Prometheus, Vol. 21, No. 4, December 2003

Carfax Publishing
Taylor & Francis Group

Electronic Commerce: Conceptual Pitfalls and Practical Realities[1]

ROBIN MANSELL

ABSTRACT *This paper offers a critical assessment of the development of business-to-business electronic commerce. Focusing particularly on the use of Internet-based 'many-to-many' electronic marketplaces, the practical reality of the experience of B2B electronic commerce for a sample of garment and horticulture sector firms in Bangladesh, Kenya and South Africa is examined. The limitations of conventional transaction cost perspectives on the development of electronic commerce are considered. A conceptual framework is applied that gives greater emphasis to institutional structures and practices and to the specific characteristics of the markets and supply chains in which firms operate. The empirical results suggest that in contrast to speculation about the benefits of Internet-based many-to-many electronic markets especially for firms in developing countries, for firms that are already engaged in international trade, the emergence of restricted access Internet-based trading and new ways of integrating supply chain information are the most significant developments. The paper considers some of the factors that are likely to influence future developments in B2B electronic commerce and the lessons for policy makers and practitioners.*

Keywords: electronic commerce, global supply chains, garments, horticulture, developing countries.

Introduction

Promoting business-to-business (B2B) electronic commerce is high on the policy agenda of national governments and international development agencies.[2] Definitions of electronic commerce vary considerably depending upon whether the focus is on Internet-based commerce or transactions involving computer networks more generally.[3] Nevertheless, although it is not always clear exactly what type of electronic commerce is being promoted through policy measures and industry initiatives, there is a widespread expectation that when firms in all regions of the world are able to connect to global networks they will be able to implement electronic commerce in ways that enable them to compete more effectively.[4]

B2B electronic commerce is widely believed to have implications for the complete value chain of business processes that firms become involved in when

Prometheus ISSN 0810-9028 print/ISSN 1470-1030 online © 2003 Taylor & Francis Ltd
http://www.tandf.co.uk/journals
DOI: 10.1080/0810902032000144646

they trade.[5] B2B electronic commerce, enabled by the Internet, is expected to increase the efficiency of internal firm processes and to streamline inter-firm linkages. Firms of all sizes are expected to benefit from reduced information asymmetries and from strengthened business relationships as a result of their introduction to a range of electronic commerce applications.

There has been considerable interest in the development of Internet-based electronic marketplaces as a specific type of B2B electronic commerce. The popularity of the World Wide Web has created the potential to develop websites that are open to many buyers and sellers, offering new opportunities for interactions between firms. Steven Kaplan and Mohanbir Sawhney define these electronic marketplaces or 'e-hubs' as 'neutral Internet-based intermediaries that focus on specific industry verticals or specific business processes, host electronic marketplaces, and use various market-making mechanisms to mediate any-to-any transactions among businesses'.[6]

Electronic marketplaces are expected to add value to transactions between many different buyers and sellers partly because their use is expected to lower transaction costs associated with trading on the open market.[7] As empirical evidence about the development of these sites has begun to accumulate, however, there is at least a suggestion that many-to-many trading is not strongly favoured. Even though these electronic marketplaces are designed to aggregate a large number of buyers and sellers, 'buyers generally use open markets for just 10 percent to 15 percent of their needs . . . they tend to choose sellers with whom they have already had personal experience'.[8] Producer firms may not wish to use these sites if they are required to release valuable information into the public domain or risk exposure to increased competition.

Despite the potential benefits of B2B many-to-many electronic marketplaces, the actual experience of the development of new forms of electronic trading does not appear to coincide with initial expectations. Many early attempts to consider how B2B electronic commerce might influence the performance of firms and the structure of markets had a very strong theoretical orientation. There were relatively few attempts to verify claims about the positive 'impacts' of the new electronic platforms for trading online. In policy circles, efforts to promote electronic commerce tended to offer 'one size fits all' recommendations for firms, regardless of the contexts in which they were operating.

When empirical studies of B2B electronic commerce have been undertaken, however, there have been signs that '. . . local differences in the factors influencing electronic commerce diffusion are evident between countries . . . the diffusion process is indeed shaped by national environments and policy rather than taking a universal trajectory'.[9] The results of empirical studies have also suggested that the effects of electronic commerce are likely to differ by sector. Eric Brousseau argues, for example, that when applied to standard goods or services, electronic commerce should make markets more transparent and reinforce price competition. However, 'when applied to customized and specific goods and services, EDI type systems will enable business partners to cooperate more efficiently only if they are able to maintain long-term cooperative relationships'.[10]

Most research on B2B electronic commerce focuses on the experiences of firms and industrial sectors in the industrialised countries. Evidence on the use of B2B electronic commerce in developing countries is, as Sagran Moodley argues, 'scattered and anecdotal, or based on speculation and theoretical arguments'.[11] When empirical research is undertaken in developing countries, the local context

in which business activity is conducted emerges as a key factor influencing whether enterprises can build effective businesses around electronic commerce.[12] Studies of the 'e-readiness'[13] of industrial sectors in developing countries also give very little attention to the specific characteristics of B2B electronic commerce applications that are available to firms in developing countries.[14]

In this paper a major conceptual pitfall is considered that informs many assessments of the likely potential of B2B electronic commerce. A conceptual framework is applied that gives greater emphasis to institutional structures and practices and to the specific characteristics of the markets and supply chains in which firms operate. This framework is used to structure an examination of the practical reality of the experience of B2B electronic commerce for a sample of firms in Bangladesh, Kenya and South Africa. All the firms were active in international markets as producers of garments or horticultural products. The empirical evidence focuses on the extent to which these firms were benefiting from access to global networks, on perceptions of the likely advantages of many-to-many electronic marketplaces, and on the specific uses of information and communication technologies (ICTs) that were favoured by these firms. Consideration is also given to some of the factors that seem likely to influence future developments in B2B electronic commerce and to lessons for policy makers and practitioners.

Conceptual Pitfalls and B2B Electronic Commerce Expectations

The predominant approach to the analysis of the implications of the development of B2B electronic commerce is informed by analyses of how new forms of trading will impact on transaction costs. Transaction costs are the 'costs of running the system'[15] and they are the 'economic equivalent of friction in a physical system'.[16] If they can be reduced substantially through the use of ICT-enabled trading mechanisms, barriers to participation in trade should be reduced for firms. In theory, this effect should be available to any firm regardless of its location as long as it is able to access cost reducing electronic trading mechanisms.

From the vantage point of transaction cost analysis, commercial trading relationships involve two types of cost.[17] The first is coordination costs. These are incurred in the process of searching for information, negotiating and fulfilling contracts, ensuring that the terms of contracts are met, and adapting to change in the marketplace.[18] The second is costs that are incurred because of incomplete or asymmetrical information. Firms may lack the information needed to decide whether the terms of an agreement are acceptable. By helping to reduce both these types of cost, B2B electronic commerce, and electronic marketplaces in particular, are expected to lead to decreases in transaction costs. This, in turn, is expected to facilitate trade across national boundaries and to enhance the competitiveness of firms that adopt the technology.

In theory, producer firms should be able to use many-to-many electronic marketplace sites to reduce the costs of searching for information and to better coordinate with other firms that are up or downstream in their supply chains. By implementing B2B electronic commerce, firms of all sizes should be able to use the new applications to facilitate a 'closer integration of adjacent steps in the value-added chain'.[19] They should also be able to scale up the number of transactions they engage in on the international market. This is because of their access to the wide range of buyers that are expected to participate in many-to-many electronic marketplaces based on the Internet.[20]

The conceptual apparatus provided by transaction cost analysis with its focus on the informational characteristics of trading on the market and on contractual relations has been widely applied by those seeking to foster B2B electronic commerce. It has been concluded that many-to-many electronic marketplaces will strengthen the international trading prospects of firms based in developing countries. Four basic propositions about the 'impact' of this form of B2B electronic commerce can be derived from reports published by United Nations agencies concerned with international trade and development.

> *Electronic commerce is likely to work through many-to-many electronic marketplaces*, i.e. '. . . e-markets involve a large number of buyers and sellers that engage in many-to-many transactions and relationships. They create a trading community in which buyers' orders are matched with sellers' offers and the trading partners benefit from other forms of collaboration'.[21]

> *Many-to-many electronic markets will be supported by complementary business functions*, i.e. 'B2B e-marketplaces and the implementation of their business models rely to a very large extent on technology infrastructure. The market maker must possess or have access to a technology that is capable of handling the full range of commercial processes from ordering to order fulfilment and settlement. The technology must support transactions involving large numbers of users over the Internet and be capable of handling complex business practices, user relationships and integration with third-party commercial applications'.[22]

> *B2B electronic commerce offers high returns to firms in developing countries*, i.e. 'Traditional marketing and export channels [for primary products] tend to be inefficient and dominated by multiple intermediaries . . . Developing countries, using existing local commodity exchanges and commodity export associations as a foundation, can use B2B on-line trading as a means of transforming existing commodity marketing systems to great advantage'.[23]

> *B2B electronic commerce helps smaller firms to enter global markets*, i.e. 'E-trade opens new commercial opportunities to the export-oriented enterprise . . . it empowers the small and medium-sized enterprise, allowing it to participate in international markets where previously market entry and promotion costs were prohibitive',[24] and 'E-commerce gives small and medium-sized enterprises the ability to access international markets that used to be difficult to enter due to high transaction costs and other market access barriers'.[25]

The expectation underlying these propositions is that the technological innovations that have supported the spread of the Internet and the use of the World Wide Web to create numerous kinds of information and transaction-related services will lead to greater market efficiency and transparency. This should enable producer firms in developing countries either to expand their share of the markets in which they trade and/or to reposition themselves within global supply chains to their advantage.

Within the United States, this expectation has been questioned on the basis of empirical studies of the impact of electronic commerce in a variety of industry sectors.[26] The structure and operation of markets are not automatically modified to achieve greater efficiency and transparency as a result of the application of the new

technologies. The notion that they will be modified in this way is a major conceptual pitfall that is implicit in many of the more speculative considerations of the development of B2B electronic commerce. Empirical research in Europe also suggests that the outcomes for firms that adopt various types of B2B electronic commerce can be enormously varied. They are more likely to be informed by prevailing commercial practices and the structural features of specific sectors than by any elixir of technology. Empirical observation shows that some costs of transacting may decline when digital trading platforms are introduced, but other costs may increase for a wide variety of reasons.[27]

Circumventing this conceptual pitfall requires empirical inquiry and openness to discovery of the circumstances in which firms are actually trading in international markets. This pitfall arises both from inflated expectations about the 'impact' of ICTs on information searching and coordination costs and from mainly theoretical assessments of changes in the level of transaction costs that are incurred in the process of trading internationally.

By the end of the decade of the 1990s, analysis of how B2B electronic commerce implementations were affecting firms particularly in developing countries was relatively uncharted territory.[28] There was some research on the role of ICTs in the development process and a growing body of work on the nature of global supply chains.[29] These two strands of research informed a recent study of the actual experiences of B2B electronic commerce by firms in developing countries.[30]

The next section of this paper highlights some of the results of this study which aimed to critically assess the four prevailing propositions about B2B electronic commerce. The conceptual starting point for the research in contrast to the traditional transaction cost framework, was that innovations in ICTs must not be expected to have universally similar 'impacts' on adopting firms. Technology adoption is best conceived as an uncertain process that is dependent on many non-technological factors. One very significant factor is the characteristics of the institutional structures, processes and constraints under which firms actually operate. The ways these factors influence the choices of firms in developing countries about when and how to develop B2B electronic commerce provided the main focus for the research.

The Practical Realities of B2B Electronic Commerce

The examination of B2B electronic commerce with developing countries that is reported in this section focused on two sectors—garments and horticulture—both of which are important for employment and export growth in developing countries.[31] The garment sector is one of the most important export sectors in South and South East Asia.[32] Fruits and vegetables are significant for sub-Saharan African countries.[33] At the time the research was conducted in 2001 and 2002 numerous B2B electronic marketplaces supporting these two sectors were in operation.[34] Bangladesh, Kenya, and South Africa were selected for the interview-based component of the research.[35]

The ways firms were organising their relationships with international trading partners were investigated using a semi-structured interview protocol. This allowed the researchers to elicit information about the nature of the relationships between the firms in the sample and their customers and suppliers. A total of 112 interviews were undertaken with senior representatives of firms and key informant organisations (including industry experts, business association and chamber of commerce

Table 1. Registration with open electronic marketplaces

	Garment firms	Horticulture firms	Total	
			Number	%
Have not registered	41*	16	57	77
Have registered, but no sales materialised	3	7	10	14
Have registered, and sales materialised	3	4	7	9
Total	47	27	74	100

*Two firms had registered with private electronic marketplaces, but not with many-to-many electronic marketplaces.

representatives) across the three sectors and three countries.[36] The majority of firms in the sample had been in business for between one and 25 years. They were selected because they were known to be involved in international trade and, therefore, were likely to be involved in, or considering, some form of B2B electronic commerce.

B2B Electronic Commerce—Establishing Global Connectivity

If firms in developing countries are to avail themselves of the potential benefits of B2B many-to-many electronic marketplaces that are accessible using the Web, they need to have a means of accessing electronic networks. The 47 firms in the garment sector were using computers and had connections to the Internet using either analogue modems (63%) or Integrated Service Digital Network (ISDN) connections (29%). Only four firms were using higher speed Internet connections. In the horticulture sector, all 27 firms similarly were using computers and had connections to the Internet using analogue modems (52%) or ISDN connections (33%). As in the garment sector, there was very little use of higher bandwidth access.

Despite the generally acknowledged weakness of the ICT infrastructure in Bangladesh, Kenya and South Africa, all the firms in the sample had some means available to them to access the Internet.[37] Very few of the respondents in the sample suggested that they were being pressured by buyers to introduce more advanced technology.

Taking Advantage of B2B Many-to-Many Electronic Marketplaces

Despite the availability of many-to-many electronic marketplaces providing a range of services from trade leads to buyer/seller links, requests for quotes, online auctions, etc. (rarely online payment facilities), the majority of the firms in the research sample had never registered with an electronic marketplace (see Table 1).

The results shown in Table 1 were examined by firm size indicating a negative correlation between firm size and reports of registration at open electronic marketplaces,[38] suggesting that smaller firms are more likely to register with many-to-many electronic marketplaces. Table 2 shows the extent of use by firm size of any Internet application including e-mail to buy or sell products internationally by firm

Table 2. Firms using the Internet to buy or sell products internationally

Number of employees	Have used Internet to buy or sell	Have not used Internet to buy or sell	Total
≤500	10	7	17
≤501	23	34	57
Total	33	41	74

size. Statistical testing suggests that the likelihood of reporting that products have been bought or sold using the Internet is unrelated to the size of the firm.[39] Despite the greater likelihood of registering at electronic marketplaces, smaller firms seem no more likely than larger firms to report successfully using these sites to complete a transaction.

B2B electronic marketplaces are not necessarily open to all buyers and sellers. The right of access to a website may be managed to achieve a restricted membership community. There were a very few instances of the use of these types of restricted entry marketplaces in the sample.[40] Large buyers were promoting restricted online trading as a means of facilitating the streamlining of their sourcing activities.

B2B Electronic Commerce is Basically About Electronic Mail Use

Even if there was little sign that firms in the sample were following the many-to-many electronic marketplace model of B2B electronic commerce, the availability of global connectivity was influencing the way that the firms were doing business. This was particularly so when repeat transactions were involved. E-mail was reported as the most important Internet application. It was being used to facilitate communication with the firms' existing customers and suppliers.[41] Table 3 shows the extent to which the firms were using e-mail to place or accept product orders.

A respondent in the garment sector stated that 'e-mail has substantially replaced the telephone for us—the result is miraculous for us in terms of cost'. Another respondent in the same sector observed that 'one of our main expenses has always been at the level of communication and e-mail has been a blessing'. In the

Table 3. Use of e-mail to place or accept product orders

	Garment firms	Horticulture firms	Total
Always	24	11	35 (47%)
Frequently	20	5	25 (34%)
Seldom	0	7	7 (9%)
Never	2	3	5 (7%)
No response	1	1	2 (3%)
Total	47	27	74

horticulture sector, e-mail was regularly being used for co-ordinating schedules and to exchange digital photographs of produce.

Using the Web for Information Purposes

More than 75% of the 74 firm-based respondents indicated that they 'seldom' or 'never' used the Web to obtain general information about product inputs and product markets or about information concerning specific customers or suppliers. Although they could all access the Web in principle, nearly all of them preferred to rely primarily on interpersonal networks and face-to-face meetings to exchange certain types of information. Of the 62 respondents in the sample who were asked if their firms had a website, 66% reported that they did not have a website.[42] For those that did have one, there was a positive correlation between firm size and the presence of a site.[43] Most of these sites had no facilities for interactivity. They were serving as marketing tools to promote the firms' capabilities and to provide product and basic contact information.

B2B Electronic Commerce—Some Qualitative Accounts

The interview data provided many insights into the respondents' motivations and expectations with respect to the further development of B2B electronic commerce. The experiences of several firms are presented briefly in this section to highlight some of the most predominant experiences and assessments of the potential of B2B electronic commerce.

Bangladesh Garment Sector—Company A

Company A had about 4,500 employees and was producing woven and knitted garments. It was buying in some fabrics and all sewing was done in-house. Dying was outsourced to local and foreign firms. Some 60% of its exports were to the European Union, and the other 40% was to the United States. This company was producing products to order on a contract basis and had long-standing relationships with its customers. It moved from a dial-up connection to the Internet to a high-speed cable connection in 2001 because it was cheaper and more reliable. The company had been using e-mail since 1996 to maintain contacts with its buyers and suppliers and to place and accept orders with its foreign customers and suppliers. The management was motivated by the desire to gain experience of using ICTs that might lead to long-term benefits. Its website was launched in 2000 and contained product and contact information. This was not believed to have generated new business partly because this company was operating at full capacity. Some customers had asked them to place information on their websites, but they had yet to do so. There was little awareness of B2B electronic marketplaces, but no opposition to online bidding. ICTs were being used to support supply chain management but there was a low level of ICT integration between this company and its buyers and suppliers.[44]

South Africa Garment Intermediary Firm—Company B

Company B was a South African garment-exporting agent with less than 15 employees, and owned by a large Hong Kong trading group. In South Africa its

primary role was quality assurance. It was using local dial-up service to the Internet and e-mail was the most frequent means of maintaining contacts with suppliers (documentation was conveyed physically). About 90% of garment factories in the Southern African Development Community were thought to have access to e-mail. The respondent said 'we don't want to work with the other 10%'. This was because these were micro-firms that might be engaged in questionable practices. Foreign buyers were thought to be becoming more sophisticated in their use of ICTs but 90% of buyer needs could be met using e-mail. The Web was not generally being used as a research tool because some of the firms did not have any web presence. Company B had established a restricted access website in the United States where customers with whom they were already doing business could register and place orders. Little pressure was being put on garment producers to make greater use of B2B electronic commerce. Resistance to the use of ICTs was attributed to 'mature managers' who lack understanding. 'In terms of IT, there is a lot of progress being made on the processing side of things in terms of customers and suppliers receiving information. E-mail is faster, easier, and quicker than fax. Virtually no progress is being made at the transaction level. Doing deals is another story, people want personal contact.'[45]

South Africa Garment Sector—Company C

Someone who regarded ICTs as a hobby and had developed a database of international garment manufacturers ran company C. The database included contact and product information of garment firms in a large number of countries. 'Originally I thought that it would be a static site. It started as a joke and turned out to be nightmare.' This respondent did not think the sector was set up to deal with electronic marketplaces. For the main firms, 'unless they want something, you have to bang on their door and drag them into the 21st century'. Company C was developing a web interface with a plan to 'go live' as an information portal, later moving towards providing B2B platforms. 'We won't mediate transactions. We've got the technology but the human element behind the trade is the problem.' In South Africa the Internet was seen as developing as an information medium, not as a business tool partly because of the cost of high speed connections which are prohibitive for small and medium-sized enterprises.[46]

South African Horticulture Sector—Company D

Company D had an Internet site for the South African horticulture sector catering to domestic producers. It was providing web links to information content and revenues were generated through advertising. It also ran a subscription service for information 'brokerage'. It was planning a restricted access online auction for fresh produce, grain, and livestock and also developing bespoke software solutions for e-procurement. The company was experiencing many technical problems with the auction platform but the technical side of the auction was expected to be a key determinant of its success. This company had been started by an agricultural trade magazine and 'without the support of the printed media, it probably wouldn't have survived'. It became a financial 'black hole' and was acquired by a connectivity provider. Internet connectivity within South Africa was acknowledged as a problem. There was a perceived need for an electronic marketplace, but 'the industry is perhaps naive and uninformed. The potential benefits need to be proven'. B2B

electronic commerce was expected to grow but only within certain limits. It was not expected to become seamless because 'if you shorten the supply chain you will likely short-change yourself'. Potential export markets were being developed but this process was informed by social and professional factors and by face-to-face interactions. The transactional dimensions of trading were taking place offline where deals could be negotiated on the basis of trusted relationships.[47]

Kenya Horticultural Sector—Company E

Company E was one of the largest horticulture exporters in Kenya producing fresh vegetables and flowers. With around 5,500 employees, it was growing much of its produce on its own farms and had its own processing facilities. It was exporting about 95% of its produce to supermarkets in the United Kingdom under contract and the rest to continental Europe. E-mail was being used frequently resulting in a big reduction in telephone costs. For vegetable and flower orders, the company was sent spreadsheets by the buyers' representatives as weekly e-mail attachments. For each product line, and for each customer, a schedule for the following week would specify the weight, sell-by date, price, number of containers and punnets, date for picking, and date of arrival on the supermarket shelf. There was a strong preference for contracts that contribute to price stability. There was no interest in selling flowers through auctions or in selling through intermediaries. Sales were said to depend on trust and reputation and it was suggested that supermarkets would not buy products on the Internet 'because traceability is essential'.

Kenya Horticultural Sector—Company F

Company F was another large vegetable and flower producer based in Kenya. Some 80% of its products were being exported to the United Kingdom and the rest to continental Europe. The company had an analogue modem link to the Internet, but an 'always on' connection was being investigated. This respondent said that 'e-mail is the best thing that has ever happened to us . . . the fax is virtually dead'. The company was receiving 15–30 e-mails per day from one importer but most contact with supermarket buyers continued to be face-to-face. It was not envisaged that the Web would be used to integrate information provided by e-mail about production schedules and order quantities as this information was needed only by one person in the company. Nevertheless, Internet access to information was regarded as a benefit to enable everyone to be aware of where product launches were taking place—'It will prevent Chinese whispers'.[48]

Kenya Horticulture Sector—Company G

Company G had less than five permanent employees and a larger casual work force. It was selling fruits and vegetables and exporting mainly to Middle Eastern countries. It had an analogue modem connection to the Internet, was using e-mail extensively, and was using the Web to access general information about product markets and about specific customers. This company had used the Internet to sell its products internationally and had also registered with an electronic marketplace. The site provided considerable information. However, apart from establishing an initial contact with potential buyers, all aspects of deals were conducted through direct contacts between the seller and the buyers. This was because success was

thought to depend on how relationships are nurtured and followed up. The company had come across websites which required registration and a fee which it would always decline to pay. 'We get constant requests, orders' but there had been payment problems and the company could not always satisfy requests for orders for capacity reasons.[49]

Kenya Horticulture Sector—Company H

Company H was a large firm that had been in business for many years and was exporting mainly to Europe. It had an analogue modem connection to the Internet, 'sometimes the line works, sometimes it doesn't—It's a nightmare'. Getting a leased line was thought vital to the business. There was an Intranet and 70% of the employees were connected. E-mail was viewed as being essential but faxes were being used to confirm orders. Web searches were limited because marketing organisations were collecting information and browsing the Web was too slow and costly. Large organisations had established supply chains and were not thought to be looking to increase business through the Web. This company was using supply chain management software in conjunction with an airfreight company, but 'whether it will enhance performance to the extent that investment is worth it, is unknown'. Implementing software and hardware for information management was seen as an expensive exercise and, so far, the costs involved did not seem to justify the investment. There had been pressure from buyers who had stated categorically that it would be an advantage for them if Company H were in a position to directly exchange information online—'we feel the same way'.[50] The main motivation for making greater use of ICTs was to improve the quality of information. Revenues had not increased as a result of web use but e-mail use was reported to have increased profitability.

In summary, the evidence in this section suggests that in contrast to the propositions in the preceding section of this paper about the great potential of B2B many-to-many electronic marketplaces, there is a provisional basis for the following propositions.

B2B many-to-many electronic marketplaces are not the main important development for firms in developing countries that are already trading in global markets. Restricted access Internet trading and new ways of integrating supply chain information to achieve better coordination are the more important developments.

B2B many-to-many electronic marketplaces may be supported by business functions to help firms to transact online in a few cases, but firms in developing countries are not likely to change their offline business practices and relationships unless they see major benefits for their positioning in global supply chains.

B2B electronic commerce does not seem to offer high returns to firms in developing countries as compared to other ways of conducting trade. Producer firms in developing countries rely on preferred intermediaries and conventional trade channels. Geographical distance from buyer markets continues to matter despite the distance-reducing potential of the Internet.

B2B many-to-many electronic commerce is unlikely to help many small firms to enter global markets. The high costs of global branding, the need to form trusted relationships,

and the need to meet quality and other standards of buyers in global supply chains continue to present barriers to market entry.

In the research reported here there was evidence of extensive use of e-mail to coordinate with foreign customers and suppliers. There were also signs of growing use of supply chain management software, although there was little information system integration between buyers and suppliers. Restricted access electronic marketplaces appeared to be favoured over many-to-many trading sites on the Internet because producer firms had established relationships with their buyers and often had little spare capacity to take on new business. Even where innovative electronic commerce applications were being developed in the form of databases or auction sites, the importance of trust, face-to-face interaction, and offline transacting was consistently emphasised. Some web applications for electronic commerce were supported by some of the firms and there was a general feeling that B2B electronic commerce would continue to spread. However, investment to support this was seen as costly in terms of software and hardware and in terms of organisational change, especially since there was little clear evidence of a revenue enhancing return on that investment.

B2B Electronic Commerce with Developing Countries

B2B many-to-many electronic marketplaces do not appear to be playing the role initially expected of them. Michael Quayle suggests that despite the advantages to buyers of opening up the supplier base through the use of many-to-many electronic marketplaces, 'what this does not recognise, however, is the partnership/long term business relationship, e.g. single sourcing and trust, which may have significantly more benefits to all concerned than maintaining a huge supplier base'.[51]

Similarly, Sergio Mariotti and Franscesca Sgobbi suggest that the use of ICTs should not necessarily be expected to promote anonymous arm's-length trading.[52] The use of these technologies is just as likely to lead to strong inter-firm networks and to closely tied relationships. Inter-firm networks supporting international trade are central to global supply chains.[53] These networks are very complex, particularly in sectors where global buyers have created production and distribution systems to meet their requirements.[54] Exclusive or restricted access B2B electronic commerce is likely to be more attractive to buyers and sellers within established supply chains.

The attractiveness of restricted access sites on the Internet is similar to earlier uses of ICTs which often favoured closed networks to support firms' information and communication requirements. Donald Lamberton's and Eli Noam's work on the economics of information and communication has long suggested that there are strong incentives to develop both open and exclusive forms of exchange relationships facilitated by new technologies.[55] Internet protocols can be configured for open access to the Internet or for restricted access. Transaction cost perspectives may suggest that there are strong drivers to reduce information asymmetries in order to reap efficiency gains in the market. However, developing restricted access B2B electronic commerce applications is consistent with the interests of some buyers and sellers in maintaining information asymmetries. The limited available evidence about restricted access B2B electronic marketplaces suggests that their use will grow as efforts are made to more tightly integrate global supply chains.

These observations about how certain types of B2B electronic commerce are favoured over others resonate with the wider experience of technological innovation in the ICT sector. There are parallels between the development of electronic trading sites on the Internet and the development of information systems more generally to support information processing over the last two decades.[56] A central lesson of the latter research is that the potential of ICTs is 'not released by simply transferring technologies and processes from advanced economies'.[57]

Improved access to global markets for developing country producer firms is not likely to follow simply from the deployment of B2B electronic commerce. Measures to tackle 'digital divides' or to create electronic trust mechanisms are not likely to change this substantially. The restricted access B2B electronic marketplaces that are being developed do not seem to be changing the positions of firms within their global supply chains. When new market access possibilities become available to firms, this is more likely to be due to changes in their position within their supply chains than to the use of new technology. The structure of these chains and the coordination requirements of buyers and sellers appear to strongly influence the types of B2B electronic commerce that will be developed in the future.

International market conditions are influenced more by existing market structures and commercial practices than by the introduction of new ICTs. However, if buyers in the supply chains in which developing country firms are integrated move towards greater use of supply chain management software this will increase the need for producer firms to invest in new data input procedures and new capabilities for providing and monitoring digital information. Weak capabilities in this area and limited financial resources could create new barriers to trade for developing country producer firms in the future.

The difficulties of building capabilities for using B2B electronic commerce suggest that in the international market intermediary firms will continue to play an important role. Many of these firms are not simply creating friction in an otherwise friction-free marketplace. They often play key roles in the sector markets in which they operate. In some cases, they are introducing B2B electronic commerce applications that producer firms could not develop themselves. There may be efficiency gains as a result of some forms of Internet-based B2B electronic commerce. However, these cannot be taken for granted. There remains a strong preference—at least in the two sectors examined here—to maintain personal contacts with firms in the supply chains. Despite the theoretical potential to reduce transaction costs and barriers to international trade, there is no *a priori* reason to expect that Internet-based B2B electronic commerce will replace conventional means of organising trade.

In their work on the role of ICTs in supporting small and medium-sized enterprises in Africa, Richard Duncombe and Richard Heeks suggest that an integrated and holistic approach should underpin all considerations about ICT investment by organisations in developing countries.

> An integrated approach: this sees ICTs as one means to serve information and enterprise needs, not as an end in themselves . . . A holistic approach: this recognises the presence of an information chain that requires a whole series of resources—tangible, intangible and embedded—not merely for accessing data but also for assessing, applying and acting upon that data.[58]

Conclusion and Policy Implications

By 2002, UNCTAD was suggesting that 'e-commerce offers no instant cure for the ills of any economy; excessive expectations about what it can do for development should not be encouraged'.[59] Nevertheless, there still were signs of very high expectations—'E-commerce gives small and medium-sized enterprises the ability to access international markets that used to be difficult to enter due to high transaction costs and other market access barriers'.[60] Optimism about B2B electronic commerce seemed to be holding in spite of observations that only a handful of electronic marketplaces serving the largest industries and players are likely to succeed.[61]

The results of the empirical study reported in this paper and a review of the B2B electronic commerce literature suggest some clear messages for the policy makers and practitioners. The starting assumption must be that the problems faced by firms trading internationally from their base in developing countries vary enormously. It is essential to examine what obstacles they encounter in their regions or sectors and how they are integrated within their global supply chains. Participation in international markets by firms producing material products is becoming more, rather than less, difficult in many instances as firms must meet new standards of quality and business practices and operations.

There are no magical B2B electronic commerce formulas that will launch developing country firms into new markets or help them to find new customers. The way these firms should use ICTs must be assessed from the standpoint of local stakeholders and the firms and agencies that influence their external markets. Although investment in ICTs is important, choices should be based on what is best for each sector and firm in a given country—not on abstract assessments of technological potential and its theoretical impact on transaction costs. There are forums in developing countries that are initiating capacity building in the ICT area, but they mainly focus on ICT strategies.[62] Despite the user-centred intentions of many of these initiatives, the focus is mainly on the 'e', often without sufficient understanding of the sector- and firm-specific needs.

Achieving greater participation by producer firms in various forms of B2B electronic commerce requires a rethinking of the goals of ICT investment. The goals need to be linked to achieving more equitable participation of producer firms in international markets. Initiatives to reduce 'digital divides' in developing countries tend to put technology first. While measures to extend access to networks and to reduce the costs of use are needed, B2B electronic commerce seems most likely to develop in line with requirements for trusted and frequently, exclusive, business relationships. Analysis of this process should come before the decisions about technology.

In addition to their consideration of the ICT investment issues, policy makers and practitioners need to address other country and sector specific issues if they want to encourage greater use of B2B electronic commerce. The state of investment in the transport infrastructure for material goods is crucial. Although improving legislation and regulations for B2B electronic commerce may be desirable, it does not seem to be the highest priority. Policy makers who want to secure better access to international markets for exporters in developing countries should recognise that there is very little online buying and selling of developing country firms' material products. In addition, contract commitments and payments are not generally occurring online. Conventional commercial practices are still

favoured even when firms find buyers or suppliers through B2B electronic marketplaces.

Lack of awareness of B2B electronic commerce developments and the need for training are very important issues. There is a need to build capacities in the industrial sectors of developing countries. However, the response to this need should not be driven by 'top-down' ICT and B2B electronic commerce strategies. Instead, it should be driven by an understanding of how firms are integrated into global supply chains and by how specific sector strengths can be combined with the potential of selected applications of ICTs.

Finally, policy makers and practitioners need to avoid the conceptual pitfall of assuming that 'old' commercial practices are always less efficient than B2B electronic commerce facilitated trading. In some cases, innovative forms of B2B electronic commerce will yield reductions in transaction costs and efficiency gains. But there are many other costs and business factors associated with institutional structures and practices that must be considered prior to deciding that ICT investment is the answer to problems of unequal global trade.

Notes and References

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40. The focus of the study was on the prevalence of many-to-many electronic marketplaces and the low frequency of restricted access sites in the sample should not be interpreted as being indicative of their actual prevalence.
41. This result is consistent with studies of Internet use in many developing countries where costs of access to the Internet are high and there is little use of dedicated higher bandwidth connections resulting in slow and costly web access.
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