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Unlocking Value in the “New Economy”: The Implications of B2B E-Commerce for South African Apparel and Automotive Component Firms

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**Unlocking Value in the “New Economy”:
The Implications of B2B E-Commerce for South African
Apparel and Automotive Component Firms¹**

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I INTRODUCTION

a. Prologue

The “new economy” remains an ambiguous concept which means different things to different people (see, for example, Cohen et al. 2000; OECD, 2000a, b; Shapiro and Varian, 1999). We argue that the notion of a “new economy” is closely tied to the economic transformations which are powered by the development and diffusion of information and communication technologies (ICTs), the rise of knowledge-based productivity and competitiveness, and the increasing dominance of global value chains incorporating global networks of capital, production and trade. The major factors spearheading the new information economy are modern microelectronics-based information technology, deregulation, privatisation, and liberalisation of trade and investment (Dicken, 1998; Gereffi, 2001). The notion of the new economy is thus firmly anchored in the new ideological environment that resulted from the collapse of statism, the crisis of welfarism and the contradictions of the developmental state (Held et al., 1999). The new economy originated mainly in the United States, but is spreading rapidly into Europe, Japan, Asia Pacific and in selected developing countries (Schiller, 1999).

The key point that needs to be emphasised is that organisational learning, knowledge management, digital networking and information processing are critical elements for firms operating in the new economy (Tuomi, 1999). According to Castells (2000: 77), the productivity and competitiveness of firms “fundamentally depend on their capacity to generate, process, and apply efficiently knowledge-based information”. E-commerce and the global networked business model are the archetypical expressions of the new economy (Castells, 2000; Hartman, Sifonis and Kador, 2000). It is important to remember, however, that the growth and development of the new economy has been highly uneven both *within* and *between* countries. The networking logic is based on asymmetrical interdependency, and is exclusionary locking out those individuals, groups, regions, sectors and countries lacking the required knowledge intensive skills and capacities. Moreover, the new economy is not about soft landings and smooth growth, rather it is about a structural shift in the global economy heralding transformation, risk and disruption for developing economies.

In South Africa, the critical importance of e-commerce and online electronic linkages in shaping the performance of domestic enterprises in the global, networked economy has recently come under the policymaking spotlight (Department of Communication, 2000; Department of Trade and Industry, 2001; Kaplan, 2000). This is not surprising since, in the new economy, ICTs play an increasingly important role in innovation, profit margins, output performance, value-added, employment creation and investment (Baily and Lawrence, 2001; ILO, 2001; OECD, 2000a, b). The South African development challenge is indeed a formidable one: high structural unemployment (39.5%); a sluggish economic growth rate (an average of only 2.1% annually between 1996-99; well below the population growth rate); large scale brain drain with the flight of knowledge intensive skills for Australasia, North America and Europe; high levels of poverty in the black population (53% of individuals fall below the poverty line of R301.70 per adult equivalent);² and high inequality (a Gini coefficient of 0.593) (Harsch,

² The poverty line is based on a population cut-off at the 40th percentile of households ranked by adult equivalent expenditure.

2001; www.statssa.gov.za; Woolard and Leibbrandt, 1999; World Bank, 2000).³ The challenge is one of how to promote and sustain development in such an environment. The DTI (2001), for example, argues that South Africa needs to follow an ICT-enabled, knowledge-based industrial development trajectory in order to achieve steady high rates of economic growth and structural change in the domestic economic system.

b. The Rise of E-Commerce

ICT companies, together with the media and the financial community, over-hyped the potential of e-commerce, and underestimated the time it would take to implement new Web-based applications and services. Expectations of what e-commerce could deliver were blown out of proportion and therefore clouded business decisions. This, however, should not mislead us into underestimating its truly fundamental significance in industry. The misguided notion that e-commerce is an instant moneymaking machine⁴ has given way to a more pragmatic notion that ICTs are just a part – often an essential part – of running a business in the new economy.

Some social scientists have been quick to dismiss e-commerce as hype without fully understanding what e-commerce actually entails. Their opinions have no doubt been coloured by the overblown claims of an “internet revolution” found in the popular business media, and the unfounded triumphalism, couched in techno-speak, of the ICT sector. In South Africa, IT consultancies have latched onto e-commerce with alacrity. This “gold-rush” mentality is not surprising considering the vast amounts of money that IT companies stand to make from consultancy fees, the sale of expensive software and hardware, and providing lucrative support services to business. The danger, however, is that IT companies are marketing e-commerce primarily as a “technology solution”. The net result of which is that emphasis is placed squarely on expensive technological infrastructure and generic software applications which are fraught with risk and failure. Instead, the focus should be on appropriate business models and e-commerce strategies tailored to the specific business requirements of each firm and informed by an understanding of the ICT strategies adopted by the lead firms in the value chain. In addition, important issues such as the risks and challenges of e-commerce connectivity, and the requisite organizational changes, and knowledge-based skills and intellectual capital needed to leverage the value creation potential of e-commerce are either underplayed or ignored altogether. If this trend continues, firms are likely to yield little return on their expensive e-commerce investments. Excluding government transactions, approximately 90% of global e-commerce by value is conducted between businesses (Mansell, 2001). 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 (Standard & Poor’s Industrial Surveys, 2001). 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 (E-business runs on e-intelligence, 2000: 30). Contrary to popular opinion, then, it is business-to-business (B2B) [a supply chain model] rather than business-to-consumer (B2C) [a retail model] e-

³ The Gini coefficient is an aggregate numerical measure of income inequality ranging from 0 (perfect equality) to 1 (perfect inequality). Along with Brazil, South Africa has one of the highest inequality of income distributions in the world.

⁴ Note the irrational exuberance and speculative excesses accompanying the dot.com bubble.

commerce which is likely to make the most impact on developing country producers, particularly their interaction with lead firms in the highly industrialised countries (Moodley, 2001, a-d; Panagariya, 2000). This trend is in line with the emergence and dominance of global value chains which require the organisational linking of the manufacture of components according to clear standards and protocols. This is likely to entail a radical shift in the way in which enterprises in poor countries trade with the rich countries of the north, but with uncertain results.⁵

E-commerce is ultimately about using the internet to harness the networks of trust, knowledge sharing and information processing that takes place both *within* and *between* organisations. We define 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 electronic data interchange network.

Table 1: The Potential Benefits of B2B E-Commerce

Lower Costs	Network Scale	Improved Service Levels
Process and transaction cost savings: includes developing supplier relationships, handling quotations, and processing purchasing orders	Reach, i.e. access and connecting to customers and suppliers. Competing globally through deepening upstream and downstream linkages in the value chain	Offer more products and services
Speed (time-to-market)	Richness, i.e. the depth and detail of information that the firm provides suppliers and customers, and is regarded as being important for building close relationships with trading partners	Provide better information faster
Streamline and optimise inter-firm transactions, and exploiting systemic efficiencies in the value chain	Target lucrative, particularly export, markets	Shorten delivery time
Reduced inventory	Access to new business: a larger pool of buyers create a larger market for developing country producers	Improved ability to compare options
Shorten sales cycle	More suppliers mean more choices for buyers	Advanced supply chain management and logistics
Increasing pricing flexibility		More efficient and effective customer service
Unit cost savings arise when a firm solicits bids from multiple buyers, rather than repeatedly awarding the contract to the same firm/s		

Source: Based on Moodley, 2001a, b, c, d

The issue of engaging more openly in global production and trade networks has become central to debates on how formerly inwardly-oriented industrial sectors restructure themselves to maintain competitiveness in a more open, trade-liberalised environment (Kaplinisky, Morris and Readman 2001; Morris 2001; Nadvi, 1999; Schmitz, 2000; Sturgeon, 2000). The use of the internet to co-ordinate production through domestic and cross-border, inter-firm networks is therefore likely to have a significant

⁵ See the contents of the special issue of the IDS Bulletin July 2001 on Value Chains with contributions from the leading academics focusing on value chain analysis.

impact on the competitiveness of South African firms. The value of e-commerce rests squarely on the ability of the firm to extend processes and integrate with other companies, and on a broader level, to integrate and consolidate supply chains (Table 1). The question is whether this potential can be translated into reality for South African firms. According to Table 1, the value of B2B e-commerce for SA firms is broad, but lies primarily in:

- productivity gains;
- minimising transaction costs;
- streamlining and optimising inter-firm linkages;
- exploiting systemic efficiencies in the value chain;
- reducing uncertainty; and
- facilitating and enabling access to global markets.

c. The Research Agenda for South Africa

The key issue facing researchers and policy makers is to be able to assess what the base line state of e-commerce in South Africa's economy (principally but not exclusively the manufacturing sector) is in regard to the global demands of the new information economy. Very little research has in fact been conducted in this area, and the basis for decision making is heavily dominated by consultants keen to sell new turn-key information systems.

Based on the six areas of focus outlined above, our aim in this paper is to provide a preliminary analytical foundation in order to help focus the policy debate and provide the results of some baseline pilot research work recently undertaken on the potential and uptake of e-commerce in two different value chains representing opposite ends of the manufacturing technology spectrum. We discuss and contrast the dynamics operating in the 'buyer driven' apparel/clothing value chain with that of the 'producer driven' automotive value chain.⁶ The apparel value chain is low-tech, labour-intensive, governed by the retailers and has low barriers to entry. By contrast, the automotive components value chain is governed by the assemblers, tends to be capital-intensive, is far more sophisticated as far as technology is concerned, and has higher barriers to entry. Apart from establishing the current state of play, we also attempted to ascertain the scope for e-commerce in the two sectors. Our analysis remains tentative, and should be taken only as a first empirical approach to suggest lines of analysis on the evolution of e-commerce in South African industry.

In order to assess how well placed South African firms are in respect of leveraging e-commerce to bolster their competitive advantage, we undertook an exploratory survey of the apparel and automotive component sectors based on a series of open-ended, face-to-face interviews with business executives in 57 firms. In the apparel sector, we interviewed 21 large apparel manufacturers located in Cape Town, Durban and Johannesburg, and 17 national retail chains⁷. The Eastern Cape (ECBC) and KwaZulu-Natal Benchmarking (KZBC) Clubs (comprising 12 and 14 firms respectively) provided

⁶ See the various articles in the special IDS Bulletin (2001) on value chains.

⁷ It is very important to note that we did not interview any international buyers. This is a major weakness of the research given the export emphasis currently laid on the domestic apparel sector and the importance of the apparel value chain being globally driven with international buyers playing the leading role..

the research population for the automotive survey. The two benchmarking clubs have as their prime objective the continuous improvement of their members' operational competitiveness through the generation of comparative domestic and international benchmarks. In addition to the survey we have also drawn on our ongoing intensive interaction with auto firms in Gauteng, KwaZulu-Natal and Port Elizabeth for additional quantitative and qualitative information.⁸ In addition, we interviewed 21 industry experts with knowledge about these two sectors. 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 paper is organised into five sections. The first section sets out the path of inquiry and establishes an analytical framework for the paper. Section II focuses on the South African apparel sector providing a brief state of the industry review and establishing a meaningful frame of reference for the presentation of the survey results. Section III provides the background and context for the South African automotive components sector and present the key findings that emerged from the e-commerce survey of the automotive components industry. Section IV weaves together the salient points that emerge from the empirical sections. Section V concludes the paper and discusses the implications for policy.

II THE APPAREL SECTOR

a. Background

Over the last decade, the South African apparel industry has experienced a fragmentation (i.e. job losses, firm closures, increasing trend towards outsourcing and subcontracting arrangements, and growing informalisation of the industry) of the formal sector, and a flood of cheap imported clothing, both legal and illegal, primarily from the Far East. This affects the whole industry although it is more markedly apparent in the KwaZulu-Natal region where price-based competition is most intense. The following statistics are drawn from the Clofed (2000) handbook. Although there are over 8 000 retailers employing 50 000 people, only five retail groups account for 50% of turnover. In other words, the retail market is highly concentrated. There are approximately 1 600 apparel manufacturers (formal sector) in South Africa, employing 133 000 people. If the informal sector is included, this figure could rise to 200 000 people. Over the past four years, the industry has shed 20% of its labour. According to Clofed, total production is equal to R9 650 million (value of actual sales). Apparel imports (f.o.b) is valued at R931 million, and apparel exports (f.o.b) at R772 million. There is thus a trade deficit of R159 million. A key distinction that needs to be highlighted in examining imports and exports is the nature of their source. Imports of clothing to South Africa are primarily from developing countries competing on the basis of price, whilst apparel exports are primarily to the highly industrialised countries. South Africa sourced 62.8% of its total apparel imports from just three countries, i.e. Malawi, China and India respectively. On the other hand the main export destinations for South African apparel products are the US (42.3%), which is the world leader in e-commerce development, and the UK (32%), which is

⁸ There are now three benchmarking clubs with the recent launch of the Gauteng Automotive Benchmarking Club. These are quintessentially knowledge sharing clusters of firms utilising the DTI's Sector Partnership Fund to increase their competitiveness. See www.kznbenchmarking.co.za

rapidly adopting e-commerce technologies. This has major implications for the future global integration of this South African apparel sector as it seeks to expand exports to the USA by taking advantage of AGOA.

Internationally, apparel production has become globally dispersed and competition between countries has intensified (Gereffi, 1999). The importance of connecting into global value chains to grow exports, especially in high value-added fashion garments, is important for the long-term survival and growth of the South African apparel sector. International retailers and marketers in the industrialised countries are operating according to wider dimensions than simply price competitiveness. Increasingly they are placing new demands on manufacturers vis-à-vis cost reduction, improved quality, product innovation, greater productivity, environmental standards and service issues, and increasingly, e-commerce connectivity. The uptake is that developing country manufacturers increasingly have to focus on improving their ICT links, operational efficiency, productivity, product quality and service in order to maintain their market positions. The e-commerce-aligned international buyers source apparel products globally, thus there is intense competition between manufacturers selling to these retailers.

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. The international apparel industry is increasingly becoming ICT based and knowledge-driven (Abernathy et al., 1999). Leading-edge apparel buyers and their major suppliers are using e-commerce to transform the way they do business and how they collaborate with trading partners. 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. The key challenge thus confronting the SA apparel sector is not *whether* to participate in global processes, but *how* to do so in ways that provide for sustainable growth.

b. Key Findings

The retailers

Based on our primary research findings, the diffusion of e-commerce in the domestic retail sector appears to be a function of ownership structure, firm size and market segment (Tables 3-5). 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. Domestic 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.⁹ However, since we are dealing with relatively small numbers caution is advised when reaching conclusions. The results are nonetheless suggestive.

Table 2: A Profile of the Retailers (N=17)

Internet access	100.0%
Enterprise Resource Planning (ERP)	47.1%
Electronic data-interchange (EDI)	41.2%
Website	64.7%
Intranet	58.8%
Extranet	0.0%
Business-to-consumer (B2C) online trading	29.4%
Business-to-business (B2B) online trading	35.3%

Table 3: Ownership – Retailers (N=17)

	ERP	EDI	Website	Intranet	B2C Online Trading	B2B Online Trading
Ownership						
JSE Listed (N=9)	66.7%	55.5%	89%	88.9%	33.3%	55.5%
Subsidiary of a Domestic Company (N=3)	33.3%	33.3%	33.3%	33.3%	0.0%	33.3%
Private Company PTY (LTD) (N=5)	0.0%	20.0%	40.0%	0.0%	0.0%	0.0%

Table 4: Firm Size – Retailers (N=17)

	ERP	EDI	Website	Intranet	B2C Online Trading	B2B Online Trading
No. of Employees						
<1000 (N=9)	22.2%	22.2%	55.6%	22.2%	0.0%	22.2%
>1000 (N=8)	75.0%	62.5%	87.5%	100.0%	62.5%	62.5%

Table 5: Market Segment – Retailers (N=17)

	ERP	EDI	Website	Intranet	B2C Online Trading	B2B Online Trading
Market Segment						
Upper-income (N=5)	60.0%	60.0%	80.0%	80.0%	40.0%	60.0%
Middle-income (N=7)	42.9%	42.9%	71.4%	57.1%	28.6%	42.9%
Low-income (N=5)	20.0%	20.0%	40.0%	40.0%	0.0%	20.0%

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 35.3% of South African retailers are using the internet or EDI to trade online with their suppliers (Table 2). EDI linkages tend to be exclusively with local suppliers. None of the retailers indicated that e-commerce capabilities on the part of

⁹ 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. Electronic data-interchange (EDI) can best be described as a dedicated inter-organisational computer to computer exchange of business documentation in a standard machine processable format. EDI takes place through expensive and inflexible proprietary, value-added networks (VANs). These forces tend to narrow and concentrate supply chains within a quasi-cooperative framework, which could, in principle, limit the scope of a firm's sourcing options. Notwithstanding this, those companies which have experience using EDI will probably make the transition to internet-based e-commerce faster than companies with no EDI experience.

producers is a condition of trade. Two retailers (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 domestic 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 obtain 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.

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 South African retailers did not have a conscious policy of investing in their producers capabilities and developing "obligational relationships" (Sako 1992).

The fact that the domestic 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. Of the 17 national retail chains interviewed, only Retailer 2 has an active supply chain development programme, and is committed to feeding back information to their suppliers in order to assist in upgrading their performance.

Table 6: Levels of E-Commerce Development

Levels	1	2	3
Sphere	<ul style="list-style-type: none"> Functional orientation 	<ul style="list-style-type: none"> Integrating across functional departments 	<ul style="list-style-type: none"> Cross-enterprise involvement
Rationale	<ul style="list-style-type: none"> Departmental focus The purchasing & sales department using EDI Individual departments developing specific internet applications, e.g. a marketing website 	<ul style="list-style-type: none"> Integrated business activities via internet/intranet applications 	<ul style="list-style-type: none"> A virtual ecosystem that connects employees, suppliers and customers by extending existing EDI 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
Levers	<ul style="list-style-type: none"> Technological infrastructure and software applications 	Business processes (process efficiencies within the firm)	<ul style="list-style-type: none"> Cultivating knowledge workers Developing and exploiting intellectual capital to create opportunities Building relationships

Source: Moodley, 2001c

Most of the retailers have a Web presence (64.7%) (Level 1, Table 6). Only 47.1% 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.¹⁰ None of the retailers are presently operating an extranet, although a few indicated that this was a medium-term goal.¹¹ This suggests that the retailers' prime focus is still on operational efficiency within the enterprise (Level 2, Table 6) rather than trying to increase the organisation's effectiveness outside the enterprise by linking across the internet with suppliers to create more closely integrated virtual supply chains (Level 3, Table 6).

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 35.3% of retailers allow their suppliers access to information about how each of their apparel products is selling in their stores. These 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. telephonically or through sales representatives) or by fax.

Most of the domestic 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 29.4% 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.

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 7-9). 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, given the small numbers caution is advised.

¹⁰ An intranet is an internet-based network for use within the company only.

¹¹ An extranet is an internet-based network for use by a company and its trading partners.

Table 7: Apparel Manufacturers Profile (N=21)

Internet access	100.0%
Enterprise Resource Planning (ERP)	38.1%
Electronic data-interchange (EDI)	57.1%
Website	47.6%
Intranet	14.3%
Extranet	0.0%
B2C online trading	9.5%
B2B online trading	52.4%

Table 8: Firm Size – Apparel Manufacturers (N=21)

	ERP	EDI	Website	Intranet	B2B Online Trading	B2C Online Trading
No. of Employees						
≤100 (N=4)	0.0%	0.0%	25.0%	0.0%	25.0%	25.0%
101-500 (N=7)	28.6%	42.9%	42.9%	0.0%	42.9%	14.3%
501-800 (N=5)	40.0%	100.0%	40.0%	20.0%	80.0%	0.0%
800+ (N=5)	80.0%	80.0%	80.0%	40.0%	60.0%	0.0%

Table 9: Exporting – Apparel Manufacturers (N=21)

	ERP	EDI	Website	Intranet	B2B Online Trading	B2C Online Trading
Exporting						
Yes (N=15)	40.0%	60.0%	53.3%	20.0%	60.0%	13.3%
No (N=6)	40.0%	50.0%	33.3%	0.0%	33.3%	0.0%

Only 47.6% of manufacturers have a website, and just 52.4% of firms are using the internet or EDI to trade online with their customers (Table 7). 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.

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 7). 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 (71.4%). The manufacturers claimed that they make use of agents to connect to export markets, rather than through digital links. Digital connections it is argued is important for contacting the agents, but not for direct communication to the 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 was the view among the respondents that garments may not be as tradable over the internet as other commodities such as automotive parts, computer software and laboratory products.

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 business 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 (38.1%) 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, i.e. they are 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.

III THE AUTOMOTIVE COMPONENTS SECTOR

a. Background

The South African automotive components industry currently finds itself under threat as a net result of: (1) increased international competition due largely to rapid and sweeping liberalisation of the South African trade policy regime; (2) a stagnant domestic market; and (3) the rapid erosion of local sourcing by South African original equipment manufacturers (OEMs) as they become increasingly integrated into the global strategic operations of their parent companies. According to Barnes (2000b: 70), "uncompetitive firms with poor international linkages will disappear from the (components) industry, but those firms that improve their competitiveness and create appropriate linkages with international firms could benefit from burgeoning export sales". The automotive components industry thus urgently needs to reposition itself in global-scale value chains

in order to consolidate relationships with OEMs and facilitate exports. Transnational companies' (TNCs) control of international production and trade networks makes it extremely difficult for domestic automotive component firms to export independently. Hence, the issue of connectedness to OEMs or to TNC 1st tier component suppliers has become fundamentally important for the long-term survival and growth of the South African automotive components sector.

With the exception of the German-owned OEMs and their global lead source component suppliers, the South African automotive industry is generally characterised by weak global networking links. The inward-orientation of the South African automotive components sector has been fostered by a history of state protectionism and import-substitution industrialisation (ISI) during the apartheid era (Joffe et al., 1995). This inward focus was reinforced by trade isolation, disinvestment and the imposition of economic sanctions during the 1980s and early 1990s. As a result, nationally-based producers were for a long time insulated from the cut and thrust of international competition. Since the transition period (post 1994), however, the South African automotive industry landscape has been substantially altered by the twin pressures of globalisation and the rapid liberalisation of the trade policy regime. Moreover, in September 1995, the government launched a Motor Industry Development Programme (MIDP) to promote greater integration of the domestic automotive assembly and component industries into the global automotive arena. The primary objective of the MIDP was to improve the international competitiveness of the South African automotive sector, and to grow the assembly and component industries, especially through exports.

The South African automotive industry involves multiple players in logistically complex supply chains. The automotive industry can best be described as a "producer-driven" supply chain with multi-layered production systems that are organised hierarchically into tiers (i.e. OEMs, 1st, 2nd and 3rd tier component suppliers) (Gereffi, 1999). With the exception of a few independent aftermarket component suppliers, the South African automotive industry is to a large extent controlled by seven OEMs, i.e. Toyota SA, Volkswagen SA, BMW SA, DaimlerChrysler SA, Ford SA, Automakers (Nissan) and Delta Motor Corporation (General Motors). The relationships within and between the automotive value chains tends to be fixed, linear and clearly demarcated. Enormous potential, therefore, exists in creating an environment in which relationships between these players can be more direct, cost efficient and interactive.

The South African automotive industry is the 18th largest in the world, but accounts for less than 1% of the world market. The industry employs about 82 000 people and accounts for approximately 6.4% of total manufacturing GDP (Barnes, 2000b: 52). There are approximately 180 component firms in South Africa who supply primarily to the automotive industry, and a further 200 producers who are secondary suppliers (Barnes and Kaplinsky, 2000a: 801). The South African components sector is being forced to adjust to fundamental changes taking place in the assembly industry: (1) the re-incorporation of the previously locally owned and locally controlled domestic assembly industry under global ownership; and (2) the increasing integration of the OEMs into their parent companies' global manufacturing operations (Barnes and Kaplinsky, 2000a;

Moodley, 2001a).¹² Toyota SA and Delta Motor Corporation are the two exceptions, as they still have majority local ownership and are still largely inwardly focused.¹³

South African manufacturers of vehicles and automotive components are becoming increasingly dependent on exports. For example, in 1999, vehicles, parts and accessories comprised 6.5% of total national exports; with this category not even featuring in 1990 (Finance Week, 27 October 2000). In the new liberalised trading environment, the domestic OEMs have effectively been set free from local purchasing requirements and now operate in a more or less duty-free tariff structure. The net effect of this is that there has been a recent trend on the part of domestic OEMs to import components that were previously sourced domestically (Barnes and Kaplinsky, 2000b: 232). Survival of the South African components industry will, therefore, depend to a large extent on finding a space in increasingly international production networks, largely controlled by TNCs. Thus, greater connectivity of domestic firms to TNC component firms who effectively control design, marketing and technology developments for high value-added products is critical (Barnes and Kaplinsky, 2000a, b; Barnes, 2000a, b).

The low levels of supply chain flexibility that exists in the SA automotive industry has been documented by Barnes (2000c, d; 2001). His benchmarking survey of 27 SA and 21 international automotive component manufacturers reveal that the SA firms' lead time performance was largely stagnant between 1998-2000, and is lagging the international average (14.20 days) by a substantial margin (61.5%) (Barnes, 2001). The SA lead time average for 1998 was 37.01, and in 1999 this increased to 38.61, and subsequently dropped to 36.92 days in 2000. This indicates a mediocre 0.2% improvement between 1998 and 2000. Moreover, the SA average of on-time deliveries is 90.88%, whereas the international average is 91.05%. The SA firms' performance is compounded by the weak delivery reliability (86.31%) of the surveyed firms' suppliers. The international firm average is ahead at 89.24%. There is thus a significant performance gap of 3.4%. The poor lead times and on-time deliveries captures and reflects the lack of visibility across the supply chain. SA firms will therefore need to improve their customer and supplier interface, as well as the flexibility of their production systems. Speed and reliability of delivery are critical success factors in the global automotive industry and are heavily dependent on ICTs.

In addition, Barnes (2000c) surveyed 11 international automotive firms purchasing South African manufactured automotive components and found that they were disappointed with the performance of their SA suppliers in terms of on-time deliveries and adherence to specified lead times. This is clearly evident in the large performance gaps that exist between the international customer requirements and their perceptions of the performance of the SA component manufacturers. The gap for flexibility was for example 24.1%, whilst for delivery reliability it was 45.5%. Significant performance gaps also exist between international customer (n=6) ratings of SA firm performance levels against their international counterparts: delivery reliability (37.5%) and flexibility (26.9%). These large performance gaps are problematic in that they open a window of opportunity for better performing international suppliers to capture SA suppliers' market share.

¹² This is especially true of the German OEMs, i.e. BMW, Mercedes Benz and Volkswagen.

¹³ Toyota SA is 65% locally owned, with the remaining 35% owned by Toyota Motor Corporation of Japan. Delta, on the other hand, is 51% locally owned, with 49% owned by General Motors.

Barnes (2000d) also found that domestic OEMs were largely dissatisfied with the flexibility and delivery reliability of their local automotive component suppliers. A performance gap of 13.79% for flexibility and 19.73% for delivery reliability was recorded. There is consequently a significant performance variance in value chain flexibility between the SA component firms actual performance and their customers' (both domestic and international) requirements. B2B e-commerce capabilities, alongside world class manufacturing principles, is a critical tool that could enable SA firms to 'catch-up' with their continuously improving international competitors and meet the demanding JIT requirements, as well as other standards and specifications of their customers, particularly in export markets.

b. Key Findings

According to Table 10, all KZN and Eastern Cape Benchmarking Club members have access to the internet, but only 63.2% have a website. The fact that these firms connect to the internet, however, does not mean that internet use is extensive. Nonetheless, they claimed to be using the internet for a wide variety of purposes - communication, order processing, production, engineering/technical, inventory management, logistics, sales, marketing, procurement, services & support, management of distribution channels, research. These firms members are only just beginning to use the internet for supply chain management (SCM). Currently, the internet is used most extensively for intra- and inter-firm communication and for marketing and lead generation, rather than for inter-business transactions. Respondents cited *inadequate ICT systems integration* and *the lack of standards* for sharing data as the main barriers to B2B e-commerce.

Table 10: Uptake of E-Commerce (N=19)

E-Commerce Technologies:	
Internet	100.0%
Website	63.2%
EDI	73.7%
Material Requirements Planning (MRP)	68.4%
Enterprise Resource Planning (ERP)	42.1%
Manufacturing Resource Planning (MRPII)	42.1%
Intranet	26.3%
Extranet	15.8%
B2B E-Commerce	57.9%

We conducted an internet survey of club members' websites, the results of which show that they are invariably not much more than a front-end, an online catalogue with orders being emailed, faxed in, and/or taken over the telephone. Customers are unable to check, for example, on service call status, order shipping status and delivery information via the internet. Four firms use their websites to take orders and deliver products but have not added any capabilities such as customisation or interactivity to distinguish the service from other types of direct selling. It would appear as if too much emphasis is being placed on establishing a Web presence and too little stress is placed on ensuring that the ICT infrastructure is able to support online procurement, trading, marketing and customer sales. Most of the club members are at the stage of basic online "brochureware". Companies have developed static information on a website, with

minimal ability for any interaction beyond email, company background, and in a limited number of cases, the placing of orders.

A substantial 73.7% of the club members have an EDI system in place (Table 10). They have identified the key drivers for e-commerce in the South African automotive component sector as: globalisation, trade liberalisation, customer requirements, closer integration with customers & suppliers, increased competitiveness, connectivity, agility/business flexibility, joint ventures, market expansion, customer retention, improved efficiencies, cost control, customer & supplier information exchange, accelerated speed to market, the need to streamline business processes, spread of the internet. The major benefits of the internet were listed as: reduces the cost of information, improves inventory management, greater geographical reach increasing domestic and international market access, gives the firm a competitive edge, reduces transaction costs, shortens order-ship-bill cycles, speed combined with flexibility. This would seem to suggest that club members are, by and large, quite positive about the need for e-commerce, especially regarding the strong forces promoting a rapid uptake of e-commerce and the expected benefits of internet use.

Table 11: Internet-Enabled SCM (N=19)

⇒ Use of the internet for SCM	31.6%
⇒ Do your suppliers have access to real-time information of your company's sales and stock levels?	10.5%
⇒ Do your customers have access to real-time information of your company's stock levels?	31.6%
⇒ Are your firm's internal operations electronically integrated with that of your customers?	21.1%
⇒ Are your firm's internal operations electronically integrated with that of your suppliers?	15.8%
⇒ Does your company have the e-commerce capacity to access your suppliers': In terms of production capacity, available inventory, lead times, delivery flexibility	21.1%
⇒ Are your front and back office systems electronically integrated?	31.6%
⇒ Does your company require suppliers to make use of e-commerce technologies?	26.3%
⇒ Does your company have a supply chain development programme?	0.0%
⇒ Does your company use e-commerce technology for B2B procurement?	78.9%
⇒ Does your company use e-commerce technology for B2B sales?	47.4%

Table 11 reveals that internet-enabled supply chain management is in its infancy in the benchmarking clubs. The sluggishness of these companies is reflective of the caution with which enterprises view an ICT tool that is still developing. Many club members feel that a misplaced step into the B2B e-commerce space will not just result in the loss of substantial investment, they fear that they are also “betting the firm” on the move. Integrating functions across businesses, such as workflow arrangements in a supply chain situation, is predicated on working, integrated internal systems. Table 11 reveals that many component manufacturers do not have fully automated and integrated back and front office systems. A major challenge for the sector is, therefore, one of converging legacy ICT systems with the internet.

The issue of online B2B trading exchanges has recently received a great deal of attention in the automotive industry; especially with the launch of Covisint, the giant Detroit-based global automotive virtual marketplace for procuring car components,

supplies, services and information.¹⁴ Only 36.8% of club members are presently part of an online B2B trading hub, but it must be stressed that actual trade via the hubs have, thus far, been very limited. Nonetheless, club members listed a number of expected benefits from these unified B2B supply chain enterprise networks as: set standards, cut costs, speed (since internet-based transactions are instantaneous, interactive and rich), supply chain efficiency eliminating the need for intermediaries thereby reducing procurement costs, market transparency allowing bidding for contracts not previously known about, improving operating efficiencies, achieving purchasing cooperation and economies of scale and lowering purchasing prices. Club members, however, also recognised a number of possible risks associated with internet-based B2B trading exchanges - rationalisation of the supplier base, potential oligopolistic control and manipulation by transnational assemblers and TNCs 1st tier component suppliers, privacy concerns, pressure on prices, threat to established partnerships, relationships and alliances. Further, club members stressed three main conditions for a trading hub to be successful: (1) openness and transparency; (2) trust and loyalty; and (3) a critical mass of value chain participants.

There is a dissonance between what the club members consider to be the expected benefits of B2B e-commerce (including internet trading hubs) and their own adoption and use of e-commerce infrastructure. It would appear that while the club members are generally familiar with the obvious (and sometimes exaggerated) gains of B2B e-commerce which are frequently espoused in popular business and IT magazines, and ardently promoted by IT consultants, they do not seem to be in any hurry to actually implement e-commerce strategies and business models. There are two main reasons for their inaction: 1) their inability to develop an apposite e-commerce model which is tightly integrated into their respective value chains; and 2) the large barriers impeding their progress to a functional e-commerce system (see Section IV).

E-commerce is not yet a strategic imperative in the South African automotive components sector. The majority of firms in the industry are unable to support e-commerce ventures as yet, because they do not have the integrated customer and supplier ICT interfaces in place (Table 11). Currently, most of the component firms' prime focus is still on a functional orientation (Level 1 in Table 6) or on operational efficiency across the enterprise (Level 2). None of the firms are using e-commerce to increase the organisation's effectiveness outside the enterprise by linking across the internet with suppliers and customers to create virtual supply chains (Level 3). It should be borne in mind that the e-commerce survey of the automotive components sector was undertaken two years ago, i.e. at a time when e-commerce was just beginning to filter into the SA

¹⁴ Covisint has been developed by General Motors, Ford and DaimlerChrysler, and has been recently joined by Renault-Nissan (www.covisint.com). It would appear that centralised B2B e-marketplaces suffered from a certain naïveté about business fundamentals (Berryman and Heck, 2001). It was assumed that simply automating transactions would be enough to bring buyers and sellers together online. The fact that deciding which supplier to buy from is often based on other factors, such as the quality of the product, how quickly and reliably that product can be delivered, and even contractual obligations was effectively ignored. Further, if the goods are not highly commoditised, it becomes very difficult for the public marketplaces to provide value. That type of product is better suited for a private online marketplace, which is run by a particular company for its customers and suppliers. In a private marketplace, no bidding or negotiation is necessary. The service's main goal is electronically connecting companies that regularly do business with each other – without sacrificing quality or profits.

automotive industry. In the interim, industry analysts have observed a rapid, and more intense outward reorientation of the South African based OEMs and the major established domestic component manufacturers. The domestic automotive component sector is presently undergoing profound structural transformation in order to rapidly improve its performance to meet more demanding market requirements, both domestically and in export markets, generate economies of scale and to contend with intense international competition.

Simultaneously, the South African based OEMs are being rapidly assimilated into their parent company's e-commerce aligned global operations.¹⁵ This, in turn, is leading to a systematic restructuring of their relationship with SA component suppliers. Another trend of note is that SA based OEMs are exerting pressure on local component suppliers to become linked to MNCs, in order to access global supply networks, cutting-edge technologies, state of the art designs and knowledge resources. As a consequence of a convergence of the aforementioned trends, it is quite possible that e-commerce is being driven down the supply chain to a greater extent than that captured in our two-year old e-commerce survey of the industry.

IV ANALYSIS

The findings from the two sectoral studies clearly indicate that B2B e-commerce development is still in its infancy. South Africa is lagging behind Australia, Brazil, North America, Western Europe, Singapore and South Korea in adopting e-commerce, and using it to raise productivity, competitiveness, investment and employment (McConnell International, 2001). A failure to adopt B2B e-commerce technologies will mean that SA firms will find themselves increasingly marginalised by digital trading relationships that depend not only on sophisticated ICTs, but also efficient logistics, payment and certification systems. By not making the transition to e-commerce, firms run the risk of becoming less competitive, affecting both their present market positions and long-term viability.

The main uses of the internet by the firms include: accessing commercial databases or services; information searches; marketing; monitoring prices; keeping abreast of technology and market trends; using online catalogues for contracted parts; checking supplier financials; email applications; and, to a lesser extent, actual transactions between firms. The main advantages that the firms associate with e-commerce are: strengthening customer relationships; reaching new markets; optimising business processes; and reducing costs. The joint survey findings suggest that although the majority (73.7%) of the respondents had positive expectations of B2B e-commerce, they were generally not well prepared for B2B e-commerce. Few companies understand:

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

¹⁵ Delta Motor Corporation, for example, is now purchasing components directly through General Motors' internet-based Global Purchasing Supply Network.

Table 12: E-Commerce Models Planning to Use (N=57)

Individual supplier catalogues	75.4%
Internet-based electronic data interchange	42.1%
Aggregated multi-supplier catalogues	17.5%
Internet-based extranet	49.1%
Online trading communities (portals)	45.6%
Open buying on the internet (OBI) systems	33.3%
Internet-based enterprise resource planning	14.0%
Internet auctions	14.0%

Only 14% of the firms had a formal e-commerce policy, while 17.5% of companies were attempting to generate sales through the internet. Furthermore, only 57.9% of firms had a corporate website. Respondents are using their websites primarily as online brochures rather than for online trading. Currently, none of the companies interviewed have fully integrated e-commerce systems in place. Moreover, none of the firms are currently operating an extranet, although 49.1% of the firms indicated that this was a long-term goal (Table 12).

Firms mentioned the following supply chain problems: high inventory levels; long lead times; poor inter-firm communication; lack of trust and obligational relationships; limited collaborative forecasting, planning and replenishment processes; little strategic supply chain thinking; and an imbalance between supply and demand. Thus it would appear that companies have much to gain from an appropriate B2B e-commerce strategy. Table 12 indicates the types of e-commerce models that the firms plan to use in the next 2-3 years. However, making the transition to B2B e-commerce will not be easy, as there are formidable obstacles that need to be overcome. These include:

- Limited awareness among firms of the potential of e-commerce;
- Uncertainty about returns from e-commerce investments;
- Security concerns;
- Firms spend little time developing a strategic view of their business. They are preoccupied with survival, i.e. a vision which is tightly focused on the short-term and on issues such as profit, tax, competition and regulations;
- Management's reluctance to change existing operating structures;
- Evolutionary path dependencies which focus on the reduction of labour and input costs as competitive advantage rather than pursuing a knowledge and innovation-intensive growth trajectory;
- Management's "laager" mentality which have locked firms into an insular, inwardly-oriented way of thinking;
- The lack of adequate e-commerce infrastructures, skills and capabilities. Many firms (especially apparel producers) simply lack the basic knowledge and technical skills to implement e-commerce strategies;
- Lack of access to affordable broadband connectivity; and
- The relatively high initial investment costs involved in developing an appropriate e-commerce infrastructure.

In the relatively small, captive South African market, competitiveness has previously revolved more around marketing effectiveness and price competition than systemic efficiencies, knowledge flows, innovation and global connectivity. The small

scale and volumes of the South African market perhaps made the viability of fully-fledged electronic business information systems questionable. However, the current pressures of globalisation and trade liberalisation, and the challenge to direct overseas market expansion underscores the importance of e-commerce for the local apparel and automotive sectors. For the future of these two sectors depends on high value-added output, which in turn depends on adopting a culture of continuous improvement, innovation and best practice to meet the challenges of a highly competitive, knowledge-based, global economy.

The long-term challenge for the firms 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; and
- Better integration with input suppliers and buyers to efficiently adapt to fluctuating demand.

E-commerce is a necessary condition to meet these challenges. Failure to adopt e-commerce technologies could lead to South African firms becoming increasingly marginalised from the international markets that they wish to supply. In other words, the integration of internet-based ICT systems within the firm and across the value chain has become a necessary condition for global competitiveness. It is not however a sufficient condition for higher value added, knowledge intensive based global competitiveness. Because e-commerce appears to be at the forefront of the new knowledge economy, there is a danger in assuming that, simply by engaging in such technical relationships in a value chain, this becomes equivalent to entering the information economy at the high value end. E-commerce can be used in some value chains as the basis for pursuing a policy of price based competition, and firms and developing countries that get locked into such value chains may well find themselves in an even faster and more rapidly escalating price based race to the bottom. In short e-commerce, in of itself, is no guarantee of escaping the dangers of an immiserising growth path. It only works if it is attached to the strategies for increasing flexibility, cutting lead times, reducing inventory, eliminating waste and banishing defects, and not as a replacement for such generic productivity improvements. The problem is that consultants who currently dominate this field tend to ignore this issue and sell e-commerce solutions as if it was equivalent to entering into the high road of the new information economy.

V CONCLUSION

The policy challenge is to create an enabling and nurturing environment aimed at promoting and accelerating the diffusion of e-commerce technologies and strategies among South African firms. Policy needs to be focused on two key issues:

- *Diffusion*, including dissemination of information on e-commerce (success stories and best practice), training, skills development and human resources; and
- *Enabling*, such as systems configuration and integration for e-commerce connectivity (Table 13).

Table 13: Multi-Level Systems Integration

Layer I: Application Products
<ul style="list-style-type: none"> • Collaborative applications • Customer Relationship Management (CRM) • Enterprise Resource Planning (ERP) • Supply Chain Management (SCM)
Layer II: Development Software Products
<ul style="list-style-type: none"> • Data management • Application design • Application life-cycle & management • Application servers • Information access & delivery
Layer III: Systems Software & Products, & Technical Services
<ul style="list-style-type: none"> • Systems management • Networking & network management • Security software (transaction security covering authentication and certification) • Middle-ware • Server-ware • System logic
Layer IV: ICT-Specific Infrastructure
<ul style="list-style-type: none"> • Telecommunication companies • Internet service providers (ISPs) • Internet backbone carriers • Companies providing final access • Manufacturers of end-user networking equipment • ICT sector (i.e. software system providers, system integrators and software developers)
Layer V: Support Infrastructure & Services
<ul style="list-style-type: none"> • Human resource development • Innovation hub – promotion & co-ordination • Incubation – bandwidth barn • Business associations & trade unions • Research (CSIR, universities, technikons, etc.) • Consultancies and service companies designing, building and maintaining e-commerce systems • Web content providers & market intermediaries (brokerage firms, resellers and portals) • Financing • State policies (DTI, DoL, DoC, DoE & SAITIS) • Firms' strategies

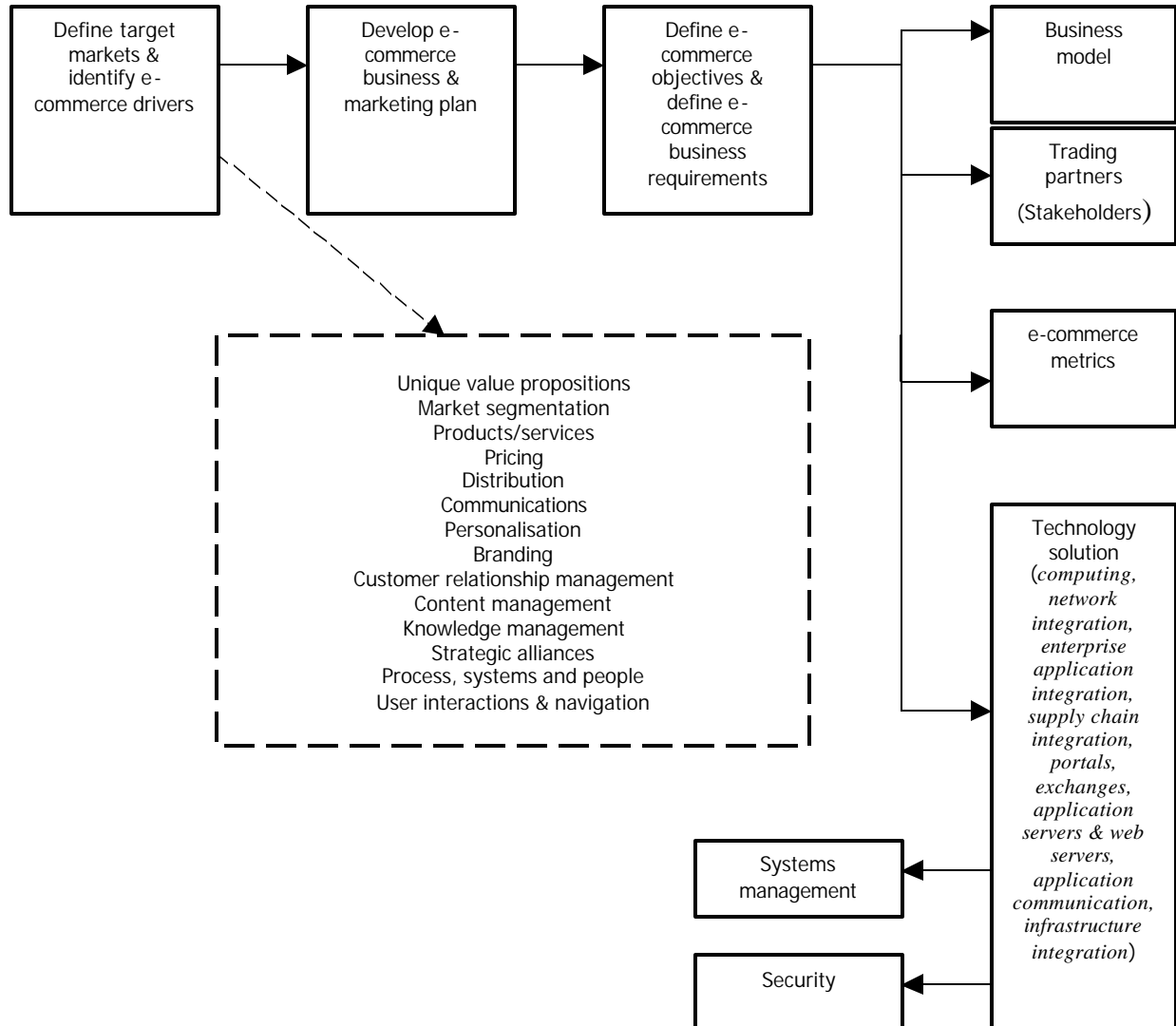
Source: Moodley, 2001d

Government and the private sector will need to become actively involved in developing training courses and workshops on e-commerce for SA firms. The establishment of a centre to provide comprehensive information, advice and training on business usage of the internet as well as support services for the establishment of e-commerce activities is of critical importance. Training and skill formation should be carried out in conjunction with unions and industry associations, and with consortia of firms in order to gain economies of scale in developing and delivering training services.

A policy priority is to liberalise the highly regulated and concentrated South African telecommunication market and promote competition in order to stimulate new investment, increase demand for communications access and services through falling prices, and promote greater efficiency and innovation in the provision of infrastructure and services. Policy initiatives to lower network infrastructure costs and internet access charges for companies are important. This is likely to provide a stimulus to the growth of e-commerce in industry. In the OECD (2000a) countries, for example, the availability of

affordable access to high-speed telecommunication infrastructure is closely linked with firm migration to e-commerce.

Figure I: E-Commerce Strategy



Source: Moodley, 2001d

The magnitude of the e-commerce challenge is such that there is a need for various public-private and multi-partnerships, alliances and consortia. There is an urgent need for the forging of partnerships to:

- Develop e-commerce solutions and systems which are tailored to SA firms in different industrial sectors. Figure I illustrates a systematic project-based approach which policymakers could adopt as a guide to developing and upgrading SA firms' e-commerce capabilities. We advocate an incremental approach guided by appropriate technology rather than one-off large-scale, expensive transformations such as ERP which is fraught with risk and a large number of

failures. Before making decisions about e-commerce systems, and choosing the necessary hardware and software, managers should carefully determine the format for communication, information flows and transactions favoured by the lead firms in their value chain, and then use e-commerce to support those relationships. The e-commerce system should be implemented in stages where return on investment is achievable within a 6 to 12 month period. This ensures that the risk is minimised and gains are maximised, since the implementation team will be able to gauge when any future ICT investments are likely to lead to diminishing returns. Managers should also take care not to employ B2B e-commerce in ways that disrupt existing, successful relationships;

- Assist firms to access capital for their e-commerce ventures;
- Encourage firms to form networks and clusters in order to share knowledge, reduce the average costs of their input transactions, and increase their relative market power in e-commerce transactions. The policy challenges of such an intervention revolving around:
 - ⇒ developing an integrated information portal for the industry;
 - ⇒ providing security; and
 - ⇒ establishing a standard format for information flows.
- Develop ICT capacities and skills through education and training, and countering skill shortages which 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.
- Build high capacity bandwidth links connecting the major commercial centres;
- Create innovation support centres and technology incubators to assist local firms in developing appropriate e-commerce strategies and in technology transfer; and
- Educate firms about e-commerce opportunities, challenges and risks.

E-commerce will play an instrumental role in establishing and sustaining global linkages and in so doing, provide a lever for SA companies linking into export markets. B2B e-commerce capabilities are important for SA firms as they are struggling to compete in a globalised and interconnected world which is organised around knowledge and information flows. The critical policy challenge is to build the e-commerce capacity of firms in order to defend local markets, expand their global reach, maximise export sales and gain a sustainable competitive advantage over lower-cost producers under the US Africa Growth and Opportunity Act (AGOA) and the SA-EU trade agreements. The transition to an integrated internet trading system will, however, not be easy. It is a long-term project which will require a great deal of commitment from different stakeholders. Importantly, the benefits that arise from such a commitment may not be immediately obvious in that SA industry needs to make significant progress simply to maintain its present position with the global operating environment. Notwithstanding this, B2B e-commerce provides a necessary lever to meet ever more demanding performance requirements that depend on information and knowledge-intensive value chain relationships.

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