



Research review

Critical themes in electronic commerce research: a meta-analysis

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Abstract

This paper profiles the eCommerce research of the past 7 years. Drawing on a sample of 582 articles in both academic and professional journals, we highlight the major domains and explore the most salient themes in each area. Our analysis finds that the interdisciplinary nature of eCommerce research has led to great diversity in the topics explored. Moreover, eCommerce researchers have been diverse in their use of both research approaches and methods. Our analysis delineates several areas that remain underserved, highlighting a number of research opportunities for the IS community as eCommerce continues to evolve.

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Introduction

There has been substantial media and trade press attention accorded to electronic commerce in the past 7 years. Concurrent with this interest has been a heavy emphasis on the electronic commerce phenomenon in academic research. Whereas the level of media focus on electronic commerce seems to rise and fall with the dot.com boom and crash around the turn of the millennium, academic research has been less cyclical. Indeed, in our opinion, the steady growth in eCommerce literature more accurately tracks the actual evolution of the eCommerce phenomenon. Estimates from the United States show growing eCommerce revenues from 1999 through 2003 (US Department of Commerce, 2004). Similar figures from the European Union also suggest a constant upward increase in eCommerce activities, despite any tarnishing of the eCommerce image implied by the implosion of the dot.com market bubble (Hobley, 2001; e-Business Watch, 2003, 2004).

Given the sheer volume of eCommerce research publications, it seemed obvious that a surveying of the literature, and an interpretation of this literature à la meta-analysis, was in order. To this aim, we were especially interested in the evolution of the discourse over the last 7 years, that is, the underlying themes, domains, technologies, results and contributions of eCommerce research. Moreover, it is our goal that this kind of survey will enable us to identify

trends, gaps or weaknesses in the research that will guide future investigation into this important phenomenon.

Another major focus of this study is to explore the different foci of the professional journals, such as *CACM*, compared with the traditionally academic journals. While we would naturally expect that the professional journals would show far less of a theoretical emphasis than the academic publications, differences in technology and application domain may also emerge. If we assume that professional journals are closer to the current needs of practitioners, then it may be of interest to track the divergences between these two groups to identify lags and oversights by the academic community.

The eCommerce discourse: applying a meta-analytic perspective

Any analysis of eCommerce research first requires a strict exercise of delineation. Electronic commerce discourse has been vigorous in many managerial disciplines outside of information systems, including marketing, finance, and logistics among the more obvious. Given this tremendous breadth, it has been necessary to limit our analysis to what one would typically call mainstream IS journals. A full list and frequencies of the journals included in the study appear in Table 1.

Table 1 Articles by journal and year of publication

Journal	1997	1998	1999	2000	2001	2002	2003	Total	%
<i>International Journal of Electronic Commerce</i>				6	17	17	15	55	9
<i>Journal of Organizational Computing and Electronic Commerce</i>	1	2	2	11	6	5	9	36	6
<i>Decision Support Systems</i>	4	4		8	9	2	7	34	6
<i>Management Science</i>			2	2		2	16	22	4
<i>Journal of Information Technology</i>		2	9	3	2	1	1	18	3
<i>Information and Management</i>				1	4	6	3	14	2
<i>Information Systems Research</i>					2	10		12	2
<i>e-Service Journal</i>					4		7	11	2
<i>European Journal of Information Systems</i>				2		4	5	11	2
<i>Journal of Management Information Systems</i>	3			2	1	3	1	10	2
<i>The Journal of Strategic Information Systems</i>			2		1	5		8	1
<i>Decision Sciences</i>					1	4	2	7	1
<i>Journal of Information Systems</i>				1		6		7	1
<i>Database for Advances in Information Systems</i>					1	2	3	6	1
<i>Journal of the AIS</i>				3		2	1	6	1
<i>MIS Quarterly</i>			1			2	1	4	1
Academic Journals Total	8	8	16	39	48	71	71	261	45
<i>Electronic Markets</i>			22	23	16	17	11	89	15
<i>Communications of the ACM</i>		8	8	13	8	15	18	70	12
<i>Information Systems Management</i>		1	4	6	9	2	7	29	5
<i>European Management Journal</i>	1	1	3	3	5	5	7	25	4
<i>Communications of the AIS</i>			3	4	4	1	11	23	4
<i>MIT Sloan Management Review</i>				2	11	6	3	22	4
<i>Harvard Business Review</i>	2	2	3	8	4			19	3
<i>Information Society</i>	8		2		1		8	19	3
<i>California Management Review</i>		1		2	3	1	3	10	2
<i>IEEE Internet Computing</i>	5			1		1		7	1
<i>IEEE Computer</i>			2	4				6	1
<i>Academy of Management Executive</i>		1					1	2	0
Practitioner Journal Total	16	14	47	66	61	48	69	321	55
Grand Total	24	22	63	105	109	119	140	582	100

The starting date of the literature search was 1997, as we felt that this was the first year in which electronic commerce research began to achieve any substantial publication volume. In addition, we wanted a sample that represented the published work both prior to, and after, the dot.com market crash of 2000. It is noteworthy that 65% of our sample was published during 2001–2003, that is, in the years after the dot.com market collapse. This may be a result of the normal delay inherent in the review/publication cycle. Alternatively, it may actually be that the journal editors perceive readership interest in electronic commerce topics to be increasing through time, a proposition worthy of further exploration.

Our sample for meta-analysis is thus composed of 582 articles with a fairly even distribution between academic and professional journals. The literature search was based upon a key word search of electronic databases as well as supplements from the physical archives in the event that the journal was not published on-line. The descriptors used in the search included ‘eCommerce’, ‘electronic commerce’, ‘electronic business’, and ‘e-Business.’ We make no general differentiation between the terms eCommerce and

e-Business, although it is clear that the media has altered its emphasis on the terminology through time. Initially, abstracts of the papers were reviewed. In the instance that a review of the abstract was insufficient to ascertain the content of the paper, the full article was read. Initial coding and classification of the articles was completed by two of the authors. In addition, we conducted a test of inter-rater reliabilities. Cohens’ (1960) Kappa, the statistic that adjusts raw agreement figures to account for the possibility of the agreement occurring by chance, is shown in Table 2. This Kappa value of 0.768 is quite high. Kappa values above 0.6 are considered substantial, where Kappa values above 0.8 are considered almost perfect (Landis and Koch, 1977).

Analysis and coding

Coding: Domain

Given the size and the breadth of our sample, the classification of the article domain was by far the most diverse category encountered. There are several topics that are clearly dominant in our sample such as B2C and B2B

Table 2 Measurement of inter-rater reliability with Kappa statistic

		<i>Value</i>	<i>Asymp. Std. Error</i>	<i>Approx. T</i>	<i>Approx. Sig.</i>
Measure of agreement	Kappa	0.768	0.065	13.990	0.000
No. of valid cases		50			

Table 3 Description of major domains

Agents	Electronic agents that search, transact, or perform some other remote function on behalf of the user
Architecture	Research concerning the development or application of a specific technical infrastructure or application. Includes literature on technical standards, integration and middleware
Auctions	Electronic markets where auction based mechanisms are designed or employed
B2B	Electronic markets where the transacting parties are businesses. Includes business intermediaries, hubs and interorganizational systems
B2C	Electronic commerce where transacting parties include the businesses and consumers. Includes research on pricing strategies, retailing, purchasing behavior and industry specific markets such as financial services
CRM	The use of Customer Relationship Management applications that complement electronic commerce. Not CRM systems exclusively
e-Services	The provision of some kind of services that are substantially differentiated from traditional retailing, such as professional services, entertainment or education
Mobile commerce	Electronic commerce where some kind of mobile or handheld computing device is employed
P2P	Peer to Peer electronic transactions including MP3 file sharing
Regulation	Literature discussing the role of government, policy formulation and taxation in electronic commerce
Research	Articles that provided some kind of summary of other research findings
Security	The analysis of security threats or applications and practices that can increase resistance to such threats
Strategy	Literature concerning basic business models, rent generation and competitive positioning of electronic commerce initiatives
Supply chain	The use of electronic commerce to facilitate procurement, delivery and fulfillment of goods and services in manufacturing, logistics and service industries
Technology adoption	The adoption, implementation and use of specific eCommerce technologies and applications. Includes literature pertaining to the diffusion of eCommerce in specific industries, geographic regions as well as experimental tests of TAM or other adoption models
Trust	Literature concerned with the role of trust and loyalty in the formation of long-term, profitable relationships in electronic channels
Value of IS	Analytical exercises that attempt to determine the economic value realized in electronic commerce applications

eCommerce, as well as auctions. However, these categories are so broad that such categorization conveys limited information. As a consequence, we added additional codes to further qualify these high level categories, which are presented in Table 3.

For each of these high level codes, a variety of sub-level codes was also, but not always noted. These included codes such as geographic region or industry type, which was often the case within the technology adoption category. Broad codes such as B2C were qualified with sub-codes such as pricing, purchasing behavior, grocery, or financial markets. The use of sub-codes was not exclusive to any higher level category. For example, it is possible that electronic commerce in the United Kingdom (sub-coded UK) was addressed in both 'technology adoption' as well as 'strategy' specific articles.

Our first major grouping of sub-codes included topics that were related to a specific product or industry. These included: advertising, agriculture, airlines, insurance, financial markets, grocery, health care, media, music,

pornography, publishing, real estate, retail, travel and wine. These topics could either be a specific vertical industry or product group, as well as a service that may span multiple sectors, such as accounting or legal services.

Our next major grouping of sub-codes included geographical regions. It is not surprising that eCommerce research maintains a strong North American bias. However, there were a number of articles that explicitly focused on socio-political regions outside of North America. In the instance that a specific region was a central theme in the article, it was registered. These regions include: Argentina, Australia, Brazil, China, Denmark, Dubai, East Europe, Egypt, Ethiopia, Europe, France, Germany, Greece, Hong Kong, internationalization, Mexico, New Zealand, Singapore, South Korea, Sweden, and the United Kingdom.

Our final group of sub-codes encompasses topics and phenomena that are manifested within eCommerce or are required to facilitate the function of eCommerce markets. These included: *branding, catalogues, commodities, customization, data mining, EDI, enhanced TV, fraud, human*

resource management, interorganizational systems, knowledge management, marketing, measurement, payments, pricing, privacy, purchasing behavior, reputation, search costs/behavior, security, small and medium enterprises, taxation.

Coding of research approach

Research approaches are the underlying epistemologies guiding research. Following Orlikowski and Baroudi's (1991) categorization of descriptive, positivist and interpretive epistemologies, we added a fourth one, design science, to represent the refinement of recent research ontologies in this area (Purao *et al.*, 2003). Descriptive articles were primarily treatises that described current practices within electronic commerce. These articles attempted no theoretical grounding or rigorous data collection and analysis. Neither did they attempt to attain testable results; rather, they presented issues that they believed should to be shared with the community (Orlikowski and Baroudi, 1991). Positivist articles followed the standard premise of positive research, where propositions or hypotheses are formulated and tested, or analytical propositions are derived. Interpretive research included articles where the basic premise of the researcher is that the research perspective is fundamentally subjective, and thus, attempt to understand phenomena through the meaning that participants assign to them (Orlikowski and Baroudi, 1991). The purpose of such studies is to increase understanding rather than generalize results. Finally, design science research takes the perspective that understanding is obtained through the process of construction and improvement of an IS artifact, such as constructs, models, methods, systems and their instantiations (ISWorld, 2004).

Coding of method

Whereas the approach taken by the researcher describes the implicit philosophical or epistemological position of the authors, the methods category explicitly describes the research procedures employed. The categories are described in Table 4, and include both empirical and developmental models.

Coding: readership

As part of our analysis, we categorized the pool of articles according to intended major audience; professional or

academic. Such delineation will undoubtedly be controversial. However, we felt that the differences between literatures focused on academic versus professional audiences were of interest. The basis for the delineation was the general presentation of the articles. If the overall tone of the journal spoke to a broader, professional audience, then we coded the journal as professional. If the articles maintained a high concentration of specialized, theoretical language, combined with research or analytical techniques that are only accessible to a predominantly academic audience, then we classified the journal as such. This is not to say that a professional journal presented work with a reduced academic value or less rigor. Rather, it is a statement of our estimation of the target readership of the journal. In addition, the articles were not coded individually in this instance, but rather grouped according to the journal in which they were published.

Findings

Domain

A broad look at the top level codes indicates a concentration of research in four main areas; B2B, B2C, strategy, and technology adoption. Given the rather broad definition of these codes, some further qualification is beneficial (see Table 5).

B2B

Within the B2B articles, we find a high concentration of articles focused on either EDI or interorganizational systems. It is noteworthy that all the articles on EDI appear before the year 2000. This is likely the result of the perception that the use of XML over open HTTP on the Internet has replaced EDI as the predominate standard for business to business communication. Ironically, however, data from the US indicate that this is not the case (US Department of Commerce, 2004), suggesting that well over 90% of all B2B transactions still occur through traditional, proprietary EDI.

There is a steady stream of research on interorganizational systems emerging in recent years. This body of literature has articulated the ways that interorganizational systems permit the integration of processes in a manner that render traditional firm boundaries less definitive or

Table 4 Description of Methods

Conceptual	Conceptual analysis, theoretical analysis, mathematical models, analysis or narration based upon author's experience, observation or thoughts. No strong empirical evidence to support author's conclusion. Descriptions of current practices, situations and imagined scenarios
Review	Literature review, historical rendition, commentaries, current status review, practice review
Data analysis	Document analysis, content analysis, secondary data analysis, field data analysis, and other analysis based on data not from questionnaire instruments and/or experimentation
Survey	Mail survey, online survey, use of questionnaires to obtain quantitative or qualitative data
Experiment	Lab experiment, field experiment, free simulation
Case study	Intensive analysis of cases based upon interviews, observations and analysis in some specific context
Developmental	Techniques, methods, frameworks, instruments to develop some technical application, system, protocol, etc.
Other	Ethnography, action research, other

Table 5 Frequencies of major domains

Domain		
Agent	16	3%
Architecture	42	7%
Auction	17	3%
B2B	70	12%
B2C	109	19%
CRM	7	1%
e-Service	12	2%
Mobile commerce	19	3%
P2P	6	1%
Regulation	16	3%
Research	16	3%
Security	15	3%
Strategy	82	14%
Supply chain	19	3%
Technology adoption	58	10%
Trust	47	8%
Value of IS	31	5%
Total	582	100%

permeable. The challenges in managing interorganizational processes remain of great interest to IS scholars, including the problems of agency conflicts, information sharing and its competitive consequences and managerial challenges (Christiaanse, 2002).

The focus of the B2B literature changed in tone after the dot.com crash. Earlier work introduced classification schemes that explain how the different types of B2B marketplaces, or e-hubs, work (Kaplan and Sawhney, 2000). However, later research acknowledged the shakeout in the B2B market seeking to identify factors that determine the survival and profitability of these markets (Day *et al.*, 2003). This has led to more focused analyses of the value-added functions that intermediaries provide (Senn, 2000), the role of dis-intermediation as well as re-intermediation (Chircu and Kauffman, 1999; Carr, 2000), and how intermediary roles must evolve in order to sustain profitability (Anderson and Anderson, 2002; Yoo *et al.*, 2002). This research is augmented by an analysis of information disclosure principles in interorganizational systems and their effects on firm incentives and decision behavior (Zhu, 2002).

B2C

B2C research demonstrates the highest frequency of research articles. As an initial observation, it must be noted that B2C electronic commerce remains a small proportion of the total transaction volume of business exchanges (US Department of Commerce, 2004). Estimates for the fourth quarter of 2003 indicate that eCommerce constitutes less than 2% of all retail transactions. Figures from Europe are similar (e-Business Watch 2004). The fact that B2B transaction volume significantly outweighs B2C is not counterintuitive. Industrial enterprises have employed EDI for decades with industries such as transportation equipment, beverage and tobacco, electrical equipment,

pharmaceuticals, and wholesale/distributors. Nonetheless, research in B2C has been explosive, commensurate with the enthusiasm that characterized the dot.com boom up through 2000.

The major topics of B2C electronic commerce identified in our sample include purchasing behavior and pricing strategies. Unsurprisingly, research on purchasing behavior relies heavily upon experimentation, measurement and instrumentation. The first is concerned with user acceptance of on-line sites and their corresponding purchasing behavior (Chen *et al.*, 2002; Torkzadeh and Dhillon, 2002). For example, Koufaris (2002) employed the Technology Acceptance Model to show how emotional and cognitive responses to visiting a web-based store for the first time can influence online consumers' intention to return and their likelihood to make unplanned purchases. Unsurprisingly, user acceptance is also related to trust, as shown in Gefen and Straub (2003).

An e-vendor's website inseparably embodies an interaction with the vendor and an interaction with the IT website interface. Accordingly, research (Gefen *et al.*, 2003a, b) has shown two sets of unrelated usage antecedents by customers: (1) customer trust in the e-vendor and (2) customer assessments of the IT itself, specifically the perceived usefulness and perceived ease-of-use of the website as depicted in the Technology Acceptance Model (TAM). This work goes on to observe, however, that the degree and impact of trust, perceived usefulness, and perceived ease of use change with experience.

Using existing, validated scales, these studies describe a free-simulation experiment that compares the degree and relative importance of customer trust in an e-vendor *vis-à-vis* TAM constructs of the website, between potential (i.e., new) customers and repeat (i.e., experienced) ones. The study found that repeat customers trusted the e-vendor more, perceived the website to be more useful and easier to use, and were more inclined to purchase from it. The data also show that while repeat customers' purchase intentions were influenced by both their trust in the e-vendor and their perception that the website was useful, potential customers were not influenced by perceived usefulness, but only by their trust in the e-vendor. Implications of this apparent trust-barrier and guidelines for practice are discussed.

Another very prolific grain of research has been the issue of on-line pricing. The pricing literature is predominantly based upon mathematical models to inform pricing strategies on the Internet, although empirical work appears in this stream as well. Initial intuition about the Internet is that the reduced search costs would lead to vastly increased competition among firms. This would lead to lower overall prices with a very tight dispersion around the market price for any given product. However, many studies have indicated that Internet prices can be both higher, but also have a wider dispersion, thereby contradicting intuition (Brynjolfsson and Smith, 2000; Clemons *et al.*, 2002; Latzer, 2002). The most commonly accepted explanation is that the Internet, through a variety of signaling mechanisms, allows retailers to register consumers' price sensitivity and practice a more sophisticated form of price discrimination. This is also a result of the lower menu cost of changing prices on the Internet (Kannan and Kopalle, 2001), as well

as the ability of flexible manufacturing technologies to reduce the costs of designing and producing tailored consumer goods and vertically differentiate (Dewan *et al.*, 2000, 2003). Finally, Bakos and Brynjolfsson (1999) explored the use of bundling as a subtle form of price discrimination that is often employed with information-based products.

Strategy

Another major theme of electronic commerce research is strategy. The literature in this stream tends to be either conceptual or empirical in nature, often with illustrative case studies. This stream, more than any other, tends to focus on specific companies or industries to explicate the successful strategic use of electronic commerce. The strategy literature has explored many of the typical strategy issues as related to eCommerce (Grover, 1999; Erasala and Benamati, 2003). Strategy formulation in eCommerce success has been addressed by Saban (2001). In a similar grain, Pinker *et al.* (2002) discussed guidelines of managerial responsibility and leadership in the electronic-business development. Sauer and Willcocks (2002) examined the importance of strong communication between strategists and technologists if eCommerce endeavors are to be successful.

The strategy literature easily blends into other common managerial themes, given its central position in the discourse. For example, Gallagher (2002) examined the role of electronic-commerce in restructuring distribution channels, where Shi and Wright (2003) discussed the effects of electronic commerce on the characteristics and rules of business competition.

A unique perspective is taken by Thurow (2001), who argues that many companies fail to formulate an appropriate exit strategy. But given the high rate of failure in the industry, this could be prudent and responsible for stakeholders in the venture. Drew (2003) looked at the adoption of eCommerce by SMEs.

Given the rhetoric surrounding the 'new economy' (or perhaps better positioned as the 'networked economy' (Straub, 2004)), scholarly efforts to design or test business models that can leverage the potential of electronic commerce have been plentiful. It will, however, be of great interest to assess the long-term viability and impact of this research stream with large, longitudinal data sets in the future.

Technology adoption

Technology adoption has been another prolific literature stream of electronic commerce researchers. These studies tend to focus on the diffusion and adoption practices of enterprises in specific regions of the world, as well as experimental evaluation of technology adoption models. These studies often employ comparative cases studies to determine the adoption patterns of companies in a given country, region or industrial sector. We discuss industrial and geographic focus in greater detail in a following section.

Technology architecture

While IS journals are not as technology focused as engineering-oriented journals such as *ACM Transactions* or *IEEE Transactions*, purely technology-based topics do appear on occasion at the intersection of eCommerce and technology. There is an active stream of literature concerned with site design, including tools for developing and measuring the ease and usefulness of transactional web sites (Krishnan 2001; Aladwani 2002). However, much of this literature blends into the marketing-oriented research and has a stronger interest in user acceptance than purely technical design matters. Technology design challenges are of interest, but tend to be addressed at a fairly high level. For example, Kim *et al.* (2002) offers metrics for the architectural readiness of businesses to deploy Internet business infrastructures, based on the current status of their architectures.

The boom of ERP sales in the late 1990s has also left its mark on eCommerce research. However, this research stream seems to have subsided as vendors of packaged systems have incorporated this ability into the standard product installations. Datta *et al.* (2003) identified the main causes of delay on the Web, and provide a review of the various caching strategies employed to mitigate these delays. As such, while technology architecture issues are of interest to IS researchers within eCommerce, the focus is at a fairly high level, intersecting with managerial, strategic or marketing-based concerns.

Agents

The design and application of electronic agents to search and negotiate electronic transactions has also commanded attention from IS scholars. Some research is positioned at a strategic level, discussing the effects of agents on the changing nature of business models (Wagner and Turban, 2002). But the majority of the articles in our sample are focused on the theoretical design of specific search and negotiation protocols (Lee *et al.*, 2000). For example, Karageorgos *et al.* (2002) propose design heuristics for agent-based B2B electronic commerce transactions, where Vulkan and Preist (2003) outline a specific structure for automated trading agents in markets for communication bandwidth. Other researchers have been concerned with the security of agent-based transactions. Validation of agent authenticity is of concern, as the reliability and honesty cannot be guaranteed by technical security mechanisms, such as encryption of messages and digital signing of documents (Padovan *et al.*, 2002). In a similar vein, Mandry *et al.* (2000) argue that market servers have to be protected against malicious agents, and mobile agents have to be protected against malicious hosts.

It is curious that most research in agents is predominantly design oriented. It is feasible that there would be a great interest in empirical or experimental research, leaving many opportunities for researchers interested in the actual application of electronic agents in specific contexts.

Auctions

Research on eCommerce auctions spans three broad themes: the optimal design of online auctions, the behavior



of on-line auction participants (Pinker *et al.*, 2003), and the role of reputation and feedback mechanisms in the successful operations of auctions.

The analytical design of auction mechanisms has a long tradition in economics, and this tendency is also reflected in the IS discipline. For example, authors have developed analytical models that characterize the revenue generation processes (Bapna *et al.*, 2002), as well as the relationship between Internet auctions and real auctions (Hakamies *et al.*, 2003). In the realm of design science, Griggs and Wild (2003) researched the middleware and infrastructure needed to support auctions.

There is also a strong stream of empirical work in the field, predominantly concerned with consumer bidding behavior on Internet auction sites (Rafaeli and Noy, 2002; Stafford and Stern, 2002; Tulder and Mol, 2002). Bapna *et al.* (2003) demonstrated that bid increment is an important factor that on-line auctioneers can manipulate and control. In a similar fashion, Hann and Terwiesch (2003) showed that consumers trade off a direct financial value (lower price) for frictional cost in the form of higher bid increments.

Finally, there is a stream of literature that explores the role of reputation and feedback mechanisms in on-line auctions, where the potential counterpart's reputation can be a significant factor in the negotiation strategy and final price (Zacharia *et al.*, 2000; Standifird, 2002). This research stream also explores important dimensions in which Internet-based feedback mechanisms differ from traditional word-of-mouth networks and is concerned with their design, evaluation, and use (Dellarocas, 2003).

CRM

Whereas the use of CRM Systems has spawned a large body of literature on its own, several articles solely concerned with the role of CRM in eCommerce are present in our sample. This literature generally confirms the idea that eCommerce can be improved by giving customers the impression that they have special customer status through CRM systems (Kohli *et al.*, 2001; Jukic *et al.*, 2002; Romano, 2002). Given the limited IS research in this area, opportunities exist for researchers interested in the complementary relationship between eCommerce and ERP systems.

Education

A smaller number of articles profile a variety of eCommerce education initiatives in several regions, including the United States (McCubbrey, 1999; Gant, 2001; Rob, 2003), as well as China (Chau and Zhang, 2002). As distance learning becomes more widespread, research into this sphere is begging to command attention (Lang and Zhao, 2000). In addition to the managerial issues, the pedagogical challenges of on-line educational delivery are also of interest.

e-Services

e-Services are broadly defined as the provision of services that are substantially differentiated from traditional retailing, such as professional services like legal, medical or accounting services, entertainment or education. As a

research domain, e-services is emerging from adolescence, where much interesting research has recently surfaced. On a general level, Rust and Kannan (2003) and Shaw and Craighead (2003) explore concepts on how to use on-line services, build customer relationships, as well as general opportunities for e-services. As a specific case, Stafford (2003) analyses the implementation of on-line tax filing services offered by the US Internal Revenue Service. Hoffman (2003) and Bolton (2003) address the marketing-related problems faced by companies that offer e-services. It should be noted that there is now a journal dedicated to the study of this important area, the *e-Services Journal*.

Government, policy and regulation

Examples of research on government and policy focus on issues of privacy, taxation and the provision of public services through eCommerce channels. The literature on privacy is copious. Zwick and Dholakia (2001) offer a review of the regulatory philosophies underlying the debates on privacy in eCommerce in the European Union and the United States, providing an understanding of the cultural differences that underpin this continually evolving area. Research on taxation has explored the difficulties in enforcing taxation policies across multiple legal jurisdictions (Chou, 1999), as well as possible solutions to this, including the greater integration of taxation compliance into eCommerce applications and operations (Hughes and Glaister, 2001). Taxation promises to be a fertile topic of policy makers and researchers alike, as technology adoption enables greater monitoring and evasion of regional taxation regimes. Finally, e-government is also a growing subject, as local and federal governments increase the provision of public services over Internet channels. As an example, Wilkins *et al.* (2002) suggest that electronic service delivery by governments can include the sponsorship of virtual communities that create value and become places where people come together around a need, enabling government agencies to extend their traditional service-provision role.

Mobile commerce

Mobile commerce has seen a significant expansion in the volume of research in the last 4 years. This stream of literature can be broadly divided into general management and strategy topics, as well as design and user adoption issues. For an early review of applications such as mobile inventory management, product location and search, and proactive service management, see Varshney *et al.* (2000). Nohria and Leestma (2001) discuss how the deployment of m-commerce requires an understanding of the role that mobility plays in people's lives today, their fundamental life intentions, and how companies can assemble the components of a total solution to address these lifestyle decisions. Other researchers have empirically addressed mobile handheld device use and adoption (Kavassalis *et al.*, 2003; Sarker and Wells, 2003), including cross-comparisons of adoption in international regions (Jarvenpaa *et al.*, 2003).

The design literature in mobile commerce has explored general issues of usability in mobile commerce (Lee and Benbasat, 2003; Venkatesh *et al.*, 2003) as well as information searching for mobile users (Sun, 2003).

Ironically, Magura (2003) found that site design is not important from user acceptance. Rather, convenience is a determinative factor for both high- and low-involvement purchases using mobile technology. Other researchers have explored the problems inherent in maintaining mobile identities as users move from device to device (Roussos *et al.*, 2003). Rao and Minakakis (2003) have extended the theme of user location detection, suggesting that it can be employed to optimize information delivery. The topic of mobile payments has also received research attention. Kreyer *et al.* (2003) argue that the acceptance of mobile payment (MP) procedures depends on cost, security, and convenience. In particular, it is important that a procedure can be used over a variety of payment scenarios and technology platforms.

It is clear that mobile commerce will continue to grow as both a social phenomenon and research domain. The managerial and technical challenges of location and device transparency will continue to offer abundant opportunities for researchers in both the social and technical sciences.

P2P

Research in Peer to Peer eCommerce is nascent. For a general discussion of P2P technology, including information on Napster and details on the P2P computing and knowledge management, see Kini (2002). Unsurprisingly, most discourse on P2P computing has focused on the bundling and distribution of digitized music over the Internet (Altinkemer and Bandyopadhyay, 2000). However, recent research has explored the design of incentive mechanisms to mitigate free riding risk and improve the overall economic efficiency of P2P trading services (Tam, 2002), as well as the potential of P2P transactions to undermine the role of 'legitimate' intermediaries. Since the recent efforts of the recording industry to inhibit the activities of Napster and private file sharing, the original fervor generated by P2P networks seems to have subsided. However, as the technology is now widely available in a variety of platforms, P2P transactions will continue to challenge traditional industry practices. The latest turmoil of the recording industry is likely not to be the last of its kind, and the market for research into this phenomenon is likely to be receptive.

Scientometric research

Research papers in the vein of studying the scientific process itself fall into two broad categories: literature surveys and commentaries. Surveys tend to focus on general reviews and classification schemes for electronic commerce research (Ngai and Wat, 2002). In addition, studies also rate researchers' perceptions of journal quality and relative prestige (Bharati and Tarasewich, 2002). Research commentaries discuss the major trends in academic discourse as well as the most significant research questions (Straub and Watson, 2001). Often, such commentaries will argue that the phenomenon of interest is fundamentally unique and requires great holistic or cross-disciplinary focus (Shaw *et al.*, 1997, Geoffrion and Krishnan, 2003).

Security

The security literature can also be classified into two broad streams. The first examines policy measures that can be deployed to improve e-business security (Rees *et al.*, 2003). This is consistent with the overall security literature emphasizing appropriate managerial policy to address security related issues. Wang *et al.* (2001) explored the application of economic mechanisms to design e-processes that discourage the exploitation of security weaknesses such as lack of authentication.

eCommerce security is also addressed on a technical level, although this is clearly not the main thrust of IS scholars. Boncella (2000) provides a tutorial that presents an overview of the major categories of web site attacks, their effects, and possible countermeasures. In a similar fashion, Muralidhar *et al.* (2001) offers an overview of data perturbation methods that offer a easy yet effective solutions to the dilemma of providing access to legitimate users while protecting the data from snoopers.

Supply chain

The supply chain literature with an eCommerce focus replicates the common theme that increased visibility in electronically integrated procurement practices confers operational and strategic benefits (Mukhopadhyay and Kekre, 2002; Vakharia, 2002). There is a general consensus concerning this theme (Frohlich, 2002; Sadeh *et al.*, 2003; Swaminathan and Tayur, 2003). Other literature is more specifically focused. For example, Rabinovich *et al.* (2003) show that Internet-mediated purchases by consumers allow for greater transaction efficiencies when inventory ownership is postponed farther upstream in the supply chain and supply chain echelons are disintermediated. Arcelus *et al.* (2002) present a common modeling structure for the implementation of operational policies by individual purchasing managers of risk-sharing agreements among supply-chain partners. Given that manifestos for greater supply chain integration and visibility inevitably require some kind of eCommerce-enabled infrastructure, it is likely that the supply chain and eCommerce literature streams will converge in the future.

Social issues

There is a varied stream of research that explores the socio-economic consequences of eCommerce. For example, Malone and Laubacher (1998) argue that the rise of outsourcing and telecommuting will lead to a proliferation of freelance and temporary workers. This trend points to the devolution of large, permanent corporations into flexible, temporary networks of individuals. Brynjolfsson *et al.* (2003) suggest that the increased product variety of on-line bookstores has enhanced consumer welfare substantially in the year of their study-2000.

Gender issues are also addressed by eCommerce researchers. For example, van Slyke explores the impact of gender on the perceptions of the characteristics of Web-based shopping. According to Cronin and Davenport (2001), the liberalization of marketing distribution channels via the Internet has also enabled the adult entertainment industry to achieve wider appeal and increased legitimacy.

Trust

The trust literature is broadly concerned with the factors affecting consumer perceptions of the on-line sellers and their willingness to trust them enough to engage in a transaction (Strader and Ramaswami, 2002). Scholars have attempted to break trust into its constituent components (McKnight *et al.*, 2002). For example, Tan and Thoen (2002) suggest that trust in transactions is a combination of an agent's trust in the other party and the trust in the control mechanisms for the successful performance of the transaction. Gefen *et al.* (2003a) further specified on-line trust as (1) a belief that the vendor has nothing to gain by cheating, (2) a belief that there are safety mechanisms built into the web site, (3) by having a typical interface, and (4) one that is, moreover, easy to use. Ba (2001) explored how a certain social structure – a community responsibility system, supported by present technology, can be employed to increase on-line trust.

The assurance literature explores the influence of assurance services on consumers' on-line transaction expectations and intent to purchase online (Kovar *et al.*, 2000; Odom *et al.*, 2002). Studies indicate that third-party-provided electronic commerce assurance programs do increase the likelihood of on-line purchase (Nöteberg *et al.*, 2003). However, results also indicate that higher intent to purchase is associated only with web assurance when consumers did not observe disclosure statements of retailer policies and product familiarity was lower. When consumers did observe retailer disclosures, intent to purchase was not significantly associated with web assurance (Mauldin and Arunachalam, 2002).

Finally, the role of feedback mechanisms has also been explored in this stream. Ba (2001) examined the extent to which trust can be induced by proper feedback mechanisms in electronic markets. Moreover, Klang (2001) describes how reputation is protected as a legal asset and how laws or legal principles support trust relationships in trade.

Value of IT

The value of IT literature is primarily concerned with measurement of the financial return on investments in eCommerce applications and technologies in specific firms or sectors of the economy (Mogollon and Raisinghani, 2003). For example, Zhu and Kraemer (2002) developed a set of constructs to measure eCommerce capability in Internet-enhanced organizations, as well as their relationships to firm performance, with data from 260 manufacturing companies divided into high IT-intensity and low IT-intensity sectors. In a more round-about manner, Subramani and Walden (2001) constructed an event study to assess the impact on the market value of electronic commerce initiatives announced by firms. Chircu and Kauffman (2000) discussed several limits to value in electronic commerce-related IT investments.

Industry focus

Of the industry-specific topics in the literature, by far the greatest concentration was in financial markets (Yap and Lin, 2001; Looney and Chatterjee, 2002; Weber, 2002). This is consistent with the long tradition of electronic infrastructure and processes found within banking and financial

institutions overall. Retail is also predictably well represented in the sample. Surprisingly, accounting services/processes and healthcare services are also the subjects of multiple studies (Payton, 2003). Finally, the grocery trade, publishing and travel industries are consistently represented in electronic commerce studies (Palmer and Lindemann, 2003; Ellis, 2003), as are wine (Gebauer and Ginsburg, 2003), real estate (Crowston and Wigand, 1999), logistics (Brown and Venkatesh, 2003) and automobiles (Iivari and Janson, 2003).

Surprisingly, several sectors of the economy that we know are very active, pornography and peer-to-peer music file sharing (N2H2, 2004), are poorly represented in our sample. Adult entertainment is estimated to be one of the most active, if not most active sectors of the retail Internet economy (National Research Council, 2002). The paucity of research in this area is therefore worthy of consideration. Adult entertainment is legal in the United States, Europe, and in most areas of Asia. Accordingly, the fact that researchers choose not to study this sector suggests that it might be viewed as poor taste, politically incorrect or insensitive, or that journal editors would be unresponsive to it. While data collection from companies may be difficult given the underground nature of the sector, this would not prohibit other forms of external data collection.

The legality of peer-to-peer file sharing of copyrighted material is likewise questionable, so it is not counter-intuitive to suggest that data collection may be difficult here as well. Moreover, there are no central entities that can assist in aggregating such data. Nonetheless, given the media attention, it is somewhat inconsistent that we do not find a greater concentration of research into the phenomena of socially controversial or illegal Internet activities.

Geographic focus

The vast majority of research on electronic commerce is implicitly and explicitly based on North American content. However, eCommerce has been gaining an international and global focus in recent years. A good number of articles in our sample contained research that was explicitly based on regional status and environments outside of North America. Of these regions, Europe was the most highly represented, with the United Kingdom and Scandinavian countries registering most frequently (Andersen *et al.*, 2003; Koenig *et al.*, 2003; Brousseau and Kraemer, 2003; Zhu *et al.*, 2003). Southern and Eastern European countries were poorly represented in our sample, although this is not entirely counterintuitive given the slow economic growth in these regions.

The second most cited region was Asia, with Singapore, Hong Kong (Damsgaard and Farhoomand, 1999), and China (Tan and Ouyang, 2003) commanding the majority of citations. That China is cited frequently in electronic commerce studies is not surprising. It is the world's most populous country and recent economic reforms have prompted significant dynamism in the economy. However, while technologically advanced, Singapore and Hong Kong are relatively small regions. The volume of research emanating from these areas could be attributed to their reputations as technologically innovative regions, as well as

Table 6 Frequencies of geographical regions outside of North America

<i>Region</i>	<i>Count</i>
Asia (East)	11
Europe	9
Comparison of regions	7
Global	6
South America	5
Middle East	2
Central America	2
Pacific	1
Eastern Europe	1
Developing countries	1
Africa	1
Total	46

a large concentration of researchers in the area leveraging research opportunities in their immediate vicinities.

Geographic regions that are blatantly under-represented in electronic commerce research include South America, the Middle East and Africa, as well as the former Soviet Union, East Block and Japan (see Table 6). South America did offer examples of research from Argentina, Brazil and Mexico (Palacios, 2003; Tigre and Dedrick, 2003). However, it must be recognized that substantial opportunities exist to assess the processes and challenges of implementing electronic commerce on the Central and South American continent. Africa, the Middle East, and the former Soviet Union were almost entirely absent in our sample. Note that there may be a great deal of research conducted in these areas that is not surfacing in the Western journals. As such, researchers with access to electronic commerce phenomena in these parts of the world now have abundant opportunities to assess the specific challenges of deploying such applications in these regions.

Research approach

The distribution of research approaches can be found in Table 7.

The majority of research in electronic commerce follows a traditional positivist approach. The relatively high percentage of descriptive articles is due to its predominance in professional journals.

Method

The frequency of methods in our sample indicates that conceptual articles are the most prevalent type of electronic commerce research (see Table 8). Yet this is not to say that this is the dominant style of research. Four of the other major categories (i.e., survey, experiment, data analysis, and case study) are empirical in nature so clearly, empirical research is the dominant research style within electronic commerce. The high concentration of conceptual papers is largely from two sources: mathematical and theoretical treatises in the academic literature, as well as the highly normative, managerial discourse of the professional journals.

Table 7 Research approaches

<i>Approach</i>	<i>%</i>
Positivist	48
Interpretivist	6
Design science	15
Descriptive	32
Total	100

Table 8 Frequencies of methods employed

<i>Method</i>	<i>%</i>
Conceptual	25
Survey	18
Experiment	13
Development	13
Data Analysis	12
Case Study	11
Review	7
Others	2
Total	100

There are several issues worth mentioning. Initially, one can conclude that experimental papers occur with a relatively low frequency in electronic commerce research. However, noting that only academic journals would typically be the exclusive outlets for this type of research, the relative percentage more than doubles. By far the most frequent research method in academic journals was conceptual. Following conceptual articles, experimental, developmental, and case studies appeared in an almost identical frequency. Within professional journals, the most frequent methods included conceptual articles espousing frameworks as well as normative recommendations of best practice. Empirical research in professional journals was largely survey-based research as well as case studies.

One can draw a number of conclusions about the methods employed in electronic commerce research. The tendency of professional journals to publish research that is conceptual, survey or case study based is not surprising. This is consistent with the general style and goal of these journals to provide clear, normative guidelines to their readerships that include many practicing professionals. The surprising result is that the academic research is so evenly distributed across four major method types. At first blush, one might suspect that experimental and developmental research is underrepresented in IS journals. Fortunately, this is not the case. These two research methods were particularly well represented in academic journals. Case studies and surveys are also liberally employed research methods.

Readership

Table 9 presents the distribution of top-level codes across the readership of academic and practitioner journals.

Table 9 Frequencies of major domains

Domain	Professional	%	Academic	%
Agent	6	2	10	4
Architecture	24	7	18	7
Auction	6	2	11	4
B2B	45	14	25	10
B2C	60	19	49	19
CRM	0	0	7	3
e-service	10	3	2	1
Mobile commerce	15	5	4	2
P2P	5	2	1	0
Regulation	11	3	5	2
Research	7	2	9	3
Security	8	2	7	3
Strategy	52	16	30	12
Supply chain	7	2	12	5
Technology adoption	37	11	21	8
Trust	15	5	32	12
Value of IS	14	4	17	7
Total	322	100	260	100

Significant differences can be found between venues on the topics of trust, strategy and B2B.

It is interesting that such a large difference exists between practitioner and academic journals with respect to trust. A tremendous amount of research in organizational theory, marketing, and strategy has focused on trust in the last few decades. It is therefore not surprising that this tendency has seeped into electronic commerce research where on-line anonymity exacerbates the perceived risks of on-line transactions. However, that this issue should command less interest from professional audiences is perplexing. On the surface, it may raise a question about whether academic interest is not motivated by any substantial need from the real economy, but has assumed significant inertia only as a body of academic discourse.

That professional journals show a greater interest in electronic commerce strategy is not counter-intuitive. Professional journals have a clear, normative bias, and this is reflected in the choice of topics published.

The difference in B2B articles is more perplexing. There is little reason to believe *a priori* that academic journals would not have just as strong an interest in B2B electronic commerce as professional journals. However, upon closer examination of the data, it is evident that the single professional journal *Electronic Markets* published the vast majority of articles on B2B. When this fact is accounted for, the distribution is far more equal.

One anomaly present in our sample is the presence of CRM papers in IS academic journals, whereas none is present in professional journals. This result may be distorting, leading to the conclusion that professional journals do not publish papers on CRM. This is not the case. Our sample only selected articles explicitly about electronic commerce. Articles that appear in our sample are concerned with electronic commerce complemented with CRM systems and do not deal exclusively with CRM system use.

A review of the academic journals shows a deficiency in topics that may be viewed as recent or leading domains. These include e-services, mobile commerce and P2P commerce. This absence of these topics in academic journals may have two explanations. Professional journals are more likely to publish articles that are directly related to industry trends and are less concerned with topics of academic interest, such as trust research. Another possible cause is the longer review and publication cycles of academic journals.

It is noteworthy that technology and architecture related topics are equally represented in both professional and academic categories. If anything, the table reveals a close matching of interests between the two communities, which contravenes the usual belief that academic work does not align well with the interests of practitioners.

Discussion

Consistent with Ngai and Wat (2002), we present Figure 1, which shows the distribution of primary topics identified in our sample. We group them into four major domains: information technology and infrastructure, applications and industry themes, business issues, and other social issues. This grouping is based on assigning the single most applicable topic-theme to an article.

It is, of course, natural that any particular article in our sample may subsume several of these topics. However, given the assignment of an article to only one primary theme, the diagram does offer a simplified conceptualization of the major domains within eCommerce research and how they relate to each other. Figure 1 highlights a few areas that seem to be underserved. One might posit that sufficient attention is being devoted to business issues and applications/industry issues, which, after all, lie at the heart of value creation. Since digital payments are so essential to the growth of eCommerce (Straub, 2004), the lack of attention (0.7%) to this theme is disheartening. Otherwise, one can argue that the spread of research effort is not unreasonable.

This point notwithstanding, the relatively low overall percentage in the infrastructure/technology domain (16.6%) is surprising. It would appear to be necessary for IT researchers to understand the technical underpinnings of the central issues before proceeding with enlightened social, business, and application research. Within this technical domain, the small percentage of security topics (2.4%) seems out of keeping with the nearly universal recognition of the critical importance of this area (Rose *et al.*, 1999).

Figure 2 provides a mapping of the eCommerce applications and phenomena discussed in this survey. At the risk of simplification, we have attempted to place each kind of application/phenomenon according to its antecedent value-adding capabilities enabled by eCommerce. This is represented by the vertical axis. In a similar fashion, not all eCommerce is entirely virtual, with much of it still firmly grounded in the physical world. This is represented by the horizontal axis.

Four main quadrants can be characterized in our diagram. The first is in the lower left-hand corner and can be loosely called consumer intimacy. Here we find

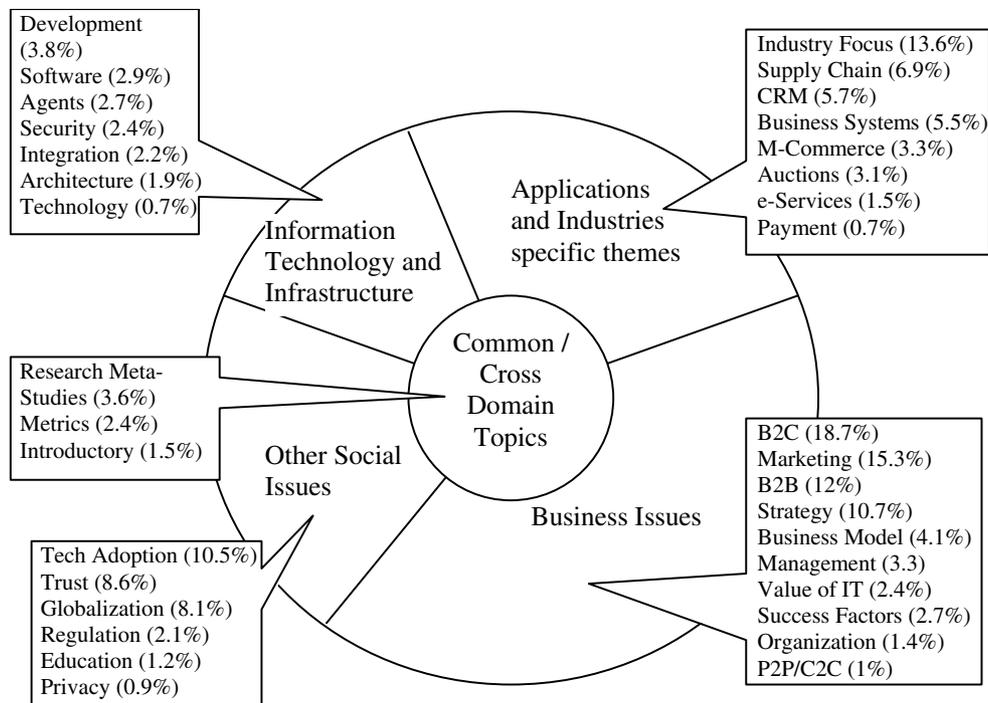


Figure 1 eCommerce research: mapping of domains.

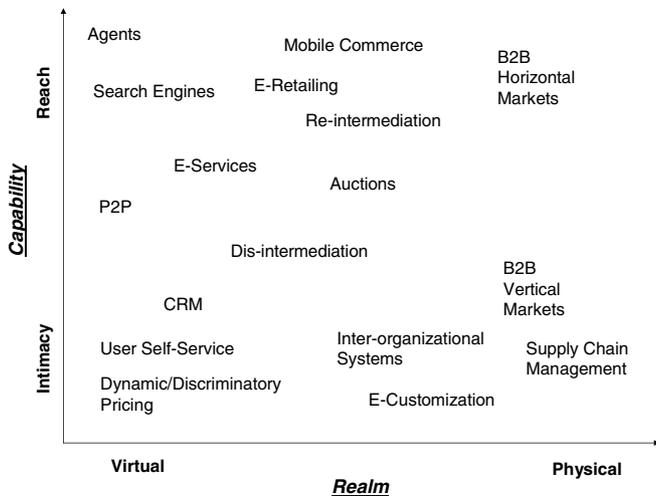


Figure 2 eCommerce applications: capabilities and realms.

applications that specifically leverage the individual relationships enabled by the Internet to cultivate intimate relationships with customers, such as CRM systems, user self-service and discriminatory pricing. In the quadrant immediately above in the upper left-hand corner, we find applications that leverage consumer reach, such as search engines, electronic agents, e-retailing and P2P commerce. Towards the right in the upper right-hand quadrant we find applications that specifically extend the reach of consumers and firms in more physically grounded realms, such as horizontal electronic markets and other intermediary types such as auctions. And in the quadrant below we find applications that are based on intimate interaction in physical logistics and manufacturing processes such as

vertical B2B markets, supply chain management solutions, inter-organizational systems, and mass- or e-customization.

Clearly, Figure 2 is an oversimplification. Intimacy and reach are not always mutually exclusive, and many examples exist that can contradict the specifics of this mapping. However, on a broad scale, the mapping does offer a cohesive overview and insight into antecedent capabilities and realms where specific eCommerce phenomena are likely to emerge and generate value to their owners and customers. We recommend that researchers map the importance of their work into this matrix and argue its pragmatic value accordingly. ‘Capability’ and ‘realm’ dimensions are not judgmental categories; they simply indicate where the business value of a paper or phenomenon lies.

Omissions and future research

As mentioned repeatedly in the text, numerous opportunities exist for eCommerce scholars in various domains. We focus next on areas that we believe deserve to grow in popularity among researchers. In most cases, these themes are nonexistent or lightly represented in the current literature. This represents a real opportunity for researchers to be innovative in their choice of topic.

Flexible manufacturing and mass-customization have been topics of managerial research for some time. Given the extensive ability of eCommerce applications to capture user preferences and behavior, it is odd that researchers have not fully explored the challenges and consequences of integrating these systems with mass-customization design and manufacturing systems. As an example, at Lands-End, a popular on-line clothing retailer, customers can report their body dimensions to obtain tailor made clothes over



the Internet. However, experience shows that many customers are inclined to understate certain measurements in a systematic way. This decision bias is incorporated into the algorithms which adjust for the overly optimistic self-perceptions of the customers (Economist, 2004). There are a number of themes in this space worthy of exploration. And while professional journals have embraced the phenomenon on a normative level, empirical research into the actual outcomes is limited.

The P2P phenomenon is also much under-represented in academic literature (only 1% *in toto* in both literatures). While this may be a consequence of the longer publication cycles of academic journals, tremendous opportunities exist for scholars interested in P2P as both a business and social phenomenon in, and outside of the music industry. In a similar manner, while much research has emerged on the design of electronic agents, far less empirical work is found in this sector.

There are a number of other topics that are under-represented in eCommerce research. For example, while trust has received marked attention, its counterparts, fraud (Chua and Wareham, 2002) and deception (Grazioli and Jarvenpaa, 2003) have commanded far less attention in academic publications. It is also apparent that that the diffusion and implementation of eCommerce in developing regions of the world will command increased attention.

Another interesting topic is the evolving types of use of eCommerce. For example, studies suggest that purchasing decisions on the Internet are no longer either/or (Economist, 2004). Rather, consumers are now using the Internet as a research tool, knowing the most competitive prices and features when they enter the store to actually purchase the item. As such, consumers are using the Internet for shopping decisions, and returning to the stores for final evaluation as well as the spatial immediacy of the product. This avoids the uncertainties involved in on-line ordering and delivery, as well as convenient return in the case of defects. The psychology of on-line consumers has been only superficially investigated to date, we would argue. In depth studies of why people buy under a host of varying conditions is called for. It also suggests that a firm's marketing strategy needs to include online and physical channels for customer interaction and that these two working together create synergies.

Finally, our data indicate that eCommerce has been applied to other online activities outside of pure B2B and B2C transactions, including services, education/training, government and entertainment. There is no consensus that these topics should be given an eCommerce label. Many papers dealing with these issues inconsistently labeled themselves eCommerce, while others do not. We see these topics as a natural evolution of eCommerce and the research in eCommerce should evolve accordingly.

Limitations

While our sampling has been extensive, it is not comprehensive. This occurred for a variety of reasons. First, we included only explicitly IS journals in our sample. As eCommerce is inherently cross-disciplinary in nature, many excellent articles in the marketing, strategy and other managerial publications also embrace this phenomenon.

Secondly, our search criteria may be incomplete, and many good papers that do not have the terms eCommerce explicitly in the title or key words may not have been included. Finally, all abstracts and many full articles were read in the course of this survey. However, we did not always read each article in its entirety, which may result in a source of bias in the evaluation and coding of the articles.

Conclusion

Despite the recent demise of the dot.com boom, eCommerce is thriving. All the recent statistics from North America and Europe indicate that eCommerce is experiencing stable, upward growth, providing numerous benefits for firms, customers and society at large. Our meta-analysis has attempted to draw a profile of the eCommerce research of the last 7 years, drawing on a sample of 582 articles from both academic and professional IS journals. We have highlighted some of the differences between professional and academic journals, and profiled the major themes and issues discussed within each domain. It was heartening to find that eCommerce researchers have been diverse in their use of research approaches and methods. And while the scope of eCommerce research has been broad, the good news is that many research opportunities are emerging in the coming evolution of eCommerce, where firms and consumers continue to innovate and adopt eCommerce in surprisingly novel ways.

Finally, we draw the IS community's attention to a set of underserved areas. Security, technology and technical issues, payment systems, mass customization, controversial areas like pornography, and illicit activities such as fraud are a few of the areas we found to be under-represented. Learning more about the psychology of e-consumers may provide answers for why some websites succeed and others fail. In short, there is a great deal of extremely important work yet to be accomplished in this exponentially expanding realm.

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Appendix A: Suggested Readings for each Major Domain

Agents

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