Business-to-business e-commerce and access to global markets: exclusive or inclusive outcomes?

John Humphrey*

Institute of Development Studies

Final Draft, January 2002

SUMMARY

This paper analyses whether and how B2B e-commerce applications might increase access to the global economy for firms in developing and transitional economies. E-marketplaces are considered according to two variables: the extent to which access to the marketplaces are open or restricted, and the extent to which the marketplace is focused on online transactions or provision of information. The paper highlights how different types of e-marketplaces address the issues of the reduction of search costs, co-ordination of the activities of buyers and sellers and containment of the risks posed by opportunistic behaviour. It concludes that transaction-oriented, open e-commerce marketplaces are likely to be less important for firms in developing countries firms than both open, information-oriented marketplaces and private and industry-sponsored marketplaces. Policies aimed at promoting B2B e-commerce in developing country firms will need to be tailored to these different types of marketplaces.

* This paper has been prepared with financial support from the Department for International Development of the UK government, which is funding a research project on e-commerce for developing countries. The author has benefited substantially from comments on earlier drafts by Daniel Paré, Robin Mansell and Hubert Schmitz, with whom he is collaborating on the research project. Any errors and omissions are the sole responsibility of the author.

1 Introduction

Business-to-business (B2B) e-commerce has been welcomed as a means of increasing the access of firms, particularly smaller firms, to global markets. In the initial surge of enthusiasm for e-commerce, it was suggested that disintermediation (buyers and sellers cutting out intermediaries and trading directly with one another) would provide considerable gains to producers. It is now widely accepted that intermediaries will continue to thrive in the Internet era, and recent reports from international agencies concerned with e-commerce in developing countries have emphasised their role (see, for example, UNCTAD 2000). However, analyses of the potential and importance of B2B e-commerce continue to focus on one particular type: many buyers and many sellers coming together in marketplaces where they can obtain sufficient information to make decisions about whether to buy or sell a product, even though payment and delivery may not necessarily be arranged online. This implies that the physical infrastructure, software and business models of these exchanges are "open" - that they do not create barriers to entry to firms. Two recent reports from UNCTAD (2000; 2001) illustrate these assumptions:

- B2B e-commerce e-marketplaces involve many buyers and sellers: "they bring together a large number of buyers and sellers into one trading community" (UNCTAD 2001: xxix).
- It is argued that B2B e-commerce offers potential advantages for developing countries because it reduces transaction costs in general, and e-commerce transaction costs are less sensitive to distance than in traditional marketing channels. Further, e-commerce should provide particular benefits when existing marketing channels work poorly: "Traditional marketing and export channels [for primary products] tend to be inefficient and dominated by multiple intermediaries" (UNCTAD 2001: xxx). This implies that B2B e-commerce should benefit developing country producers as a result of creating open and efficient marketing channels.
- It is assumed that B2B e-commerce is predominantly organised around e-marketplaces in which decisions to buy or sell can be made online. This is the implications of statements such as "the next vendor is only a mouse-click away" (UNCTAD 2000: 18). For this to happen, e-marketplaces must offer a range of functions (assurances about product, sellers, payment, etc.), and consequently it is suggested that "The e-marketplace that offers the most functionality that traders require will have an advantage" (UNCTAD 2001: xxx).

This paper argues that B2B e-commerce applications are much more varied. Firstly, there is a range of marketplaces, each with quite distinct implications for ease of access for potential buyers and sellers. Different types of products and trading relationships lend themselves to different types of e-marketplaces, which vary according to their openness and the extent to which online transactions are supported. Secondly, there is a trade-off between ease of access and the likelihood of decisions to buy and sell being made online. Adopting a transaction costs approach to the market-making functions of B2B e-marketplaces, the paper highlights the importance of reducing search costs, co-ordinating the activities of buyers and sellers and reducing the risks posed by opportunistic behaviour. It then considers the various market structures that characterise international trade, using the perspective of global value chain analysis,[1] which has analysed market structures and the co-ordination of activities between firms.

[1] For a recent selection of papers using this approach, see Gereffi and Kaplinsky (2001). For an analysis of how e-commerce might radically alter value chain linkages, see Gereffi (2001).

While the conclusions of this paper on the potential of B2B e-commerce to open up new market opportunities apply to e-commerce in general, the paper is particularly concerned with the opportunities that may (or may not) be opened up to producers in developing and transitional economies. By focusing on trading relationships and transactions costs, it explores whether the potential for Internet-based B2B e-commerce to create a open/inclusive model of exchange will in fact be realised, and considers the reasons why closed/exclusive models of B2B e-commerce might arise. This has implications not only for the access of producers in developing and transitional economies to global markets, but also for government policies for promoting the up-take/implementation of B2B e-commerce.

Section two of this paper examines debates on intermediation and transactions costs and considers the way in which different types of e-commerce platforms address the issue of transaction costs. Section three examines the characteristics of open or partially open B2B e-commerce sites and considers how the way they are structured address the transaction costs issue. Section four examines closed marketplaces. Section five discusses the implications of the findings for the access of developing country firms to global markets and government policies aimed at promoting B2B e-commerce.

2 Disintermediation, re-intermediation and e-marketplaces

The optimistic view of the potential for B2B e-commerce[2] to open up global markets to developing and transitional economy producers very much depends upon the idea that the major obstacle to increased sales is the cost of making products known to potential buyers in developed countries. Particularly relevant for developing countries is the fact that the transfer of information over the Internet operates largely irrespective of physical locations and the basic hardware and software is widely available and relatively cheap. Therefore, Internet-based B2B e-commerce would appear to offer particular advantages for developing and transitional economies.

In order to discuss these issues, some conceptual clarifications have to be made. The first part of this section discusses the way e-commerce applications vary according to their degree of openness to potential users and the extent to which transactions are conducted online. The second part discusses transaction costs and the role of intermediaries in reducing them.

2.1 The scope of e-commerce applications[3]

The first step in clarification of concepts is to distinguish between two layers of the Internet: basic protocols (and the physical infrastructure of the Internet) and applications:

> "The Internet, like many networks, has a layered architecture. That is to say, all the tasks necessary to communicating via network are divided among several functional layers, and the programs residing on these layers cooperate in standardized ways. Applications and their associated protocols occupy a layer above the basic Internet protocols that supervise basic data transmission" (Wu 1999: 1164).

Internet-based B2B e-commerce involves a variety of different types of applications that enable interactions between firms to be conducted over the Internet infrastructure (physical infrastructure and basic protocols). Examples of such applications might include auctions, request-for-quotes, catalogues, etc. In this paper, an e-marketplace is defined as a location

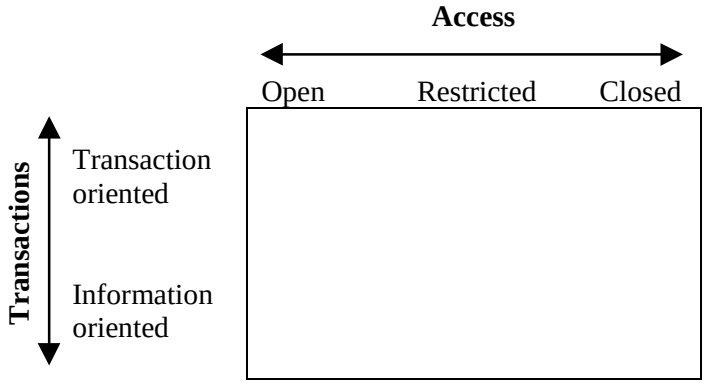
[2] There are many different definitions of B2B e-commerce. This paper is particularly concerned with interactions between firms that are conducted at least in part over public, Internet-based electronic networks.

[3] The author is particularly grateful to Daniel Paré for his observations on Internet structure and e-commerce applications.

where potential buyers and sellers interact within the context provided by a particular application. Further, following Paré (2001) we defined an Internet e-commerce hub (or e-hub) as an Internet site which may include one or more e-marketplaces.

This paper is concerned with whether and how B2B e-commerce applications might create increased trading opportunities for firms in developing and transitional economies. From this perspective, e-marketplaces can be considered according to two variables: the extent to which access to the marketplaces are open or restricted, and the extent to which the marketplace is focused on online transactions or provision of information. This is shown in Figure 1.

Figure 1: B2B e-commerce marketplaces structures



E-marketplaces vary according to whether or not participants are able to make decisions about whether to buy or sell based on the information provided by the e-marketplace. This is the variable shown on the vertical axis in Figure 1. At one extreme, some online auctions take place in real time, as in the case of pefa.com discussed below in section 3.1. Buyers make decisions about whether to buy or sell largely or exclusively based on the information provided by the marketplace. In the case of auctions, the marketplace also discovers the price. In other cases, such as online catalogues, the buyer accepts or rejects the price offered by the seller. Payment may also be made through the site, although this will frequently involve other agents, such as banks or credit agencies. At the other extreme, there are marketplaces that could be described as "dating agencies". They provide limited information about product and companies. Firms interested in following up a lead provided by the marketplace then contact the company concerned. This contact might be through the company's website or by e-mail, or through traditional means, such as tax, telephone or letter.

The horizontal axis in Figure 1 refers to the openness of access to the marketplace. At one extreme, access may be open to many buyers and sellers. For example, it may be possible for anyone to attempt to buy and sell products in a marketplace as long as they complete a simple registration procedure. Access to marketplaces may become more restricted as the requirements for registration become more complex. Marketplaces may require participants to provide proof of their status as potential traders, such as credit references, evidence of trading history, indications of product availability or bank guarantees. In this case, participation is restricted in practice, although any firm that can satisfy the specified conditions can join the marketplace. In contrast to this, there are sites where participation is effectively closed. Entry is based on a selection process made by the agents controlling the site. This is clearly the case with private marketplaces, and it also appears to be the basis for inclusion in industry-sponsored marketplaces such as Covisint, which will be discussed further in section four.

Figure 1 simplifies the range of possible e-marketplaces by identifying six particular combinations of transaction-orientation and openness. Particular e-commerce applications can appear in more than one of the boxes. For example, a Request for Quotes (RFQ) could be

posted in an open or closed e-marketplace, and the marketplace could be organised to conduct the transaction or solely to provide expressions of interest to the parties concerned. The different ways in which e-marketplaces operate will be discussed in sections three and four.

2.2 Transactions costs, intermediation and e-marketplaces

The problems facing firms wishing to buy and sell through public Internet-based e-marketplaces are, in many respects, similar to those facing all exchange: search costs, the costs of co-ordinating the activities of different agents along the value chain and the costs of combating opportunistic behaviour. Garicano and Kaplan (2000) distinguish two types of transactions costs. Firstly, there are the costs involved in co-ordination, which are "related to the need to determine prices and other details of the transaction, to make the existence and location of potential buyers and sellers known to one another, and to bring the buyers and sellers together to transact".[4] These costs increase as the "details of the transaction" become more complex, particularly when buyers and sellers need to exchange information about matters such as product design, production processes and production scheduling. Even on the assumption of goodwill between the parties, there may be costs involved in co-ordinating the activities of different firms along value chain. Secondly, there are "motivation-related" costs, which arise from the problem of opportunism (the pursuit of self-interest with guile). These costs take various forms (Clemons *et al.* 1993: 16):

- Information asymmetries. One of the parties to the transaction may not have all the information required, and the other party cannot be relied on to provide complete or honest information about matters pertaining to the transaction. Information asymmetries become more complex when the value of the product is linked to non-contractible "service" elements such as reliability of delivery, willingness to adjust specifications or volumes at short notice, etc.
- Shirking. The parties to the transaction have different interests, and it may be difficult or costly to monitor or enforce compliance with commitments. The more complex the transaction, the more difficult this may be.
- Shifts in bargaining power arising from asset-specific investments. To the extent that a transaction (or a series of transactions) involves investments in resources that cannot be applied without loss to other transactions, the party making the investment becomes vulnerable to opportunistic behaviour by the other party. The more transactions involve complex exchanges of information and investments in transaction-specific resources (machinery, human resources, materials that have a limited useful life, etc.), the more the problem of opportunism arises.
- Loss of resource control. The more that a firm is required to transfer information or technology to another party in order to make a transaction viable, the greater the possibility that these will either be used by the other party for its own benefit or pass into the hands of competitors.

E-marketplaces may offer plenty of opportunities to buy and sell, but how do particular buyers and sellers find the best transaction, and how can they be sure that each party will fulfil its commitments? These problems might appear to make B2B e-commerce impossibly risky.

In fact, these problems vary in severity, and this can be illustrated by looking at traditional trading practices, as well as e-commerce. Firstly, they are much less evident for some products than for others. Products with "high degrees of standardisation, a low complexity of valuation, and ease of description" (Schmitz 2000: 4) pose fewer problems. The nature of the product is apparent to the buyer because it is standard. The low complexity of valuation implies that relevant product attributes are clearly apparent and that it is not bundled with

[4] Milgrom and Roberts (1992: 28), quoted in Garicano and Kaplan (2000: 4).

services such as consistent quality, reliability of delivery, etc., which cannot be judged easily or at the time of purchase. Such characteristics are typical of products traded in spot markets. In such markets, payment and physical transfer of the product between buyer and seller may be facilitated by physical proximity or through specific arrangements are made for payment and delivery.

Secondly, intermediaries can facilitate transactions by resolving or ameliorating some of the problems outlined above, enabling transactions to be carried out between many potential buyers and sellers that are not necessarily known to each other previously. These intermediaries are of two distinct types, brokers and resellers. While the reseller takes ownership of the product, the broker does not. The possible roles of intermediaries in reducing transactions costs are outlined in Table 1 below. The broker focuses on search costs, services 1 and 2, and to some extent 4. While it may well not provide guarantees of redress (service 9), its knowledge of buyers and sellers and its need to maintain its own reputation act as powerful incentives to ensure the probity of both parties to the transaction (service 8). Brokers may also provide services 5 and 6, facilitating ordering and payment.

Resellers provide the services offered by brokers, but because they take ownership of the product, they can also provide additional services. In particular, they may offer "immediacy" (service 3), purchasing a product from the seller at some point prior to selling the product on to a buyer, bearing the risks of holding inventory. This also means that the reseller plays a larger role in communicating information about product demand and supply to actors in the market (service 4). To the extent that the reseller takes not only ownership but also physical possession of the product, then economies of scale in logistics will also be achieved (service 7). The buyers and sellers contract with the reseller, which means that issues of shirking and redress (services 9, 10 and 11) arise in connection with the reseller. To the extent that the reseller engages in many transactions, it is likely to be better known to both buyers and sellers and have a reputation to safeguard.

Table 1: Roles of intermediaries in reducing transaction costs

Transactions costs	Services potentially provided by intermediaries
Search costs. The costs of finding buyers and sellers.	1. Aggregation of different buyers and sellers into a single marketplace. Buyers, in particular, can find the products of various sellers at the same location. 2. Presentation of product information in standard, comparable formats, enable easy product comparisons to be made.
Co-ordination costs. Matching the requirements of buyers and sellers with regard to design, production processes and timing.[5]	3. Intermediaries provide "immediacy" through stockholding. This allows sellers to dispose of their goods before specific end-users are found, while buyers have a range of products readily available to them. Production and consumption schedules do not have to be co-ordinated 4. The processing of information so that buyers have a better understanding of what products are available and sellers know more about customer preferences. Intermediaries can communicate information about the range of products available to buyers. They can also provide sellers with information about products which are selling well, the types of products being sought and customer preferences in areas such as quality, certification, etc.
Transaction completion.	5. The provision of a common ordering system for many different products. 6. The provision of cost-effective payment systems. 7. The achievement of economies of scale in transport and distribution through working with many buyers and sellers.
Information asymmetries.	8. The reduction of information asymmetries in the market may be achieved through vetting of buyers and sellers by the intermediaries. Intermediaries are also more likely than individual buyers to engage in repeat transactions with suppliers, and this enables them to distinguish between good and bad products and suppliers. Their reputation may depend on their ability to do this.
Shirking. One of the parties does not fulfil its commitments.	9. The provision of guarantees and redress to buyers. The intermediaries own reputation may assure buyers and sellers and provide them with a point of contact in case of default. 10. The intermediary may provide a guarantee of payment to the seller, or it may act as a reseller, taking ownership and then selling the product itself. 11. The intermediary may provide or arrange for quality inspections or some type of verification of the sellers' claims about product and process.
Opportunism arising from dependence on a particular trading partner.	12. Intermediaries can do little about this problem. It normally arises in the absence of intermediaries.
Loss of resource control.	13. Intermediaries may be able to search for particular buyers or suppliers without providing full information about the requirements of the other partner. However, this problem is a serious one in open, transaction-based e-commerce sites. The more information about products and quantities is supplied, the more this information becomes available to competitors.

It is important to recognise the limitations of intermediaries. The transaction costs literature has discussed this predominantly in terms of the "make in/buy out" decision - whether it would be better for a firm to produce a particular product or service in-house or purchase it from an outside supplier. However, it can be applied equally to choice of buyer-supplier relationships. Here, the key question is whether firms maintain arm's-length market

[5] For a discussion of the role intermediaries in providing co-ordination services and thereby making the "invisible hand" of the market function, see Spulber (1996).

relationships with a range of potential trading partners, choosing between them according to the products and prices on offer, or alternatively, work with fewer suppliers and co-ordinate decisions directly about what should be produced, how and when.

The "fewer but closer" model of supplier relationships has been discussed extensively, not only in manufacturing as a result of interest in just-in-time supply (see, for example, Lamming 1993; Helper 1993) but also in relation to vertical integration, contract farming and long-term supply relationships in agriculture.[6] Intermediaries may not be able to broker efficient co-ordination of inter-linked processes when: (i) co-ordination between agents is required around issues such as design, quality or timing of production; (ii) the costs to one party from the other failing to meet contractual relationships are high; (iii) the value of the product is either difficult to determine in advance or is significantly affected by "non-contractibles" such as reliability of delivery, rapid adjustment to changes in customer requirements, joint problem-solving, etc. (leading to the problem of incomplete contracts); and (iv) asset specific investments are required.

In the context of international trade and the ways in which firms in developing and transitional economies link into the global economy, global value chain analysis (for a recent collection of articles from this perspective, see Gereffi and Kaplinsky 2001) has highlighted the different ways in which globally dispersed production and distribution systems are co-ordinated. This co-ordination frequently involves not only long-term contracts and planned production schedules, but also buyer specification of product designs, quality systems, audit procedures, etc. The value chain literature refers to these types of value chain relationship as "governance". From the perspective of inter-firm networks, Clemons *et al.* (1993) have termed them "explicit co-ordination".

Humphrey and Schmitz (2000) argue that such relationships are driven by two main factors: (i) the role of the buyer in specifying design; and (ii) the risks to the buyer of non-conformance to agreed commitments by the producer. They offer a number of reasons why explicit co-ordination is a common characteristic of inter-firm relationships in the contemporary global economy:

- Product differentiation and the development of new products are becoming an increasingly important source of competitive advantage. Powerful global buyers (retailers, brand-name companies) play an important role in product development and branding but have little or no ownership of manufacturing facilities. This tends to lead to customised, complex exchanges between buyers and suppliers.
- Where products have an integral (as opposed to modular) product architecture, changes in one part of the product are likely to require changes in others. Consequently, the designs used by suppliers cannot be developed independently by them.[7]
- In the pursuit of low-cost inputs in labour-intensive sectors such as garments, global buyers are frequently looking to develop new sources of supply. The new supply relationships frequently introduce buyers to markets that have different product requirements and higher process standards (Keesing and Lall 1992). In order to introduce

[6] Lawrence *et al.* (1997), for example, discuss the shift from spot markets to contracts in the US hog industry.

[7] As summed up by Novak (2000), an integral product architecture is one in which there are many, tightly-connected interfaces between parts. Changing one part of the product has many implications for other parts of the product. This is currently true for cars. A modular product architecture is one which has few, well-defined interfaces between parts. Changes in the design of one part doe not necessarily lead to changes in design of other parts of the product. For a discussion of the impact of modular product design architecture on industry structure, see Galvin and Morkel (2001).

these new sources, while simultaneously meeting quality requirements and labour and environmental standards, active management of the supply chain is needed.

- Final product markets in developed countries are characterised by an increasing emphasis on safety, labour and environmental standards. This places greater responsibilities on retailers and manufacturers, and implies greater monitoring and supervision of suppliers' production processes.
- Task complexity and/or time pressures require co-ordination of tasks across firms, and these increase as competition based on product differentiation increases. If products are increasingly customised to particular product or process specifications, the customer does not have the option to buy supplies on the open market or from the stocks of intermediaries.

Explicit co-ordination in global value chains can arise in many different sectors and with many different product characteristics. Two examples, taken from sectors that will be discussed below with regard to B2B e-commerce, will suffice to demonstrate the complexities of transactions and challenges facing users of e-commerce applications. Firstly, in the auto industry relationships between assemblers and first-tier suppliers have become more complex as the suppliers have come to be responsible for the design of complex parts and systems.[8] The design of these parts and systems (for example, complete dashboards, heating/cooling systems, seating systems and brake/steering/suspension systems) requires a high level of information exchange because the systems must not only meet specific performance and interface requirements, but also interact correctly with other parts of the vehicle. At the same time, there are likely to be asset-specific investments in relationships, design, engineering and equipment. Not surprisingly, therefore, a component such as a seating system for a particular car might be made by just one supplier for most if not all the lifetime of the part, even though this does not preclude competition for the initial contract.

Secondly, in the case of the horticulture industry in the UK, a combination of product innovation, a need for reliable delivery of consistent-quality products and increasing concerns about pesticide residues, environmental impact and labour standards have together led to the development of explicitly co-ordinated supply chains.[9] Control over both product and process specifications is maintained through joint product development, the imposition of strict and explicit standards, supplier audits, regular monitoring, traceability and testing. Again, this is the antithesis of arm's-length market relations, and the UK supermarkets abandoned sourcing through wholesale markets in favour of tightly controlled supply chains.

Given these considerations, buyers of such products would be very unlikely to source such products through open or restricted e-marketplaces. New sources of supply are only developed after careful analysis of the suppliers' production, quality and management systems. This does not preclude the use of B2B e-commerce, but it does mean that it has to be structured in specific ways.

The remainder of this paper discusses how e-marketplaces are structured in particular ways to enable them to address particular transaction costs issues argued that arise in different sorts of transactions. Examples of particular B2B e-commerce marketplaces described in academic

---

[8] For a discussion of changing supply relationships in the auto industry and its consequences for how relationships with suppliers are managed, see Helper (1993). For a discussion of the impact of such changes on assembler-supplier relationships in developing countries, see Humphrey (2000).

[9] For a discussion of the transition from spot markets to explicitly co-ordinated value chains in the UK fresh vegetable import business and the role of supermarkets in driving this change, see Dolan and Humphrey (2001).

publications, the news media and industry publications are presented.[10] The cases chosen are not meant in any sense to provide a representative sample of the universe of B2B e-commerce marketplaces. Further, the fact that the sites chosen have been described at some point in the past is not taken to imply that they still exist or will continue to exist, nor that they have a viable revenue model. Rather, they are analysed in order to illustrate the different ways in which particular transaction costs may be addressed. The following section discusses open and restricted sites, and section four discusses closed sites.

3 Open and restricted B2B e-marketplaces

Open or restricted e-marketplace face particular intermediation challenges. On the one hand, potentially they open up markets to many more buyers and sellers, drastically reducing the costs associated with providing and searching for information. On the other hand, precisely because public Internet and standard applications provide much greater ease of access to e-marketplaces, the problems listed in Table 1 are exacerbated. How can buyers and sellers be sure that they are choosing the best deal, and how can they guard against opportunism? Transaction-oriented and information-oriented e-marketplaces adopt diametrically opposed strategies towards these problems.

3.1 Transaction-oriented e-marketplaces

Transaction-based sites have to provide direct solutions to some of the problems listed in Table 1. If products are bought and sold in e-marketplaces through such applications as auctions or RFQ, then buyers and sellers need to be provided with sufficient information through the site (and linked sites) about both the product and the trading partner to enable them to decide whether to trade. In particular, these marketplaces have to resolve the problems of valuation and opportunism. Generally speaking, the risk to the seller (non-payment) is less complex than the risks to the buyer, which relate to the nature of product.

Transaction-based B2B e-commerce sites have developed for the trading of products such as chemicals, metals and paper. A report on sites trading in chemicals illustrate how both valuation and risk are addressed:

> "Tony De Luca, net markets director in Europe for Computer Science Corporation (CSC) says the commodity nature of product makes it easier to set up B2B marketplaces for chemicals. 'The industry has a great advantage in that there are acceptable international quality standards for products and few product attributes to describe.' In technical terms, this makes it far simpler to build B2B marketplaces and exchanges. It also gives customers greater confidence to buy online from suppliers they have not dealt with before, since they know they are comparing like with like when assessing quotes or bidding in an auction" (Financial Times 2000: 5).

Ease of valuation is achieved through industry-wide grades and standards. In the case of metals, product attributes can be more complex, but they are still definable in terms of a set of broadly accepted attributes. One large North American exchange in the metals sector, MetalSpectrum claims to have a catalogue of 40,000 items, but "each item can be requested or defined in terms of 38 different attributes" (Financial Times 2000: 10). These attributes may relate to product type, quality (for example, indicators of the incidence of particular types of defects), etc.

[10] These cases chosen are metal and chemical exchanges described in Financial Times (2000); Marshall Industries and Citius Belgium, discussed in (Timmers 1999); the industry-sponsored portals such as Covisint and GlobalNetXchange discussed in the trade literatures (see, for example, http://www.line56.com); the Teleflower auction discussed by van Heek and Ribbers (2000) and a fish auction site, pefa.com.

Marshall Industries,[11] a reseller buying electronic components from a small number of large producers and distributing them to thousands of customers, also illustrates the importance of technical norms. These norms were developed by the industry to guarantee interchangeability between the products of different manufacturers and to provide standard interfaces between components. They allow customer requirements to be defined in terms of a set of industry-wide variables, minimising the need for complex descriptions. Even requests for customised products can be accommodated by the Marshall Industries ordering system, as long as the customisation can be defined in terms of a range of variation of particular product attributes (Timmers 1999: 50-51).

The risk of opportunism can be addressed a variety of ways. Firstly, e-marketplaces may deal in products that present relatively low risks to the buyer. This is reflected in the use of e-commerce to focus on excess or redundant stock and on MRO (maintenance, repair and operations) products. The use of e-marketplaces for the rapid liquidation of inventory and sales of redundant stock seems widespread. This reduces the risks involved with continuity of supply while providing a cost-effective way of liquidating assets. Similarly, a survey of European procurement managers found that:

> "Most of the [e-commerce procurement] activity is within the maintenance, repair, operation supplies (MRO) sector, which includes items used in daily operations, such as pens and chairs, but not material used to manufacture goods. More than one half the respondents to buy online have purchased MRO goods, while about one-quarter have bought materials used in manufacturing products" (IDC 2001).

These products have the advantages of not only standardisation and ease of description, but also their non-criticality for the reliability and continuity of the purchasers' core operations. MRO goods are low value, non-strategic items, having limited impact on the products and services being manufactured by the buyer. This means that they are also invisible to the purchasing firms' own customers and unlikely to be subjected to scrutiny about labour and environmental standards. Therefore, the risks to the buyers are low, but the potential benefits in terms of reducing purchasing costs are high. According to Timmers (1999: 68-80), who describes the case of one MRO site, Citius Belgium, such sites can provide significant reductions in transaction costs by allowing cost-effective ways of decentralising purchasing of such items in large enterprise and integrating purchasing and accounting functions for the purchasers.

Secondly, the buyer's perception of the risks of purchasing a product are reduced when the seller has a good reputation or known trading history. Such assurances are provided in various ways:

- In the case of firms such as Marshall Industries, who act as reseller, taking ownership of the product, the company's own reputation forms a basis for buyer confidence about both quality and redress. The buyer's contract is with the reseller.
- Some exchanges bring together few traders. A limited number of firms, known to each other and probably with prior direct trading experience, are more able to judge trading partners and agree deals, knowing that industry reputation and the likelihood of repeat transactions will be a strong disincentive to cheating. MetalSpectrum claims to bring together just 21 partners who "claim to represent 80 per cent of the North American market in metals" (Financial Times 2000: 10).

[11] This case is taken from Timmers (1999: 49-52).

- Assurances about traders might be provided through screening of traders, financial guarantees provided by buyers, links to credit-rating agencies, insurance against non-payment, etc.
- In the case of Marshall Industries, the issues of product description, quality and delivery are addressed not only by technical norms and the reseller's role in holding inventory, but also by the reputations of the large companies that produce them.

Therefore, e-commerce is easier to arrange when reputation effects and knowledge about the parties exist in the market. Given that in any exchange, information asymmetries are less problematic for the seller (who is concerned predominantly about payment) than for the buyer (who is concerned about product description, quality, delivery, etc.), B2B e-commerce poses fewer problems in markets where there are few sellers and many buyers than in markets with few buyers and many sellers.

Thirdly, assurances about the product can be provided by mechanisms such as the use of inspection services, site-linked sample services and indications of supplier certification. One leading company in the areas of certification and testing, SGS (Société Générale de Surveillance), has been developing service provision for e-commerce aimed at providing trust between partners and reducing the uncertainty involved in trading. Among the services it offers are: a supplier rating service, using information from such sources as buyers, financial institutions and its own field staff; specification sheets with the information about the product based on testing from independent laboratories; a sample service which takes a random sample of a product and delivers it anywhere in the world; inspection of a supplier's site or of goods prior to shipment; a certification system for use in B2B e-marketplaces.[12]

Finally, e-marketplaces providers could offer assurances about payment and redress. In some cases, this is through requiring deposits or guarantees from buyers. However, few e-marketplaces appear to be prepared to assume the risks of default by either of the parties.

Two further cases, online auctions in the fish and flower industries, suggest ways in which intermediaries can structure trading and provide services to online transactions possible even when the product is more complex and factors such as origin and product quality are important to the buyer.

Pefa.com (Pan-European Fish Auctions) is a company involved in the selling fish products, including the auctioning of fresh sea fish. Its online fish auctions bring together sellers at various ports in Northern Europe with buyers from across the Continent.[13] Fresh fish poses some challenges for B2B e-commerce. Both product description and logistics requirements are more complex than in the previous cases discussed. Its perishability means that sale and distribution have to take place rapidly, and yet the buyers must be confident about the scope and accuracy of the description of the product on offer, and both buyers and sellers must be assured that contracts will be honoured.

The system developed by pefa.com and its partners (particularly the auction houses located in the fishing ports) seeks to address these issues in three ways. Firstly, information about the fish being auctioned is presented to buyers in a relatively easy-to-use web environment. Product variation can be summarised in a limited number of parameters, and the product is not customised to the specifications of any particular buyer. Each lot for the auction is

[12] This description is based on a presentation by Gérald Houet-Dutruge of SGS at a conference on E-commerce for Agribusiness held in London in June 2000. Further information can be obtained at the e-commerce services' website, www.sgsonsite.com.

[13] Information on pefa.com is taken from a presentation by its President, Marie Jeanne Becaus-Pieters, at a conference on E-commerce for Agribusiness held in London in June 2000.

described in terms of species, weight, the type of fishing vessel, the fishing ground where caught (an important determinant of fish quality) and the number of days the vessel has been at sea. Buyers participating in real-time clock auctions are also provided with information about the prices and quantities of recently sold lots and subsequent lots to be auctioned.

Secondly, pefa.com addresses the issues of information asymmetries facing both buyers and sellers. For the buyer, one critical question is the truthfulness of the information provided about the products offered for sale. This information is verified by the auction house where the fish is landed. It grades the fish, establishes its quality, provides storage and allocates lot numbers. According to its President, Pefa.com provides greater reliability for the buyers located far from the ports than the traditional system that uses port-based traders as intermediaries. Whereas intermediaries can gain from misrepresenting the products they are selling, the auction house has no such interest. Even though pefa.com does not provide redress in the case of buyer dissatisfaction, its reputation and its need to maintain its reputation do provide assurances for the buyer.

The third question is payment and delivery. Pefa.com guarantees payment to sellers. Buyers have to register in order to participate in the auctions, and one of the conditions of registration is the provision of financial guarantees. Upon sale, the product immediately becomes the property of the buyer and passes to it directly from the auction house. Payment and invoicing is automated.

Another perishable product that has long been sold through auctions is cut flowers. The potential for electronic commerce in the flower business is indicated by the fact that auctions exist and the product can be classified and valued according to a limited number of attributes. However, quality assurance issues also have to be addressed. In the case of the Teleflower Auction (TFA), described by van Heek and Ribbers (2000), which sells flowers from East Africa into the Amsterdam flower market, the auction house takes responsibility for quality assurance:

> "It soon became clear that one of the main propositions of the TFA was that the quality of the flowers determines the buyers' trust in the TFA concept. TFA's motto is 'Buyers have to trust the quality blindfold' because buyers cannot physically see the product anymore. Still, buyers who are nearby TFA can inspect the imported flowers; 30% of the buyers do so regularly. Reliable product information and stable quality control are essential. Quality control is done by TFA's quality inspectors at the grower's place at the distribution point in Nairobi (Africa), and at TFA in Amstelveen" (van Heek and Ribbers 2000: 361).

In other words, although producers and buyers have no direct contact with each other, both retain close relationships with the auction house. The auction house developed relationships with the flower producers, maintaining personnel in Kenya. The auction house and the buyers are engaged in repeat transactions characterised by physical proximity. The e-auction takes place close to the traditional flower auctions, and most of the buyers are located close by. These factors reduce the risks of default and give the buyers confidence about the products they are purchasing. In this case, the auction depends upon working closely with a limited number of buyers and sellers, being highly restricted in terms of sellers, and to a lesser extent buyers. It may have the characteristics of a closed, rather than a restricted, e-marketplace.

3.2 Information-oriented e-marketplaces

Transaction-oriented e-marketplaces require a high level of competence from the participants with respect to defining exactly what they wish to buy and the prices they are prepared to pay. Furthermore, the more that sellers are expected to provide detailed information about

products, the greater the risk of loss of resource control. Information might be acquired and used by others for their own ends. For example, it is said that some handicraft producers will not place detailed product specifications or photographs on the Internet because these would immediately be copied by large-scale manufacturers of fake handicrafts. Similarly, fresh food traders will often not quote prices in public or private exchanges because they sell at different prices to different customers and regard price information as commercially sensitive.

A diametrically opposed strategy to information asymmetries and opportunism is offered by information-oriented e-marketplaces, of which the best-known are the bulletin boards that allow participants to display catalogues or post information about what they wish to trade - offers-to-buy and offers-to-sell. These bulletin boards act as points of initial contact, with subsequent contacts conducted directly between the parties using an alternative medium (e.g. email, fax, telephone, or written letter). There may be some vetting of participants in the bulletin board, and possibly some provision of complementary services, such as links to insurance, logistics and finance sites, but information about the product is usually provided by the seller alone, without evaluation by the application provider. It is up to the buyer to find out more about the seller and its product and for buyer and seller to agree a suitable contract.

Bulletin Board services are much cheaper to set up and manage than transaction-based sites. The buyers and sellers decide what information they need to enable the transaction to proceed and how to obtain it. The transaction will also proceed at a speed and in a way that the parties find acceptable. In this case, the processes of valuation and of risk control proceed more or less in the same manner as when following a trade lead acquired through traditional means. For information about the partner, this will mean using bank references, credit agencies, checks via agents, business directories, company annual reports, etc. Information about the product is more difficult to acquire, and this is likely to restrict exchange in the first instance to (i) products that are easily valuable, (ii) products that pose little risk to the buyer, or (iii) products whose characteristics can be verified by other means, such as visits to the seller, samples, evidence of certification, etc. However, such contacts might be the start of the trading relationship. Furthermore, this type of relationship allows sellers to provide sensitive information (for example, about price or product availability) only when it is confident about doing so.

In many respects, the challenges facing bulletin board users are similar to those faced in non-electronic exchange - for example, following up leads in the trade press or at Trade Fairs. This may not be a problem, particularly if buyers and sellers are used to trading with firms not previously known to them. However, in some cases it leaves buyers without the familiar cues and knowledge provided by traditional trading methods dependent on proximity and reputation.

In addition to these costs, the, users of bulletin boards also face the costs of arranging payment and logistics, and must confront the problem of the "mutual coincidence of wants" (services 3, 5, 6 and 7 in Table 1). However, these may well be less daunting than they might appear. A survey of users conducted by ECeurope.com Limited (Electronic Commerce Europe), one of the leading global public Bulletin Board service providers,[14] found that more than half of the registered users replying to the survey classified themselves as trading houses, importers, exporters agents or distributors. In other words, the service was being used more by intermediaries than by manufacturers/producers. This would imply that the costs of completing transactions could be significantly reduced because of the intermediaries'

[14] The user survey was sent to 2000 registered users by ECeurope.com Limited (Electronic Commerce Europe), from whom 254 responses were received. The results of this survey are Copyright 2001 ECeurope.com Limited (Electronic Commerce Europe). All Rights Reserved. The authors thanks ECeurope.com Limited and its Chairman, Jonathan Cutting for permission to cite this material.

capacities in transport and payment. As important, producers from developing and transition economies might gain easier access to a wide range of intermediaries, thus achieving the goal of widening access to global markets.

In spite of its limitations with regard to transaction completion, the information-oriented model appears to be more prevalent. While it was suggested in the introduction that transaction-oriented sites are sometimes taken to be the essence of e-commerce - summed up in the expression "screen to screen negotiation and trading" - a study by Paré (2001) of 117 e-hubs supporting 184 e-marketplaces in the textiles, garments and horticulture sectors indicated the opposite. Although many e-marketplaces market themselves as transaction-based sites, most of the marketplaces examined primarily offered a level of transaction support that is characteristic of bulletin boards, not enabling online transactions to take place and providing few solutions to the problems of transaction completion, information asymmetries or opportunism. Paré's study concluded that, "The evidence presented here suggests that these services are more limited in their scope and functionality than is often assumed in the literature on B2B e-commerce development."

4 Closed B2B e-commerce sites

In addition to open and restricted sites, B2B e-commerce includes sites where access is severely restricted, and where access is decided predominantly by parties involved in operating the site. We refer to these as closed sites. Industry-sponsored marketplaces (ISMs) are a type of B2B e-commerce often promoted by small groups of large companies to facilitate and streamline sourcing. In addition, there are private e-marketplaces, created for one buyer.

ISMs have proliferated in the past few years. Among the best known are Covisint, created by the "Big Three" US auto manufacturers, GlobalNetXchange and the Worldwide Retail Exchange (WWRE). These exchanges have been formed by small groups of large companies. In the case of GlobalNetXchange (GNX), for example, the five founding members (Carrefour, J. Sainsbury, Kroger, Sears Roebuck and Coles Myer) collectively have annual sales exceeding $200 billion. As with previous examples, the issue here is not to discuss the viability of these sites, although a number of them significantly increased their turnover in 2001 (Ericson 2001). The issue is how they address transactions costs issues and the nature of the products they trade. However, there are different types of ISM,[15] and a single ISM may consist of a variety of different e-marketplaces with different trading structures.

Firstly, ISMs can be used to procure MRO goods on advantageous terms for the large companies that have sponsored their creation. In this case, the buyers would have an interest in securing the largest possible supplier base.

Secondly, ISMs are used for the procurement of standardised products, but from a limited number of suppliers to have been certified or audited in some way so that the buyers have some confidence in their management and quality systems. For example, Coltman *et al.* (2001: 13) suggest that the Covisint exchange will focus on a limited number of suppliers "who have had long established relationships with these automobile manufacturers and with each other", and the suppliers will "bid on lots of clearly specified and relatively standardised components". This approach economises on search costs and assures the buyer of the supplier's commitment, but at the expense of narrowing the range of potential suppliers.

[15] These industry-sponsored marketplaces differ from each other in a number of important respects. For a discussion of the differences between GNX and the Worldwide Retail Exchange (WWRE), see Roberts (2000).

Both of these types of transactions were being conducted in ISMs. They were developing reverse auctions, not only for MRO goods, but also for resale goods. In the third quarter of 2001, GNX arranged 580 auctions with total transactions of $500 million. Eighty percent of these transactions were for resale goods (Kaneshige 2001). The Covisint exchange has also been promoting auctions. As these activities develop, the development of standardised descriptions and inter-operability will enable both buyers and suppliers to reach a larger number of possible exchange partners (Barlas 2001b). For example, WWRE, which specialises in consumer packaged goods, announced a partnership with Global Sources in November 2001. This would potentially integrate 120,000 predominantly East Asian suppliers into the WWRE system (Barlas 2001a).

There is a third way in which ISMs can conduct exchange. They can be used to manage both initial competition for contracts and on-going supply relationships, focusing more on "e-business" and supply chain management than auctions or requests for quotes. In other words, the co-ordination function would take priority over the search function. This was clearly evident in some of the transactions being conducted through these exchanges. For example, it was reported that the Covisint system will be used by General Motors for the long-term sourcing of items such as seats and instrument panels through request for quotes (Brown 2001). This implied as very different type of interchange between buyers and suppliers. Seats and instrument panels are precisely the types of items whose design and development involve complex, long-term relationships involving joint product development between assemblers and the small number of global companies that are capable of supplying these products. There is no possibility that these products would be sourced through an auction based on the lowest price for a given design.

A parallel case can be seen on the GNX site. One highly publicised use of the GNX exchange was an auction for cheese conducted by J. Sainsbury. In this case, the only companies that were allowed to offer produce for this auction were the existing Sainsbury suppliers. Large retailers would not source this type of product without having conducted extensive audits of the suppliers' premises and systems (quality, management, traceability, etc.), and the product itself would be customised to the retailer's requirements. In a number of areas, information about product specifications, levels of demand etc would be commercially sensitive and would not be shared outside of the existing supply base. In other words, the possibility of having an auction for such products relies on a history of complex interactions between the firms involved.

Finally, ISMs are also developing supply chain management applications alongside the exchange functions. According to Roberts (2000), these would include processing transactions, planning of capacity, management of inventory along the supply chain and collaboration over product design. Their aim is not only to determine prices and to stimulate competition between suppliers, but also to provide greater integration of the supply chain. Interviews with three UK fresh fruit and vegetable importers in 2001 indicated that Internet-based applications will be used for integrating existing supply chains, by means such as providing online quality information to suppliers, shipment tracking, etc., but certainly not for purchasing products from new suppliers.[16] This is similar to a finding of Moodley *et al.* (2001), who suggest that for companies in South Africa, Internet-based interactions often represent the migration to Internet-based applications of relationships previously conducted through EDI (Electronic Data Interchange) (Moodley *et al.* 2001: 9).

[16] The logic here is not only that products have to be traceable and conform with standards imposed by customers and food safety regulations, but also that any exporter producing these products to the exacting standards of the UK market would have arranged a buyer for their product long before planting. Furthermore, in an industry based on personal contacts, any urgent need for extra produce (for example, to meet the volume requirement of a special promotion) would be met via telephone calls rather than the Internet.

ISMs overlap with private exchanges, which are appear to be developing rapidly. Some companies, such as Wal-Mart, have constructed their own private exchanges, while others have nested their private marketplaces within ISMs or within sites operated by specialist suppliers. According to Jan Stenger of eFoodmanager (interviewed December 2001), the company now provides not only its open exchange, but also the provision of systems for private exchanges and also be hosting of private exchanges on eFoodmanager's own network. Internet-based supply chain management packages are being used to integrate the activities of customers and key suppliers, without necessarily including price discovery or supplier selection components at all. In other cases, private trading platforms will include both supplier selection and price determination mechanisms (auctions, request for quotes, catalogues) and supply chain management.

Clearly, the development of such exchanges is unlikely directly to open up new markets and sales contacts for firms in developing countries. Buyers will work with a limited number of suppliers, managing more closely and effectively relations with them. This is seen, for example, in the use of the Internet-based private systems to provide online information about inventory, order status, quality, etc. However, if the costs of maintaining close control over fragmented and dispersed supply chains falls as a result of such Internet-based applications, and if the costs of such control do not vary according to distance, then in the longer run one might expect to see more outsourcing in general and a greater readiness to source from developing countries.

5 Conclusions

It has been argued in this paper that search costs, co-ordination costs and the costs associated with dealing with the threat of opportunism will have a considerable influence in shaping the nature of B2B e-commerce applications. The point is not simply that e-commerce is particularly suited to certain types of products, but rather that radically different ways of organising e-commerce transactions are developing and response to the different transactional challenges posed by different types of value chain. The analysis showed that:

1. Open, transaction-based marketplaces pose particular risks. The more marketplaces work on the basis of online transactions, the greater the risk facing participants and the less time they have to find out about partners and products.. They are more likely to occur when one or more of the following factors are present: a) product are standard or gradeable and easy to value and compare; b) there are few sellers and many buyers, so that the risks associated with product characteristics are diminished by seller reputation; c) the purchase of the product entails few risks for the buyer. In these cases, increase liquidity and options in the market are not offset by increased search costs and risks from information asymmetries.
2. There is a trade-off between the openness of e-marketplaces and the level of confidence that firms using the marketplace will have about potential trading partners. Providers of the marketplaces can create mechanisms to increase the likelihood that both sides of the transaction (the characteristics of the product being sold and payment for it) are honoured. However, this is expensive and involves vetting of participants. This leads to more restricted access and probably favours the online transaction model, because this model is more likely to generate the revenue needed to finance the services provided.
3. Where products or participants are difficult to evaluate, information-oriented marketplaces are a viable and cost-effective solution. The parties negotiate directly about the information they require.
4. Explicit co-ordination of value chains requires ongoing relationships between buyers and sellers. These are organised in closed marketplaces, which may be both transaction- and information-oriented. In these markets, there are likely to be few buyers and a larger, but still limited, number of sellers.

5. B2B e-commerce poses fewer problems in markets where there are few sellers and many buyers than in those markets where there are few buyers and many sellers. In the latter case, the buyer is also likely to play a greater role in product specification, and this increases the complexity of information flows and the likelihood of transaction-specific investments on the part of the producer.
6. Even when standard products are traded, the intermediary may still have an important role in providing buyers and sellers with confidence about the completion of the transaction (goods will be provided and paid for) and about product quality. In some cases, this may be because the intermediary acts as a reseller, and the contract is with the intermediary. More commonly, the intermediary creates a market with a reputation for contracts being honoured, through selection of traders and sanctions against defaulters.

These findings help to answer the issue defined at the beginning of the paper: would B2B e-commerce facilitate the entry into global markets of firms in developing and transitional economies? The first conclusion is that these firms are as likely to use e-commerce applications within explicitly co-ordinated value chains (through ISMs and supply chain management functions) as they are to trade or to make contact with new customers through open, public e-marketplaces. The second conclusion is that many B2B e-commerce applications are facilitated or enabled by non-electronic information and support systems: information about firms, payment systems, quality systems, etc.

It follows that governments in developing countries need to be aware of the fact that different types of e-commerce poses different challenges and that policies for e-commerce adopted by developing country governments need to consider these different forms of e-commerce. At present, it is not possible to say which forms will be more important for particular countries or products, and e-commerce potential is still evolving rapidly. At the same time, it is clear that policies should address more than the telecom and Internet infrastructure. Some examples can be offered.

Firstly, Paré's (2001) analysis of e-commerce hubs confirms the importance of Bulletin Boards. These enable firms to search for buyers and sellers, but then leave them to communicate directly over payment, product information, etc. It seems likely that contacts initiated in this way will have more chance of resulting in completed transactions if (i) buyers can be reassured quickly about the *bona fides* of developing country firms, and (ii) payment can be arranged easily. With regard to the first question, it seems to be the case that international buyers rely on commercial, international business directories such as Dun and Bradstreet, but their coverage of developing countries is probably limited.[17] Governments and business associations in developing countries could supplement such directories by providing their own online business directories or ensuring that lists of firms with trading histories or bank references are easily available to potential buyers.

Secondly, buyers may also need to be reassured about both the production facilities of firms and the existence of the product being offered for sale, whether or not they are transacting over the public Internet. Again, some commercially based services offer assurance in these areas. The services provided by SGS in this area were mentioned in section 3.1. As yet, it is unclear just how extensive the use of such services is at present, or how demand for them might develop. If they do prove to be used widely, governments and business associations could promote their introduction and facilitate the creation of the necessary local

[17] The website of a leading Business Directory, Dun and Bradstreet (<http://www.dnb.com/about/db_database/infoquality/0,,0-222-1019-0,00.htm) show the following breakdown of active companies in their database by region: Africa 1%; Middle East 1%; Latin America 3%; Asia-Pacific 13%; Europe 52%; North America 32%.

infrastructure of inspection and testing. In particular, there is a need for accessible laboratories that can complete a product test quickly.[18]

The challenges for governments posed by e-commerce through ISMs or private marketplaces are very different. If Internet-based e-commerce reduces the costs of explicit co-ordination in value chains by providing much cheaper access to online information between geographically-dispersed firms, cutting the costs of monitoring performance and co-ordinating activities, this may further accelerate the formation of global value chains and facilitate the access of developing country firms to them.

In these cases, questions of quality and payment are resolved through the ongoing relationships between the firms. Repeat transactions mean that arrangements are in place for transferring funds and pursuing quality. Similarly, the firms are known to each other and do not need to establish each other's *bona fides*. However, fast and reliable Internet connections are particularly important for this type of relationship, and this needs to be complemented by physical value chain integration through improved logistics infrastructure.

Internet-based e-commerce environments are still developing. The initial expectations of disintermediation proved to be unfounded, and open, transaction-oriented sites also appear to be struggling. However, transaction structures in e-commerce might alter radically in particular industries in the future as a result of trends such as increased use of certification as a guarantor of supplier performance and modularisation of product architecture (both reducing the need for explicit co-ordination in the value chain), as well as Internet-based traceability systems. Therefore, governments, international agencies and business organisations have to be attentive to the evolving and differing forms being taken by e-commerce and respond to its specific requirements.

[18] In this area, as in others, this problem is not confined to e-commerce. Developing country producers of perishable products frequently complain that tests required by overseas buyers either cannot be carried out locally or take such a long time that sales are lost.

References

Barlas, D., 2001a, 'WWRE Accesses Asia', **Line56**, 26 November. Available http://www.line56.com

Barlas, D., 2001b, 'WWRE Finalises UDEX Agreement', **Line56**, 19 September. Available http://www.line56.com

Brown, R., 2001, 'GM Spends $98bn Via Covisint', **Line56**, 21 Aug. Available http://www.line56.com

Clemons, E., Reddi, S., and Row, M., 1993, 'The Impact of Information Technology on the Organization of Economic Activity: The 'Move to the Middle' Hypothesis', **Journal of Management Information Systems**, Vol 10 No 2: 9-35

Coltman, T., Devinney, T., Latukefu, A., and Midgley, D., 2001, 'Transactional Structures and Global E-Business Orientation', mimeo, Sydney, Australian Graduate School of Management, University of New South Wales

Dolan, C., and Humphrey, J., 2001, 'Changing Governance Patterns in the Trade in Fresh Vegetables between Africa and the United Kingdom', Paper submitted to the International Food and Agricultural Management Review, Brighton, Institute of Development Studies. Available http://www.gapresearch.org/production/globtradprod.html. Downloaded January 2002

Ericson, J., 2001, 'E-Markets: Back Again', **Line56**, 15 November. Available http://www.line56.com

Financial Times, 2000, 'Review of Information and Communication Technology', **Financial Times**, 18 October

Galvin, P., and Morkel, A., 2001, 'The Effect of Product Modularity on Industry Structure: The Case of the World Bicycle Industry', **Industry and Innovation**, Vol 8 No 1: 31-47

Garicano, L., and Kaplan, S., 2000, 'The Effects of Business-to-Business E-Commerce on Transaction Costs', Working Paper 8017, Chicago, National Bureau of Economic Research. Available http://www.nber.org/papers/w8017

Gereffi, G., 2001, 'Beyond the Producer-Driven/Buyer-Driven Dichotomy: The Evolution of Global Value Chains in the Internet Era', **IDS Bulletin**, Vol 32 No 3: 30-40

Gereffi, G., and Kaplinsky, R., 2001, 'The Value of Value Chains', **IDS Bulletin**, Vol 32 No 3 (special issue)

Helper, S., 1993, 'An Exit-Voice Analysis of Supplier Relations: The Case of the US Automobile Industry', in G. Grabher (ed.) **The Embedded Firm**, London, Routledge: 141-160

Humphrey, J., 2000, 'Assembler-Supplier Relations in the Auto Industry: Globalisation and National Development', **Competition and Change**, Vol 4 No 3: 245-271

Humphrey, J., and Schmitz, H., 2000, 'Governance and Upgrading: Linking Industrial Cluster and Global Value Chain Research', IDS Working Paper 120, Brighton, Institute of Development Studies, University of Sussex

IDC, 2001, 'European Procurement Managers Move to Internet', **eBusiness Trends**, 68, 2 Aug 2001. Available http://www.idc.com/newsletters/

Kaneshige, T., 2001, 'GNX Posts Record Volume Quarter', **Line56**, 10 October. Available http://www.line56.com

Keesing, D., and Lall, S., 1992, 'Marketing Manufactured Exports from Developing Countries: Learning Sequences and Public Support', in G. Helleiner (ed.) **Trade Policy, Industrialisation and Development**, Oxford, Oxford University Press: 176-193

Lamming, R., 1993, **Beyond Partnership: Strategies for Innovation and Lean Supply**, London: Prentice-Hall

Lawrence, J., Rhodes, V.J., Grimes, G., and Hayenga, M., 1997, 'Vertical Coordination in the US Pork Industry: Status, Motivations, and Expectations', **Agribusiness**, Vol 13 No 1: 21-31

Milgrom, P., and Roberts, J., 1992, **Economics, Organization and Management**, Englewood Cliffs, NJ: Prentice-Hall

Moodley, S., Morris, M., and Barnes, J., 2001, 'Unlocking Value in the "New Economy": E-Commerce in the Apparel and Automotive Value Chains', paper presented at TIPS Conference on New Directions in the South African Economy, Johannesburg, September

Novak, S., 2000, 'Auto Value Chain Development', paper presented at IMVP Annual Sponsors Meeting, Boston

Paré, D., 2001, 'Does This Site Deliver? B2B E-Commerce Services for Developing Countries', mimeo, London, Media@LSE. Available http://www.gapresearch.org/production/ecommerce.html. Downloaded January 2002

Roberts, B., 2000, 'Fair Exchange?' **Line56**, 15 December. Available http://www.line56.com

Schmitz, S., 2000, 'The Effects of Electronic Commerce on the Structure of Intermediation', **Journal of Computer-Mediated Communication**, Vol 5 No 3. Available http://www.ascusc.org/jcmc/

Spulber, D., 1996, 'Market Microstructure and Intermediation', **Journal of Economic Perspectives**, Vol 10 No 3: 135-152

Timmers, P., 1999, **Electronic Commerce: Strategies and Models for Business-to-Business Trading**, Chichester: John Wiley

UNCTAD. 2000. "Building Confidence: Electronic Commerce and Development." Geneva: UNCTAD.

UNCTAD, 2001, 'E-Commerce and Development Report, 2001', Geneva, UNCTAD. Available http://www.unctad.org/ecommerce/docs/edr01_en.htm. Downloaded January 2002

Van Heek, E., and Ribbers, P., 2000, 'Experience with Electronic Auctions in the Dutch Flower Industry', in C. Westland and T. Clark (eds), **Global Electronic Commerce: Theory and Case Studies**, Cambridge, MA, The MIT Press: 355-365

Wu, T., 1999, 'Application-Centered Internet Analysis', **Virginia Law Review**, Vol 85: 1163-1204