCI, is still growing. These

facts reveal that the tendency for electronic commerce researchers is to shift their focus from techniques to management of electronic commerce activities.

The present study also reveals that more than 30 percent authors of electronic commerce articles were from the United States. This phenomenon reflects the fact that most SCIE and SSCI indexed journals are dominated by United States scholars. Moreover, based on the percentages, scholars in Asian countries, such as South Korea, Taiwan, Hong Kong, China, and Japan also play important roles in electronic commerce research.

This study shows that *Decision Support Systems*, *Information & Management*, *International Journal of Electronic Commerce*, and *Journal of Management Information Systems* are the journals that published the most electronic commerce articles. Researchers can thus select these journals for publishing either technique-based or management-based articles.

The current study also identified the highly influential electronic commerce articles that were cited most frequently by other SCI/SSCI indexed articles. Through these citation analyses, researchers can determine the highly influential electronic commerce articles as well as the theoretical base of electronic commerce articles.

## References

[1] Nagi E. W. T. and Wat F. K. T., “A literature review and classification of electronic commerce research,” Information Management, 39, 415-429, 2002.
[2] Lee S. M., Hwang T., Kim J., “An analysis of diversity in electronic commerce research,”, International Journal of Electronic Commerce, 12(1), 31-67, 2007.
[3] Ngai E. W. T. and Gunasekaran A., “A review for mobile commerce research and applications,” Decision Support Systems, 43(1), 3-15, 2007.
[4] Rahm E. and Bernstein P. A., “A survey of approaches to automatic schema matching”, VLDB Journal, 10(4), 334-350, 2001.
[5] DeLone W. H. and McLean E. R., "The DeLone and McLean model of information systems success: a ten-year update", Journal of Management Information Systems, 19(4), 9-30, 2003.
[6] Christopoulos C., Skodras A., Ebrahimi T., “The JPEG2000 still image coding system: An overview”, IEEE Trans. on Consumer Electronics, 46(4), 1103-1127, 2000.
[7] Gefen D., Karahanna E., Straub D. W., "Trust and TAM in online shopping: An integrated model", MIS Quarterly, 27(1), 51-90, 2003.
[8] Lee H. L., So K. C., Tang C. S., "The value of information sharing in a two-level supply chain", Management Science, 46(5), 626-643, 2000.
[9] Burke R. ,”Hybrid recommender systems: Survey and experiments”, User Modeling and User-Adapted Interaction, 12(4), 331-370, 2002.
[10] Cody R. B., Laramee J. A., Durst H. D., “Versatile new ion source for the analysis of materials in open air under ambient conditions”, Analytical Chemistry, 77(8), 2297-2302, 2005.
[11] Liu C., Yun F., Morkoc H., “Ferromagnetism of ZnO and GaN: A review”, Journal of Materials Science-Materials in Electronics, 16(9), 555-597, 2005.

[12] Ba S. L. and Pavlou P. A., "Evidence of the effect of trust building technology in electronic markets: Price premiums and buyer behavior", MIS Quarterly, 26(3), 243-268, 2002.
[13] Gefen D., "E-commerce: the role of familiarity and trust", Omega-International Journal of Management Science, 28(6), 725-737, 2000.
[14] Amit R. and Zott C., "Value creation in e-business", Strategic Management Journal, 22(6-7), 493-520, 2001.
[15] McKnight D. H., Choudhury V., Kacmar C., "Developing and validating trust measures for e-commerce: An integrative typology", Information Systems Research, 13(3), 334-359, 2002.
[16] Wenger E. C. and Snyder W. M., "Communities of practice: The organizational frontier", Harvard Business Review, 78(1), 139-145, 2000.
[17] Reichheld F. F. and Schefter P., "E-loyalty - Your secret weapon on the Web", Harvard Business Review, 78(4), 105-117, 2000.
[18] Lynch J. G. and Ariely D., "Wine online: Search costs affect competition on price, quality, and distribution", Marketing Science, 19(1), 2000.