
ARTICLES

E-commerce in Least Developing Countries: Summary Evidence and Implications

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ABSTRACT. We undertook a review and classification of research on electronic commerce (e-commerce) in developing countries. We analyzed 181 articles published in a broad range of journals covering e-commerce, global information technology, and development issues.

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The analysis provides a roadmap that not only indicates the current state of e-commerce for development research but also identifies gaps and priorities for future research. This will be of significant value to both academics and practitioners who are working on, or plan to work on, e-commerce in developing countries.

KEYWORDS. Developing countries, e-commerce research, electronic commerce, Internet, least developing countries

INTRODUCTION

Electronic commerce (e-commerce) is an important development that has been widely acknowledged as a revolution for the conduct of business globally. It basically entails the usage of the Internet and allied technologies to conduct business transactions and has been adopted in private, public, and not-for-profit sectors in both industrialized and developing country (DC) contexts. The potential value of e-commerce has received extensive coverage in research and trade publications with the reportage of several successful e-commerce stories (Berrill et al., 2004; Grandson and Pearson, 2003, 2004; Mukti, 2000).

It would seem, however, that e-commerce successes occur more in developed than in DCs and several factors could account for this. Some scholars have argued that the challenging environment of DCs tend to affirm the notion that assumptions, approaches and strategies defined for the successful implementation of e-commerce and the realization of its benefits may not be readily applicable or transferable to DC contexts (Chen and Ning, 2002; Okoli and Mbarika, 2003). A situation has thus developed where there tends to be rather parsimonious research focused on seeking solutions or addressing issues of e-commerce adoption and institutionalization in DCs (Bajaj and Leonard, 2004; Pani and Agrahari, 2004). E-commerce research in respect of DCs has been conducted through the theoretical lens of information systems (IS) business management, social science, and other eclectic theoretical mixtures. Conceptual and evaluation frameworks have been formulated and empiricist research carried out to examine the relative potential of e-commerce in DCs and the means of achieving it.

It is worthy of note, though, that in the light of the dynamic nature of information and communication technologies (ICTs) applied in

e-commerce and the volatile context of DCs, there is a need for new research to redefine existing knowledge to offer DCs more practical frameworks to understand e-commerce adoption. In that regard, this study proposes to break new ground. This study takes stock of the current state of e-commerce research with a view to identifying gaps in knowledge yet to be explored and addressed. An earlier study (Ngai and Wat, 2002) akin to this present one reviewed e-commerce research between 1993 and 1999 and was particularly focused on e-commerce technologies, support, and implementation in developed countries. The failure of this study to make any substantial contribution to e-commerce in DC research may have stemmed partly from the fact that, with respect to the integration of Internet, people, and business, e-commerce was in its early development stage in 1993 (Ngai and Wat, 2002) and was yet to become an established phenomenon in developed countries and, even more, diffuse into DCs (Petrazzini and Kibati, 1999; Rudriguez and Wilson, 2000).

However, much has changed since 1999. Evidence exists to show that there has been a substantial increase in the penetration and use of ICTs, including the Internet in DCs, since the 1990s. The International Telecommunication Union (ITU) reports that as of 2004 there were more than 8 times as many Internet users in developed countries than in DCs compared with the more than 73 times as many that existed in 1994 (ITU, 2006). E-commerce is gaining more academic attention with the introduction of a number of new journals particularly focused on e-commerce—*Journal of Electronic Commerce Research* in 2000, *Electronic Commerce Research* in 2001, *Journal of Electronic Commerce in Organizations* in 2003, and other IS journals that give priority to DCs such as *Electronic Journal of Information Systems in Developing Countries* in 2000. These developments necessitate the need to study what has been covered by researchers and practitioners in e-commerce research in DCs in order to synthesize what has been done, what has not been done, and what new research directions DC e-commerce researchers might need to focus on.

In this respect, the objective of this paper is to present a review of electronic commerce in DC context, indicating the current state and direction of research topics for both academics and practitioners. The next section discusses the research methodology used, followed by the synthesis of the DC. The last section presents the conclusion and research implications of results.

METHODOLOGY

In every research or academic study, literature review plays a very critical role. Webster and Waston (2002) emphasize that, in highlighting the discrepancy between what we know and what we need to know, literature review enables a researcher to identify critical knowledge gaps and thus alert and motivate other researchers to opportunities for a key contribution and also making a chart for future research. It also enables the researcher to develop an analytical approach and to relate it to new aspects of knowledge enquiry (Barrientos, 1998). However, undertaking such a study would require the review of literature that entails the gathering, assimilation, and analysis of extant literature from diverse sources largely academically oriented. It should be concept-centric, with these concepts forming the organizing framework for the paper, and cover relevant literature, not confining itself to one set of journals or one geographic region (Webster and Waston, 2002). Adopting a literature survey approach as a methodology tool in DC research has precedence in the work of Hinson (2006).

Consequently, as journals are more often than not used by academics and practitioners alike to acquire and disseminate information, this study was based on a survey of journals from a diversity of disciplines related to IS research and research in DCs (Nord and Nord, 1995). Conference papers, masters and doctoral dissertations, textbooks, unpublished working papers and commentaries, and reviews of books were excluded in the search of journal databases to collect data. The databases used were ABI-Inform (ProQuest), Science Direct, Emerald Insight, EBSCOhost Business Source Premier, and SwetsWise. In addition to searching databases, publications from eight top e-commerce journals and six other IS journals focused on global information technology (IT) issues, development, and DCs were selected and individually searched year by year (Table 1). The rankings were obtained from studies on global perceptions on journals publishing e-commerce research (Bharati and Tarasewich, 2002; Lowry et al., 2004).

The framework for the literature search used was searching abstract/citation with four descriptors [electronic commerce, e-commerce, or ecommerce and Internet commerce], and full text or article text with two descriptors [developing countries or least developing countries] from 1993 to 2005. Full-text articles were also reviewed to eliminate those, which were not related to e-commerce in DCs. From this search, 181 articles on e-commerce in DCs from

TABLE 1. Number of Total Articles by Selected Journals

Top E-commerce Journals	Number of Articles	IS Journals Focused on Global IT Issues, DCs, and Development	Number of Articles
<i>Electronic Markets</i>	21 (11.6%)	<i>Electronic Journal of Information Systems in Developing Countries</i>	12 (6.6%)
<i>Electronic Commerce Research</i>	10 (5.5%)	<i>Journal of Global Information Management</i>	11 (6.1%)
<i>Journal of Electronic Commerce Research</i>	8 (4.4%)	<i>Journal of Global Information Technology Management</i>	11 (6.1%)
<i>International Journal of Electronic Commerce</i>	7 (3.9%)	<i>Information Technology for Development</i>	7 (3.9%)
<i>Communication of AIS</i>	2 (1.1%)	<i>Information Technology & People</i>	3 (1.7%)
<i>Journal of Management Information Systems</i>	1 (0.6%)	<i>Information Technologies & International Development</i>	3 (1.7%)
<i>Information Systems Research</i>	1 (0.6%)		
<i>MIS Quarterly</i>	0 (%)		
Total	50 (27.7%)	Total	47 (26.1%)
Other journals	131 (72.3%)	Other journals	134 (73.9%)
Total of all journals	181 (100%)	Total of all journals	181 (100%)

60 journals were identified and classified. The classification framework for this study is shown in Appendix 1.

PRESENTATION OF FINDINGS

A total of 181 articles from 60 journals were classified according a classification scheme developed from the literature review and akin reviews of e-commerce research (Ngai and Wat, 2002) and frameworks (Wigand, 1997). These articles were subsequently analyzed by the percentage of the total number of articles by journal, year of publication, and classification categories.

Percentage of Total Articles by Journal

Table 1 shows the percentage of total articles by selected journals, which consist of top e-commerce journals and other IS journals focused on global IT issues, DCs, and development. The 14 selected journals contribute to slightly more than 50% of the total number of

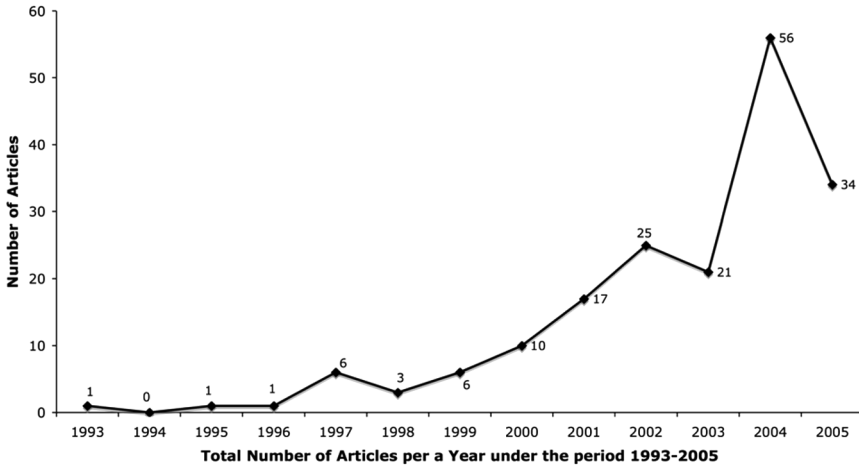
journal articles; 50 articles, 27.7% for top e-commerce journals and 47 articles, 26.1% for IS journals focused on DCs and development. The journal with the highest percentage articles is *Electronic Markets*, which also tends to be one of the top e-commerce journals. It is a quarterly journal, first published in German between 1991 and 1993 and in English since 1993, focusing on issues including the relationship between ICT innovation, the potential value creation, and the effects on organizations and society. The *Electronic Journal of Information Systems in Developing Countries* is the journal with the second largest number of articles—12 articles (6.6%). Its been in publication since 2000, serving as an international forum for academics, practitioners, and policy makers to share knowledge and experience on the development, implementation, and management of IS in DCs.

The *Journal of Global Information Management* and *Journal of Global Information Technology Management* are the journals with the third (tie) largest number of articles, each having 11 articles (6.1%). They are both international journals, with the former publishing original material focused on global information and its implications on IT and the latter addressing international issues of IT management. Other top e-commerce journals that made a substantial contribution of articles are the *Electronic Commerce Research*, 10 articles (5.5%); *Journal of Electronic Commerce Research*, 8 articles (4.4%); and the *International Journal of Electronic Commerce*, 7 articles (3.9%). These quarterly journals stimulate and disseminate research on several issues related to e-commerce including business activities, theories, applications, and technologies. The *Journal of Electronic Commerce Research* and *Electronic Commerce Research* are relatively new journals, which began publishing in 2000 and 2001, respectively. Other IS journals focused on DCs, development, and global issues that made a substantial contribution of articles is the *Information Technology for Development*, with 7 articles (3.9%). Appendix 2 shows the percentage of total articles by journal sorted by percentages in the descending order.

Distribution of Articles by Year of Publication

Figure 1 shows the distribution of articles by year from 1993 to 2005. It demonstrates that scanty e-commerce research was carried

FIGURE 1. Distribution of Articles by Year



out in DCs before 1999 and that there has been an appreciable increase since 2000.

There is a steep increase in number of articles from 21 articles in 2003 to 56 articles in 2004 and a fairly steep decrease to 34 articles in 2005. The steep increase in number of articles is a result of special issues of the *Electronic Markets*, *Electronic Commerce Research*, and *Journal of Global Information Management*; *Journal of Electronic Commerce in Organizations* was published in 2004 (Table 2). These special issues focused on e-commerce issues of relative relevance to DCs. *Electronic Markets*, Volume 14, Issue 1, addressed the globalization effects of e-commerce, which included cross-country

TABLE 2. Journals with Special Issue on E-commerce in DCs in 2004

Journal	2003	2004	2005
<i>Electronic Commerce Research</i>	0	6	0
<i>Journal of Global Information Management</i>	4	6	1
<i>Electronic Markets</i>	0	5	0
<i>Journal of Electronic Commerce in Organizations</i>	0	5	2
<i>Electronic Journal of Information Systems in Developing Countries</i>	1	4	2

studies on e-commerce adoption and other studies on e-commerce diffusion in Brazil and China.

Electronic Commerce Research, Volume 4, Issue 3, assessed the void of knowledge on the state of e-commerce in DCs, considering it to be necessary to assist decision-makers in realizing the benefits of e-commerce and defining strategies to achieve them. Articles from this special issue therefore focused on implications of e-commerce in DCs including cross-country studies and studies from Mexico and China. *Journal of Global Information Management*, Volume 12, Issue 1, is a special issue devoted to papers from the Second International Conference on Electronic Business that was held in Taipei in 2002. Three research papers and two research notes are published from the conference. The research papers focused on the adaptive strategies of firms in high-velocity environments, privacy and trust concerns in e-commerce adoption, and issues concerning the customer relationship management. *Journal of Electronic Commerce in Organizations*, Volume 2, Issue 2, is also devoted to papers from an International Workshop on E-commerce and Education held in Hong Kong in 2003. The papers address issues and “best practices” from the teaching and learning of e-commerce with data from countries including Hong Kong and China. The articles from the special issues of these journals and other articles published by these journals in 2004 contribute to the increase in number of articles in that year. Notably, another journal contributory to the steep increase in number of articles in 2004 is the *Electronic Journal of Information Systems in Developing Countries*. This journal had its largest number of articles relevant to this review in 2004.

Comparing these numbers of articles published by the cited journals in 2003, 2004, and 2005, relatively few articles of relevance to this review were published in 2003 and 2005, as shown in Table 2. It therefore tends to be that issues of journals focused on e-commerce issues of relevance to DCs, development, and perhaps globalization create the opportunity for more e-commerce research in DCs to be published and, moreover, published in top e-commerce journals that reflect the theoretical and practitioner-oriented depth of knowledge contributed. Then, again, we also give heed to Davenport and Markus (1999, p. 21), who caution that, “not only must IS academics focus on publishing readable applied theory research in academic journals, they must also support outlets that practitioners read and that publish the research they value.” Although this has an implication on the theoretical depth, the practical orientation of

knowledge contributed, the approach, and required evaluation criteria, IS researchers researching on e-commerce in DCs must support hybrid business-academic journals including *Journal of Internet Banking and Commerce* (10 articles, 5.5% in this study) and *World Link* (1 article, 0.6%), by submitting research to them to extend the audience of IS research and the impact of new knowledge in practice and to help promote the reputations of more journals as outlets for premier IS research. Considering the rapid developing nature of e-commerce and its continual emphasis within ICT for development circles, a theoretically grounded and practice-oriented understanding of e-commerce is critical to academics, practitioners, and policy makers.

Distributions of Articles by Classification Categories

The numbers of articles by classification categories are shown in Tables 3 to 6.

Business Activities

Business-oriented activities consisting of business activities between businesses and activities between governments or the public sector and business has been researched more (47 articles, 26%) than consumer-oriented business activities (31 articles, 17%). Within business-oriented activities, the focus of the research has been more on business-to-business activities (43 articles, 24%) than on government or public sector-to-business activities (4 articles, 2%). However, the bulk of the research (98 articles, 54%) has focused on general activities and issues that pertain to both consumer-oriented,

TABLE 3. Number of Articles by Business Activities

Business Activities	Number of Articles
<i>Business Oriented</i>	47 (26%)
-Business-to-Business	43 (24%)
-Government-to-Business	4 (2%)
<i>Consumer Oriented</i>	31 (17%)
<i>General Activities & Issues</i>	98 (54%)
<i>Mobile Commerce</i>	5 (3%)
Total	181 (100%)

TABLE 4. Number of Articles by Infrastructure

Infrastructure	Number of Articles
<i>Applications</i>	114 (63%)
-Organizational Systems	29 (16%)
-Financial Services	26 (14%)
-Retailing	17 (9%)
-Electronic Payment Systems	5 (3%)
-Electronic Services	2 (2%)
-Auctions	1 (1%)
-Education and Training	1 (1%)
-General Applications	33 (18%)
<i>Hard Infrastructure</i>	13 (7%)
<i>General</i>	54 (30%)
Total	181 (100%)

TABLE 5. Distributions of Articles by Focus on E-commerce

Research Focus	Number of Articles
<i>Potential & Constraints</i>	41 (23%)
-Opportunities	19 (10%)
-Assessment	17 (9%)
-Development	5 (3%)
<i>Adoption and Diffusion</i>	66 (36%)
-Technology	19 (10%)
-Managerial	6 (3%)
-Organizational	2 (1%)
-Cultural	6 (3%)
-Environmental	9 (5%)
-E-readiness	3 (2%)
-Interaction	21 (12%)
<i>Support and Implementation</i>	69 (38%)
-Consumer Behavior	4 (2%)
-Design and Development	4 (2%)
-Public Policy—Legal	3 (2%)
-Public Policy—Security & Trust	4 (2%)
-Public Policy—Taxation	2 (1%)
-Service Evaluation	6 (3%)
-Organizational and Industrial Strategy	25 (14%)
-National and Regional Strategy	21 (12%)
<i>Education</i>	4 (2%)
<i>Knowledge Management</i>	1 (1%)
Total	181 (100%)

TABLE 6. Distributions of Articles by Theoretical Frameworks

Theoretical Frameworks	Number of Articles
Group 1—Assessment of Opportunities and Evaluation of Benefits	
Transaction Cost Theory (reviewed in Pare, 2003)	4
Economic Theory on Online Shopping (reviewed Mahmood et al., 2004)	1
Group 2—Adoption, Diffusion, Consumer Behavior, and Service Evaluation	
Technology Acceptance Model (TAM) (Davis, 1985)	12
Technology-Organization-Environment (Tornatzky and Fleischer, 1990)	9
Diffusion of Innovation (Rogers, 1983)	7
Hofstede's Cultural Framework (Hofstede, 1980)	7
Theory of Planned Behavior (Ajzen, 1991)	5
Decomposed Version of the Theory of Planned Behavior (Taylor and Todd, 1995); Environmental-Organizational-Managerial Framework (Wang and Cheung, 2004); Institutional Economics (reviewed in Garcia-Murillo, 2004); Majority Confirming Dimension Strategy (Attribute-Based Preference and Attitude-Based Preference) (Bettman et al., 1998); Model of Internet Commerce Adoption (Burgess and Cooper, 2000); Perceived Characteristics of Innovation (PCI) Model (Plouffe et al., 2001); Perceived E-Readiness Model (PERM Model) (Molla and Licker, 2005); Theory of Reasoned Action (Ajzen and Fishbein, 1980)	11
Group 3—Strategy	
Resource-Based Theory (Barney, 1991; Teece et al., 1997)	3
Adaptation-Evolution Strategies of Firms (reviewed in Ganesh et al., 2004); Nolan's Stages Theory (Nolan, 1973); Industry Lifecycle Theory (Abernathy and Utterback, 1978); Network-Based Conceptual Framework of E-business Strategy (Li and Chang, 2004); Porter's National Diamond of Competitive Advantage (Porter, 1998); Porter's Five Competitive Forces Model (Porter and Millar, 1985); DeLone and McLean's IS Success Model (Molla and Licker, 2001)	6
Group 4—Public Policy, Infrastructure, and Others	21
Frameworks Include Three Layers of E-commerce Network (Singh and Gilchrist, 2002); Privacy-Trust-Behavioral Intentions Model (Liu et al., 2004); and Framework for Assessing E-commerce in sub-Saharan Africa (Okoli and Mbarika, 2003)	

business-oriented e-commerce activities and e-commerce in DCs. Although the study did not specifically focus on mobile commerce, the results of 5 articles (3%) from the literature survey relatively indicate a potential adoption and use in DCs exists, and a more focused

study on e-commerce activities enabled by wireless technologies may yield more results and knowledge than expected.

Infrastructure

Table 4 shows that the bulk of the articles are focused on e-commerce applications or soft infrastructure (114 articles, 63%) compared with hard infrastructure (13 articles, 7%). The literature on e-commerce applications is also particularly focused on organizational systems (28 articles, 5%) financial services (26 articles, 14%), and retailing (17 articles, 9%) compared with those on electronic payment systems (5 articles, 3%), auctions (1 article, 1%), and education and training (1 article, 1%). Another application of e-commerce, which is an early adoption stage in DCs, is in electronic services (2 articles, 1%).

The less-researched applications stem from research studies in Asia (China and Hong Kong) (Poon and Chau, 2001; Westland et al., 1997) and Latin America (Joia and Zamot, 2002; Rodriguez, 2005). None of the less-researched applications were represented in other developing regions like Africa. E-commerce research in Africa centered on the use of email and Internet for creating an online presence, searching for suppliers, and providing retail and banking services (Bekele, 2000; Kamel and Hussein, 2004; Molla and Licker, 2005; Sorensen & Buatsi, 2002). In comparing developing regions, sub-Saharan Africa has 2.8 Internet users per 100 inhabitants compared with 11.7 in eastern Asia and 15.2 in Latin America and the Caribbean (ITU, 2007). The regions with higher institutional readiness for e-commerce tend to be more likely to develop and implement e-commerce application with higher service sophistication. For example, basic organizational Web sites and email enable the provision of information-push and download services, while the use of the Internet for retail and electronic banking enables the provision of transactional services.

Quite a considerable amount of research has indicated predominant e-commerce applications in DCs are email, for maintaining contacts with buyers and to accept product orders, and the Web, for obtaining general information about inputs and product markets (McCormick and Kinyanjui, 2002; Moodley, 2002; Wresch, 2003). The dominance of literature on organizational systems, financial service applications, and retailing applications, compared with electronic payment systems, Internet-based auctions, and electronic delivery of education and training programs, tends to reflect the relative ease of

adoption of the more researched e-commerce applications. This relative ease of adoption relates directly and indirectly to the readiness of supporting institutional foundations in DCs, the organizational readiness of the firms, and their perceived usefulness, ease of use, and strategic relevance of the more-researched e-commerce applications. Moodley (2002) argues that it would entail a *leap of faith* for garment exporting firms to adopt e-commerce for fully integrated transactions: "The market was not demanding it, and the payoffs of transaction-oriented e-commerce and e-marketplaces were regarded as being uncertain" (p. 21).

However, other researchers (Bekele, 2000; Wresch, 2003) have presented case studies of firms that have navigated around their institutional constraints and developed relatively unique business models that are centered on transaction-oriented e-commerce. Bekele (2000) presents a case of an Ethiopian firm, EthioGift, that offers an online retail service for the purchase and delivery of sheep, cakes, flowers, and liquor within Ethiopia, through credit card payments handled by a secure socket layer server in Canada. In research on initial efforts made by nine least developing countries (Nicaragua, Pakistan, Senegal, Ghana, Kenya, Nepal, Tanzania, Sudan, and Mozambique), Wresch (2003) indicates that many businesses have bypassed local Web service weaknesses by hosting overseas.

The question is what are these firms doing right in order to effectively adopt e-commerce and achieve its benefits. Research focused on examining the strategic measures and business models being implemented by such firms or how these firms develop transaction-oriented e-commerce capabilities amid their institutional constraints is therefore necessary because learning outcomes that can contribute to theory and practice.

Research Focus

Table 5 shows that the bulk of articles are focused on issues on support and implementation (69 articles, 38%), adoption and diffusion (66 articles, 36%), and potential and constraints (41 articles, 23%). The less-represented issues are focused on education (4 articles, 2%) and knowledge management (1 article, 1%). Within potential and constraints, more articles are focused on opportunities (19 articles, 10%) and assessment (17 articles, 9%) compared with articles on development (5 articles, 3%). The knowledge gap tends to lie in

how e-commerce impacts development and means by which it may be achieved. Although the potential contribution of e-commerce to development has been well-argued literature, there are only a few studies that actually explore how this can be achieved in the context of DCs (Akel and Phillips, 2001; Wood, 2004). There is a need to move beyond the transaction costs perspective of e-commerce benefits, which tends to be a relatively firm-level focus, to determine the other strategic benefits that can be obtained and means by which e-commerce, as a business- and consumer-oriented activity, can impact development in DCs at the national, industry, or community level.

With adoption and diffusion of e-commerce, the focus tends to be on interaction (12%, 21 articles) and technological (10%, 19 articles) issues and factors. The knowledge gap lies in the influence of organizational determinants (1%, 2 articles), such as organizational innovativeness and readiness, on e-commerce. The Chau study emphasized the lack of organizational readiness as an inhibiting factor for the adoption of e-commerce by small firms in Hong Kong. These firms considered *ability to adopt*—requisite knowledge and skills on the technology, internal IT support to support use, and positive organizational attitude toward e-commerce—to be more important than the benefits of adoption. Moodley (2002) attests to this, arguing that organizational and people issues are likely to present more of a challenge in exploiting e-commerce than deploying its related applications. Further exploration of these insights is considerably one of the necessary steps to defining applicable solutions for e-commerce adoption and institutionalisation among firms in DCs.

The bulk of articles on support and implementation have focused on strategy issues, with 25 articles (14%) focused on organizational and industrial strategy and 21 articles (12%) focused on national and regional strategy. The less-represented articles are on security and trust issues (4 articles, 2%), legal issues (3 articles, 2%), and taxation issues (2 articles, 1%), under public policy. The focus of future research on public policy issues can interrelatedly open opportunities for investigating the low adoption of less dominating e-commerce applications including electronic payment systems and Internet-based auctions in DCs. If e-commerce has any potential of substantially contributing to socioeconomic development, as argued by both “e-commerce optimists and pessimists” (Pare, 2003), then all other e-commerce activities and related e-commerce

applications are also relevant in exploiting this potential. Future research on less-researched areas like consumer behavior (4 articles, 2%) and service evaluation (6 articles, 3%) can contribute new knowledge on consumer-oriented activities that can increase the adoption of related e-commerce applications.

Theoretical Frameworks

With reference to Table 6, Group 1 consists of theoretical frameworks used in studying issues relating to assessment of e-commerce opportunities and evaluation of e-commerce benefits after implementation. Transactional cost theory is that most commonly used (4 articles). Group 2 consists of theoretical frameworks used in studying issues relating to adoption, diffusion, consumer behavior, and service evaluation. Three major theories—diffusion of innovation, theory of planned behavior, and theory of reasoned action—tend to be the underpinning theories of quite a number of adoption and diffusion theoretical framework research models including the technology acceptance model (12 articles) (Al Sukkar and Hasan, 2005; Ure, 2002). As a result, e-commerce research on adoption and diffusion has a fundamental theoretical understanding that facilitates easier formulation of research models and their replication in research in different DCs and makes the knowledge contributed more theoretically and practically grounded.

Group 3 consists of theoretical frameworks used in studying issues relating to strategy—organizational, industrial, and national strategy (Table 6). However, compared with Group 2, Group 3 tends to have no theory that has been widely used in theoretical models to study strategy issues in e-commerce in DC research. The dominant theoretical framework is the resource-based theory (RBT) of the firm used in analyzing organizational strategy in e-commerce adoption and institutionalization. As a well-established theory in strategic management and other diverse disciplines, RBT offers the theoretical path of determining the strategic guidance required by DC firms for the effective and efficient development and utilization of resources to achieve e-commerce benefits (Garcia-Murillo, 2004; Zhu and Kraemer, 2005).

Further research employing this theory would therefore contribute substantial knowledge theoretically and practically in the application of concepts of the theory by DC firms. Group Four consists of publications that use models formulated from literature review with

no specific or underpinning theory. Group Four has 21 articles, mostly on literature on e-commerce infrastructure and public policy issues.

Research Methods

Two research methods (Table 7) are most commonly used in e-commerce research in DCs: survey (62 articles, 34%) and case study (44 articles, 24%). Mixed methods are also fairly represented, forming 6% of articles (10 articles). Less-represented research methods include content analysis (1 article, 1%), archival or historical data analysis (1 article, 1%), and attribute analysis (2 articles, 1%). Simulation or experimental studies used in the design and development of e-commerce technologies, education, and training and in studying consumer behavior cover 2% of the articles (4 articles).

Region

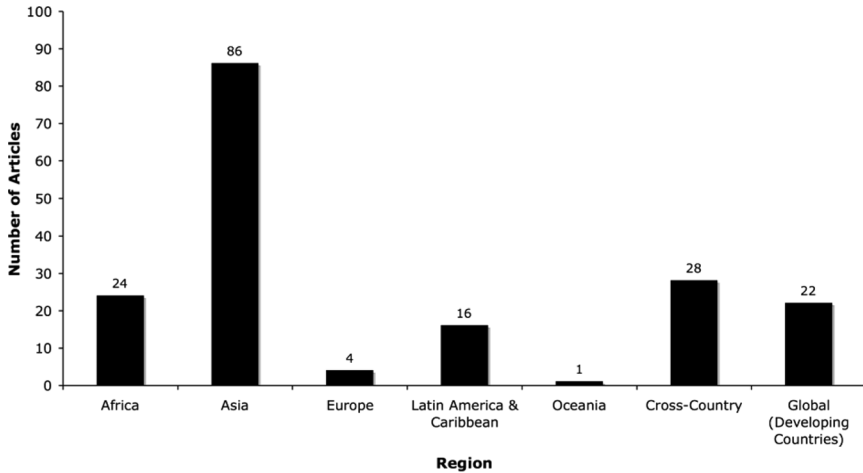
As shown in Figure 2, the frequency of literature on e-commerce in DCs reviewed in this study fairly indicates that most of the present research of e-commerce in DCs (published in journals reviewed here) is concentrated in Asia (86 articles, 48%), Africa (24 articles, 13%), and Latin America (16 articles, 9%).

There tends to be a preponderance of Asian studies. This is arguably reflective of the relative maturity of ICT infrastructure in terms of roll-out and use. The relative lack of literature in Latin America relates to the fact that this review was restricted to English-language

TABLE 7. Distributions of Articles by Research Methods

Research Methods	Number of Articles
Survey	62 (34%)
Case study	44 (24%)
Content analysis	1 (1%)
Archival data analysis	1 (1%)
Attribute analysis	1 (1%)
Simulation/experimental study	4 (2%)
Mixed methods	10 (6%)
Other (not directly related to the above)	57 (31%)
Total	181 (100%)

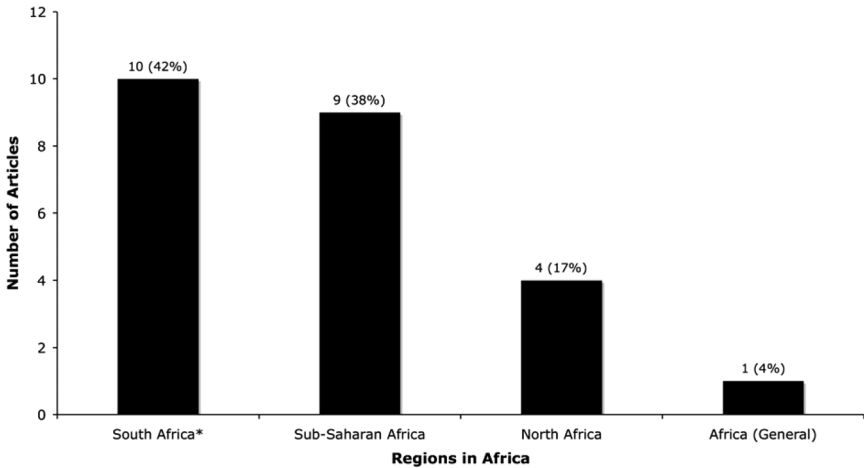
FIGURE 2. Distributions of Articles by Region



journals, whereas research on Latin America is often in Spanish- or Portuguese-language journals. There is still a relative underrepresentation of African studies on e-commerce in DCs. Within these regions, differences do occur with respect to the number of articles per country. This is suggested in the distribution of articles by countries in the African region, where there tends to be more literature on South Africa (42%, 10 articles) compared with the rest of the sub-Saharan (38%, 9 articles) and North Africa (17%, 4 articles) regions (Figure 3).

Perhaps the reason for Africa being underresearched may be the political instability within certain countries in the region, making it unattractive to researchers in the developed world, as previously experienced in apartheid South Africa (Goodman, 1994). There is also the issue of poor collaboration of the private sector and the academics in tertiary institutions in DCs, which influences the potential for research. Moreover, these tertiary institutions may offer few programs within the IS discipline due to the lack of requisite human and technical resources to offer such programs. This relatively limits the space for substantial IS research. Even where such requisite resources exist, the political and financial constraints related to the funding of tertiary institutions in DCs affect the allocation of grants to support such research activities (Odedra et al., 2003).

FIGURE 3. Distribution of Articles by Regions in Africa



Additionally, most research in Africa, as in other developing regions of the world, are more often funded by academic institutions and development-oriented agencies within the developed world that have guidelines, interests, and specific objectives that influence or govern the disbursement of funds (DFID, 2007). A complexity of several issues contributes to the lack of adequate research in Africa; however, in view of the many benefits that could accrue for African countries that successfully implement e-commerce; a study that focuses on such an underresearched part of the world is relevant and cannot be overemphasized (Okoli and Mbarika, 2003).

CONCLUSION AND RESEARCH IMPLICATIONS

We carried out a review of research on e-commerce in DCs to ascertain the current state of research and to indicate the gaps of knowledge yet to be explored and addressed. Amid the ongoing discourse on e-commerce potential, the diversity of research issues and theoretical frameworks used give evidence of the efforts of DC firms to circumvent the constraints in their context and exploit the potential of e-commerce. However, what tends to be lacking in research is, first, a wider perspective of potential benefits of e-commerce and

relative e-commerce applications that can help achieve that. Literature on e-commerce potential and constraints in DCs has particularly focused on the potential firm-level opportunities and benefits, compared with the contribution of e-commerce to development and means by which this may be achieved. With business-to-business activities having gained much attention from researchers, a focus on how e-commerce can impact on development could also open more opportunities for the introduction of other consumer-oriented and government/public sector-to-business e-commerce activities and the subsequent adoption of related applications and technologies including mobile commerce.

The second gap focuses on the need to develop a theoretically grounded and practically oriented understanding of how DC firms can address or navigate around the institutional constraints and challenges in their contexts to achieve the e-commerce benefits identified. As realized from the stated results, much has been researched and published on adoption and diffusion, investigating the variety of factors that discriminate e-commerce adopters from nonadopters at the firm, sector/industry, or country level. It tends to be that most literature on e-commerce in DCs has been rather silent in addressing the issue of offering strategic guidance to DC firms to handle their institutional constraints and move beyond adoption to institutionalize e-commerce into organizational routine and processes. As Xu et al. (2004, p. 14) argues, “such a restrictive view does not completely capture the reach and richness of the use of IT innovations.” There is therefore the “need to better understand how organizations facilitate and promote innovation and creativity in the use and application of IT to achieve strategic success as well as operational excellence” (Lee, 2001). This requires moving beyond e-commerce adoption and diffusion and investigating e-commerce institutionalization (Molla and Licker, 2004) or the extent of e-commerce adoption (Xu et al., 2004), in order to determine the strategic measures or paths through which DC firms achieve e-commerce benefits.

Studies into these strategic measures or paths require the application of relevant strategy-related theories that can effectively explore and examine the means by which some DC firms adapt or navigate around the constraints of their environment to implement e-commerce and relatively achieve its benefits. The use of strategy-related theories such as the resource-based theory and adaptation-evolution strategies of firms

in studying e-commerce research provides an opportunity to investigate how DC firms develop firm-specific capabilities within their volatile environment to support e-commerce and realize its benefits. From this review of literature, only three studies (from Mexico, from Ecuador, and a cross-country research of 10 countries; Montealegre, 2002; Garcia-Murillo, 2004; and Zhu and Kramer, 2005) have used the resource-based theory of the firm, and only one study from India (Ganesh et al., 2004) has employed the adaptation-evolution strategies of the firm. More research is needed to explore the application of these theories through other cases and in different countries and regions, perhaps sub-Saharan Africa (Figure 3), in order to enhance external validity of findings and the theoretical depth and practical orientation of knowledge contributed.

Notwithstanding, this also raises other research methodological issues, emphasizing the need for more case studies and mixed methods in studying e-commerce in DCs research. Case studies enable a contemporary phenomenon like e-commerce to be studied within its real-life context, especially when the boundaries between the phenomenon and its context are not clearly evident (Yin, 1994, p. 13). Combining case studies with other research methods, including survey, further facilitates the unearthing of underlying structures, processes, and relationships observed in the quantitative description of trends, attitudes, or opinions of a population under a study. This offers the opportunity to engage in theory building in research areas where relatively little prior research and theory exist, like organizational strategies of DC firms (Montealegre, 2002; Montealegre and Keil, 2000).

Although not exhaustive, the attempt in this review to classify the current state of e-commerce in DCs research has yielded several important implications and reasonable insights that can guide researchers in future research. More knowledge is required to enable DC firms to exploit and sustain e-commerce benefits and substantially contribute to development in their contexts.

Limitations of the Paper

This study could have been strengthened by scanning e-commerce-related literature from trade publication sources and conference proceedings papers. It could also have been strengthened by scanning papers from IS-oriented journals from least developing countries like the *Botswana Journal of Technology*, *The Information Technologist* from

Nigeria, the *Journal of Science and Technology (Zambia)* and the *Journal of Science and Technology (Ghana)*. In the light of the peculiar limitations we placed on the types of literature we wanted to review, however, we could not include some of these literature sources. A logical follow-up to this study might therefore be another literature synthesis that includes a wider variety of e-commerce sources. For the present study, however, we consider the literature sources we have used as apt.

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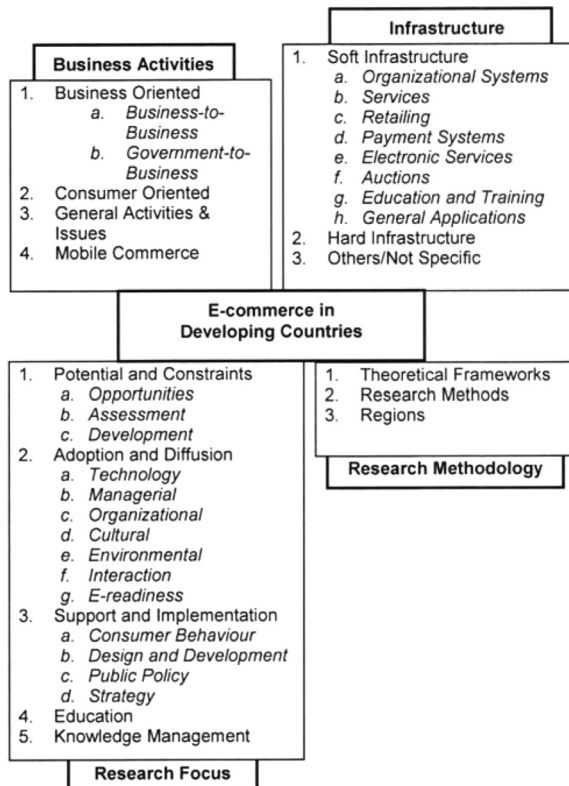
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APPENDIX 1. Classification of Topics of E-commerce in DCs



APPENDIX 2. Distributions of Articles by Journals (1993–2005)

Name of Journal	Frequency of Articles by Year (Descending)													Total	Percent of all Journals
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005		
<i>Electronic Markets</i>	0	0	0	0	5	2	2	3	3	1	0	5	0	21	11.6
<i>Electronic Journal on Information Systems in Developing Countries</i>	0	0	0	0	0	0	0	2	0	3	1	4	2	12	6.6
<i>Journal of Global Information Management</i>	0	0	0	0	0	0	0	0	0	0	4	6	1	11	6.1
<i>Journal of Global Information Technology Management</i>	0	0	0	0	0	0	1	1	1	1	4	3	0	11	6.1
<i>Electronic Commerce Research</i>	0	0	0	0	0	0	0	0	0	4	0	6	0	10	5.5
<i>Journal of Internet Banking and Commerce</i>	0	0	0	0	0	0	0	0	1	0	2	3	4	10	5.5
<i>Journal of Electronic Commerce Research</i>	0	0	0	0	0	0	0	0	3	2	0	2	1	8	4.4
<i>International Journal of Electronic Commerce</i>	0	0	0	0	1	1	0	0	0	0	0	3	2	7	3.9
<i>Information Technology for Development</i>	0	0	0	1	0	0	0	0	0	0	2	0	4	7	3.9
<i>Journal of Electronic Commerce in Organizations</i>	0	0	0	0	0	0	0	0	0	0	0	5	2	7	3.9
<i>Information & Management</i>	0	0	0	0	0	0	0	0	1	1	0	1	3	6	3.3
<i>International Marketing Review</i>	0	0	0	0	0	0	0	0	1	0	1	1	2	5	2.8
<i>Industrial Management & Data Systems</i>	0	0	0	0	0	0	0	0	1	0	0	2	1	4	2.2
<i>Communications of the</i>	1	0	0	0	0	0	0	0	0	1	0	0	1	3	1.7

APPENDIX 2. Continued

Name of Journal	Frequency of Articles by Year (Descending)												Total	Percent of all Journals	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004			2005
<i>Technology Law International Journal of Banking Management</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.6
<i>International Journal of Management</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6
<i>International Journal of Management & Enterprise Development</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6
<i>International Journal of Service Industry Management</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6
<i>International Journal of Technology Management</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6
<i>Information Management & Computer Security</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.6
<i>Integrated Manufacturing Systems</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.6
<i>Information Society</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.6
<i>International Review of Law, Computers & Technology</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.6
<i>Information Resources Management Journal</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6
<i>Information Systems Research</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6
<i>International Tax Review</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.6
<i>Journal of Computer Information</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.6

