PROFILING RESEARCH PUBLISHED IN THE
JOURNAL OF ELECTRONIC COMMERCE RESEARCH

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ABSTRACT

This article endeavors to profile the types of research published in the *Journal of Electronic Commerce Research* (*JECR)* from 2000 to 2007. An analysis of the published material includes examining variables such as citation analysis, universities associated with the most publications, geographic diversity, authors' backgrounds, subject areas most often investigated, and research methodologies. Like other profiling research, this work has implications for researchers, journal editors, universities, and research institutions. Since this work has utilized variables published in a previous study, the findings will allow a comparison to be made between *JECR*'s profile and other Information Systems (IS) journals. Also, as this is the first profiling work for any Electronic Commerce Journal, it is thus likely to form the basis and motivation for profiling other journals in this area.

Keywords: *JECR*, E-Commerce, IS Research, Meta-Analysis, Research Paradigm, Research Profile

1. Introduction

Since its inception, the development and growth of Electronic Commerce (EC) has experienced both sudden 'boom' and 'bust' phases for a number of reasons. Since the bust phase, both industry and academia have been attempting to understand the reasons for failure, and utilizing such reasons as lessons to assist with the building of successful electronic commerce ventures. This has led to enormous academic and research interest from various disciplines, such as information systems, business, management, marketing, economics, and psychology. This multi-disciplinary interest is helpful in understanding the multi-dimensional/faceted view of electronic commerce and has resulted in a large number of EC-related publications appearing in a variety of journals. In order to provide indicators of EC research trends, such publications have been reviewed and classified by a number of previous studies (eg. [Chua et al. 2005, Ngai & Wat 2002, Kauffman & Walden 2001, Wareham et al. 2005]). In addition to the miscellaneous journals publishing EC related material, a number of journals dedicated solely to addressing EC issues have emerged since the late 1990s (e.g. *Journal of Electronic Commerce Research*, *International Journal of*

Electronic Commerce Research and *Electronic Markets*). Although previous articles have appeared that profile EC publications appearing in non-EC specialized journals [Ngai & Wat 2002, Kauffman & Walden 2001, Wareham et al. 2005], the publications appearing in specialized EC journals have yet to be profiled. It is considered an important and useful activity to profile research publications appearing in a particular journal (especially in the emerging phase) as it helps to identify major research issues and research paradigms [Palvia et al. 2007], where such profiling is likely to help authors, reviewers, and editors of the journal [Avison et al. 2008] to produce balanced and quality publications.

The *Journal of Electronic Commerce Research (JECR)* is a highly regarded journal for publishing electronic commerce research. Within two years of its launch, a study by Bharati and Tarasewich [2002] ranked it fourth in "*overall quality in publishing E-Commerce research*". Since then it has continually developed its international reach and has evolved both in terms of quality and quantity of output. With reference to journal publications, profiling is considered to be an art of introspection that aims to benefit a specific audience and takes a journal towards the right and balanced direction [Palvia et al. 2007]. For the benefit of JECR's audience, this paper provides an overview of research published in the journal, and which is intended to help them to appreciate and identify topics worthy of research and publication [Palvia et al. 2007]. Also, such efforts will provide a valuable addition towards the efforts exerted by Ngai & Wat [2002], Kauffman & Walden [2001], and Wareham et al. [2005] for understanding and developing the area of EC research. Furthermore, our study is likely to stimulate researchers to profile other EC Journals in order to conduct comparative/cross-journal studies.

In light of the above, the aim of this paper is to provide a systematic review of *JECR* publications in order to ascertain the current "state of play" of the EC field along a number of dimensions. This overall aim is realized by means of the following objectives: 1. To determine the research impact of the published research; 2. To determine the geographic location of contributing authors; 3. To identify authors' backgrounds (i.e. home departments and academic, or practitioner); 4. To identify the universities associated with the most research publications; 5. To classify *JECR* publications on the basis of their use of primary research data (empirical and non-empirical); 6. To classify *JECR* publications on the basis of the nature of primary research data (quantitative and qualitative); 7. To classify *JECR* publications according to the research methods employed; 8. To identify the various *units of analysis* commonly utilised in *JECR* publications; 9. To determine the most frequently used keywords in *JECR* publications; 10. To determine the topics often investigated, and analyze their trends; and 11. To classify *JECR* publications according to the research paradigm.

In order to achieve these objectives, a systematic review of 139 articles published during the period 2000-2007 was conducted. The remainder of this paper is structured as follows. Section 2 provides a discussion of the method employed in the analysis of the published *JECR* research. The findings are presented in Section 3 and discussed in Section 4. Finally, Section 5 presents conclusions from this work and the limitations to the approach.

2.   Research Methodology

In order to create a profile of the research topics, research methodologies, universities, and authors, the study thoroughly examined all *JECR* papers published between the years 2000 and 2007. The authors carefully reviewed a total of 139 research articles for capturing data on these variables. Such a research approach for the systematic classification of research published in a particular journal is termed as 'meta-studies' [Palvia et al. 2007] or 'longitudinal literature review'. Since this approach has been previously successfully employed to profile a number of IS journals including *Information & Management (I&M)* [Claver et al. 2000, Palvia et al. 2007] and the *Information Systems Journal (ISJ)* [Avison et al. 2008], we also utilized it to profile *JECR* publications.

Various items were recorded for each article including the citations of selected articles, geographic regions, authors' backgrounds, research topics and the research methodology used by the authors. The impact of the research was assessed using Google's scholar citation counts. Institutional contributions/productivity was examined by utilizing an adjusted count approach in which only one count was allocated to authors from the same institution [Palvia et al. 2007]. Both the background of authors and geographic location variables were adapted from Avison et al. [2008]; however, for future comparison and to maintain consistency, geographic regions for data collection were divided according to the Association of Information Systems (AIS) guidelines. AIS has divided the world into the following three regions: (1) AIS Region 1 – Americas; (2) AIS Region 2 – Europe, Africa and Middle East; and (3) AIS Region 3 – Asia Pacific. Consequently, we grouped the data collected from the various countries into these three groups.

The categories for recording the research methodologies related aspects were adapted from previous studies [Avison et al. 2008, Chen & Hirschheim 2004, Palvia et al. 2007, Wareham et al. 2005]. For exploring the research paradigm, three categories were considered, namely positivist, interpretive, and descriptive/conceptual [Avison et al. 2008, Wareham et al. 2005]. A further classification was done in terms of Empirical vs. Non-Empirical and

Qualitative vs. Quantitative [Avison et al. 2008, Wareham et al. 2005]. A total of eight research method categories (e.g. Conceptual, Survey, Development, Experiment, Case Study, Data Analysis, Interview, and Ethnographic Studies) were employed to classify *JECR* publications. Although, due to space limitations, it is not appropriate to provide detailed information on these categories, readers can refer to the original sources [Avison et al. 2008, Chen & Hirschheim 2004, Palvia et al. 2007, Wareham et al. 2005] for more detail. The level or unit of analysis is an important variable which can illustrate the trend of research in various contexts. However, none of the previous studies have utilized this variable for the purpose of profiling. For classifying *JECR* papers, the approach and categories for level or unit of analysis are adapted from a forthcoming paper on profiling research on the adoption and diffusion of Information Systems/Information Technology [Dwivedi et al. 2008].

For capturing the data on research topics authors adapted Barki et al.'s [1993] classification scheme that consists of nine major research themes. However, by observing the nature of published EC research [Ngai & Wat 2002, Wareham et al. 2005], we can compress the nine categories into five categories namely 'Electronic Commerce Environment', 'Electronic Commerce Management', 'Electronic Commerce Technological and Developmental Issues', 'Electronic Commerce Applications', and 'Electronic Commerce Research and Education'. The reason for choosing this scheme over others published within electronic commerce area was due to better clarity in the classification scheme and for providing researchers with comparative data. Avison et al. [2008] recently employed this classification scheme for profiling 17 years of ISJ publications. A further reason for not adapting the Ngai & Wat [2002] and Wareham et al. [2005] classifications is the level of abstraction; their categories were too abstract which may have posed problems of correctly allocating a particular paper to the appropriate category. Also, some of their categories are overlapping in nature which would have caused further problems. We classified all articles at two levels. At the first level, all papers were classified into five major mutually exclusive categories. This is because although a particular paper maybe addressing more than one subtopics, the main focus of the paper cannot be more than one problem area. However, for more detailed analysis on the topic, similar to Palvia et al. [2007], our coding allowed for up to three research sub-topics per article, as many articles generally address more than one research issue.

It is important to emphasize at this point that like previous profiling studies [Claver et al. 2000, Palvia et al. 2007] the findings of this study, in terms of universities with the most contributors, should be regarded as 'indicative and not an authoritative declaration' [Palvia et al. 2007]. This is because it is possible that some universities may have niches of research expertise that are not yet visible.

3. Findings

Figure 1 illustrates the JECR submission and acceptance trend. The illustrated pattern suggests that JECR is constantly evolving both in terms of the number of submissions and quality of published papers. The acceptance rate of the launch issue was 50%. In contrast, the acceptance rate of the last issue of 2007 was 12%, which suggests a significant improvement in terms of rigor of the review process and ultimate quality of the published papers. The submission level has also increased substantially over a period of eight years as shown in Figure 1.
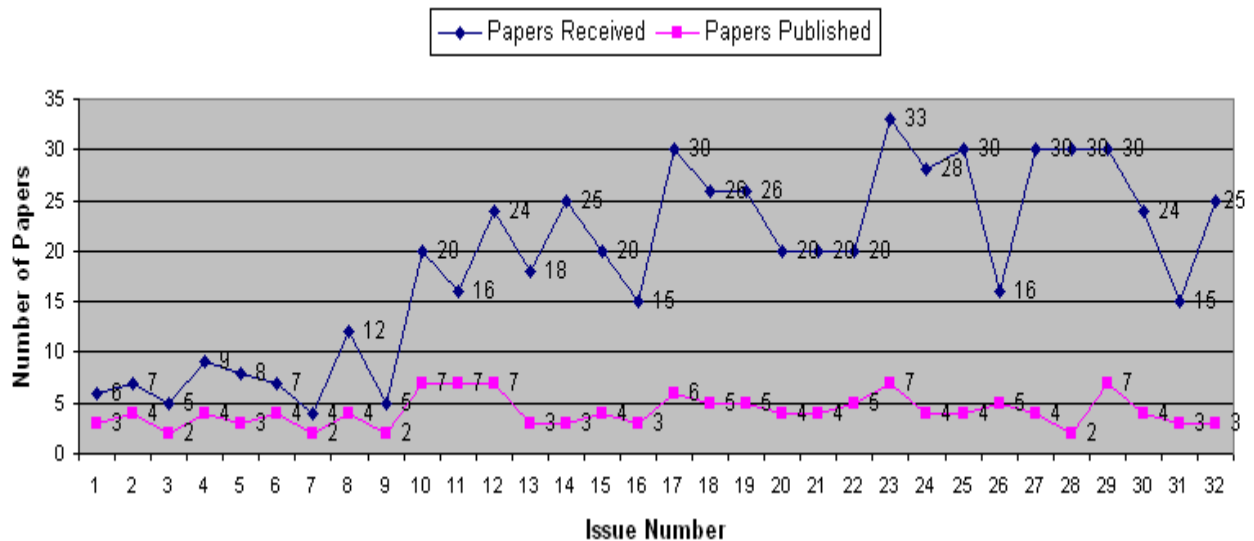

Figure 1: Number of Papers Received and Published in *JECR* between period 2000-2007

The findings of this study are presented in the following subsections. The first subsection presents citation analysis to illustrate the research impact of the most inferential authors. This follows the co-author analysis to show the collaborative nature of the EC research. Following this, geographical diversity and authors' backgrounds including university, department, and country information is presented. Next, we profile the publication by data source, research paradigm, research approach, and research method utilized. This is followed by categorizing the unit of analysis and keyword analysis. The last two subsections discuss the most researched topics published in *JECR*.

3.1.   Citation Analysis

A citation analysis was conducted to determine the research impact of the most influential authors based on number of *JECR* publication citations. Table 1 summaries citation data from *Google Scholar* retrieved on March 17, 2008 for all 139 articles appearing in *JECR* between the years 2000 and 2007. Data on total citation count per article suggests that the majority of articles (a total of 86 articles) were cited three times or more. A larger value of citation counts were 98 [Barnes & Vidgen 2002, Vol. 3, Issue 3], 61[Molla & Licker 2001, Vol. 2, Issue 4], 38 [Wang et al. 2001, Vol. 2, Issue 3], 32 [Chan et al. 2002, Vol. 3, Issue 3], 31 [Bauer et al. 2005, Vol. 6, Issue 3], 30 [Chen et al. 2003, Vol. 4, Issue 4], 29 [Stamp 2003, Vol. 4, Issue 3], 28 [Young & Benamati 2000, Vol. 1, Issue 3], 25 [Kim & Benbasat 2003, Vol. 4, Issue 2], and 22 [Luarn & Lin 2003, Vol. 4, Issue 4]. It is important to know that unlike the citation records found at other commercial database services such as *Scopus* and *Web of Science*, *Google Scholar* records citations from all sources including conferences, book chapters, working papers, and other non-traditional sources. However, a recent study by Jacso [2005] found that although some of the hits from *Google Scholar* were non-traditional, the majority of the records were relevant and substantial. Another issue related with citation count is how old a particular article is. Older articles are more likely to have larger citations, while newer articles are likely to possess fewer citation counts. This can be evidenced by the fact that articles possessing the largest number citations were published in early volumes (Vol. 1, 2, 3, 4) of *JECR* and only one article from a relatively recent volume (Vol. 6) had a larger count.

Table 1: Google Scholar Citations for JECR Articles 2000 - 2007 (Retrieved March 17, 2008)

Citations	Count	Percent	Citations	Count	Percent
98	1	0.72%	14	2	1.44%
61	1	0.72%	13	1	0.72%
38	1	0.72%	12	3	2.16%
32	1	0.72%	11	2	1.44%
31	1	0.72%	10	7	5.04%
30	1	0.72%	9	4	2.88%
29	1	0.72%	8	6	4.32%
28	1	0.72%	7	6	4.32%
25	1	0.72%	6	3	2.16%
22	1	0.72%	5	5	3.60%
21	2	1.44%	4	14	10.07%
20	2	1.44%	3	13	9.35%
19	1	0.72%	2	10	7.19%
18	2	1.44%	1	18	12.95%
17	2	1.44%	0	25	17.99%
16	1	0.72%	**Total**	**139**	**100%**

3.2.   Co-author Analysis

In terms of the number of co-authors who contributed to each article, 21.58% (C=30) of the articles were written by one author (Single Authored). Articles produced by multiple authors form the following categories: 42.45% (C=59) articles which form the largest category were co-authored by two authors, 28.06% (C=39) articles by three authors and 7.19% (C=10) articles by four authors. Only one article was co-authored by six authors (see Table 2).

Table 2: Pattern of Co-authorship of *JECR* Articles (approach adapted from Avison et al. 2008)

Number of Co-authors	Count	Percent
1	30	21.58%
2	59	42.45%
3	39	28.06%
4	10	7.19%
6	1	0.72%
Total	**139**	**100%**

3.3. Area of Academic Expertise/Authors Home Department/School

In terms of the number of authors/contributors from different departments, the largest number of contributors were located in the Information Systems (IS) department (109, 35.05%), which is followed by the Business (65, 20.9%), Management (37, 11.9%), Computer Science (CS) (23, 7.40%), and Marketing (20, 6.43%). All other departments contributed relatively few articles including Electronic Commerce/E-Business with 8 articles (2.57%) (see Table 3). The reason that Electronic Commerce/Electronic Business does not come on top is because most schools does not have a separate Electronic Commerce Department but usually house e-commerce in IS, CS, or Marketing department.

Table 3: Authors' Home Department/Academic Background (approach & categories adapted from Avison et al. 2008)

Discipline	Count	Percent
MIS/Information Systems	109	35.05%
Business	65	20.90%
Management	37	11.90%
Computer Science	23	7.40%
Marketing	20	6.43%
Engineering	10	3.22%
Electronic Commerce/Electronic Business	8	2.57%
Psychology	6	1.93%
Accounting	2	0.64%
Others	31	9.97%
Total	**311**	**100.00%**

3.4. Background of Authors

Table 4 illustrates the number of authors/contributors from academia or industry. The largest number of contributors was from academia (302, 97.11%) and only a very small proportion of authors were based in industry (9, 2.89%).

Table 4: Authors' Background (approach & categories adapted from Avison et al. 2008)

Authors' Background	Count	Percent
Academic	302	97.11%
Industry/Others	9	2.89%
Total	**311**	**100%**

3.5. Leading Research Universities

Authors/contributors from 163 organizations/universities contributed to one or more articles in *JECR* between 2000 and 2007. Table 5 presents the top 32 universities having 2 or more articles published in the journal. The following is a breakdown of the frequency of contributors/authors affiliated with a particular organization or university. Eight universities ranked first contributed 3 articles each. This is followed by 24 universities each contributed 2 articles. Finally, the largest number (C=131) of universities had affiliation with one contribution from each.

Table 5: Top 32 Universities Published in *JECR* (approach adapted from Avison et al. 2008, Palvia et al. 2007)

Universities	Country	Count
Chinese University of Hong Kong	Hong Kong	3
Griffith University	Australia	3
McMaster University	Canada	3
Texas A&M University	USA	3
University of California	USA	3
University of Dallas	USA	3
University of Manchester	UK	3
University of North Carolina at Greensboro	USA	3
Arizona State University	USA	2
California State University, Long Beach	USA	2
DePaul University	USA	2
George Mason University	USA	2
Georgia State University	USA	2
Hong Kong University of Science and Technology	Hong Kong	2
Iowa State University	USA	2
Kingston University	UK	2
Monash University	Australia	2
National Chengchi University	Taiwan	2
Northern Kentucky University	USA	2
Oakland University	USA	2
Purdue University	USA	2
Syracuse University	USA	2
Tennessee State University	USA	2
University of Hong Kong	Hong Kong	2
University of Iowa	USA	2
University of Kentucky	USA	2
University of Maryland, Baltimore County	USA	2
University of Nebraska - Lincoln	USA	2
University of Nebraska - Omaha	USA	2
University of South Carolina	USA	2
Vienna University of Economics & Business Administration	Austria	2
Yonsei University	Korea	2

3.6.   Country

    A total of 27 countries' authors published in *JECR* between the years 2000 and 2007 (see Table 6). In terms of the number of authors/contributors from different countries, the largest number of contributors were located in the USA (149, 47.91%), which was followed by the UK (24, 7.72%). The third largest category (20, 6.43%) was formed by German authors and then Australian (17, 5.47%) at fourth place. Table 6 illustrates the proportion of contributors from the 27 countries.

Table 6: Contributors' Geographical Location for (approach adapted from Avison et al. 2008, Wareham et al. 2005)

SL	Country	Count	Percent	SL	Country	Count	Percent
1	USA	149	47.91%	15	Greece	3	0.96%
2	UK	24	7.72%	16	Switzerland	3	0.96%
3	Germany	20	6.43%	17	South Africa	2	0.64%
4	Australia	17	5.47%	18	Israel	2	0.64%
5	Taiwan	16	5.14%	19	Thailand	2	0.64%

6	Hong Kong	13	4.18%	20	Norway	2	0.64%
7	Canada	11	3.54%	21	Not Known	2	0.64%
8	Korea	8	2.57%	22	Singapore	2	0.64%
9	Austria	7	2.25%	23	The Netherlands	1	0.32%
10	Italy	6	1.93%	24	Japan	1	0.32%
11	Spain	5	1.61%	25	Denmark	1	0.32%
11	France	5	1.61%	26	Nigeria	1	0.32%
13	India	4	1.29%	27	Kingdom of Saudi Arabia	1	0.32%
14	New Zealand	3	0.96%		**Total**	**311**	**100.00%**

3.7.   Country and Region of Data Collection Site

While analyzing the papers, we observed that author location may differ from place where data was collected for a particular study. Keeping this in mind, a further analysis was conducted for location of data collection. A total of 22 countries' data were utilised in articles published in *JECR* between the years 2000 and 2007 (Table 7). The largest number of studies were based on data collected from the USA (62, 44.6%), followed by studies that utilised data collected from more than one country (16, 11.5%) and then from the UK (8, 5.8%). Next was studies that utilised data collected from Germany and Taiwan, each with seven studies (5%), and then Australia (5, 3.6%) at fifth place. Table 7 illustrates the proportion of contributors from the remaining 18 countries.

Table 7 Geographical Location of Data Collection (approach adapted from Avison et al. 2008, Wareham et al. 2005)

SL	Country	Count	Percent	SL	Country	Count	Percent
1	USA	62	44.6%	13	France	2	1.4%
2	Multi-Country Data Collection	16	11.5%	14	India	2	1.4%
3	UK	8	5.8%	15	New Zealand	2	1.4%
4	Germany	7	5.0%	16	South Africa	2	1.4%
5	Taiwan	7	5.0%	17	China	2	1.4%
6	Australia	5	3.6%	18	Switzerland	1	.7%
7	Hong Kong	4	2.9%	19	Israel	1	.7%
8	Canada	4	2.9%	20	Thailand	1	.7%
9	Austria	3	2.2%	21	Norway	1	.7%
10	Spain	3	2.2%	22	The Netherlands	1	.7%
11	Korea	2	1.4%	23	Japan	1	.7%
12	Italy	2	1.4%		**Total**	**139**	**100%**

In terms of the number of studies with data collected from different geographical regions, as suggested by the Association of Information Systems (AIS), the largest number of studies were supported by data collected from the AIS Region 1 – America (68, 48.9%), followed by the AIS Region 2 – Europe, the Middle East, and Africa with 23.7% (C=33) of the studies. The third and final large category was formed by the AIS Region 3 – the Asia-Pacific region with 18.0% (C=25) of the studies (Table 8). Seven studies were supported by data collected from two countries and six studies with data from more than two countries.

Table 8: Geographical Regions of Data Collection (approach adapted from Avison et al. 2008, Wareham et al. 2005)

Geographical Region (AIS Classification)	Count	Percent
AIS-Region 1-Americas	68	48.9%
AIS-Region 2-Europe, Africa and Middle East	33	23.7%
AIS Region3 – Asia Pacific	25	18.0%
Comparison (2 countries)	7	5.0%
Global (3 or more countries)	6	4.3%
Total	**139**	**100.0**

3.8.   Research Paradigm

The findings obtained from the analysis clearly indicates that positivism (used in 64, 46% articles) is the dominant or most popular research paradigm amongst articles published in *JECR*, closely followed by the descriptive, developmental, and design research (being employed in 62, 44.6% articles). We have labelled this category 'descriptive, developmental, and design research' for papers that do not neatly fit into either positivist or interpretive categories, primarily comprising articles based on literature reviews, personal view points, or studies that are highly conceptual in nature (Avison et al. 2008). The remaining 13 (9.3%) articles belong to interpretive category (see Table 9).

Table 9: Research Paradigm employed (categories adapted from Avison et al. 2008, Chen & Hirschheim 2004, Wareham et al. 2005)

Research Paradigm Category	Count	Percent
Positivist	64	46.0%
Descriptive, Developmental and Design Research	62	44.6%
Interpretive	13	9.4%
Total	**139**	**100.0%**

3.9.   Empirical vs. Non-Empirical

The proportion of *JECR* articles which was reported empirical in nature (79, 56.8%) was slightly larger than the proportion of articles that fell within the non-empirical category (60, 8.6%).

Table 10: Research Methodology: Empirical vs. Non-Empirical (categories adapted from Avison et al. 2008, Chen & Hirschheim 2004)

Empirical vs. Non-Empirical	Count	Percent
Empirical	79	56.8%
Non Empirical	60	43.2%
Total	**139**	**100%**

3.10.   Qualitative vs. Quantitative

The findings suggest that the quantitative and descriptive/conceptual approaches equally dominated research published in *JECR*. A total of 62 (44.6%) articles employed a quantitative approach. There are 60 (43.2%) articles employed descriptive/conceptual approaches in comparison to the qualitative approach which was employed by only 15 (10.8%) articles (see Table 11).

Table 11: Research Methodology: Qualitative vs. Quantitative (categories adapted from Avison et al. 2008, Chen & Hirschheim 2004)

Nature of data	Count	Percent
Quantitative	62	44.6%
Descriptive/Conceptual	60	43.2%
Qualitative	15	10.8%
Mixed	2	1.4%
Total	**139**	**100%**

3.11.   Research Methods

The findings suggest that although a total of eight different research methods were recorded from our data analysis activities, the majority of studies within our results employed conceptual (47, 33.8%) and survey (42, 30.25%) methods. The other categories employed were the development (14, 10.1%), experiment (13, 9.4%), case study (11, 7.9%), secondary data analysis (4, 2.9%), interview (3, 2.2%), ethnographic method (1, 0.7%), and others (4, 2.9%). (see Table 12).

Table 12: Research Methods employed (categories adapted from Avison et al. 2008, Chen & Hirschheim 2004, Wareham et al. 2005)

Research Methods	Count	Percent
Conceptual	47	33.8%
Survey	42	30.2%
Development	14	10.1%
Experiment	13	9.4%
Case Study	11	7.9%
Data Analysis	4	2.9%
Others	4	2.9%
Interview	3	2.2%
Ethnographic Studies	1	.7%
Total	**139**	**100%**

3.12.   Unit of Analysis

The results of our exploration into the most common forms of unit of analysis employed suggest that the majority of articles examined EC issues at the organizational level(48, 34.5%), followed by studies focusing upon the consumer (30, 21.6), students (11, 7.9), SMEs (8, 5.8%), users (6, 4.3%), industry (1, 0.7%), and others (34, 24.5%).

Table 13: Unit of Analysis (categories adapted from Dwivedi et al. 2008)

Unit of Analysis	Count	Percent
Organizations	48	34.5%
Consumers	30	21.6%
Students	11	7.9%
SMEs	8	5.8%
Users	6	4.3%
Industry	1	.7%
Public Sector Organization	1	.7%
Others/Not Appropriate	34	24.5%
Total	**139**	**100%**

3.13.   Keyword Analysis: Popular Keywords

In order to assess the most frequently utilized (employed) keywords, all the keywords (a total of 435) that appeared between the first issue of 2000 and last issue of 2007 were collected. These keywords were then sorted in alphabetical order in order to explore the most frequently utilized keywords. A total of 37 keywords were utilized two or more times. These 37 keywords, along with their frequency, are listed in Table 14. E-Commerce/Electronic Commerce/E-Business/Electronic Business was the most frequently used keyword, with 39 papers utilizing this keyword. 'Trust' emerged as the second most utilized keyword as nine studies utilized this keyword or, in other words, investigated trust-related issues in electronic commerce. This was closely followed by 'Adoption (3)/Acceptance (2)/Electronic Commerce Adoption (2)', 'Internet', and 'Online Auction (4)/ Auctions (2)/Auction Price' where each type was investigated or utilized in seven studies. The fourth most popular keyword 'Web Service' was utilized six times followed by three keywords 'M-Commerce (2)/ Mobile Commerce (3)', 'Consumer behavior(3)/ Online Shopping (1)/Online Shopping Behavior (1)' and 'E-Banking (3)/ Internet Banking (2)' at fifth place, with each utilized five times. Table 4 summarized the frequency of usage of the top 37 keywords.

Table 14: Most frequently utilized keywords

Keywords	Freq	Keywords	Freq
E-Commerce (18)/Electronic Commerce (16)/ E-Business (4)/ Electronic Business (1)	39	eBay	2
Trust	9	E-Commerce security	2
Adoption(3)/Acceptance(2)/Electronic Commerce Adoption (2)	7	Empirical Investigation/Empirical Study	2
Internet	7	Evaluation	2
Online Auction (4)/ Auctions (2)/Auction Price(1)	7	Event study	2
Web Service	6	Interactivity	2
M-Commerce (2)/ Mobile Commerce (3)	5	Internet Marketing	2
Consumer behavior(3)/ Online Shopping (1)/Online Shopping Behaviour (1)	5	Internet Retailing	2
E-Banking (3)/ Internet Banking (2)	5	Loyalty	2
Innovation (3)/Innovation Adoption (1)	4	Mobile Technology	2
Structure Equation Model	4	Small Businesses/Small Firms	2
B2B	3	Smart card/Smart Card Technology	2
China (2)/Chinese Consumer (1)	3	Software agents	2
Micro-payment/Micro-payment systems (2)	3	Strategy	2
Privacy (2)/Privacy Statements	3	Supply chain management	2
Application/Application Integration	2	Theory of Reasoned Action/TRA	2
Cross-cultural/cultural study	2		

3.14.   Major Research Topics

The findings suggest that the largest number of articles investigated research issues related with the Electronic Commerce Management category (52.5% C=73), which is followed by the EC Technological and Developmental Issue category (23% C=32). The third most researched topic was Electronic Commerce Applications, as 18 articles (12.9%) fell within this category, followed by the EC Environment (9.4% C=13) category. Finally, the Electronic Commerce Research and Education: Cross Domain Issues category was represented by three articles (2.2% C=3) (see Table 15).

Table 15: Frequency and Percentage of Major Research Topics (categories adapted from Avison et al. 2008, Barki et al. 1993)

Topics	Count	Percent
Electronic Commerce Management Issues **(ECM)**	73	52.5%
Electronic Commerce Technological and Developmental Issues **(ECTD)**	32	23.0%
Electronic Commerce Applications **(ECA)**	18	12.9%
Electronic Commerce Environment **(ECE)**	13	9.4%
Electronic Commerce Research and Education: Cross Domain Issues **(ECR)**	3	2.2%
Total	**139**	**100.0%**

3.15.   Detailed Research Topics

Data presented in Table 16 illustrates the EC research subtopics and the associated frequency and percentage of their occurrence in articles published from 2000 to 2007. This study adapted Barki et al.'s [1993] approach and topic categories for recording the occurrence/frequency of each subtopic. The most frequently researched sub topic by *JECR* authors is EC Evaluation as 46 (33.1%) articles have addressed issues related to this topic. This is followed by EC Planning, Strategies, Business Models, and Architecture -related research published in the 33 (23.7%) articles. The third largest frequently published (31, 22.3%) topic category was EC adoption related issues, followed by two categories, namely Social Issues (Trust, Ethics, Ethical Issues, Privacy, Discrimination, Social Values, Social Entities, Cultural Differences) (23, 16.5%) and Organizational Issues (22, 15.8%). The other sub-topics and associated frequency and percentages are illustrated in Table 16. This study will discuss the findings with previous such studies in the following section.

Table 16: Frequency and Percentage of Research Subtopics (categories adapted from Avison et al. 2008, Barki et al. 1993, Ngai & Wat 2002, Palvia et al. 2007, Wareham et al. 2005)

SN	Research Issues	Count	%
1	ECM: Evaluation (Impact, Quality, Value etc.)	46	33.1%
2	ECM: Planning, Strategies, Business Models and Architecture	33	23.7%
3	ECM: Adoption	31	22.3%
4	ECA: Others (Such as Mobile Commerce)	25	18%
5	ECE: Social Issues (Trust, Ethics, Ethical Issues, Privacy, Discrimination, Social Values, Social Entities, Cultural Differences)	23	16.5%
6	ECE: Organizational Issues	22	15.8%
7	ECA: B2C	22	15.8%
8	ECTD: Technological Component (COBRA, Agents, SGML, HTML, XML, JAVA)	19	13.7%
9	ECTD: Development Strategies/Approaches/Methodologies	14	10.1%
10	ECA: Financial Services (Online stock trading, virtual/home/online banking)	14	10.1%
11	ECTD: Design (Logical/System/Conceptual/Interface Design)	13	9.4%
12	ECM: Use/Usage and Satisfaction	12	8.6%
13	ECA: B2B	11	7.9%
14	ECTD: HCI Issues	10	7.2%
15	ECM: Security	8	5.8%
16	ECM: Integration	8	5.8%
17	ECA: Retailing (Online/electronic malls, CD-ROM/Internet as a shopping channel)	8	5.8%
18	ECA: Auctions	7	5%
19	ECTD: Algorithm	6	4.3%
20	ECE: Legal Environment (Fraud, Piracy, Copyrights, Patents, Licensing)	5	3.6%
21	ECTD: NT (Network Protocols, HTTP, TCP/IP)	5	3.6%
22	ECA: Electronic Payment Systems- e-cash, smartcards, credit/debit cards, electronic checks	5	3.6%
23	ECRE: Research	5	3.6%
24	ECE: Economic Sector	4	2.9%
25	ECA: IOS (EDI, Extranets, Electronic Fund Transfer (EFT))	3	2.2%
26	ECA: Marketing & Advertising	3	2.2%
27	ECE: Economic Impacts	2	1.4%
28	ECM: Problems/Failure	2	1.4%
29	ECM: Success	2	1.4%
30	ECM: Risk Management	2	1.4%
31	ECA: Online Publishing (Electronic News Paper, Magazines, News)	2	1.4%
32	ECA: Entertainment	2	1.4%
33	ECE: Political Environment	1	0.7%
34	ECM: Project Management	1	0.7%
35	ECM: Evolution	1	0.7%
36	ECTD: Support Systems- DSS and Distributed Applications	1	0.7%
37	ECTD: EC Software Packages such as ERP, CRM etc	1	0.7%
38	ECTD: Implementation	1	0.7%
39	ECA: Intra-organizational (Intranet)	1	0.7%
40	ECA: e-Government	1	0.7%
41	ECM: Staffing	0	0%
42	ECM: Control	0	0%
43	ECM: Marketing of EC Applications	0	0%
44	ECM: Globalization	0	0%
45	ECA: Education & Training	0	0%
46	ECA: C2C/P2P	0	0%
47	ECRE: Education	0	0%

4. Discussion

Wareham et al.'s [2005] review of electronic commerce articles that had been published in variety of IS journals reported that a number of geographical regions (such as South America, the Middle East, Former Soviet Union and Japan) are under-represented in terms of undertaking and publishing electronic commerce research. A similar picture of such geographical disparity is evident in an analysis of publications appearing in the *Information Systems Journal* [Avison et al. 2008]. Our investigation revealed no representation from the Southern and Central American Regions and highly under-represented levels of electronic commerce research from the Middle East, Africa and many Asian countries (see Tables 6-8). This highly imbalanced picture certainly raises an important research agenda for electronic commerce researchers to investigate, *viz*: is this situation a consequence of a global electronic commerce digital divide or is it due to a lack of interest or lack of necessary expertise to undertake electronic commerce research within such countries. In either case, the problem of a potential global electronic commerce divide needs to be investigated and academics from EC hotspots such as the USA, UK, Australia, Hong Kong, Taiwan, Korea, and European countries should consider collaboration with researchers from under-represented regions in order to undertake more fruitful research which is critical to the global emergence of electronic commerce. Another issue is the appropriateness of using the AIS Regions for geographical comparison. We suggest researchers divide the AIS Region 2 into three sub-divisions, namely European regions, the Middle East and Africa. Similarly, the AIS Region 1 should be divided into North and South America, and the AIS Region 3 should be divided into the Pacific Region (Australia & New Zealand), active Asian nations such as Singapore, Hong Kong, South Korea, Japan, Taiwan, China, and India, and comparatively less active Asian regions such as Afghanistan, Bangladesh, Cambodia, Indonesia, Malaysia, Nepal, Pakistan, Sri Lanka, Thailand, and many other countries. Without such a finer division it will not be possible to develop a clear picture of the regional growth of electronic commerce practice and research.

Avison et al. [2008] argued through the *Information Systems Journal* analysis that in the early years of the emergence of a research field and journal launch, researchers are likely to engage in '*searching for an understanding of the foundations of the discipline and so were concerned with theory building*' [Avison et al. 2008]. Hence, more papers published in the early stages of emergence are likely to be descriptive/conceptual/theoretical in nature. This is clearly evident from both Wareham et al.'s [2005] study, and indeed from our investigation. Wareham et al.'s [2005] work illustrated a large number of descriptive/conceptual/theoretical papers, and similar trends are observed in our study (see Table 9). However, what is concerning is the relatively low utilization of the interpretive approach. The interpretive approach facilitates a richer understanding of a research issue within a social context. A number of areas of electronic commerce research, such as trust, privacy, fraud, and many cultural issues, could be better understood by employing an interpretive approach and such research, without compromising quality, should be encouraged and published. Our analysis further illustrates a high level of imbalance between qualitative and quantitative research which the authors believe is related to the imbalance between research paradigms. In terms of research methods employed, the findings of Wareham et al. [2005] and our research (see Table 12) suggest a similar trend, which indicates that the use of research methods in *JECR* publications are comparable to the use of research methods in electronic commerce publications across IS journals. We believe this underlines the rigor and quality of *JECR* publications. Findings on the unit of analysis (see Table 13) suggest that *JECR* publications have relevance on various levels such as organizational, consumer, SME, and User. The issue that appeared to be in most need of attention in this respect was the use of students as a sample. This has implications for the need of reviewers to be cautious whilst evaluating such submissions and reviewers should ensure as far as possible that the use of such samples would not affect the implications and external validity of such studies in the "real world".

Building upon previous e-commerce research [Ngai & Wat 2002, Wareham et al. 2005] and research in its immediate reference discipline 'Information Systems' [Avison et al. 2008, Barki et al. 1993], this paper proposes a simple yet comprehensive framework for classifying future e-commerce research publications (see Figure 2). Our proposed framework is flexible enough to accommodate a variety of issues related to electronic commerce. The five core components of this framework are derived from Barki et al.'s [1993] IS classification scheme, which was recently successfully employed to categorize 17 years of *ISJ* publications [Avison et al. 2008]. The component in the centre of the framework is entitled 'Electronic Commerce Research and Education (ECR)', which Ngai & Wat [2002] termed 'Common Topic of Electronic Commerce', and Wareham et al. [2005] termed it as 'Common/Cross Domain Topics'. Types of research that should be included within this category are EC curriculum and certification, EC research methodologies and frameworks, and EC research issues such as diffusion of EC research, EC research agenda, EC journals, and history and evolution of EC [Barki et al. 1993]. The findings presented in Table 15 show several *JECR* publications appeared within this category, however they only address EC research areas such as research agenda and evolution of EC research, and no work has yet appeared within the area of EC curriculum and certification. This indicates further opportunities to undertake research within this area. For example, one of the potential areas of EC research is to examine the diffusion of electronic commerce research by collecting and

organizing keywords appearing in past EC publications. This could be achieved by employing Barki et al.'s [1993] keyword classification scheme. Another area of work within this category could include profiling research published in other EC journals to better understand the overall current state of the EC research field.
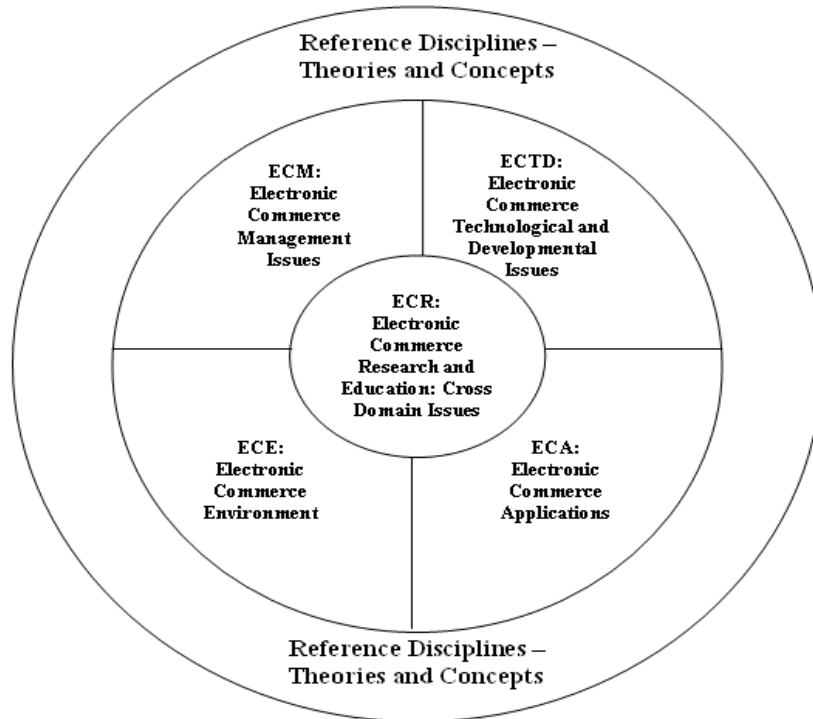

Figure 2: Framework for Classification of Electronic Commerce Research (Source: Adapted from Avison et al. 2008, Barki et al. 1993, Ngai & Wat 2002, Wareham et al. 2005)

The second category of the proposed framework 'Electronic Commerce Management Issues (ECM)', is currently one of the most researched areas within JECR publications (see Tables 15 &16). The major research focus of work published in *JECR* within this category has been concentrated on EC evaluation in terms of performance, quality, and impact, and other issues related to EC security, strategies, business models, adoption, success, and consumer satisfaction with e-commerce systems [Barki et al. 1993]. However, many areas such as EC project management-related issues, EC staffing issues, and marketing of EC applications [Barki et al. 1993], are as a rule untouched and provide scope for future fruitful research activity.

The third category of the proposed framework is entitled 'Electronic Commerce Technological and Developmental Issues (ECTD)' which Ngai & Wat [2002] termed 'Technological Issues' and Wareham et al. [2005] termed 'Information Technology and Infrastructure'. This is the second most published area within *JECR*, probably due to the fast evolution of technology and its critical role in the growth and development of electronic commerce. However, most of the efforts to date have been concentrated on the design of websites and technological components such as agents and developmental tools (i.e. XML). Much opportunity for further research exists in building developmental strategies and understanding implementation issues within EC.

The fourth category of the framework is 'Electronic Commerce Applications (ECA)', which Ngai & Wat [2002] refer to as 'Applications' and Wareham et al. [2005] termed 'Applications and Industries Specific Themes' and 'Business Issues'. Existing publications within *JECR* have robustly examined areas such online shopping, financial applications such as e-banking and online trading, and applications such as online auctions, mobile commerce, and electronic payment systems. However, future effort should also be placed on researching and publishing emerging EC applications such as online publishing, entertainment, online education and training, online marketing and advertising, and C2C/P2P applications.

The fifth and final category of the framework is the 'Electronic Commerce Environment (ECE)', which includes both the external (legal, political, economic, and social) and internal (organizational) environments within which EC applications are implemented and used. Ngai & Wat [2002] termed this aspect 'Support and Implementation' and Wareham et al. [2005] termed it 'Other Social Issues'. Some of the areas within this category, such as trust, taxation,

privacy, copyright, and piracy have been addressed within a number of existing *JECR* publications. However, many areas such as fraud, the effect of religion and culture on the growth and the development of EC, development and adoption of EC in developing and third-world countries, EC impacts on various areas of the economy, and the politics and growth of EC offers huge scope for research activity and publication.

In line with Barki et al.'s (1993) classification scheme, we also propose the category of 'Reference Disciplines – Theories & Concepts' for works focused upon borrowing theoretical and methodological foundations for examining EC related issues. Considering its broad scope, we propose that this category has relevance to all five core components and categories of the proposed framework. Existing publications within *JECR* have already borrowed and applied theories, theoretical constructs, and models such as value, trust, differentiation, quality, Porter's five forces model, contracting, critical success factors, the theory of planned behavior, the decomposed theory of planned behavior, McCarthy's four marketing mix model, information economics, public good theory, dependency network diagrams, usability, loyalty, satisfaction, performance, Gutman's means-end theory, action psychology, product quality, transaction cost theory, social experience, social construction, game theory, virtual community, consumer behavior, organizational innovation theory, disruptive innovation theory, technology acceptance model, and diffusion of innovation theory. These are just a few examples that have been previously utilized within *JECR* publications, and many further theories and models are likely to be borrowed from different reference disciplines.

Finally, Wareham et al. [2005] suggest that future research activity should include studies on aspects such as flexible manufacturing and mass customization, P2P application, fraud, deception, diffusion of electronic commerce in developing countries, evolving types of use of electronic commerce, psychology of online consumers, application of electronic commerce in areas such as services, education/training, government and entertainment. Although, as discussed above, some of these issues have already been addressed (to varying extents) by existing JECR publications, the majority of issues are still untouched and remain worthy of future research investigation. Ngai & Wat [2002] argued that public policy matters (such as taxation, legal and privacy issues) and topics related to technical standards are areas of relevance to EC researchers. Although substantial research has now been published in these areas, these research topics continue to hold relevance as areas worthy of investigation within the EC research domain, and are likely to do so for the foreseeable future.

5. Conclusions

This paper aimed to depict the current state of EC research published in *JECR* by presenting the results of a systematic and comprehensive review of 139 articles that appeared between the years 2000 and 2007. The paper presented the results of an investigation along a series of dimensions including research impact of most influential authors, authors' backgrounds, universities, country, and region, most frequently used keywords, most frequently researched topics, methodological practice, use of primary data, and research paradigm.

The following are the main conclusions that have emerged from the analysis presented in this study. The highest research impact is reported for the paper published by Barnes & Vidgen [2002, Vol. 3, Issue 3], which was assessed by citations obtained from *Google Scholar* for all articles published in *JECR*. The largest number of papers is co-authored by two authors followed by three authors which suggest substantial collaborative activity when conducting e-commerce research. In terms of home department/schools of authors, the largest number of researchers is from MIS/IS backgrounds, followed by the Business and Management areas. Very few authors were from industry in comparison to academia. The universities with the largest number of contributions (three contributors from each) are the Chinese University of Hong Kong, Griffith University, McMaster University, Texas A&M Universities, University of California, University of Dallas, University of Manchester, and the University of North Carolina at Greensboro. This indicates a dominance of USA based researchers over other regions as half of the eight top universities were located in the USA. Furthermore, geographical diversity of *JECR* authors indicates that the largest concentration of contributors was also based in the USA.

A keywords analysis indicated that trust, adoption, acceptance, Internet, and Web service were the most utilised keywords, or in other words, the most investigated research issues. Electronic Commerce Management related topics followed by Electronic Commerce Technological and Development Issues were the most widely published areas within the eight years of *JECR* publications. Positivist, empirical and quantitative approaches were the most widely employed approaches. The conceptual method was the most dominant research approach utilised by *JECR* authors within the eight years studied, followed by the survey and experiment.

Whilst creating and presenting the *JECR* research profile, a number of practical implications were provided to the editor, associate editors, reviewers, and authors. Therefore, we anticipate that this paper will prove to be a useful source of information for *JECR* readers who wish to learn more about the various facets pertaining to the existing body of published EC research in *JECR*.

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