

ELECTRONIC COMMERCE RESEARCH: THE FIRST 15 YEARS IN THE FIELDS OF MARKETING, MANAGEMENT, AND INFORMATION SYSTEMS

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Electronic commerce (EC) research examines the process and consequences of conducting business electronically. By definition and scope, EC research is cross disciplinary in nature, yet past attempts to classify and synthesize EC research have been piecemeal with only a subset of a given field's journals being considered. This article presents the results of a business-oriented cross disciplinary review and classification of the first fifteen years of electronic commerce research from twenty-five leading journals in the traditional college of business fields of marketing, management and information systems. The purpose of this analysis is to answer three fundamental questions: 1) What are the overarching categories of EC research? 2) What are the dominant themes within those broad categories? 3) What are the seminal articles within each discipline? The answers to these questions provide researchers with a basis for understanding how EC research has evolved and identify research opportunities.

INTRODUCTION

How people shop and search for information has dramatically changed over the past fifteen years. With the advent of widespread commercial Internet technologies, the changes in business operations and consumer behavior have been unprecedented. In the United States alone, purchasing has grown from nothing in 1993 to more than \$1 trillion in 2007, accounting for more than three percent of all retail transactions. Globally, the adoption of the Internet has allowed over 500 million Asians and 300 million Europeans instant access to news, information and online events through mobile and PC-based connections. The myriad of uses of the Internet has evolved such that consumers use it to make purchases, seek health information, and even vote in national elections. Businesses have developed worldwide virtual teams and conduct meetings with clients and employees on a daily basis through webcasting. However, even such positive contributions to society are countered by negative consequences of the Internet such

as reduced barriers to vices including gambling and pornography.

As the use of the Internet has grown, so has academic interest in addressing issues surrounding the implementation, adoption and use of the Internet in society and business. Important questions such as 1) How has the Internet affected consumer behavior? 2) How should firms present information in a secure and positive manner? and 3) How should firms proceed in the development and deployment of Electronic Commerce operations? are often posed by businesses and researched by academics. As academic interest has grown in Electronic Commerce (hereafter EC), so has the number of topics investigated by researchers.

EC, by definition is cross disciplinary in focus and scope. The main business fields that have addressed EC operations have been information systems, management, and marketing. In this paper, the authors' goal is to assess the combined cross disciplinary contributions of these three business disciplines to the study of EC.

Prior Reviews in Electronic Commerce

Previous studies of EC research have followed one of two paths. The first path has been an assessment of EC research topics in a specified subfield of journals (Romano and Fjermestad 2001; Tomasello 2001). For example, in the field of communications research, Tomasello (2001) reviewed five communications journals from 1994 to 1999 with respect to research trends within those journals, classifying the research topic into six predefined categories. Similarly, Kim and Weaver (2002) examined the methodological and theoretical approaches of communication-based research from 1996 to 2000. In the field of management information systems, Romano and Fjermestad (2001) examined selected articles that addressed issues in electronic customer relationships.

The second path represents a more abstract approach and attempted to examine the broader impact of EC on a specific field of study within business (Cho and Kang 2006; Ngai and Wat 2002). For example, Cho and Khang (2006) examined research trends and patterns using a content analysis of fifteen journals in communications, marketing, and advertising. Similarly, Urbaczewski, Jessup, and Wheeler (2002) examined the theoretical perspective within predominantly information systems activities.

Though all these reviews provide value and provide researchers guidance toward understanding EC, each of the reviews have included a mix of what would be considered the research agenda-setting journals and articles which would have a more limited dissemination. Additionally, the extant reviews do not attempt to integrate EC research across disciplines, thus potentially obscuring the overall impact of EC. The present study attempts to address this issue. In short, the authors hope to expand on the knowledge of EC research by providing a comprehensive synthesis of the driving literature of the fields of marketing, management, and information systems. With this goal in mind, the research questions are as follows:

RQ₁: What are the overarching categories of EC research?

RQ₂: What are the dominant themes within those broad categories?

RQ₃: What are the seminal articles within each discipline?

METHOD

Sample

The data considered for this research included full-length published research articles in the fields of marketing, management and information systems. This cross-disciplinary approach was deemed necessary in order to provide a complete picture of the research that would be of interest to business academics and practitioners. Only academic journals were included in the search. These journals represent the highest level of research and can be considered the agenda-setting research journals of the fields. They are the source most used by academics for acquiring and disseminating new and innovative research. The editorial missions of these journals routinely state that they seek articles that contribute significantly to the field.

Twenty-five journals which represent the leading journals of the field of business (Marketing, Management and Information Systems) were selected to be included in the analysis. The leading marketing journals (*Journal of Marketing*, *Journal of the Academy of Marketing Science*, *Journal of Marketing Research*, *Journal of Consumer Research*, *Marketing Science*, *Journal of Retailing*, *Journal of Advertising*, *International Journal of Electronic Commerce*, *Journal of Public Policy and Marketing*, *Journal of Consumer Psychology*, and *Psychology and Marketing*) were included in the analysis. In the field of management, the four leading journals (*Journal of Management*, *Management Science*, and *Organization Science*) were included (*Academy of Management Journal*, a top management journal, was included in the initial search but contained no relevant articles.). From the information systems research, seven dominant journals (*Communications of the ACM*,

Decision Support Systems, Journal of Management Information Systems, Information Systems Research, MIS Quarterly, IEEE Transactions of Engineering Management, and Decision Sciences) were selected. Additionally, the leading general business journals which are cross disciplinary in nature, (*Journal of Business Research, Harvard Business Review, Journal of Business, and Journal of World Business*) were also included. Though argument can be made that journals listed in a specified field can be considered cross disciplinary in nature, the authors utilized available publication lists from several

universities to develop and validate this classification. Table 1 lists the journals where articles were found that were included in the analysis, the number of articles from that journal, and the journals' impact ratings according to the Social Science Citation Index (as of spring 2008).

Article Selection

First the authors established an overarching definition of EC research. This analysis utilizes a modified definition similar to that used by Hayashi (1996) and Urbaczewski, Jessup, and

TABLE 1
Journals Used in Analysis with Impact Rating and Article Count

Journal	Impact Rating	Count
Marketing		
<i>International Journal of Electronic Commerce</i>	1.429	56
<i>Journal of Advertising</i>	0.667	16
<i>Journal of Consumer Psychology</i>	1.763	1
<i>Journal of Consumer Research</i>	2.043	9
<i>Journal of Marketing</i>	4.831	9
<i>Journal of Marketing Research</i>	2.389	10
<i>Journal of Public Policy and Marketing</i>	0.649	16
<i>Journal of Retailing</i>	1.196	17
<i>Journal of the Academy of Marketing Science</i>	1.463	11
<i>Marketing Science</i>	3.977	12
<i>Psychology and Marketing</i>	0.948	7
Management		
<i>Academy of Management Journal</i>	6.079	0
<i>Journal of Management</i>	1.954	1
<i>Management Science</i>	1.687	25
<i>Organization Science</i>	2.815	1
Information Systems		
<i>Communications of the ACM</i>	1.509	118
<i>Decision Sciences</i>	1.620	11
<i>Decision Support Systems</i>	1.160	49
<i>IEEE Transactions on Engineering Management</i>	0.825	2
<i>Information Systems Research</i>	2.537	28
<i>Journal of Management Information Systems</i>	1.818	39
<i>MIS Quarterly</i>	4.731	12
Cross Disciplinary		
<i>Harvard Business Review</i>	1.505	19
<i>Journal of Business</i>	0.882	3
<i>Journal of Business Research</i>	0.815	40
<i>Journal of World Business</i>	0.627	1

Wheeler (2002), defining EC research as any research that examines *the process and consequences* of the use of computer networks to conduct business electronically (the exchange of goods, services, or information) with one’s suppliers, customers, competitors, or consumers (authors’ modification in italics). This definition is intentionally broad in order to encompass the strategic impact of Internet segments such as the World Wide Web, e-mail, online chat, virtual reality, instant messaging, and intranets on business operations (e.g., Cho and Kang 2006). A starting point of 1993 was selected because this was the year that the first user-friendly web browser, NCSA Mosaic, was introduced (Zwass 2003) and the topic of EC was addressed in any of the top-level journals. The endpoint of the research investigated here was articles that were published in March 2007.

To obtain appropriate articles the authors implemented a search strategy which included the use of EBSCO Host. EBSCO Host is a research database which contains full text articles of each of the selected target journals. First, the tables of contents of each issue of each journal were examined to determine which articles were a relevant fit. Next, a list of fifteen keywords and phrases was created based on previous research as well as the subject classification in EBSCO Host for the articles found in the first step. EBSCO Host was then searched for these keywords. Any articles published in peer-reviewed journals that were not found on the initial inspection of the journals were included during this phase. The list of the keywords can be found in Table 2. Next, a backward citation analysis using the Social Science Citation Index (SSCI) print and electronic resources was then conducted on each article. Relevant articles that were cited were found and inspected to determine if the article was: 1) in a leading journal, and 2) focused on EC research. This iterative search process resulted in the initial inclusion of 557 articles. The resultant pool of articles were then examined by each of the authors and reviewed for the purpose of eliminating any articles whose content did not meet the stated definition of e-commerce. We believe that the

resultant set of 513 articles encompassing the years 1993 – 2007 and twenty-five journals, while not exhaustive, does encompass a comprehensive basis for understanding the topic across disciplines. A complete bibliography of the 513 articles which were reviewed is available from the authors.

TABLE 2
Keywords used in Electronic Database Search

Keywords and Phrases Utilized in the Search
e-commerce
electronic marketing
online services
online auctions
Internet strategy
interactive shopping
electronic pricing
online learning
adoption / diffusion of electronic markets
online advertising
electronic market efficiency / effectiveness
electronic agents
online relationship marketing

Measures

During the analysis phase of this study, a bottom-up approach was taken. The articles were coded into sixty-three emerging categories. Articles which were found to address multiple research subjects were included in each relevant category, resulting in more than half of the articles being coded into multiple categories. This method allowed the researchers to evaluate which topics were prevalent. The researchers independently reviewed each of the articles and coded them separately. Any differences in opinion were discussed and resolved (overall agreement rate of ninety-three percent).

Table 3 provides an overview of the number of articles published by each journal and the year each article was published. This illustrates the true cross-disciplinary nature of e-commerce research. Longitudinally, it appears that research has been most concentrated in the *Communications of the ACM* and *Decision Support Systems*. However, recent research

appears to be more concentrated within *Management Science*, *Journal of Business Research*, *International Journal of Electronic Commerce*, and *Communications of the ACM*. Figure 2 suggests an overall increasing number of articles published regarding EC research.

RESULTS

We now present the following findings regarding each of the research questions.

RQ1: What are the overarching categories of EC research?

The classification system employed by Ngai and Watt (2002) informed the system employed by the authors. The classification framework, shown in Figure 1 represents the four broad

topic areas of the published articles– Consumer Behavior, Distribution, Organization, and Conceptual – into which the emergent categories were classified. To determine membership in each category, the authors counted the number of articles appearing in each of the journals. Articles that were classified in more than one subtheme were allowed to be counted in multiple themes.

Consumer behavior issues received the most attention, with thirty-six percent of the articles published across all major journals. All journals had at least one article addressing Consumer Behavior, with the exception of *Journal of World Business* which had none. Consumer behavior is truly an interdisciplinary research area. Marketing (ninety-five articles) and information systems (seventy-nine articles)

FIGURE 1
E-Commerce Research Classification Categories and Themes

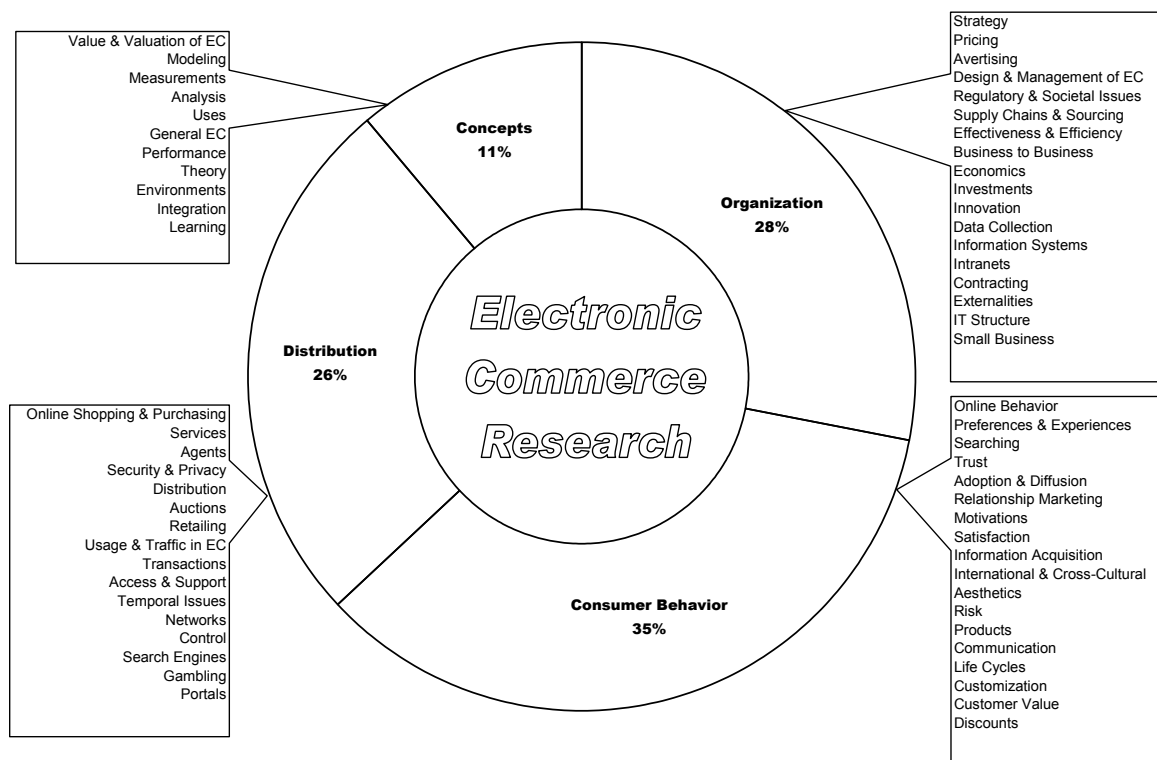
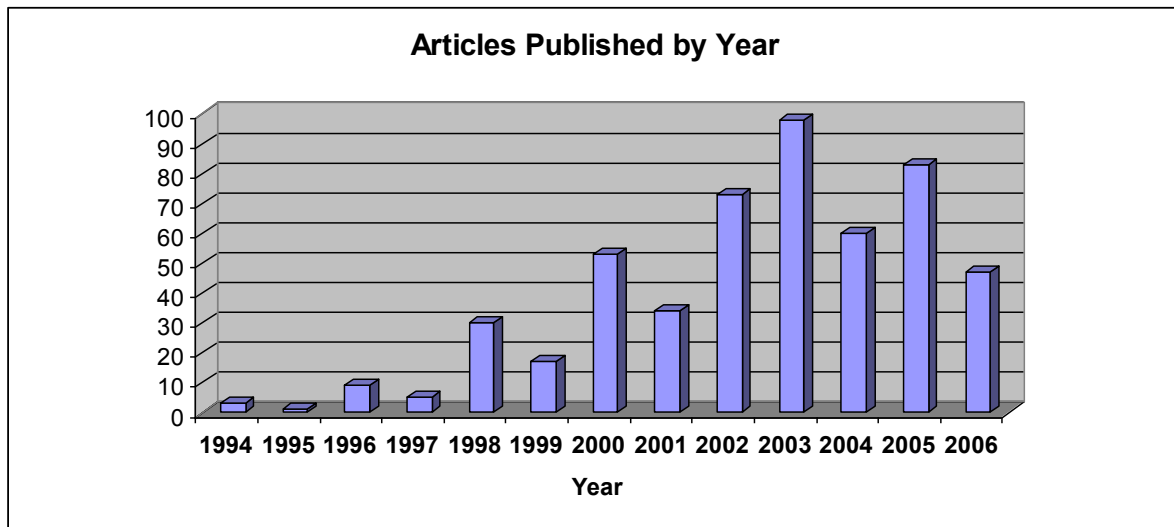


TABLE 3
Breakdown of Number of Articles in Each Journal by Year

Journal	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total	% of Total	
<i>Communications of the ACM</i>	2		5		14	8	11	7	21	32	9	9		118	23.00	
<i>Decision Sciences</i>								1	2	2	1	3	2	11	2.14	
<i>Decision Support Systems</i>					6	2	9	4	9	11	2	6		49	9.55	
<i>Harvard Business Review</i>			3	1	2	2	7	3		1				19	3.70	
<i>IEEE Transactions on Engineering Management</i>										2				2	0.39	
<i>Information Systems Research</i>								1	15	1	7	4		28	5.46	
<i>International Journal of Electronic Commerce</i>											10	10	20	16	56	10.92
<i>Journal of Advertising</i>								2	7			3	3	1	16	3.12
<i>Journal of Business</i>											1	1	1	3	0.58	
<i>Journal of Business Research</i>					7			1	5	8	2	11	6	40	7.80	
<i>Journal of Consumer Psychology</i>										1				1	0.19	
<i>Journal of Consumer Research</i>							3	1	1	2	1	1		9	1.75	
<i>Journal of Management</i>												1		1	0.19	
<i>Journal of Management Information Systems</i>		1		1			7	4	2	6	11	7		39	7.60	
<i>Journal of Marketing</i>	1		1	1				1	1	2		2		9	1.75	
<i>Journal of Marketing Research</i>							1	1	1	2	1	1	3	10	1.95	
<i>Journal of Public Policy and Marketing</i>							7	1		6	2			16	3.12	
<i>Journal of Retailing</i>							1	4	2	2	4	2	2	17	3.31	
<i>Journal of the Academy of Marketing Science</i>				1				1	4	2			3	11	2.14	
<i>Journal of World Business</i>							1							1	0.19	
<i>Management Science</i>						1	2		2		3	10	7	25	4.87	
<i>Marketing Science</i>						1	4			4		1	2	12	2.34	
<i>MIS Quarterly</i>				1	1	2	1	2	1	2	2			12	2.34	
<i>Organization Science</i>										1				1	0.19	
<i>Psychology and Marketing</i>											1	1	4	7	1.36	
Total	3	1	9	5	30	17	53	34	73	98	60	83	47	513	100.00	

FIGURE 2
Sum Count of EC Research by Year



published the most articles about consumer behavior, and the dominant journals are *Communications of the ACM* (thirty-two articles), *International Journal of Electronic Commerce*, and *Journal of Business Research* (each with twenty-six articles).

Next were Organization and Distribution, each with twenty-seven percent of the articles reviewed. The category of Organization was also very cross-disciplinary yet not as much so as Consumer Behavior. Three journals contained no articles addressing organizational concerns – *Journal of Organizational Science*, *IEEE Transactions on Engineering Management*, and *Journal of Consumer Psychology*. Marketing (eighty-three articles) and IS (sixty-four articles) published the most articles relating to organizational concerns. The dominant journals were *International Journal of Electronic Commerce* (thirty-three articles) and *Communications of the ACM* (twenty-six articles).

The category of Distribution was a bit more concentrated with five journals containing no articles in this area – *Journal of Consumer Psychology*, *Journal of Management*, *Organization Science*, *Journal of Organizational Behavior*, and *Journal of World*

Business. The most articles appeared in *Communications of the ACM* (fifty-one articles), *Decision Support Systems*, and *International Journal of Electronic Commerce* (each with twenty-four articles).

The category of Conceptual, or theory-building, research is the least researched with only two journals having more than ten conceptually-oriented articles over the study period (*Journal of Management Information Systems* and *Information Systems Research*). Conceptually-oriented articles are fragmented across disciplines and several journals contain no conceptual articles (*Journal of Consumer Research*, *Journal of Public Policy and Marketing*, *Journal of Consumer Psychology*, *Journal of Management*, *Organization Science*, *Journal of Organizational Behavior*, and *Journal of World Business*).

RQ₂: What are the dominant themes within the broad categories?

The larger subcategories, as shown in Table 4, are listed with some of the more representative articles within that broad category. The classification system employed was similar to that used to address Research Question 1 (Ngai and Wat 2002). In order for an emergent theme

to be considered, the authors set the cutoff at ten articles addressing that theme. The same method has been utilized by others (Urbaczewski et al. 2002). A benefit of this method is that themes that have attracted a large number of researchers serve as a proxy for importance. Conversely, themes that are less important are addressed less frequently. Alternatively, one could argue that those themes that are less-researched provide methodological challenges or lack proper conceptualization that encourages further exploration. This issue is addressed at a later point.

Consumer Behavior

Online Behavior: Articles placed into this category describe the factors that directly influence purchasing decisions as the consumer is surfing the web. Research in this area focuses on how consumers behave in different sets of circumstances online and focuses overall on how information is gathered as well as the ways that eWOM and virtual communities influence decision-making. Some researchers have conducted comparisons of consumer behavior influenced by various media such as the web, television, and print. Also in this category, researchers have examined the characteristics of online consumers. More limited work has considered post-purchase behaviors such as satisfaction and reactions to product delivery. In terms of satisfaction with online retailers, a number of the articles addressed the reasons that consumers switch or stay. Also, descriptions of human-to-computer interaction have included both the consumer's usage of the website as well as the ways in which the characteristics of the website impact the overall online consumer experience.

Preferences and Experiences: Consumer perceptions of the web experience characterized this theme. Researchers have examined both the site characteristics that influence behavior and the consumers' characteristics that impact their online experience. They have also described the impact of site interactivity such as 3-D or rich media on consumers' online

experience. Lastly, researchers have discussed the influence of the amount of site personalization on the consumer's experience.

Searching: The articles in this subcategory included articles that addressed actual consumer search for products in the e-commerce setting. The researchers examined primarily the power of search to influence purchase decisions, the importance of search accuracy, and search dynamics. Authors also discussed the impact of search for various types of goods, both experience and credence. Limited research has been devoted to issues of disability accessibility related to search.

Adoption and Diffusion: Early entries in this stream of literature attempted to predict adoption of the Internet and the eventual diffusion of the technology on a global scale. As the technology and the diffusion literature stream has matured, there has been coverage of when firms' should participate in e-markets as well as investigations of the factors which contribute to consumers' decisions to adopt EC. The most recent article in this category was published in 2005, indicating that it would appear that this stream has reached its peak.

Trust: The importance of consumer and business trust in e-commerce channels was examined in these articles. A great number of these articles examined the role of trust in deciding to engage in EC and its role in the selection of an e-retailer. Articles have looked specifically at trust mechanisms such as e-seals and links. Another topic that has received attention is the measurement of online trust. Most of the articles discussed trust in a B2C context with some attention paid to C2C trust and much less to B2B trust.

Advertising: Advertising as a factor that moves a consumer through the purchase process and as a component of website design was the focus of these articles. Several authors examined the importance of understanding the impact of various components of web advertising such as ad congruity, 3-D effects, animation speed, interactivity, repeated exposures and page

TABLE 4
Emergent Themes within Categories and Article Counts
(Shaded areas represent dominant themes.)

Organization		Consumer Behavior		Distribution		Concepts	
Strategy	110	Online Behavior Preferences, Experiences	82	Online Shopping and Purchasing	55	Value and the Valuation of EC	24
Pricing	26	Trust	45	Services	30	Modeling	16
Advertising	22	Searching	29	Agents	26	Measurements	15
Supply Chains and Sourcing	18	Adoption and Diffusion	28	Security and Privacy	22	Analysis General EC (Not cat. Specific)	9
Design and Mgt of EC	17	Advertising	27	Auctions	19	Performance	9
Regulatory and Societal Issues	15	Satisfaction	22	Retailing	17	Theory	8
Business to Business	13	Relationship Mktg Motivations	16	Distribution Usage and Traffic in EC	14	Uses	7
Efficiency	5	International and Cross-cultural Issues	13	Transactions	11	Environments	4
Investments	5	Information Acquisition	10	Access and Support	9	Integration	4
Economics	4	Aesthetics	9	Temporal Issues	8	Learning	2
Innovation	4	Risk	8	Search Engines	8		
IT Structure	3	Products	5	Networks	6		
Data Collection	2	Communication	4	Control	5		
Information Systems	2	Life Cycles	3	Gambling	4		
Intranets	2	Customization	3	Portals	2		
Contracting	1	Customer Value	2		1		
Externalities	1	Discounts	1				
Small Business	1						
Total Articles	251	Total Articles	317	Total Articles	237	Total Articles	100
Percentage of Total	27.73%	Percentage of Total	35.03%	Percentage of Total	26.19%	Percentage of Total	11.05%

complexity. Consumer characteristics such as curiosity, involvement with the web ad, and online experience were also examined. Less attention has been paid to the integration of web advertising and tools used to measure the effectiveness of web advertising. Some authors also discussed the role of the webpage as an advertisement, and limited research has addressed the legal implications of wireless advertising.

Satisfaction: Articles in this stream were primarily concerned with the factors that contribute to satisfaction with online providers and the online experience. Some also addressed satisfaction with multi-channel distribution. Beginning in 2002, there also

seemed to be a greater interest in measuring overall satisfaction with e-commerce.

Relationship Marketing: The increased emphasis placed on relationship marketing in the literature was reflected in the articles that were grouped in this subcategory. Some articles were prescriptive in nature, describing the antecedents and consequences of online relationship marketing while other articles discussed the optimal ways to maintain customer relationships.

Motivations: These articles addressed consumer and firm motivations in the utilization of electronic channels. Beginning with an overarching model of participant

motivations (Alba, Lynch, Weitz, Janiszewski, Lutz, Sawyer and Wood 1997), most of the articles in this stream examine motivations as predictors of behavior. Some explored hedonic vs. utilitarian motives and others looked at the factors contributing to an individual's intention to search online.

Organization

Strategy: Representing the most researched subtheme of EC, the articles placed into this category describe several strategic perspectives. Approximately thirty percent of the articles in the category discussed strategic decisions by the firm regarding the implementation of an e-channel. About twenty percent of the articles examined industry-specific case studies of firms who are participating in e-commerce. Another twenty percent covered future strategies. Fewer articles assess strategy as it relates specifically to consumer behavior. Other themes that emerged included the ways that firms are integrating the e-channel into their existing channel structure, the success of Internet channels, and descriptions of alliances and reactions to competitor actions.

Pricing: The articles in this literature stream displayed a maturing process regarding Internet pricing. The early literature seemed to focus on whether the Internet would decrease or even completely eliminate price competition, but this stream evolved to describe the medium's impact on price-related search, price dispersion, and pricing strategy.

Design and Management of E-Commerce: More specific than the overall business strategy, these articles discussed the logistics required to design and implement an EC channel. Effective website design from a theoretical perspective is important, as well as the design of m-commerce components, and the design of negotiation systems.

Supply Chains and Sourcing: The articles in this subcategory addressed three primary themes. A popular topic was the selection of strategic channel partners such as the use of

drop shippers vs. full inventory ownership, forward buying, or alliance formation. Other research discussed the design of the e-supply chain specifically. Finally, some authors described the impact of e-replenishment and supply chain structure on costs and efficiency.

Regulatory and Societal Issues: The proliferation of EC has created a fertile environment for information predators. The bulk of the articles in this stream related to issues of consumer privacy. Only a couple dealt with firms' intellectual property rights. Antitrust issues have also been addressed. Another broad stream related to negative behaviors in general such as gambling, spam, failure to design sites that are usable by the disabled, and unsolicited wireless advertising.

Business to Business: Several articles discussed the impact of B2B EC. The majority of them described the design of efficient e-marketplaces, addressing issues such as privacy, agents, overall adoption, and descriptions of participants. Other research examined various components of satisfaction in B2B relationships.

Distribution

Online Shopping and Purchasing: These articles were predominately from a firm perspective and examined various aspects of the online shopping experience. An extensively researched area was site design and the ways in which it impacts perceived quality and satisfaction. Another important stream discussed internal customer characteristics of those who shop online and subsequent consumer decision-making process in the online setting.

Services: The Internet as a channel for service delivery is the theme of these articles. The authors described the evolution of services functions by discussing the ways that the web is shaping not only service industries decision to use web portals but also the manner in which services are delivered. A number of articles also described the role of consumer

characteristics in the decision to use an online service provider as well as in satisfaction with services, loyalty to service providers, and switching.

Security and Privacy: Security and privacy implementation decisions on the firm's side as they impact both firms and consumers were the subjects of this stream. The majority of the authors discussed privacy concerns from the consumer's standpoint. Another stream examined the primary privacy concerns from the standpoint of business. Among these, the primary subjects of concern seemed to be international privacy, methods for data security, and legal and ethical issues.

Agents: These articles addressed online search agents, their design, and impact on the market. The research areas included the role of agents in auctions and their impact as product recommenders. Search strategies were described as well as the design of agents as personable companions. Adaptive agents were also researched as were the potential dangerous effects of agents on price perceptions and the potential profitability generated by agents.

Auctions: Online auctions have had a serious impact on the ways that consumers shop for both goods and services. Several of the articles in this subcategory examined online bidding strategies, while others discussed various auction outcomes such as fraud reduction, mediation, and third-parties. A few also described efficient auction design and implementation.

Distribution: The articles in this category followed two primary streams. The first dealt with the firm's decision whether to utilize multi-channel distribution. The second discussed organizing distribution channels for digital goods.

Retailing: The impact of EC on retailing was examined in these articles. The vast majority of them discussed the development of a theory of e-retailing and its differences from traditional retailing. The remainder dealt with issues

involving decision-making regarding subjects such as inventory policies and channel decisions.

Usage and Traffic: These articles discussed the factors that drive e-commerce traffic and the implications of being able to measure and predict that traffic. Included were descriptions of the ways that e-commerce is utilized, including descriptions of flow and cross-cultural use. Other articles described methods for predicting and tracking EC usage.

Conceptual

Value and Valuation of EC: The articles in this literature stream addressed the impact of adding a net channel to the firm's marketing mix as well as limits to the value provided. Other research addressed the requirements to make an online venture successful. Another theme was the value to consumers of online shopping.

Modeling: The authors of these articles applied modeling techniques to EC policies and procedures to better describe their impact on both firms and consumers. These models were of two types – theoretical and mathematical. Theoretical models have been developed to describe transaction quality, website usage, online communication, privacy concerns, customer experience, and the diffusion of e-business cross-culturally. Mathematical models were used to demonstrate clickstream behavior, brand loyalty, trust, forward bidding in auctions, market entry by firms, and supply chain choices.

Measurements: The articles in this subcategory predominantly represented attempts to develop measures that tap various aspects of the consumer experience. Some are general scales developed to assess the overall experience while others more specifically measure information privacy and trust, interactivity, or consumer knowledge. Instruments have also been developed to measure firm EC performance and value.

RQ₃: What are the seminal articles within each discipline?

The evolving knowledge within each discipline regarding EC is grounded by a core set of researchers. These researchers have provided the theoretical and empirical foundations for their fields. To identify the seminal articles, the authors of this synthesis utilized the web-based Social Science Citation Index. Each article collected was evaluated in terms of number of citations. No distinction was made as to where the article was cited due to the fact that seminal articles by definition will start a research stream at a number of research levels. In order to be considered seminal, the research piece needed to be cited more than thirty times prior to June 2008. Table 5 presents a summary of seminal articles in each discipline. We now briefly discuss these seminal articles.

Seminal Papers in the Field of Marketing

The dominant journals in the marketing discipline were the *International Journal of Electronic Commerce* (fifty-nine articles), *Journal of Retailing* (sixteen articles), *Journal of Public Policy and Marketing* (sixteen articles), *Journal of Advertising* (fifteen articles), *Marketing Science* (thirteen articles), *Journal of the Academy of Marketing Science* (twelve articles), *Journal of Marketing* (nine articles) and *Journal of Marketing Research* (nine articles). Nine articles have formed the base of EC research in marketing. The primary EC research streams in marketing research included modeling the adoption process (394 citations-two articles), the implications of EC (164 citations - two articles), the impact of competition (121 citations-two articles), customer experience online (97 citations - one article), and the use of agents (59 citations - two articles).

Hoffman and Novak's (1996) article on the conceptual foundations of marketing in the EC environment (291 citations) and Alba et al.'s article modeling EC adoption (183 citations) are by far the most heavily cited articles across all disciplines. Also within marketing, the

implications of EC have been examined by Peterson et al. (1997) with 103 citations, Szymanski and Hise (2000) with forty-six citations and Zeithaml, Parasuraman, Malhotra (2002) with fifteen citations. Lynch and Ariely's (2000) research on search costs and their effect on competition (eighty-two citations) as well as Bakos and Brynjolfsson's (2000) research regarding bundling and competition (thirty-nine citations) have been influential as well. Studies of customer experience in marketing have relied heavily on Novak, Hoffman and Yung (2000) modeling efforts (ninety-seven citations) as well as Haubl and Trifts' (2000) research regarding the role of agents in decision making online (fifty-nine citations).

Seminal Papers in the Field of Management

The dominant journals within the field of management that have been outlets for EC research have been in *Management Science* (twenty-four articles). Two articles have formed the basis of management-oriented EC research. Brynjolfsson and Smith's (2000) dominant article with one hundred and thirty five citations reflects the field of management's emphasis on comparing EC to traditional channels. An additional important contribution within the management discipline is Keeney's (1999) description of the value of EC to consumers with forty-five citations.

Seminal Papers in the Field of Information Systems

The dominant journals in the information systems discipline have been *Communications of the ACM* (100 articles), *Decision Support Systems* (forty-eight articles), *Journal of Management Information Systems* (thirty-seven articles), *Information Systems Research* (twenty-one articles), *MIS Quarterly* (eleven articles), and *Decision Sciences* (ten articles). Eighteen articles form the base of EC research in Information Systems. The topics receiving the most attention from information systems researchers include the use of online agents (344 citations - five articles), consumer

TABLE 5
Seminal Articles with Times Cited, Authors, and Journal

Author(s)	Year	Journal	Times Cited
Marketing			
Hoffman and Novak	(1996)	Journal of Marketing	291
Alba et al.	(1997)	Journal of Marketing	183
Peterson, Balasubramanian, and Bronnenberg	(1997)	JAMS	103
Novak, Hoffman, and Yung	(2003)	Marketing Science	97
Lynch and Ariely	(2000)	Marketing Science	82
Haubl and Trifts	(2000)	Marketing Science	59
Szymanski and Hise	(2000)	Journal of Retailing	46
Bakos and Brynjolfsson	(2000)	Marketing Science	39
Zeithaml, Parasuraman, and Malhotra	(2002)	JAMS	35
Management			
Brynjolfsson and Smith	(2000)	Management Science	135
Keeney	(1999)	Management Science	45
Information Systems			
Etzioni and Weld	(1994)	Communications of the ACM	105
Maes, Guttman, and Moukas	(1999)	Communications of the ACM	102
Bettman, Lohse, and Johnson	(1999)	Communications of the ACM	64
Lohse and Spiller	(1998)	Communications of the ACM	61
Agrawal and Karahanna	(2000)	MIS Quarterly	59
Glushko, Tenenbaum, and Meltzer	(1999)	Communications of the ACM	46
Lederer et al.	(2000)	Decision Support Systems	43
Friedman, Kahn, and Howe	(2000)	Communications of the ACM	41
Koufaris	(2002)	Information Systems Research	39
Palmer	(2002)	Information Systems Research	39
Palmer and Griffith	(1998)	Communications of the ACM	36
Norman	(1994)	Communications of the ACM	34
Bhimani	(1996)	Communications of the ACM	34
Wong, Paciorek, and Moore	(1999)	Communications of the ACM	34
Liang and Huang	(1998)	Decision Support Systems	34
McKnight, Choudhury, and Kacmar	(2002)	Information Systems Research	33
Wurman, Walsh, and Wellman	(1998)	Decision Support Systems	33
Gefen, Karahanna, and Straub	(1999)	MIS Quarterly	33
Cross Disciplinary			
Porter	(2001)	Harvard Business Review	101
Rayport and Sviokla	(2000)	Harvard Business Review	88
Chesbrough and Teece	(1996)	Harvard Business Review	74
Reichheld and Schefter	(2000)	Harvard Business Review	50
Kaplan and Sawhney	(2000)	Harvard Business Review	49
Iansiti and MacCormack	(1997)	Harvard Business Review	43
Klein	(1998)	Journal of Business Research	36
Gulati and Garing	(2000)	Harvard Business Review	35
Eighmey and McCord	(1998)	Journal of Business Research	34
Hoffman and Novak	(2000)	Harvard Business Review	33
Ghosh	(1998)	Harvard Business Review	33

behavior online (297 citations – six articles), EC adoption (110 citations – three articles), website design (seventy-five citations – two articles), and online security (thirty-four citations - one article).

Describing the use of agents online, Etzioni and Weld's (1994) article describing softbot-based interface research leads the pack with one hundred and five citations. This is closely followed by Maes, Guttman, and Moukas' (1999) research on agents that buy and sell (102 citations). Other agent research includes Glushko, Tenenbaum, and Meltzer's (1999) agent-based EC research (forty-six citations), Norman's (1994) research on how consumers interact with agents (thirty-four citations), Wong, Paciorek, and Moore (1999) examination of mobile agents (thirty-four citations), and Wurman, Walsh, and Wellman (1998) flexible double auction research (thirty-three citations). Consumer behavior research in information systems journals has focused on such topics as Bettman, Lohse, and Johnson's (1999) predictors of online buying behavior (sixty-four citations); Lohse and Spiller's (1998) article (sixty-one citations); as well as Agrawal and Karahana's (2000) and Koufaris' (2002) descriptions of the ways that consumers experience online activities (fifty-nine and thirty-nine citations respectively); and Friedman, Kahn, and Howe's (2000) and McKnight, Choudhury and Kacmar's (2002) discussion of online trust (forty-one and thirty-three citations respectively). Information systems research has also focused on EC adoption with Lederer, Maupin, and Zhuang's (2000) article on the use of the TAM model (forty-three citations) and Liang and Huang's (1998) transaction cost model approach with thirty-four citations, as well as Gefen, Karahanna, and Straub (2003) integrated trust and TAM approach with thirty-three citations. Site design has also been an important area of research with Palmer's (2002) site performance metrics (thirty-nine citations) and Palmer and Griffith's (1998) model for website design (thirty-six citations). Lastly, the work of Bhimani (1996) provides the foundation for

research into online security (thirty-four citations).

Cross-Disciplinary

The dominant cross-disciplinary business journals which have been outlets for EC research have been *Journal of Business Research* (thirty-nine articles) and *Harvard Business Review* (eighteen articles). In this area of research, there have been three primary research agenda – strategy, consumer behavior online, and customer acquisition. The most heavily-cited area is that of strategy with a combined total of 456 citations across several authors. Seminal streams within strategy include overall business strategy (Ghosh 1998; Porter 2001); virtual channels (Gulati and Garing 2000; Rayport and Sviokla 2000); product innovation (Chesbrough and Teece 1996; Iansiti and MacCormack 1997); and developing B2B marketplaces (Kaplan and Sawhney 2000). The next represented agenda is consumer behavior online with work by Klein (1998) producing thirty-six citations and Eighmey and McCord (1998) producing thirty-four citations with research regarding consumer use of websites. Additionally, customer acquisition work by Hoffman and Novak (2000) produced thirty-three citations, and Reichheld and Scheffer (2000) produced fifty citations with research regarding customer relationship management.

DISCUSSION AND CONCLUSION

In the research presented here the authors embarked on an ambitious task. In short they sought to answer the general question, "In what areas has EC research been investigated across disciplines?" We parsed this question down to three manageable research questions, 1) What are the overarching categories of EC research? 2) What are the dominant themes within those broad categories? and 3) What are the seminal articles within each discipline? Extensive review of over five hundred articles from twenty five journals allowed a presentation of the historical findings on the previous pages. Overall, the growth of interest and scholarly

articles has shown that EC is an extremely important factor in the fields of marketing, management and information systems. Researchers have investigated the impact of the Internet in a broad array of settings and contexts – from the perspective of EC impact on a firm’s ROI (Chircu and Kaufman 2000) to the role of privacy seals on consumer trust (Aiker and Boush 2006).

Additionally, in Table 4 the analysis indicates those areas that have been heavily researched as well as those that are less researched. The body of the paper contained an extensive description of the heavily researched areas. Though these areas are important, the reader should note that focusing on these areas for ideas regarding future research may be more difficult in an attempt to uncover unique contributions. Examination of Table 4 indicates that there are a number of areas that have not received as much attention as others. Probably one of the most important areas is the development of theories in EC. Arguably, theory development is a more difficult task than theory testing. Future researchers should be encouraged to develop theoretical frameworks that focus on the EC environment as opposed to comparisons between environments (i.e., print vs. web). Theory development will allow EC research a solid conceptual foundation instead of relying on the application of theories developed for other settings. Note that the most heavily-cited papers uncovered by RQ 3 are theory-oriented papers.

A second under-researched area appears to be dark side behaviors online. Dark side behaviors such as online gambling and viewing pornography have received some attention but other behaviors such as falling prey to phishing schemes and Internet scams have received much less. From a public policy standpoint, understanding the implications of these issues from both the perpetrators’ and the victims’ standpoints are necessary in order to develop educational campaigns and online filtering. An additional dark side behavior that has its roots in flaming is cyberbullying, especially through social network sites.

Future research could investigate the role of customer co-production. This research could take the form of understanding the technical requirements necessary for a firm to initiate co-production, or the use of customer site actions in the development of new products. Currently, few papers have addressed the issues of how to use customer-generated information that is stored on the company’s servers.

Lastly, much firm-oriented research has been conducted or implemented through large companies. A known advantage of the Internet is the ability of any firm to operate a web site. Future EC research can examine issues that are germane to small businesses given that they face unique resource and personnel constraints.

Regarding this research, several practical implications for managers also exist. Familiarity with the articles that explain the reasoning behind experimental results is something that can benefit managers. Managers have a unique perspective that they derive from day-to-day, hands-on experience with consumers and other practitioners. Through studying what marketing academics have examined, these managers are in an excellent position to leverage research findings to their specific use.

In conclusion, in this paper the authors sought to synthesize EC research across the leading journals in the fields of marketing, management and information systems. The suggested areas of future research based on this classification of past research can serve as a starting point for researchers who desire to move the understanding of EC forward.

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