This is the post-peer reviewed final draft version of the following article: Molla, A. & Heeks, R. "Exploring e-commerce benefits for businesses in a developing country", *The Information Society*, 23(2), 95-108, 2007, which has been published in final form at: <http://www.tandfonline.com/doi/abs/10.1080/01972240701224028>

EXPLORING E-COMMERCE BENEFITS FOR BUSINESSES IN A DEVELOPING COUNTRY¹

Alemayehu Molla (PhD) (Corresponding Author)

School of Business Information Technology
RMIT University
239 Bourke Street, Melbourne, VIC 3001, Australia
Tel: +613 9925 5803
Fax: +613 9925 5850
alemayehu.molla@rmit.edu.au

Richard Heeks (PhD)
Development Informatics Group, IDPM
The University of Manchester
Oxford Road, Manchester M13 9QH, UK
Tel: +44-161-275 2870
Fax: +44-161-273 8829
richard.hecks@manchester.ac.uk

Abstract

Developing countries are home to more than 80% of the world's population, and are the site for growing use of e-commerce. There are theoretical claims that e-commerce could bring significant benefits to firms in developing countries, but we know very little empirically about the actual outcomes of e-commerce implementation. Our paper addresses this gap in knowledge through a survey of 92 businesses in South Africa, all of which have moved beyond the basic stage of e-commerce. The findings indicate that e-commerce benefits are, by and large, limited to improvements in intra- and inter-organizational communications. More strategic benefits relating to market access, customer/supplier linkages or cost savings were not found in the majority (more than 80%) of organizations surveyed. This therefore limits the likelihood of broader benefits such as incorporation into global supply chains, disintermediation, and improved competitiveness. Turning this somewhat disappointing e-commerce picture around requires a multi-prong strategy aimed at building the resources and capabilities of businesses, developing electronic-mediated business routines with partners and customers, and addressing national e-readiness and global trade regulation issues.

Keywords: E-Commerce, E-Commerce Benefits Evaluation, Developing Countries, South Africa

Running Head: E-Commerce Benefits in a Developing Country

¹ An earlier (and shorter) version of this paper was presented at the Fourth International Conference on Electronic Business, Beijing, China, December 5-9, 2004.

INTRODUCTION

There is tremendous potential for e-commerce in developing countries. While the base of Internet use in these countries has been relatively low, the rate of growth has been high. Between 2000 and 2005 developing countries' Internet user population grew by more than 300% to roughly 400 million, increasing their global share of all Internet users from 25% to 40% (InternetWorldStats, 2005; UNCTAD, 2005). Internet bandwidth has also been expanding at a fast pace, with growth rates in developing regions roughly twice those in the developed world during 2003-2005 (TeleGeography, 2005). What this growth means for e-commerce uptake is difficult to gauge because the data for developing countries is "virtually non-existent" (UNCTAD, 2005:19).

Papers on e-commerce in developing countries are often purely conceptual, lacking an empirical base. They tend to assume that Internet access will enhance e-commerce in developing countries because of greater access to global markets, easier incorporation into global supply chains, cost savings, and disintermediation (Goldstein and O'Connor, 2000; Heeks, 2000; Singh and Tanburn, 2001; UNCTAD, 2004). Critics point out these papers ignore local realities in developing countries such as norms, resources, infrastructure and culture (Hempel and Kwong, 2001; Ho and Chen, 1999; Odedra-Straub, 2003). However, such critiques have themselves tended to be conceptual rather than based on empirical analysis. Even the little empirical work that exists on e-commerce in developing countries has tended to focus on "upstream" issues such as factors that enable or constrain adoption of e-commerce rather than researching "downstream", post-adoption benefits (Molla and Licker, 2005; Murillo, 2004; Paré, 2003).

This paper seeks to start filling this gap by examining empirical evidence on the benefits of e-commerce in developing countries. The study is exploratory in nature and is not intended to support any specific theory or model. Rather, the aims of the paper are: (i) to explore the benefits of e-commerce through a survey of business organizations, (ii) to assess if the achieved benefits match the potential described in current literature, and (iii) to discuss some broader issues related to e-commerce in developing countries. Beyond contributions to the literature and the policy-making process, the paper seeks to inform practitioners contemplating e-commerce investments about what benefits to realistically expect.

The paper is organized in four sections. In the next section the theoretical foundations of e-commerce research in general and developing countries in particular are reviewed and the research questions of this study discussed. After a description of the research methodology, the results of the field survey are presented. Analysis of the results is then followed by a conclusions section.

THEORETICAL FOUNDATIONS

E-commerce literature has tended to rely on: (1) transaction cost theory and (2) strategic management perspectives. We will start by reviewing these two perspectives.

Transaction Cost Theory

Transaction cost refers to the cost of coordination in the production and marketing of a product (Malone *et al.*, 1989; Wigand, 1995; Robins, 1987; Williamson, 1985). It includes the specific search costs of gathering information about an item to be exchanged (its design, price,

quantity, delivery details, etc.), the broader search costs of finding and finding out about buyers or suppliers, and the costs of coordinating the people and processes involved in actual production and exchange and in managing the exchange relationship (Benjamin and Wigand, 1995; Sarkar *et al.*, 1995). According to the transaction cost perspective, the use of e-commerce can potentially reduce transaction costs because of electronic coordination of transactions (automating transaction processes) and disintermediation (removing transaction processes).

Many authors working out of the transaction costs framework confirm the expectations of lowered costs. For instance, Malone *et al.* (1989) observe that digital information and communication networks improve the speed and cost of communicating the same unit of information. Potential e-commerce cost savings are expected from reductions in search costs such as the cost of identifying a market (buyer or supplier) and/or a product or service (Malone *et al.*, 1989). In particular, electronic networks can reduce information asymmetries between buyers and sellers. Not only does this make the process of exchange itself more efficient in time and financial terms, it can also assist identification of lower-cost inputs (Barua *et al.*, 2004; Malone *et al.*, 1989).

When transactions are coordinated through the use of intermediaries, there is always the danger of *intermediary opportunism* (Robins, 1987). They could use their market position, experience and power to extract opportunistic “rents,” typically to the detriment of upstream suppliers. To mitigate this threat, businesses need to invest in ex-ante safeguards and ex-post enforcements, adding to transaction costs. Using network applications, such as middleware and electronic markets, organizations can internalize and automate activities that in the past have been performed by intermediaries (such as wholesalers, retailers, agents, distributors, brokers, warehousing operations, and forwarders). This can reduce producer—intermediary and intermediary—producer costs, and minimize the danger of intermediary opportunism (Bakos, 1998; Barua *et al.*, 2004).

Strategic Management Perspectives

According to strategic management perspectives, businesses that use e-commerce can potentially increase their market reach and at the same time implement mass customization strategies that suit the needs and preferences of individual consumers. For instance, e-commerce can minimize the trade-off between “richness” and “reach” (Evans and Wurster, 2000). Richness refers to the quality of information in terms of accuracy, currency, customization, interactivity, relevance, etc.; reach measures the number of people who can be contacted with that information. Traditionally, the greater the investment in richness, the fewer contacts could be reached; conversely, the greater the attempted reach, the less rich the information flows that were possible. E-commerce allows both supplier- and customer-side digitization and customization and can enable businesses to differentiate their offering and develop better relationships with customers and suppliers (Barua *et al.*, 2004). This can improve customer retention and loyalty.

Further, organizations that build an “online informational capability” (Barua *et al.*, 2004) can bypass (even if not to completely eliminate) some, if not all, of the intermediaries and hence overcome market impediments related to intermediary reach, cost, and delay. Organizations can also use e-commerce to reengineer their selling and distribution processes and eliminate some of the intermediary activities to develop direct contact with their customers. This allows locking-in of customers, improving their relationship with the business, and developing their

loyalty. As a result, e-commerce might contribute to improving the business bottom line and to promoting competitiveness.

Research Questions

Research on the potential benefits of e-commerce in developing countries has also been rooted in these theoretical frameworks. Of the various potential benefits derived from these frameworks in the literature on e-commerce and development, four broad and interlinked themes can be identified: improving market efficiency, improving operational efficiency, market access, and linkage. We review each theme in turn.

Market Efficiency. Most businesses (including those involved in agriculture; typically a developing country's key economic sector) depend on long supply chains and on one or more intermediaries to market their products and to purchase required inputs (Dolan and Humphrey, 2001). More often than not, the intermediaries demonstrate opportunism by taking the lion's share of profits, and by deciding which products are to be delivered to the market and from which supplier to purchase equipment and other necessary inputs: so-called "biases of dealers" (Kebede, 2001). They also add to the cost of input materials and finished products. For firms in developing countries, then, any disintermediation effect of e-commerce could deliver significant benefits. By enabling direct marketing of goods to clients (including those in global markets), direct purchasing from suppliers, and better sharing of information with partners, e-commerce could not only reduce costs but also significantly increase firm control over its place in the supply chain.

The question to be asked in relation to this area of potential benefits is:

"Has the use of e-commerce enabled firms in developing countries to improve their market efficiency?" (Question 1)

Operational Efficiency. It has been argued that businesses in developing countries incur particularly high costs in coordination of their economic activities because of inefficient systems of procurement, communication, inventory control, and operation (Mann, 2001; Murillo, 2004). Traditional data communications infrastructure in these countries is also expensive to access and use. Such high costs normally add to the market price of products and adversely affect the competitiveness of developing countries' products in the global market. Using transaction cost theory, one can argue that developing country businesses' use of e-commerce could reduce the costs of intra-firm coordination, thus also addressing some of the inefficiency problems these firms face (Moodley, 2003). As well as improving cost competitiveness of their products in local and global markets, any e-commerce-induced reduction in transaction costs could also reduce the costs of engaging in partnerships and strategic alliances, and reduce the perceived and actual barriers to trade.

The question to be asked in relation to this area of potential benefits is:

"Has the use of e-commerce enabled firms in developing countries to achieve operational efficiency?" (Question 2)

Market Access. Enterprises in developing countries have been characterized by absolute levels of "information poverty", and by location-based constraints to accessing information about markets and, hence, to accessing markets (Duncombe and Heeks, 2002). The networking capacities that underlie e-commerce have the potential to enable these businesses to overcome their informational barriers by increasing the speed, richness, and volume of

information flows between a given enterprise and other market actors. The outcome of this should normally lead to better inter-firm information flows and increased market reach.

The question to be asked in relation to this area of potential benefits is:

“Has the use of e-commerce enabled firms in developing countries to improve their market access?” (Question 3)

Linkage. Market access is often conceived in relation to greater access to customers but – given that global business is increasingly organized around commodity chains and supplier networks – it more generally means an ability to link with and integrate into global supply chains (Dolan and Humphrey, 2001; Gereffi, 2001). At present, most businesses in developing countries are excluded from such chains but e-commerce offers the potential to change this. This could increase the visibility of firms in developing countries. Linkage to supply chains could also support diversification by opening up new technology-enabled opportunities with digital data flows, such as business process outsourcing and hence, increase overall firm competitiveness (Palvia *et al.*, 1996; UNCTAD, 2005).

The question to be asked in relation to this area of potential benefits is:

“Has the use of e-commerce enabled firms in developing countries to improve their competitiveness?” (Question 4)

From the review above, we can see a range of potential benefits from e-commerce; benefits that are generic to business but which have particular values to firms in developing countries (DCs) given the exclusions, costs, asymmetries, and other challenges that firms in these countries face. As noted, though, existing empirical data on the actual achievement of such benefits is very limited, with the few studies that exist tending to focus more on e-commerce adoption and use. In seeking answers to the above four questions, we have also explored the possible impacts of firm size, industry sector, and e-commerce capability on realized e-commerce benefits. Figure 1 lays out the conceptual framework of the study reported here.

Figure 1: Research Framework

RESEARCH METHODS

The data reported in this paper are extracted from a survey of 150 South African businesses conducted as part of a broader research project during 2001 and 2002. Outline of the survey method is provided here, with further details reported in Molla and Licker (2004).

Operationalization of Constructs

From the literature discussed in the theoretical foundations section, we drew 15 e-commerce benefit statements related to market efficiency, operational efficiency, market access, and linkage (Appendix A). Drawing from the e-commerce success literature (Delone and McLean, 2003; Molla and Licker 2001), an additional item “we are satisfied with the overall performance of our e-commerce application” was used to assess the overall success of e-commerce.

To analyze the business value of e-commerce, it was critical that we select businesses with demonstrated e-commerce use. The level of e-commerce use can be measured by using an e-commerce capability indicator. Of the various models available in the literature, we used a six-point e-commerce capability indicator (Molla and Licker 2004):

- *No e-commerce* indicates a company without e-mail or an Internet connection.
- *Connected e-commerce* represents a company that has an Internet connection and e-mail.
- *Informational e-commerce* indicates a company using a Web site to publish basic information about the company and its products/services in a static manner.
- *Interactive e-commerce* refers to the ability of users to search the company’s product catalogue, make queries, and enter orders.
- *Transactional e-commerce* allows online selling and purchasing of products/services including online payment and customer service.
- *Integrated e-commerce* means that the company’s e-commerce systems are integrated with suppliers, customers, and other back office systems allowing most business transactions to be conducted electronically.

Instrument Design

All the items related to e-commerce benefits are based on a five-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). These measures are thus self-reported

perceptual measures. In the information systems (IS) literature, both primary and secondary attributes of the implementation and benefits of IS have been recognized. Primary attributes refer to objective and quantitative measures of benefits whereas secondary attributes refer to perception-based measures. Some authors mistrust the subjectivity of perceptual measures (Seddon, 1997) but, because of the correlations between the two attributes (and the difficulty of obtaining economic and quantitative measures of benefits), perceived measures have been widely accepted as conceptually meaningful and usable proxies of actual IS benefits (Grover *et al.*, 1998; Mirani and Lederer, 1998, Saarinen, 1996). Further, Delone and McLean (2003) note not only the use of secondary attributes but also the specific applicability to e-commerce of general approaches to IS benefit measurement. Therefore, the use of perceptual measures as a proxy to gauge real e-commerce benefits is both conceptually and methodologically tenable.

Data Collection, Extraction and Analysis

South Africa was chosen for the study not because it represents all types of developing countries but because it is one of the developing countries with a reasonable level of e-commerce adoption – a pre-condition for the study of e-commerce benefits. Table 1 provides a comparison of South Africa with some other developing countries. South Africa may be seen as more representative of middle-income countries than of all developing countries, including those low-income countries that form the majority of other African nations.

Table 1: A Comparison of South Africa with Selected Developing Countries

<i>Criteria</i>	Nigeria	India	Egypt	China	South Africa	Brazil	Mexico
<i>Income category</i> ^a	Low Income	Low Income	Middle Income	Middle Income	Middle Income	Middle Income	Middle Income
<i>Gross domestic product (US\$ per capita)</i> ^a	393	560	1,040	1,096	2,293	2,864	6,328
<i>Internet users (% population)</i> ^b	1.1	3.6	6.0	7.9	9.9	12.3	16.4
<i>No. of Internet hosts (per 10,000 population)</i> ^a	0.08	1.3	0.5	1.2	78	193	145
<i>Network readiness ranking</i> ^c	86	39	57	41	34	46	60
<i>Digital access index (DAI)</i> ^d	0.15 (low access)	0.32 (middle access)	0.40 (middle access)	0.43 (middle access)	0.45 (middle access)	0.50 (upper access)	0.50 (upper access)

Source: a= ITU (2005); b= InternetWorldStats (2005); c= Dutta and Lopez-Claros (2005); d= ITU (2003)

Because the nature of the research required responses from executives who could make an overall assessment of e-commerce benefits for their firms, we specifically sought out the CEOs, general managers, and managing directors of organizations to respond to the survey questions. For more details about the data collection protocol, refer to Molla and Licker (2004, 2005).

To select the data for the purposes of this paper, the e-commerce capability of the businesses was used as a data extraction criterion. In order to talk about e-commerce benefits, we assumed that the businesses needed to have at least an informational e-commerce capability, given that this represents the foundational level at which an organization has digitized at least basic information for exchange and transaction (Barua *et al.*, 2004). On the basis of this criterion, 92 of the total 150 responding businesses were selected: those that had attained an informational or interactive or transactional or integrated e-commerce capability and that had completed the e-commerce benefits part of the questionnaire. For the purpose of analysis, we referred to this subset as e-commerce users and the remaining respondents as e-commerce non-users.

A range of demographic characteristics was analyzed from the extracted data subset (Table 2). The majority of the respondents held a job title of managing director or CEO or general manager. The surveyed firms represent a fairly broad range of economic sectors, albeit with some emphasis on service firms. Most were large² businesses operating for more than ten years. A comparison of the e-commerce users with e-commerce non-users indicates that the two groups were significantly different only in terms of size (*t-value* 2.93; *p*= 0.004, *df*=148), not in terms of sector or number of years in business. The data therefore reflect the experiences of larger-than-overall-sample-average firms; something which might not be unexpected given the greater constraints that small and medium enterprises have faced in adopting e-commerce (Tucker and Lafferty, 2004).

² According to Statistics South Africa and the South African National Small Business Act 102 of 1996, businesses with 50 or fewer full-time employees' size (FTES) are considered small. Those with 50 to 100 FTES (maximum limit of 200 in mining, manufacturing and construction) are medium, and the rest are considered large.

Table 2: Characteristics of Firms in the Sample

Characteristics	E-Commerce Users (n= 92)		E-Commerce Non-Users (n= 58)	
	No.	%	No.	%
<i>Respondent's Job Title</i>				
Managing director or CEO or general manager	66	72%	30	52%
Finance director	10	11%	12	21%
IT director	9	10%	9	16%
E-commerce director	4	4%	2	3%
Marketing director	3	3%	1	2%
Not specified	--	--	4	7%
<i>Business Size</i>				
Small and medium	16	17%	22	38
Large	76	83%	36	62
<i>Sector</i>				
Service (financial, consulting, media, marketing & tourism)	36	39%	13	22%
Manufacturing	20	22%	19	33%
Primary (agriculture, construction and mining)	16	17%	9	16%
Trade (wholesale and retail) and transport	11	12%	10	17%
ICT (computers and communications)	9	10%	7	12%
<i>Number of Years in Business</i>				
1-10	16	17%	8	14%
>10	76	83%	50	86%
<i>E-commerce Capability</i>				
No e-commerce	--	--	24	41%
Connected e-commerce	--	--	29	50%
Informational e-commerce	19	21%	3	5%
Interactive e-commerce	43	47%	2	3%
Transactional e-commerce	24	26%	--	--
Integrated e-commerce	6	7%	--	--

The data were further analyzed using exploratory statistical techniques such as analysis of variance and factor analysis. The results of all analyses are presented next.

FINDINGS

Descriptive Results

In order to assess the benefits of e-commerce to the firms, we counted the number of respondents who agreed or strongly agreed and compared it with those that disagreed or strongly disagreed on each of the survey items. The results are summarized in Table 3 and the comparison (which excluded the respondents who neither agreed nor disagreed) is plotted in Figure 2.

Table 3: Responses on E-Commerce Benefits

	Number of respondents that			Mean	Standard deviation
	Strongly agree and agree	Neutral	Disagree and strongly disagree		
Increased revenue	14	5	73	3.44	1.06
Reduced operation costs	15	5	72	3.43	1.04
Reduced costs of purchasing and procurement	16	6	70	3.36	1.06
Increased customer loyalty and retention	20	5	67	3.13	0.97
Reduced marketing costs	21	6	65	3.29	1.03
Improved supplier relationship	22	6	64	3.15	0.97
Overall satisfaction	30	5	57	2.94	0.91
Reduced cost of maintaining information	30	5	57	2.95	1.07
Product/service differentiation	34	5	53	2.79	0.94
Improved customer relationship	36	5	51	2.76	0.93
Improved competitive position	37	5	50	2.82	1.05
Extending firms' reach (market)	42	5	45	2.62	1.03
Improved process speed	43	6	43	2.67	1.03
Improved external communication	57	5	30	2.31	1.00
Improved company image	62	5	25	2.25	0.85
Improved internal communication	67	5	20	2.08	0.95

Figure 2: Chart of E-Commerce Benefits

Examination of Table 3 and Figure 2 indicates that e-commerce benefit is seen as largely limited to internal (77% of respondents either strongly agreeing or agreeing) and external (71%) communications improvements. The only other benefits supported by a greater or equal

number to those disagreeing are improved company image (65%) and improved process speed (50%). Thus e-commerce did not appear to enable most of the businesses in the survey to reduce the cost of operations (83% disagree or strongly disagree), of purchasing and recruitment (81%), of marketing (76%) or of maintaining information (66%). Further, 84% of respondents did not appear to realize increased revenue as a result of e-commerce. Another 74% and 72% of respondents respectively either disagreed or strongly disagreed with the improved supplier relationships and the customer loyalty and retention benefits of e-commerce. Overall, just 30% of the respondents were satisfied with the performance of e-commerce. These findings are explained later in the discussion and conclusion section.

E-Commerce Benefit Constructs

Exploratory factor analysis was used in order to identify underlying constructs and investigate relationships among the 16 items used to assess e-commerce benefits. Consistent with the exploratory nature of the study, the factors were extracted using an iterative sequence based on the principal components extraction technique. To facilitate interpretability, this was followed by varimax rotation. The criterion used for assigning an item to a factor was a minimum factor loading of 0.5. In each cycle of the iteration, we retained only factors with eigenvalues greater than one. In addition, single item factors, items with factor loadings less than 0.5 on any one factor, and items with a factor loading greater than 0.5 on two or more factors were excluded from subsequent iterations. The final factor structure with three factors containing 12 items was obtained after the third iteration (Table 4). In addition, Cronbach's alpha was calculated; the scores (0.87, 0.71 and 0.78 for factors 1, 2 and 3, respectively) were above the acceptable level (Cronbach, 1979).

Table 4: E-Commerce Benefits Factor Analysis

Variable	Factor Loadings (Varimax Raw) E-Commerce Benefits Extraction: principal components (loadings are all >0.5)		
	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>
Extending firm's reach (market)	0.840		
Product/service differentiation	0.846		
Increased customer loyalty and retention	0.809		
Improved revenue	0.596		
Improved competitive position	0.620		
Improved customer relationship	0.733		
Improved internal communication		0.859	
Improved external communication		0.906	
Improved process speed			0.588
Reduced operation cost			0.735
Reduced cost of purchasing and procurement			0.833
Improved supplier relationship			0.736
<i>Eigenvalue</i>	<i>5.142</i>	<i>1.768</i>	<i>1.280</i>
<i>Total variance explained</i>	<i>42.85%</i>	<i>14.73%</i>	<i>10.66%</i>
<i>Cronbach's alpha</i>	<i>0.87</i>	<i>0.71</i>	<i>0.78</i>

As can be seen in Table 4, three main categories of benefits are identified from the data (factors 1, 2 and 3). Cumulatively, these three main factors explain 68% of the variance in the

data. The factor loadings indicate the degree of correlation that exists among the items grouped under the same variable, implying that the items under each block can be used to measure three categories of e-commerce benefits. Cronbach alpha values show the reliability of the measure.

Examination of the results of factor analysis in Table 4 indicates that the first factor with six items accounts for 42.9% of the variance in the data. This means the benefits grouped under this factor explain more of the variations in responses than any other group. This factor is related to both the linkage and market access benefits of e-commerce and we labeled it here as the *market performance* gains of e-commerce. The results of our survey (Figure 3³) indicate that market performance e-commerce benefits among the South African businesses generally fall short of the potential indicated in the literature. Therefore, based on the evidence in this study, the answer to questions three and four above appears to be generally negative: use of e-commerce in this developing country has typically not enabled firms to improve their linkages and market access.

Figure 3: Status of E-Commerce Benefits

The second factor, with two items, accounts for 14.7% of the variance and is labeled *communications* improvement benefits of e-commerce. Communication is one dimension of e-commerce (Kalakota and Whinston, 1996). Use of e-mail, intranets and extranets might help organizations to improve the reach and richness of the information to be communicated. In addition, as noted above, such networks can improve the speed and cost of communicating the same unit of information and enable the design and deployment of strategic linkages among market players (Malone *et al.*, 1989). Our findings (Figure 3) indicate that this is one area in which there is more sign of businesses benefiting from e-commerce. We might thus modify the answer to questions three and four: while recognizing no strong sign of outcomes such as market access or competitiveness or diversification there are signs of improvements in the communications that underlie linkages.

The third factor, with four items, accounts for 10.66% of the variance. This factor is related to the efficiency (market and operational) theme identified in the literature review and is labeled here as the *transaction cost reduction* benefit of e-commerce. The items under factor three appear to relate to both hierarchy (operational) and market transaction cost savings. Such savings are expected from reductions in operating costs (such as personnel, rent, and order

³ The y-axis of Figures 3, 4, 5 and 6 indicates average perceived benefits. Note that the scale used is 1=strongly agree ... 5= strongly disagree. Thus, lower average values mean higher benefits.

processing), supply acquisition and supplier management costs, and improving internal processes. However, such benefits of e-commerce appear to have rather eluded our respondents (Figure 3). This leads to a negative answer to questions one and two: firms in this developing country have typically not achieved market or operational efficiency gains through use of e-commerce.

The three factors extracted above demonstrate some inter-relationship (Table 5). Particularly, there is a relatively stronger relationship between market performance and transaction cost reduction than between the other factors. This implies that if a business is not successful in reducing transaction costs, then it is unlikely for that business to perform better in the market, which means it would find itself at a competitive disadvantage.

Table 5: Correlation Coefficients

Variable	Correlations: E-Commerce Benefits All correlations are significant at $p < 0.05$		
	<i>Market Performance</i>	<i>Communication</i>	<i>Transaction Cost Reduction</i>
<i>Market Performance</i>	(1.00)	0.29	0.54
<i>Communication</i>		(1.00)	0.35
<i>Transaction Cost Reduction</i>			(1.00)

Impact of Demographic Variables

To explore differences in e-commerce benefits between small and medium and large enterprises, the size-wise mean score values of the three factors were plotted (Figure 4). Examination of Figure 4 indicates a more or less consistent pattern across enterprises. In both small and medium and large size groups, improvements in internal and external communications were reported by most organizations while cost reduction and market performance benefits remained the least experienced. The graph also indicates relatively better e-commerce benefits for small and medium enterprises in the first two factors, i.e., market performance and communications. However, on further testing of this difference using a one-way analysis of variance (ANOVA), it was not found to be significant ($Wilks\ lambda=0.97, F(3, 83)=0.96, p=.417$).

Figure 4: E-Commerce Benefits by Business Size

In addition to size, e-commerce benefit variations due to sector differences were tested. The sector-wise mean benefit scores are plotted in Figure 5. The result has not produced a single pattern indicating one particular sector benefiting more from e-commerce than other sectors. The ANOVA test ($Wilks\ lambda=0.88$, $F(12, 211.95)=0.84$, $p=0.6102$), produced an insignificant result, reinforcing this finding.

Figure 5: E-Commerce Benefits by Sector

We anticipated that the e-commerce capability of businesses – captured in terms of the informational or interactive or transactional or integrated status attained – would have some impact on e-commerce benefits. The mean plot (Figure 6) appears to indicate a distinction in terms of benefits between businesses with informational e-commerce capability and those that have developed integrated e-commerce capability. As would be anticipated, businesses that have developed integrated e-commerce capability seem to have obtained greater benefit from their e-commerce investment in all the three areas. However, the ANOVA test did not produce a statistically significant result for these differences.

Figure 6: E-Commerce Benefit by E-Commerce Capability

Finally, in order to benchmark the impact of demographic variables reported here, we compared the results on firm size, industry sector, and e-commerce capability with the *Globalization of E-Commerce* study (Kraemer *et al.* , 2002). Our two studies used different instruments and different sample populations, so direct comparison is not possible. However, the summary in Table 6 indicates that the findings of our study more or less conform to Kraemer *et al.*'s (2002) results. One difference is the effect of e-commerce capability on e-commerce benefits. While the current study shows a statistically insignificant relationship, Kraemer *et al.* found a strong positive association (although not causality) between these two. Possible explanations for such differences could be the mediating role of the globalization of the firm (a variable we have not studied) and significant inclusion of experience of firms from industrialized countries in Kraemer *et al.*'s analysis.

Table 6: Benchmarking E-Commerce Findings

Item	Present Study	Kraemer <i>et al.</i> (2002)
<i>No. of countries covered</i>	Single country – South Africa	Ten countries, of which only three (Brazil, China, and Mexico) are developing countries.
<i>Effect of firm size on e-commerce benefit</i>	Firm size has no significant impact on differences in market performance, communication and transaction cost reduction benefits of e-commerce	Firm size was unrelated to efficiency, coordination and commerce performances of businesses (p.18)
<i>Effect of sector on e-commerce benefit</i>	Sector differences have no significant impact on variations in e-commerce benefits.	Industry sector was unrelated to efficiency, coordination and commerce performances of businesses (p.18)
<i>Effect of e-commerce capability on e-commerce benefits</i>	Organizations with higher e-commerce capability seem to have obtained greater benefit from e-commerce. However this was not statistically significant.	The level of e-commerce adoption had strong positive impacts on all three types of firm performance. (p.19)

DISCUSSION AND CONCLUSION

Our findings about the benefits of e-commerce for businesses in South Africa suggest that, by and large, the potential for e-commerce in developing countries – as summarized in the section on theoretical foundations – is not being realized. As noted earlier, there is very little empirical evidence till date on e-commerce benefits in developing countries, but our work is in line with the two field studies that have been reported (Humphrey *et al.*, 2003; Moodley *et al.*, 2003). While they focused on individual sectors and a limited range of benefits only, they did report a lack of evidence of disintermediation, trade/reach facilitation, or reduction in transaction costs.

Our study has been more comprehensive in both conceptualization of benefits and breadth of sectoral coverage. In relation to the literature-based conceptualization, we find the majority of businesses do not appear to have obtained e-commerce benefits in terms of expanding their access to markets, improving their reach or linkages to customers or suppliers, or in relation to

cost savings or other efficiency gains. Our field data suggested a slightly different conceptualization of benefits may be useful for those working on e-commerce. Again, though, the story on benefits was much the same: overall market performance and reduction of transaction costs was typically not seen. Firms only reported basic communications improvements; a significant shortfall from the promise of e-commerce. This also implies that the findings here do not support the transaction cost and strategic management theses of e-commerce benefits. Nevertheless it has to be noted that the results are based on a synchronic single country survey and cannot be generalized.

We can also step back to look at some of the broader economic benefits identified in the theoretical development section. These saw e-commerce as potentially valuable in addressing challenges that negatively impact business in developing countries: information poverty and asymmetry, exclusion from global supply chains, loss of profits and control to intermediaries, and poor cost competitiveness. We find no strong evidence from this survey that e-commerce is delivering the precursory benefits necessary to address these challenges. These findings therefore contradict the optimism surrounding e-commerce in developing countries expressed by some authors identified in the introduction. E-commerce may be producing some limited communicational benefits but there is no evidence that it is systematically delivering strategic business benefits. Our finding seems to suggest that a realistic view on e-commerce benefits in developing countries (at least in the short to medium-term) will not necessarily be an optimistic one. This is of particular concern if set alongside evidence that some firms in industrialized countries do appear to be achieving such benefits (Fitzgerald *et al.*, 2005; Soliman and Youssef, 2003). This raises the possibility that foreign firms may be able to use the benefits of e-commerce to penetrate markets in developing countries while firms in developing countries may not be able to counter-penetrate industrialized country markets. Hence, e-commerce may be part of a broader historical pattern that has seen new technologies tend to increase global inequalities (Heeks and Kenny, 2002).

Our focus in this paper has been on reporting the extent to which e-commerce is producing benefits for businesses in one developing country. However, we also feel it would be appropriate to comment on an issue that – while not the core focus for conceptualization or data-gathering – is very much related: the issue of why such limited benefits have been seen. The most obvious explanation would be one that calls implicitly on a chronological picture, with developing countries being further behind on a timeline than industrialized countries. This could be seen as a timeline of e-commerce capabilities, with arguments that – as businesses progress along the six capability categories from no e-commerce to integrated e-commerce – they achieve greater e-commerce benefits (Barua *et al.*, 2004; Kraemer *et al.*, 2002; Zhu and Kraemer, 2002). Hence, the argument would run, developing countries see fewer benefits from e-commerce because they have more lower-level capability firms and fewer higher-level capability firms. Further, these findings could arise because e-commerce in developing countries is still developing and has yet to achieve full traction (Dutta and Lopez-Claros, 2005).

However, we would just note some caveats thrown up by this research and other sources. First, there seems to be strong evidence from developing countries of a pattern of many more lower-level than higher-level capability firms: not just from this research but also other studies in Brazil (Tigre, 2003), China (Tan and Ouyang, 2004), Malaysia (Le and Koh, 2002), and Mexico (Palacios, 2003). However, that is equally the pattern seen in industrialized countries (Brousseau and Chaves, 2005; Kraemer *et al.*, 2002). Second, there is some discounting of any effect in the current research because the first two capability categories –

more than one-third of surveyed businesses – were excluded from statistical analysis. In turn, this analysis, while showing a pattern of higher benefits related to higher capability levels, failed to identify this pattern as statistically significant.

All this at least suggests we might look for other explanations, and these have been offered within another timeline concept: that of e-readiness. Here, the suggestion would be that businesses in developing countries reap comparatively fewer benefits from e-commerce because they lag behind industrialized countries in contextual enablers such as technological infrastructure, human infrastructure, institutional support, and legislative framework (Mansell, 2001; Patterson and Wilson, 2000). This may be a more robust explanation but it lies beyond the scope of evidence in this paper. We do, though, note one final point – one cannot assume that it is simply a matter of time before developing countries “catch up” in e-readiness terms and, hence, in terms of e-commerce benefits. There are arguably structural features of globalization, of national economies, and of business characteristics that maintain infrastructural inequalities and institutional and organizational differences that may serve to maintain the uneven benefits pattern found in this paper (Molla and Licker, 2005; Schech, 2002; Sutz, 1989)

Therefore, to turn the somewhat disappointing realized e-commerce benefits around, there needs to be a multi-prong strategy aimed at reducing the many facets of technological divides and improving the local and international institutional arrangements that support the conduct of business. This requires a public-private partnership to develop the resources and capabilities of businesses and improve the national e-readiness factors. It also requires developing country firms to constantly improve their e-commerce capabilities in both downstream functionalities and up-stream integration. Further, favourable international trade regulations have to be negotiated at a global scale. There may well be some merit in these ideas that would warrant further investigation.

To summarize, we have shown the reality of e-commerce benefits in a developing country to contrast sharply with some of the dominant theoretical perspectives and the more optimistic literature that seems rooted in potentiality rather than actuality. Our cross-sectoral study has investigated a range of benefits and strikes a cautionary note for practitioners: expectations should be muted about what e-commerce can deliver for developing country firms. This must be particularly true of expectations about returns on e-commerce investments, given that costs of information systems implementation in developing countries are higher than global averages (Heeks and Kenny, 2002). This is not to suggest that practitioners – business staff, consultants, business advisors, even policy-makers – should turn against e-commerce. However, they do need to stay aware of its opportunity costs, and see it as one business improvement initiative among a number of options rather than as “the solution”.

We hope, too, that we have provided a contribution for researchers and to knowledge in the e-commerce literature. At root, this has been an addition to a very limited data pool on e-commerce benefits in developing countries but it has also outlined a data-led categorization of those benefits into three core areas of impact, and an instance in which three factors – sector, size, even level of e-commerce capability – did not demonstrate a statistically significant relation to benefits.

Of course, we must avoid being too sweeping in the generalization of these results. They come from a survey of mainly large firms in just one country that, as noted earlier, is at best representative of only one tranche of developing countries. Given the general lack of data on

impact of e-commerce in those nations that are home to more than 80% of the world's population, we will end by a call for much more survey data on e-commerce in developing countries. Such further research can focus on the extent of benefits but also, as noted, on investigation of the antecedents of e-commerce benefits in developing countries, including the key issue of whether or not current global inequalities are likely to be reduced.

REFERENCES

- Bakos, Y. (1998) The emerging role of electronic market places on the Internet. *Communications of the ACM* 41(8):35-42.
- Barua, A., Konana, P. and Whinston, A. (2004) An empirical investigation of net-enabled business value. *MIS Quarterly* 28(4):585-620.
- Benjamin, R. and Wigand, R. (1995) Electronic markets and virtual value chains on the information superhighway. *Sloan Management Review* 36(2):62-73.
- Brousseau, E. and Chaves, B. (2005) Contrasted paths of adoption: is e-business really converging toward a common organizational model? *Electronic Markets* 15(3):181-198.
- Cronbach, L.J. (1979) Test validation. In: Thorndike, R.L. (ed.), *Educational Measurement*, 2nd edn, Washington, DC: American Council on Education, pp.443-507.
- Delone, W.H. & McLean, E.R. (2003) The Delone and McLean model of information systems success: A 10 year update. *Journal of Management Information Systems* 19(4):9-30.
- Dolan, C. and Humphrey, J. (2001) Governance and trade in fresh vegetables: the impact of UK supermarkets on the African horticultural industry. *Journal of Development Studies* 37(2):147-76.
- Duncombe, R. and Heeks, R.B. (2002) Enterprise across the digital divide. *Journal of International Development* 14(1):61-74
- Dutta, S. and Lopez-Claros, A. (eds.) (2005) *The Global Information Technology Report: Efficiency in an Increasingly Connected World*. Basingstoke, UK: Palgrave Macmillan.
- Evans, P. and Wurster, T.S. (2000) *Blown to Bits: How the New Economics of Information Transforms Strategy*. Boston, MA: Harvard Business School.
- Fitzgerald, B., Papazafeiropoulou, A., Piris, L. and Serrano, A. (2005) Organizational perceptions of e-commerce: re-assessing the benefits. *Electronic Markets* 15(3):225-234.
- Gereffi, G. (2001) Shifting governance structures in global commodity chains with special reference to the Internet. *American Behavioral Scientist* 44(10):1616-1637.
- Goldstein, A. and O'Connor, D. (2000) *E-Commerce for Development*. Paris: OECD. <http://www.oecd.org/dev> (Accessed October, 2004).
- Grover, V., Teng, J., Segars, A.H. and Fiedler, K. (1998) The influence of information technology diffusion and business process change on perceived productivity. *Information & Management*, 34:141-159.
- Heeks, R. (2000) *Analyzing eCommerce for Development*. Manchester, UK: IDPM, University of Manchester. <http://www.manchester.ac.uk/idpm/dig/briefings.htm> (Accessed July, 2005).

- Heeks, R. and Kenny, C. (2002) ICTs and development: convergence or divergence for developing countries?, paper presented at IFIP WG9.4 conference on *ICTs and Development*, Indian Institute of Management-Bangalore, 29-31 May
- Hempel, P.S. and Kwong, Y.K. (2001) B2B e-commerce in emerging economies: I-metal.com's non-ferrous metals exchange in China. *Journal of Strategic Information Systems* 10: 335-355.
- Ho, C. and Chen, J. (1999) The prospects of B2B e-commerce in China's Internet industry. *Business Forum* 24(3/4): 62-69.
- Humphrey, J., Mansell, R., Paré, D. and Schmitz, H. (2003) *The Reality of E-Commerce with Developing Countries*. Brighton, UK: IDS, University of Sussex.
- InternetWorldStats (2005) *Internet Usage Statistics*. InternetWorldStats.
<http://www.Internetworldstats.com/stats.htm> (Accessed December, 2005).
- ITU (2003) *World Telecommunications Development Report: Access Indicators for the Information Society*. Geneva: International Telecommunications Union.
- ITU (2005) *ICT Indicators*. Geneva: International Telecommunications Union.
<http://www.itu.int/itu-d/ict/statistics/> (Accessed December, 2005).
- Kalakota, R. and Whinston, A.B. (1996) *Electronic Commerce: A Manager's Guide*. London, UK: Addison Wesley Publishing.
- Kebede, T. (2001) The potentials of electronic commerce. In: *Proceedings of Ethiopia in the Knowledge Age: A Conference on Information and Communications Technology and Development*. Addis Ababa: British Council.
<http://www.ethiopiaknowledge.org/index.htm> (Accessed September, 2005).
- Kraemer, K.L., Dedrick, J. and Dunkle, D. (2002) *E-Commerce: A Mile Wide and an Inch Deep*, CRITO Industry Sector Snapshot. Irvine, CA: University of California, Irvine.
<http://www.crito.uci.edu/projectsGECpapers.asp> (Accessed November, 2005).
- Le, T.T. and Koh, A.C. (2002) A managerial perspective on electronic commerce development in Malaysia. *Electronic Commerce Research* 2(1-2):7-29.
- Malone, T., Yates, J. & Benjamin, R. (1989) The logic of electronic markets. *Harvard Business Review* May-June:166-172.
- Mann, C.L. (2001) *Global E-Commerce: Issues and Policy for Developing Countries*. New York, NY: Institute for International Economics.
- Mansell, R. (2001) Digital opportunities and the missing link for developing countries. *Oxford Review of Economic Policy* 17:282-295.
- Mirani, R. and Lederer, A.L. (1998) An instrument for assessing the organizational benefits of IS projects. *Decision Sciences* 29(4):803-838.
- Molla, A. and Licker, P. (2001) E-commerce systems success: An attempt to partially extend and respecify the Delone and Mclean model of IS success. *Journal of Electronic Commerce Research* 2(4):131-141.
- Molla, A. and Licker, P. (2004) Maturation stage of e-commerce in developing countries: A survey of South African companies. *Journal of IT and International Development* 2(1): 89-98.

- Molla, A. and Licker, P. (2005) Perceived e-readiness factors in e-commerce adoption: An empirical investigation in a developing country. *International Journal of Electronic Commerce* 10(1): 83-110.
- Moodley, S., Morris, M. and Velia, M. (2003) *E-Commerce for Exporting Garments from South Africa*, IDS Working Paper 182. Brighton, UK: IDS, University of Sussex. <http://www.gapresearch.org/production> (Accessed January, 2004).
- Murillo, M. G. (2004) Institutions and the adoption of electronic-commerce in Mexico. *Electronic Commerce Research* 4: 201-219.
- Odedra-Straub, M (2003) E-commerce and development: whose development? *Electronic Journal of Information Systems in Developing Countries* 11(2): 1-5.
- Palacios, J.J. (2003) The development of e-commerce in Mexico: a business-led boom or a step toward the emergence of a digital economy? *The Information Society* 19(1):69-80.
- Palvia, P.C., Palvia, S.C. and Roche, E.M. (1996) *Global Information Technology and Systems Management: Key Issues and Trends*. West Ford, MA: Ivy League Publishing.
- Paré, D.J. (2003) Does this site deliver? B2B e-commerce services for developing countries. *The Information Society* 19(2): 123-135.
- Patterson, R. and Wilson, E.J. (2000) New IT and social inequality: resting the research and policy agenda. *The Information Society* 16(1):77-86.
- Robins, J. A. (1987) Organizational economics: Notes on the use of transaction cost theory in the study of organizations. *Administrative Science Quarterly* 32: 68-86.
- Saarinen, T. (1996) An expanded instrument for evaluating information system success. *Information & Management* 31:103-118.
- Sarkar, M.B., Butler, B. and Steinfield, C. (1995) Intermediaries and cybermediaries: A continuing role for mediating players in the electronic marketplace. *Journal of Computer-Mediated Communication* 1(3):1-13.
- Schech, S. (2002) Wired for change: the links between ICTs and development discourses. *Journal of International Development* 14(1):13-23
- Seddon, P.B. (1997) A respecification and extension of the Delone and McLean model of IS success. *Information Systems Research* 8(3):240-252.
- Singh, A. and Tanburn, J. (2001) *ICTs and Enterprises in Developing Countries*, SEED Working Paper no.17. Geneva: International Labor Office.
- Soliman, F. and Youssef, M.A. (2003) Internet-based e-commerce and its impact on manufacturing and business operations. *Industrial Management & Data Systems* 103(8):546-552.
- Sutz, J. (1989) On informatics and underdevelopment. *AI & Society* 3(2):146-155
- Tan, Z. and Ouyang, W. (2004) Diffusion and impacts of the Internet and e-commerce in China. *Electronic Markets* 14(1):25-36.
- TeleGeography (2005) *Global Internet Geography 2006*. Washington, DC: TeleGeography Research. <http://www.telegeography.com> (Accessed December, 2005).
- Tigre, P.B. (2003) Brazil in the age of electronic commerce. *The Information Society* 19:33-43.

- Tucker, D. and Lafferty, A. (2004) Implementing electronic commerce in SMEs: processes and barriers. *Journal of Electronic Commerce in Organizations* 2(4):20-29.
- UNCTAD (2004). *E-Commerce and Development Report 2004*. New York, NY: United Nations.
- UNCTAD (2005). *Information Economy Report 2005: E-Commerce and Development*. New York, NY: United Nations.
- Wigand, R. (1995) Electronic commerce and reduced transaction costs: firms' migration into highly interconnected electronic markets. *Electronic Markets* 16/17:1-5.
- Williamson, O. (1985) *The Economic Institutions of Capitalism*, New York: The Free Press.
- Zhu, K. and Kraemer, K.L. (2002) e-Commerce metrics for net-enhanced organizations: assessing the value of e-commerce to firm performance in the manufacturing sector. *Information Systems Research* 13(3):275-296.

APPENDIX A: SURVEY ITEMS USED TO COLLECT E-COMMERCE BENEFITS DATA

The following statements indicate possible benefits of e-commerce. Please indicate the extent to which **your organization has experienced these benefits** by expressing your degree of agreement or disagreement.

	Strongly Agree			Strongly Disagree	
	1	2	3	4	5
1. Reduced operation costs (personnel, rent, order and payment processing)	☐	☐	☐	☐	☐
2. Reduced marketing costs (communications, interactions and managing customer information and bypassing intermediaries)	☐	☐	☐	☐	☐
3. Reduced costs of maintaining up-to-date company information	☐	☐	☐	☐	☐
4. Reduced costs through Web-based purchasing and procurement	☐	☐	☐	☐	☐
5. Extending firm's reach (market)	☐	☐	☐	☐	☐
6. Product/service differentiation	☐	☐	☐	☐	☐
7. Increased customer loyalty and retention	☐	☐	☐	☐	☐
8. Improved process speed	☐	☐	☐	☐	☐
9. Improved customer relationship	☐	☐	☐	☐	☐
10. Improved supplier relationship	☐	☐	☐	☐	☐
11. Improved company image	☐	☐	☐	☐	☐
12. Improved internal communication	☐	☐	☐	☐	☐
13. Improved inter-organizational communication	☐	☐	☐	☐	☐
14. Increased revenue	☐	☐	☐	☐	☐
15. Improved competitive position	☐	☐	☐	☐	☐
16. We are satisfied with the performance of our e-commerce application	☐	☐	☐	☐	☐