The potential of internet-based business-to-business electronic commerce for a ‘technology follower’: the case of the South African apparel sector

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Abstract: Business-to-Business (B2B) electronic commerce technologies are becoming increasingly important for South African (SA) apparel producers as they are integrated into global value chains and exposed to the demands of more sophisticated markets. For the SA apparel sector, B2B e-commerce represents an opportunity not only to connect with global markets but also to catch up and remain at the frontier of ‘world class’ competitiveness. Despite strong theoretical arguments suggesting that B2B e-commerce has much to offer the SA apparel industry, the empirical evidence emanating from a survey of the apparel manufacturing and retail sectors would seem to suggest that e-commerce is still in its infancy. However, there is potential for growth. The paper suggests a raft of policy measures designed to create an enabling and nurturing environment aimed at promoting and accelerating the diffusion of B2B e-commerce technologies in the SA apparel sector.

Keywords: Electronic commerce; inter-firm e-commerce; apparel sector; South Africa; corporate internet use.


Biographical notes: Sagren Moodley, MSc (Natal), MPhil (Sussex), is a research fellow in the School of Development Studies at the University of Natal. His field of expertise centres around information and communication technologies, especially their application to business processes in developing country contexts. He has just completed e-commerce surveys of the apparel, automotive and wooden furniture sectors in South Africa. The research was funded by the Canadian International Development Research Centre and the European Union through its policy support program for the Department of Trade and Industry (DTI). The findings and recommendations emanating from the study have fed directly into policy support for the DTI and into capacity building initiatives for the sectors concerned. The next phase of the research agenda will focus on the potential of e-commerce for enhancing the innovation capacity of small and medium enterprises in the province of KwaZulu-Natal.
1 Introduction

The international apparel industry is increasingly becoming Information and Communication Technology (ICT) based and knowledge driven [1-3]. Leading-edge apparel buyers and suppliers are using e-commerce to transform the way they do business and in which they collaborate with trading partners. For the South African (SA) apparel sector, Business-to-Business (B2B) e-commerce represents a chance not only to connect with global markets but also to catch up. For decades, the SA apparel sector was sheltered by state protectionism and a policy favouring import substitution industrialisation. In the post-apartheid era, however, the inwardly oriented apparel sector has become increasingly exposed to the cut and thrust of international competition as a direct result of a major shift in state policy to open markets, a rapid erosion of both tariff and non-tariff barriers and the implementation of an export oriented industrial policy [4]. The key challenge thus confronting the SA apparel sector is not whether to participate in global processes, but how to do so in ways which provide for sustainable growth.

The author defines e-commerce as any form of commercial or administrative transaction or information exchange that takes place via an ICT-based, computer-mediated network. B2B e-commerce encompasses a range of electronic interactions between a firm and its upstream and downstream trading partners. B2B e-commerce refers to procurement, logistics and administrative processes occurring between firms and can be divided into two categories: open marketplace-based trade and direct trade between business partners. The former takes place at various internet-based auctions or exchange sites, whilst the latter occurs either through a firm’s website which has an online purchasing function or an EDI-type network [5]. The value of B2B e-commerce for the SA apparel industry lies in streamlining inter-firm linkages, exploiting systemic efficiencies in the value chain and connecting to global markets.

This paper focuses exclusively on B2B interactions. There are two main reasons for this emphasis:

1. the author’s concern is primarily with the potential of the internet for enhancing inter-firm linkages in the value chain
2. current trends seem to indicate that B2B e-commerce (a supply chain model) will far outstrip that of Business-to-Consumer (B2C) e-commerce (a retail model) [6,7].

Excluding government transactions, approximately 90% of global e-commerce by value is conducted between firms [8]. According to the Gartner Group, B2B e-commerce will grow from US$145 billion globally in 1999 to US$401 billion in 2000 and to US$7.3 trillion by 2004 [9].

From a development perspective, this exploratory study is important because recent evidence suggests that sectors and countries that have experienced the most rapid diffusion of ICTs, have also experienced the most rapid rates of employment and output growth [10–13]. The importance of ICTs lies in the fact that economists generally attribute the greater part of measured growth to technological progress rather than to increases in the traditional inputs of labour and capital [14-16]. The critical question that arises is: Can B2B e-commerce provide a necessary lever to enhance the competitiveness of the SA apparel sector? This exploratory paper critically discusses the challenges, opportunities and risks of e-commerce for the SA apparel sector. While this study is far
from exhaustive, it represents an important first step in understanding the potential of B2B e-commerce in a developing country context.

The basis of the empirical data and analysis that follows is a series of open-ended, face-to-face interviews with 21 apparel manufacturers, 17 national retail chains and 15 industry experts. The interviews were conducted by the author between January and March 2001 [17]. The panel of industry experts included representatives from academia, government, trade unions, employers’ associations, NGOs, the Export Council and business, marketing and IT consultancies. The firm-level interviews were held with respondents who were either IT, marketing, purchasing, planning or merchandising directors.

The South African retail sector is highly concentrated and the bulk (approximately 70%) of the retail market is controlled by the 17 chains that were interviewed (Box 1). The sample of manufacturers were drawn from the three major centres of apparel production in South Africa, i.e. Durban, Johannesburg and Cape Town. The manufacturers were identified through the Clothing Federation (CLOFED) handbook and through leads provided by the key informants [18]. On the basis of the experts’ recommendations the author decided to target large manufacturers, especially those who are currently exporting, as well as the major national retail chains. Based on their experience, the experts believed that these large enterprises were more likely to:

- have a fairly sophisticated IT infrastructure
- be trading online
- have an e-commerce strategy.

**Box 1** The South African apparel industry: a macro perspective (1998 figures)

- 8 000 retailers, employing 50 000 people.
- Domestic apparel retail sales – R25 000 million.
- Approximately 1 600 manufacturers (formal sector) employing 133 000 people. If the informal sector is included, this figure could rise to 200 000 people. Total production – R9 650 million (value of actual sales).
- Apparel imports (f.o.b) – R931 million; Apparel exports (f.o.b) – R772 million.
- South Africa sourced 62.8% of its total apparel imports from just three countries, i.e. Malawi, China and India. The US (42.3%) and the UK (32%) are South Africa’s two main export markets.
- Five retail groups account for 50% of turnover.
- Over the past four years the industry has shed 20% of its labour.

*Source: LOFED (2000: 62, 63, 65, 81)*

2 The South African context

South Africa has experienced rapid growth in internet use and is placed at number 35, by the Economist Intelligence Unit’s (EIU) ‘E-business Readiness Rankings’, of 60 countries [19]. The number of dial-up subscribers grew by an average annual rate of 80% since 1994, according to Telkom and the number of internet users had surpassed the one million mark by 1998 [20]. According to EIU’s Pyramid Research, South Africa had
540,000 internet dial-up accounts in 1999 and will reach 1.1 million by 2002 [21]. Of the estimated three million internet users in Africa, two million are in South Africa [22]. The Internet Service Provider (ISP) market is becoming increasingly competitive, with over 150 ISPs already operating in the country. The major ones being: CiTEC, IBM, Intekom, Internet Solution, LIA, M-Web, Pix and UU Net. SA has produced some very successful IT companies, based on e-commerce, such as Ariel Technologies, Dimension Data, Johnnic, Ixchange, McCarthys, Nedbank and Super Group. In line with global trends, B2B e-commerce procurement hubs (such as Motoronline, Autris, Miraculum, Commerce One and ProcureTrade) have also been developed.

SA now ranks in the world’s top 20 countries in terms of number of internet sites [23]. With the rapid growth in internet use forecast in South Africa, the potential for growth in e-commerce is promising. BMI-TechKnowledge, a market research consultancy, predicts that the B2B e-commerce market in South Africa will increase from R21 billion in 2000 to R87 billion in 2002 [24]. A BMI-Techknowledge survey puts the percentage of large companies generating sales from electronic networks at 25% and for medium-sized firms at 20% [25]. The B2C market in SA is presently very small. The total value of internet retail shopping reached R238 million in 2000, which is equivalent to 1% of total retail turnover. The most popular items were computer software and hardware, books, wine and flowers [26].

According to the IDC, by the end of 2001 nine countries (including Argentina, Australia, the Netherlands, Norway and South Africa) are likely to generate more than 8% of their revenue from online sales. The IDC cites the use of electronic B2B exchanges and the large number of in-house computers connected to the internet as possible reasons for the success that these countries are experiencing [23].

With a well developed telecommunication infrastructure and deep integration into global economic networks, South Africa is better positioned than any other African nation to take advantage of growth opportunities in e-commerce. South Africa has a well-developed internet infrastructure in business and academia and its degree of connectivity places it in the top 25 in the world [27]. SA has an advanced telecom network in the commercial centres, but this contrasts with very low penetration of services in rural and remote locations, especially in the previously ‘independent’ black homelands. While the costs of access are generally affordable in most cities, because of the existence of local Points of Presence (POPs), there is no low cost method of access outside of these areas.

SA’s e-commerce development is weak in two critical areas: a deficient IT skills base and limited access to low-cost, high-bandwidth internet. Training and indeed basic education of the black majority were largely neglected during the apartheid era. As a result, companies tend to rely heavily on a small nucleus of skilled white and Indian workers for their IT requirements. This is obviously an unsustainable policy in the long-term. In a recent report, internet networking consultancy Cisco Systems forecasts that the shortage of skilled IT professionals in SA will be among the most severe in Europe, the Middle East and Africa [28]. The local skills shortfall is forecast to rise from 33% in 1999 to 62% in 2003. This is likely to have an adverse effect on growth of e-commerce in the country.
3 Survey findings

3.1 The retailers

The diffusion of e-commerce in the retail sector appears to be a function of ownership structure, firm size and market segment (Tables 1, 2 and 3). As far as ownership is concerned, it would seem as if firms listed on the Johannesburg Stock Exchange (JSE) are more likely to have adopted e-commerce technologies than firms which are a subsidiary of a domestic company and, to a greater extent, private companies. Larger firms (i.e. firms which have more than 1 000 employees) reveal a higher uptake of e-commerce technologies than smaller firms (i.e. firms with less than a 1 000 employees). Market segment in the retail link also seems to be an indicator of a firm’s adoption of e-commerce technologies. Retail chains operating in the upper-income (AB) and middle-income (BC) market segments were more likely to have Enterprise Resource Planning (ERP), EDI and a website and to be currently engaged in online trading, than retail chains operating in the lower-income (CD) market segment [29]. However, since we are dealing with relatively small numbers caution is advised when reaching conclusions. The results are nonetheless suggestive.

### Table 1 Ownership – retailers (N=17)

<table>
<thead>
<tr>
<th>Ownership</th>
<th>ERP</th>
<th>EDI</th>
<th>Website</th>
<th>Intranet</th>
<th>B2C Online Trading</th>
<th>B2B Online Trading</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSE Listed (N=9)</td>
<td>67%</td>
<td>56%</td>
<td>89%</td>
<td>89%</td>
<td>33%</td>
<td>56%</td>
</tr>
<tr>
<td>Subsidiary of a Domestic Company (N=3)</td>
<td>33%</td>
<td>33%</td>
<td>33%</td>
<td>33%</td>
<td>0%</td>
<td>33%</td>
</tr>
<tr>
<td>Private Company PTY (LTD) (N=5)</td>
<td>0%</td>
<td>20%</td>
<td>40%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

### Table 2 Firm size – retailers (N=17)

<table>
<thead>
<tr>
<th>No. of Employees</th>
<th>ERP</th>
<th>EDI</th>
<th>Website</th>
<th>Intranet</th>
<th>B2C Online Trading</th>
<th>B2B Online Trading</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1000 (N=9)</td>
<td>22%</td>
<td>22%</td>
<td>56%</td>
<td>22%</td>
<td>0%</td>
<td>22%</td>
</tr>
<tr>
<td>&gt;1000 (N=8)</td>
<td>75%</td>
<td>63%</td>
<td>88%</td>
<td>100%</td>
<td>63%</td>
<td>63%</td>
</tr>
</tbody>
</table>

### Table 3 Market segment – retailers (N=17)

<table>
<thead>
<tr>
<th>Market Segment</th>
<th>ERP</th>
<th>EDI</th>
<th>Website</th>
<th>Intranet</th>
<th>B2C Online Trading</th>
<th>B2B Online Trading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper-income (N=5)</td>
<td>60%</td>
<td>60%</td>
<td>80%</td>
<td>80%</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>Middle-income (N=7)</td>
<td>43%</td>
<td>43%</td>
<td>71%</td>
<td>57%</td>
<td>29%</td>
<td>43%</td>
</tr>
<tr>
<td>Low-income (N=5)</td>
<td>20%</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
<td>0%</td>
<td>20%</td>
</tr>
</tbody>
</table>
B2B e-commerce does exist in the SA apparel sector, in the form of EDI linkages between the major retail chains and the large apparel manufacturers and accounts for substantial B2B trade revenues. EDI is generally used for core business, i.e. regular bilateral trade between suppliers and customers for large, predictable orders. At present, EDI is used mainly for replenishing cosmetics, toiletries and core apparel products such as lingerie. The retailer agrees set stock holdings with the suppliers and the suppliers procure raw materials and set production space around that.

Currently, only 35% of retailers are using the internet or EDI to trade online with their suppliers (Table 4). EDI linkages tend to be exclusively with local suppliers. None of the retailers indicated that e-commerce capabilities on the part of producers is a condition of trade. Retailer 1 and Retailer 2 are shifting their EDI systems from proprietary, value-added networks to an open, internet architecture. These retailers are pushing through e-commerce initiatives and, in the long-term, they expect to see improved supplier collaboration delivering improved gross product margins, better in-store availability and reduced inventory. When large retail chains move their purchasing and sales to the internet, a ripple effect through the value chain is likely to be the outcome. Since the retailers have invested a substantial amount of money in web architecture, they are likely to be determined to get a return on it. Consequently, all of the retailers’ trading partners immediately come under pressure to adopt an e-commerce infrastructure, in order to create a sustainable digital trading network. Suppliers, particularly small producers, who resist the internet may be ‘frozen out’ of the supply chain.

Table 4 A profile of the retailers (N=17)

<table>
<thead>
<tr>
<th>Internet access</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Resource Planning (ERP)</td>
<td>47%</td>
</tr>
<tr>
<td>Electronic data-interchange (EDI)</td>
<td>41%</td>
</tr>
<tr>
<td>Website</td>
<td>65%</td>
</tr>
<tr>
<td>Intranet</td>
<td>59%</td>
</tr>
<tr>
<td>Extranet</td>
<td>0%</td>
</tr>
<tr>
<td>Business-to-consumer (B2C) online trading</td>
<td>29%</td>
</tr>
<tr>
<td>Business-to-business (B2B) online trading</td>
<td>35%</td>
</tr>
</tbody>
</table>

There does not appear to be long-term loyalty between a retailer and its constellation of fashion garment suppliers (i.e. non-core products). The primary reason for this is that fashion trends change constantly, particularly in terms of fabric, style and colour. As a result, retailers often engage in one-time or occasional transactions with suppliers of differentiated fashion garments. Obligational contracting relationships involving trust does not appear to be a defining feature of the buyer-seller relationship, in most cases. Most retailers did not have a conscious policy of investing in their producers capabilities and developing what Sako calls ‘obligational relationships’ [30].

The fact that the apparel value chain is largely price-driven, rather than knowledge and innovation-driven, may account partially for the lack of strong mutual commitment between buyer and seller. Retailer 2 is an exceptional case. Retailer 2 is presently consolidating its supply base and deals largely with preferred suppliers with relatively stable contracts. The emphasis here is on forging long-term partnerships with suppliers
based on trust, interdependence and strong communication links, in order to ensure high quality and prompt delivery. Retailer 2 mentioned that changing suppliers for the sake of short-term price advantages is problematic because of the high transaction costs involved, as well as the potential risks associated with quality and delivery reliability. Only Retailer 2 has an active supply chain development program and is committed to feeding back information to their suppliers in order to assist in upgrading their performance.

Most of the retailers have a web presence (65%) (Level 1, Table 5). Only 47% of the retailers have an ERP system that seeks to integrate business processes and management information across the organisation. The intranets that the large companies have installed to connect different departments resemble ERP systems. None of the retailers are presently operating an extranet, although a few indicated that this was a medium-term goal. This suggests that the retailers’ prime focus is still on operational efficiency within the enterprise (Level 2, Table 5), rather than trying to increase the organisation’s effectiveness outside the enterprise by linking across the internet with suppliers to create virtual supply chains (Level 3, Table 5).

Table 5  Levels of e-commerce development

<table>
<thead>
<tr>
<th>Levels</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sphere</td>
<td>• Functional orientation</td>
<td>• Integrating across functional departments</td>
<td>• Cross-enterprise involvement</td>
</tr>
<tr>
<td>Rationale</td>
<td>• Departmental focus</td>
<td>• Integrated business activities via internet/intranet applications.</td>
<td>• A virtual ecosystem that connects employees, suppliers and customers by extending existing EDI.</td>
</tr>
<tr>
<td></td>
<td>• The purchasing &amp; sales department using EDI</td>
<td></td>
<td>• The extranet aims to: build trust and increase customer satisfaction; increase collaboration and knowledge sharing between customers and suppliers; and maximise synergies to lower costs, improve efficiencies and increase quality.</td>
</tr>
<tr>
<td></td>
<td>• Individual departments developing specific internet applications, e.g. a marketing website.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levers</td>
<td>• Technological infrastructure and software applications</td>
<td>• Business processes (process efficiencies within the firm)</td>
<td>• Cultivating knowledge workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Developing and exploiting intellectual capital to create opportunities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Building relationships</td>
</tr>
</tbody>
</table>

Source: Author’s original work
The innate conservatism of the industry appears to be a stumbling block to adopting e-commerce systems. The principal obstacle to the accessing of Electronic Point of Sales (EPOS) data is not technological but an issue of mindset. Retailers are generally unwilling to provide their suppliers with a live link into their sales and stock levels because such information is considered to be ‘confidential’. Only 35% of retailers allow their suppliers access to information about how each of their apparel products is selling in their stores. Suppliers use authentication procedures, involving user IDs and passwords, to access the system and they then use their own order numbers to trace their products so as to get an idea of stock balances. The vast majority of retailers do not provide their suppliers (even for replenishment stocks) with electronic access to their point of sales information. Core product suppliers are informed of replenishment orders through word of mouth (i.e. over the telephone or through the reps) or by fax.

Most of the retailers mentioned that a major barrier to trading directly and exclusively over the internet is the personalised, tactile nature of the buying and selling process in the fashion industry. However, there is one retailer operating at the lower end of the market who reported using the internet for procuring commodity apparel products. The idea of buying apparel through B2B trading hubs and auction sites was, however, generally not an option for the vast majority of the retailers. Only 29% of retailers are currently selling apparel products directly to consumers via the internet. B2C retail sales have been very disappointing and retailers are beginning to question the commercial viability of a B2C operation in the short to medium term.

3.2 The manufacturers

The e-commerce results of the manufacturers were not affected by ownership or channel of sales (marketing segment). Firm size and export orientation, however, seem to have affected the diffusion of e-commerce technologies amongst the manufacturers (Tables 6 and 7). The larger producers are more likely to have ERP, EDI, a website and an intranet than the smaller producers. In addition, the larger manufacturers are more likely to be engaged in online B2B trading than the smaller garment-makers. Manufacturers who are currently exporting would seem to have a better uptake of e-commerce technologies than the non-exporters. Again, caution is advised as we are dealing with small numbers.

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Firm size – manufacturers (N=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ERP</td>
</tr>
<tr>
<td>No. of Employees</td>
<td></td>
</tr>
<tr>
<td>≤100 (N=4)</td>
<td>0.0%</td>
</tr>
<tr>
<td>101-500 (N=7)</td>
<td>28.6%</td>
</tr>
<tr>
<td>501-800 (N=5)</td>
<td>40.0%</td>
</tr>
<tr>
<td>800+ (N=5)</td>
<td>80.0%</td>
</tr>
</tbody>
</table>
Only 48% of manufacturers have a website and just 52% of firms are using the internet or EDI to trade online with their customers (Table 8). Four factors appear to be holding e-commerce back. The first is simply its newness: many manufacturers cannot even contemplate doing business through the internet. The second is the lack of highly responsive supply networks that can deliver apparel components and services as needed. The third and perhaps most important, is the lack of a critical mass of firms with e-commerce capabilities. Fourthly, manufacturers are very reluctant to allow their suppliers and customers access to their databases and inner workings. This is indicative of a lack of trust in the apparel value chain and, perhaps, an unwillingness to expose a firm’s weaknesses and mistakes. It has to do mainly with evolutionary path dependencies which have locked firms into an insular, inwardly-oriented way of thinking.

**Table 7** Exporting – manufacturers (N=21)

<table>
<thead>
<tr>
<th>Exporting</th>
<th>ERP</th>
<th>EDI</th>
<th>Website</th>
<th>Intranet</th>
<th>B2B Online Trading</th>
<th>B2C Online Trading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes (N=15)</td>
<td>40.0%</td>
<td>60.0%</td>
<td>53.3%</td>
<td>20.0%</td>
<td>60.0%</td>
<td>13.3%</td>
</tr>
<tr>
<td>No (N=6)</td>
<td>40.0%</td>
<td>50.0%</td>
<td>33.3%</td>
<td>0.0%</td>
<td>33.3%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

For manufacturers, an online B2C transition is perceived as a very risky shift in strategy. Hence the low percentage of manufacturers who are engaged in B2C trade (Table 8). This has to do mainly with perceived channel conflict and fear of alienating their customers (i.e. the retailers), as they will now be directly competing with their customers. A substantial percentage of the manufacturers export (71%). The manufacturers claim that they make use of agents to connect to export markets, rather than through digital links. Digital connections, it is argued, are important for contacting the agents but not for direct communication with overseas suppliers. We found no evidence of disintermediation in the production pipeline. All of the manufacturers were emphatic that they would not purchase through online auctions because of the high risks involved: bid-price manipulation, false product descriptions and failure to deliver merchandise. Furthermore, there is the view among the respondents that garments may not be as tradable over the internet as other commodities, such as automotive parts, computer software or laboratory products.

**Table 8** A profile of the manufacturers (N=21)

<table>
<thead>
<tr>
<th>Internet access</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Resource Planning (ERP)</td>
<td>38%</td>
</tr>
<tr>
<td>Electronic data-interchange (EDI)</td>
<td>57%</td>
</tr>
<tr>
<td>Website</td>
<td>48%</td>
</tr>
<tr>
<td>Intranet</td>
<td>14%</td>
</tr>
<tr>
<td>Extranet</td>
<td>0%</td>
</tr>
<tr>
<td>B2C online trading</td>
<td>10%</td>
</tr>
<tr>
<td>B2B online trading</td>
<td>52%</td>
</tr>
</tbody>
</table>
Manufacturers mentioned a number of factors that are likely to impede the uptake of e-commerce in the apparel industry. Many manufacturers are concerned that the goal of e-commerce is simply to squeeze them on price. They are also concerned that e-commerce will weaken/threaten their long-standing relationships with existing buyers. Some manufacturers questioned the need for e-commerce, considering that retailers generally operate on short-term relationships, i.e. the relationship usually lasts for one season only.

Competitive pressures arising from globalisation and trade liberalisation have forced the larger apparel manufacturers to downsize and outsource to Cut-Make-Trim (CMT) factories, which are made up primarily of small and micro enterprises. Most manufacturers stated that the low IT capabilities of the CMTs could be seen as an obstacle to e-commerce taking root in the industry. Moreover, some of the manufacturers have developed a network of offshore assembly arrangements with low-wage countries. The introduction of global buying network arrangements can be understood as a strategy to ensure international competitiveness and as a defence against cheap imports. The spread of outsourcing in the apparel industry means that firms manage many more alliances and underlines the importance of an integrated information system.

Apparel manufacturers are being forced to adjust their production arrangements in order to improve quality, maintain lower price, produce smaller batches of more varied products and respond rapidly to changing customer demand. The drive for competitiveness is leading to changes in inter-firm arrangements. The manufacturers mentioned that non-price factors such as quality, delivery reliability, quick response and flexibility are becoming critical competitive differentiators. Apparel manufacturers are under pressure to improve their efficiency and quality levels to ensure long-term sustainability. Supply chain inefficiencies, such as high inventory levels and long lead times, were underlined as key problem areas.

Several of the manufacturers have fairly advanced information systems which provide an integrated view of each stage of the design, raw material procurement, production, marketing and sales process. Many of the manufacturers, however, still have not integrated their internal systems; others (38%) that have invested in ERP systems have a firmer foundation. Some manufacturers claimed that they have not given external parties access to their systems because their systems are not integrated, it is still very much modular based. This is problematic considering that the aim of B2B e-commerce is not to just connect customers to a manufacturer’s website but to connect them to the manufacturer’s business, i.e. to both back and front office systems. The manufacturers’ ERP systems (38%) and the intranet (14%) are primarily being used to generate internal efficiencies and to obtain integrated management information within the firm (Level 2, Table 5). They are not geared, for instance, to receiving customer demand forecasts generated direct from retailers’ EPOS terminals through the supply chain.

4 Analysis

4.1 Opportunities

Whilst much of the attention in the apparel industry is currently focused on selling directly to consumers over the internet, it is in the sphere of Supply Chain Management (SCM) and logistics that many of the real benefits of e-commerce can be found [2].
E-commerce has precipitated the move from traditional internally-focused logistics and SCM models to new models built on network-based, ICT-facilitated collaboration. This entails the sharing of critical and timely data on the movement of goods as they flow from raw material all the way to the end user. The net effect is end-to-end supply chain optimisation based on open communication between networks of trading partners. In theory, e-commerce could provide the building blocks for an integrated ICT system including:

- a network of trading partners
- a single point of connection to all participants in the value chain and production network
- a common digital platform to facilitate seamless communication and transaction processes among trading partners
- real-time response capabilities to adapt to unplanned events in the value chain.

B2B e-commerce opportunities for South African apparel firms include:

- **Small business hubs**, especially linked to a large manufacturing company or retailer who sees this as a way to outsource production more effectively and to improve the operational aspects of that network. The objective of which would be to foster broad-based sharing of information and insights. There is scope for value-creating potential, deriving a competitive advantage from exclusive collaborations and from the proprietary sharing of information with suppliers.

- **Upstream and downstream linkages**: expanding EDI through internet-based links between retailers and their branch stores, key manufacturers, design houses and CMT factories. Small and medium apparel manufacturers will be less inclined to implement B2B e-commerce systems in the manufacturing pipeline in the short-term because of the perceived cost and infrastructural requirements. The uptake of e-commerce systems for the large apparel producers who are exporting is likely to be quicker.

- **For exporters**, pipeline efficiency is critical especially when they are buoyed by big volumes and important customer requirements like proof of origin, short lead times, delivery reliability, etc. Foreign buyers are likely to be the biggest motivator for ICTs, as they have been in things like computerised cutting technology and e-mailing of patterns to manufacturers. Manufacturers without e-commerce capability will find it very difficult to win orders from the US and the EU.

Manufacturers are now faced with shorter lead times and they will need to develop capabilities to respond to this change. Ramaswamy and Gereffi argue that “the consolidation of market power in the buyers, product diversity and the higher demand uncertainty in product markets put pressure on the apparel supplier countries to adopt information systems to fill their orders efficiently” (italics added) [3]. Sharing information between retailers and manufacturers is important. Retailers benefit greatly when they can see the manufacturers’ production schedules and manufacturers, in turn, benefit when they have access to the retailers’ demand forecast, inventory and sales data for their garments. This makes it easier to plan ahead for the volume and timing of
orders. They can react in real-time rather than waiting for information to trickle down, thus providing a clear view of the balance of supply and demand.

Suppliers will be better able to plan their production and distribution activities, which should also enable a reduction in inventories and therefore working capital. The rationale adopted is one of demand-led just-in-time management strategies based on quick response, low inventories and rapid product changes. Information such as sales data, stocks, production, waste levels, supplies, capacities and lead times are shared both upstream and downstream in order to agree projected stock cover between raw and intermediate input suppliers, CMT factories, manufacturers and retailers. The objective is to ensure efficient replenishment by keeping costs, inventory levels, empty shelves and machine stoppages to a minimum. There is, thus, greater visibility across the supply chain among the trading partners.

4.2 Challenges

The SA apparel value chain is characterised by a dense network of relationships between textile mills and other intermediate input suppliers, CMT factories, manufacturers, design houses, wholesalers, distributors, agents and retailers. At first blush the prospect of disintermediation is seductive but its implementation may be problematic. The potential for disintermediation in the clothing value chain is constrained by the subjective ‘sensory factor’. Disintermediation has its limits in the clothing sector, which is largely a physical world of resources that buyers need to see and touch. Thus the procurement of apparel, especially fashion garments, requires a great deal of personal, face-to-face involvement in the buying process. Attributes such as colour, texture, drape, etc. are crucial determinants of the buying decision in both the B2B and B2C markets. The challenge will be to integrate the internet with the existing personalised communication networks in the value chain.

Whilst the internet may well change the role and function of intermediaries it is unlikely to mean the death of the middleman. Nonetheless, the value chain is likely to be characterised by fewer intermediaries. The disappearance of links will be caused by the erosion of entry barriers, which were effective in the past. Such barriers comprise exclusive knowledge and geographical protection due to proximity. The new role of intermediaries is likely to become ‘domain brokers’, establishing ‘information portals’ or to provide the virtual value chain with other new kinds of infrastructure. We may well see the emergence of B2B ‘infomediaries’ in the apparel value chain, i.e. intermediaries who collect information, add value to it and sell it to firms who will find it most useful, thereby creating a platform on which buyers and sellers can do business.

We are sceptical that electronic B2B trade exchanges (like Covisint in the automotive industry) and auction websites will take root in the fashion apparel industry. Although there may well be a market for basic, standardised garments in B2B trade exchanges. Auction sites, however, are anathema to the whole ethos of the fashion garment industry. Retailers and manufacturers catering to the lower-end of the market, where price competition is most intense, may, however, purchase stock clearances and distressed goods through an auction site. Nonetheless, the history of fashion apparel markets strongly suggests that personal involvement (sensory factors) will remain a key feature of the buying process.

The hypothetical benefits of online B2B trade exchanges rest largely on the potential for seamlessly integrating data flows and work processes across the entire value chain. In
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the South African apparel industry this kind of deep integration would be very difficult to achieve, primarily because:

- the supply chains are complex (as it involves both core products and specialised fashion items for which demand varies) and fragmented (because of trends such as outsourcing, subcontracting and informalisation of the industry)
- many firms simply do not have intranets, ERP and decision support systems and are unlikely to make big investments in ICTs in the short-term to integrate their back and front office systems.

Real benefits of B2B trading exchanges have tended to be quite elusive. B2B e-marketplaces have simply not delivered the benefits that its supporters once promised [31]. Companies, such as low-end apparel retailers purchasing commodity products might, however, value the liquidity, transparency and price-orientation of a B2B e-marketplace. This may also apply to producers purchasing commodity items such as buttons, zippers, etc. from input suppliers. On the other hand, companies purchasing highly specialised fashion garments value the possibilities for customisation offered by the traditional bilateral relationship between buyer and seller [32]. Therefore, we believe that bilateral relationships will continue to be important in the fashion apparel industry.

Factors likely to impede the adoption of e-commerce in the South African apparel sector include:

- the fragmented nature of the apparel production sector
- limited awareness of the potential of e-commerce
- evolutionary path dependencies which focus on the reduction of labour and input costs as a competitive advantage, rather than pursuing a knowledge and innovation-intensive growth trajectory
- management’s ‘laager’ mentality, which has locked firms into an insular, inwardly-oriented way of thinking
- the lack of adequate e-commerce infrastructures, skills and capabilities. Many firms simply lack the basic knowledge and technical skills to implement e-commerce strategies
- low annual investment in ICTs. Only the big corporations tend to spend on ICTs to any significant degree.

Although some of the larger manufacturers are e-commerce enabled, most are not. For e-commerce to take place in the apparel sector, a critical mass of manufacturers and retailers must be “willing and able to manage their logistical or other interlinking processes in a common, standard way” [33]. Many of the firms in the garments industry perceive information sharing as a loss of power, as a result they tend to keep their trading partners at arm’s length. Retailers generally do not divulge information on sales patterns, stockholding and planned deliveries to branch stores to the manufacturers. Such internal data is deemed to be confidential and secret. Moreover, manufacturers are often at the mercy of retailers who change order quantities and/or timings unexpectedly. Manufacturers, therefore, incur extra costs in trying to respond quickly to an amended
order within a tight time frame. This sub optimal outcome could have been avoided if retailers were willing to share data on sales, forward projections and stock cover.

4.3 Risks

There are also risks associated with e-commerce, i.e. cost cutting, price-based supplier relationships and competitive switching. Electronic links theoretically make it easier for buyers to begin and end supplier relationships. This may threaten stable, long-term relationships as suppliers lose the protection afforded by familiar inter-firm relationships and the retailers’ incomplete information about alternative supply sources [34]. The pursuance of short-term price advantages and the concomitant ‘factory hopping’ and ‘competitive switching’ on the part of buyers is, of course, at odds with upgrading the positioning of SA apparel producers in global-scale value chains. Therefore, the building of trust, loyalty and reciprocity, to reduce the threat of opportunism and to make it difficult to break long-term network relationships is important. Trust issues are likely to centre around access control, transaction privacy, information integrity and authenticity. It may well be that the internet itself could be used as a mechanism to build trust between firms. The value lies in the connectivity, especially the ability of manufacturers to begin to engage in a dialogue with the retailers. As co-creators of value, they could, in theory, cultivate trust and relationships in the value chain.

Much of the supply chain efficiency that the e-commerce model depends upon is held hostage by the pace at which a firm’s trading partners, from suppliers and customers to transportation companies, upgrade their own systems to complement the e-commerce enabled firm. Returns on investment can only be made once critical mass is reached and enough value chain participants make use of the online services offered. Implementing e-commerce means asking hundreds of companies to conform their business practices to meet very precise standards for information flow. Considering that retailers, manufacturers and input suppliers are using different types of hardware and software and are at different stages of e-commerce development, mandating and enabling total electronic compliance can be quite a daunting challenge.

Over-automation of the buying process could weaken strategic relationships that a firm has with key suppliers or customers. The firm should, therefore, ensure that the collaborative process is not stifled in the quest for fully integrated e-commerce. There is also the danger that an e-commerce system will merely be embedded into an existing modularised system. The risk is that rote implementation is likely to lead to ‘islands of automation’ thus constraining the enterprise’s ability to harness key operating synergies and systemic efficiencies.

Before adopting the technology, a firm should make sure that there are value-adding opportunities in e-commerce and should not do so just because other firms are doing it. There first needs to be a business plan with a rigorous assessment of costs and revenue streams. ERP is a recent example of a technology wave that has often resulted in high expenditure with little benefit. The ERP systems were often just bolted onto businesses, without making the necessary changes in the enterprise’s skill profile, organisational structure and business processes. Consequently, results were often disappointing. E-commerce starts with an effective integration of a company’s internal interactions, thereafter the level of integration is broadened to include customers and suppliers. E-commerce can be achieved only if suppliers and buyers invest to integrate their ICT
systems and to manage the change process actively in their enterprises and they are unlikely to do so without proof that the effort will be worthwhile.

5 Policy measures

Widespread and affordable telecommunications services are a lynchpin for successful e-commerce. An uncompetitive, regulated telecommunications environment, such as South Africa’s, could constrain the development of value-added services for business. Increased connectivity requires an environment that encourages private sector investment. The parastatal Telkom currently has a five-year monopoly over fixed-line telecommunications services, which expires in May 2002, after which it may apply for a sixth year [35]. The SA telecom industry is currently in a state of flux as government develops new policies for the post-exclusivity period. It is important that the Independent Communications Authority of South Africa (ICASA) moves quickly to open up the telecom sector.

Telkom’s restricted supply of broadband capacity is a shortcoming in linking SA companies with the rest of the world. Opening up bandwidth through investment in Digital Subscriber Line (DSL) technology and optical fibre cable is, therefore, a priority [36]. However, as long as Telkom has a monopoly, broadband access is likely to be delayed. There is evidence, however, that the industry is moving slowly but inexorably towards a more competitive environment. Government announced in July 2001 that it would partially liberalise the local telecom market by introducing two new competitors in May 2002, which will compete with Telkom on all services [37]. The private sector is likely to have the majority stake in the new operator, particularly as a black empowerment partner can bid for up to 30% of the license. In addition, Government has indicated that Telkom will be listed on the JSE Securities Exchange and possibly the New York Stock Exchange. Cellular telephony is also challenging Telkom’s monopolisation of telecommunications in South Africa, especially with the Government’s recent granting of a third cellular license. The Department of Communication (DoC) seems to be adopting a ‘managed liberalisation’ approach to gradually open up the telecom market.

The ICT policy of the South African Government is captured and reflected in three initiatives:

- the South African Information Technology Industry Strategy (SAITIS), a broad consultative group that produced an integrated framework for the ICT sector [38]
- the DoC’s efforts to develop policy to facilitate the growth of e-commerce, with the publication of an E-commerce Green Paper in November 2000 [39]
- the two recent discussion documents released by the DTI, which makes the case for ICT-based, knowledge-intensive industrial development [40,41].

SAITIS is concerned primarily with building the local ICT sector’s capacity [38]. This is important considering that packaged software applications for business are largely imported, though with most custom development and package adaptation performed locally. SAITIS, however, pays little attention to the potential impact of ICTs on other industry sectors, such as apparel and thus minimises opportunities for implementing
e-commerce in ways that can maximise economic competitiveness. Moreover, SAITIS has not taken the lead in stimulating ICT adoption through partnerships with industry. This is especially problematic since lead firms in the apparel sector have generally not taken a leadership role in rolling out e-commerce initiatives.

The DoC’s Green Paper on e-commerce raises more questions on policy and principles than it answers [39]. Despite having a very broad definition of e-commerce, the DoC’s policy paper deals primarily with legal and contractual aspects of e-commerce including: trade laws, taxation, intellectual property rights, consumers’ protection and security. It does not specifically deal with the application of the internet to the business processes embodied in industrial value chains.

While the DTI’s new industrial development strategy engages with the challenges posed by the information economy, this is done at an abstract, theoretical level [40]. Moreover, in the author’s opinion, it does not go far enough to articulate specific strategies for e-commerce development, particularly sectoral policies. The DTI will need to design and implement detailed strategies to upgrade the IT infrastructure of South African firms in specific sectors, such as apparel, which are lagging in e-commerce development. Policy will need to focus on the constraints and tensions that apparel firms are likely to face in making the transition to e-commerce.

The SA apparel sector can only maintain a competitive edge if it integrates ICTs and innovation into the production process. Currently, DTI support schemes place too much emphasis on the generation of technology rather than its effective use. In-depth technical and system-specific skills to support e-commerce is a pressing priority in the apparel sector. A weakness of the DTI’s new industrial strategy is that it provides incentives for those who already have relatively high knowledge-based skill levels and IT capabilities, thus leaving the poor and the illiterate out of the loop. This is problematic in a low-tech, labour-intensive sector such as apparel which is characterised by workers with low-levels of IT skills.

The magnitude of the e-commerce challenge is such that there is a need for various partnerships, alliances and consortia (public-private and multi-partnerships involving government, employers’ associations, trade unions and relevant organisations such as the Electronic Commerce Association of South Africa (ECASA)). There is an urgent need for the forging of partnerships to:

- create innovation support centres and technology incubators to assist local firms in developing appropriate e-commerce strategies and foster local, ICT-based industries. In the province of Gauteng, for example, construction has begun on an innovation hub, an incubator and training centre for emerging high-tech enterprises. Modelled after similar undertakings in Asia, the project will include the creation of a high-tech corridor leading from Pretoria to Johannesburg. This initiative will need to be rolled out to SA’s other provinces
- support inter-firm networking and knowledge sharing
- promote the diffusion of information on e-commerce success stories and best practice
- develop collaborative relationships based on trust in the textiles-apparel-retail channel
- create a facilitative environment for venture capital
• develop human capacities and skills. Human capital is obviously a central component of any strategy to promote e-commerce development and will need to be integrated into the Government’s National Skills Development Plan [42]. Skill shortages are greatest in three areas; managers capable of completing complex technology projects, local content creators aware of the network’s potential; and software and hardware engineers. Apart from promoting technological education, Government also needs to tailor its immigration policy to ensure that the award of work permits for foreign investors and their staff, as well as for local firms in need of specialised IT skills, is streamlined.

For the SA apparel industry, the benefits of e-commerce in the short to medium-term are likely to be more tangible in terms of information management rather than in procurement and sales. In other words, the real gains from e-commerce will come not from trading online, at least not in the short-term, but from better access to and the exchange of information regarding matters such as supply and demand forecasts and reports of inventory levels along the supply chain. According to Berryman and Heck, “the unifying feature of collaboration on this model is the sharing of information over the web” [32]. At this early stage of e-commerce development, online digital trading networks are very much a long-term goal. Our findings indicate that purchasing and sales are not web-enabled in most firms. Therefore, online transaction processing benefits will be hard to achieve in the short-term.

Since the apparel market is based on personal relationships, it will not be possible to create an internet-based transaction business instantaneously. A gradual approach is required. The Government’s initiatives should be targeted in the short-term on promoting ICT-based communication and information exchange between firms and on supply chain management and logistics (Table 9). We believe that these are the two critical areas in which gains are likely to be more immediate. Our findings suggest that the lack of high-quality inter-firm information and data exchange produces various forms of supply chain inefficiencies in the industry. Therefore, effort and investment should be put into improving end-to-end information flow in the apparel value chain. The policy challenges of such an intervention revolve around providing security, establishing a standard format for information flows and making sure that firms share information fairly.

### Table 9 Policy focus

<table>
<thead>
<tr>
<th>Potential productivity gains from B2B e-commerce:</th>
<th>Duration</th>
<th>Policy Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>A seamless communication and information exchange channel</td>
<td>Short to medium-term</td>
<td>High</td>
</tr>
<tr>
<td>Supply chain management and logistics</td>
<td>Short to medium-term</td>
<td>High</td>
</tr>
<tr>
<td>Cost efficiencies from automation of transactions</td>
<td>Medium to long-term</td>
<td>Medium</td>
</tr>
<tr>
<td>Possible economic advantages of new market intermediaries</td>
<td>Long-term</td>
<td>Low</td>
</tr>
<tr>
<td>Consolidation of demand and supply through organised B2B trade exchanges</td>
<td>Long-term</td>
<td>Low</td>
</tr>
<tr>
<td>Changes in the extent of vertical integration of firms</td>
<td>Long-term</td>
<td>Low</td>
</tr>
</tbody>
</table>

*Source: Author’s original work*
The DTI has a role to play in supporting and actively encouraging apparel manufacturers to adopt the internet for managing information flows and pipeline linkages. The DTI needs to investigate the possibility of establishing local partnerships and supply chain development programs to promote collaborative projects using ICTs. This is important since the future of the SA apparel sector depends on high value-added output, which in turn depends on manufacturers developing and exploiting new and specialised knowledge. State supply-side policy support programs, such as the Sector Partnership Fund, Competitiveness Fund and Innovation Fund, could be leveraged in this regard.

There may also be a role for the DTI, South African Clothing and Textile Workers’ Union (SACTWU) and the South African Clothing Federation (CLOFED) to work together on a project to plan and develop an information portal for the apparel sector. The internet portal should aim to:

- connect the textile mills, intermediate input suppliers, garment-makers and retailers through a common communication infrastructure of interactive tools
- function as a gateway to individual corporate portals, where logistics and transaction management is handled by individual firms.

All a company would need to connect to the information portal would be a PC which is linked to the internet. Therefore even small companies with a rudimentary IT infrastructure would be able to link into the portal. The primary benefits of the information portal will be its ability to speed up the flow of information and to make it more widely available.

Ultimately, the policy challenge is to create an enabling and nurturing environment aimed at promoting and accelerating the diffusion of e-commerce technologies and strategies in the South African apparel sector. Since there are competing agendas within government, industry and labour, close coordination and effective collaboration between the parties is essential if cross-cutting e-commerce policies are to be effectively and efficiently executed.

6 Conclusion

The South African apparel sector needs to innovate to reach and remain at the frontier of ‘world-class’ competitiveness [43,44]. E-commerce technologies are becoming increasingly important for South African apparel producers as they are integrated into global value chains and exposed to the demands of more sophisticated markets. Opportunities exist for apparel firms to participate in the re-organisation of supply chains to capture efficiency gains and to participate in more geographically diverse supply systems. Failure to adopt e-commerce technologies could lead to apparel producers becoming increasingly marginalised from the international markets that they wish to supply. By not making the transition to e-commerce apparel producers run the risk of becoming less competitive, affecting both their present market position and long-term viability.
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The long-term challenge for SA garment-makers is to achieve:

- strategic agility, i.e. flexibility to adapt to changing market dynamics, evolving customer needs and new channels of competition
- tighter control of inventory in their supply chains
- improved ability to dynamically respond to changing customer delivery requirements in the supply chain
- better integration with input suppliers and buyers to efficiently adapt to fluctuating demand.

E-commerce is a necessary condition to meet these challenges. However, it would appear that apparel firms are currently paying lip-service to e-commerce ideas. Few companies understand:

- the impact they can have by running their supply chains electronically
- the implications of B2B electronic trading
- the advantages of economies of scale and connectivity to speed up their production and distribution systems, that e-commerce offers.

South Africa is lagging behind Australia, Brazil, North America, Northern Europe, Singapore and South Korea in adopting e-commerce and using it to raise productivity, competitiveness, investment and employment [36]. Despite strong theoretical arguments suggesting that e-commerce has much to offer the SA apparel industry, the empirical evidence would seem to suggest that e-commerce in the garments industry is still in its infancy. The author, however, is guardedly optimistic that e-commerce will, in the long-term, change the basis of competitive advantage in both manufacturing and retailing. The value of e-commerce rests squarely on the ability of the apparel firm to extend processes and integrate with other companies and, on a broader level, to integrate and consolidate supply chains. The question is whether this potential can be translated into reality for the apparel sector in South Africa.

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References and Notes


15 Freeman, C. (1986) *The Economics of Industrial Innovation*, Massachusetts, MIT Press.


17 Confidentiality agreements with the respondents prevent us from identifying the manufacturers, retailers and key informants that were interviewed.


19 E-readiness refers to the extent to which a country’s business environment is conducive to internet-based commercial opportunities (www.ebusinessforum.com).

20 www.telkom.co.za

21 www.ebusinessforum.com

22 www.worldbank.org

23 www.ecommertecetimes.com


25 www.bmi-t.co.za

26 www.mg.co.za

27 Giovannetti, E. (2001) ‘Internet access and regulatory reform, the experience of South Africa’, in M. Kagami and M. Tsuji (Eds.), *The ‘IT’ Revolution and Developing Countries: Late-Comer Advantage?*, Chiba (Japan), Institute of Developing Economies (IDE).

28 www.cisco.com

29 Enterprise Resource Planning (ERP) refers to an integrated system of operation applications encompassing contract and order management, distribution, financials, HR management, logistics, production and sales forecasting.

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37 Esi-Tel, a subsidiary of the electricity utility, Eskom and Transtel, the telecom arm of transport parastatal Transnet, are the front-runners as the second and third fixed-line network operators. Both companies already have extensive telecom network infrastructure in place.