B2B E-Commerce and the South African horticultural export industry[1]

by

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1. Introduction

The research presented here attempts to examine the nature and extent of e-commerce use within the South African horticultural export sector, and to identify factors that have inhibited its development as well as sketch how it might develop in the future.

Firm and industry level competitiveness is increasingly a function of the “capacity to generate, process and apply efficiently, knowledge-based information” (Castells in Moodley *et al* 2001:2). The Internet has emerged as a key enabler of these information generation and processing activities, and has allowed for the rapid diffusion of e-commerce.

E-commence can be approached from a variety of analytical perspectives, and this has resulted in a range of e-commerce definitions, topics and functional orientations being adopted (Thompson *et al* 2000, Holsapple and Singh 2000). For the purpose of this research, e-commerce is defined as *any business transaction conducted over computer-mediated networks*. A transaction encompasses more than actual purchase of a good or service: it also includes both transaction preparation and transaction completion activities. Transaction preparation covers all actions related to the marketing, advertising and exchange of information associated with the sale of a product, while transaction completion covers all ordering, invoicing, payment and logistics actions required to transfer ownership of a product from the seller to the buyer (Paré 2001).

At the firm level, the potential benefits of e-commerce are significant. Moodley *et al* (2001) categorises these according to their ability to a) reduce costs b) expand network scale and c) improve service levels. It is not expected that these benefits will be evenly spread across countries, regions, industries and firms. As with all innovation, e-commerce will create both winners and losers. On a country level, the winners will be those with the better-developed infrastructure and lower unit costs. On an industry level, the winners will be those industries whose industry structure, product characteristics and business culture best lend themselves to e-commerce.

The agricultural sector is expected to benefit most from e-commerce’s ability to i) promote information flows, ii) facilitate industry co-ordination and iii) reduce and eliminate transaction costs (Leroux *et al*, 2001). For developing economies, these benefits hold much promise, particularly in the field of export development, as e-commerce offers the possibly of

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accessing international markets in a relatively low-risk, low-cost manner. To date, however, few of the benefits have been realised in practice. With respect to agriculture, Leroux *et al* (2001) attributes this failure to a number of industry specific factors.

The *first* factor is the growing consolidation and/or integration of agribusiness value chains. This consolidation has not only reduced the need to electronically co-ordinate fragmented markets but has also created a barrier to the development of transparent electronic market places. The *second* factor is the increasing complexity of agricultural products traded. This complexity refers not only to traditional agricultural product complexities such as uniformity, perishability and reference pricing but also to end user-driven product complexities, which have emerged due to the increase in consumer demand for healthier, convenient and more flavourful food. This has transformed agricultural products from commodities to differentiated branded products that require high levels of consistency and quality – product attributes the spot market has difficulty ensuring. The *final* factor inhibiting the development of agricultural e-commerce is what Leroux *et al* (2001) term the "high touch" nature of agricultural transactions. A key characteristic of agricultural and agribusiness transactions is that they are driven by personal relationships. In part this has to do with the fact that farmers are closely involved in one-on-one transactions such as the purchase of inputs, machinery and the organisation of transport etc. In this situation, personal evaluations relying on trust, recommendation and reputation drive transactions, while Internet transactions limit personal interaction.

2. South Africa's horticultural export sector

The agricultural sector is an important component of the South African economy and while it only contributes less than 4% of the country's GDP, it provides around 10% of the country's formal sector employment opportunities and exports. The policy and institutional environment in which the agricultural sector operates has changed dramatically over the past two decades, leading to an almost total withdrawal of direct state support to the sector (Van Zyl *et al* 2001). The fruit producing sectors, which have traditionally been export oriented, benefited from South Africa's new access to global markets following democratisation in the early 1990s, and from the deregulation that formed part of the state's withdrawal of support to agriculture. Vegetables, on the other hand, were never subjected to state support, and are grown mostly for the relatively large domestic market.

3. E-commerce and South Africa horticultural export firms

3.1 Method

The results of this study were obtained through a series of semi-structured, face-to-face interviews conducted with 18 firms and organisations active in the horticultural export sector. Respondents included not only farmers but also fruit marketing agents (brokers) and industry organisations. The emphasis of the research was on the "fresh" horticulture sub-sectors and thus firms and organisations whose primary focus was the production and marketing of processed fruit and vegetables, teas, nuts and viticulture products were excluded. Some attempt was made to select respondents to ensure a spread between the various fresh commodity groups, geographical dispersion and firm size, although no attempt was made to obtain a representative sample of either sub-sectors or firms.

3.2 Producers

Four farmers were interviewed as part of this research project. Two were located on farms close to the Cape Town Metropolitan area, while the remaining two were located in the rural parts of the Western Cape and Mpumalanga provinces respectively. All four businesses are large owner-operated family-operations, acquired through inheritance.

While some degree of product diversification was observed, each of the four farms had a clearly identified primary crop (table grapes in two cases, and avocados and stone fruit in the other two). The bulk of this crop (>70%) was marketed internationally, almost exclusively in the European Union, with the UK a key market. All four made use of a marketing agent(s), and one had a direct financial and managerial interest in the grower-owned marketing agency. This agency was set up by a group of growers to re-engineer the export supply chain to reduce costs and better distribute risk among chain partners.

All four indicated they had some form of Internet access. Two were connected via an analogue modem while two had ISDN connections. One indicated he would like to have a high-speed diginet line installed to improve data transmission speeds, however the nearest access point was located 40 km from his farm.

Only one of the producers had a website. This was set up to facilitate the transmission of graphically rich technical information related to the sale of a secondary crop (nursery trees). Two growers indicated they had access to an extranet; the first was linked to his marketing agent's website while the second grower was linked to his growers association.

All four respondents described their relationship with their marketing agents as close and personalised, facilitated by the fact that many of these marketing companies have technical personnel active in the field who liase with growers regularly. All direct business-to-business (B2B) contact is thus conveyed in person or over the telephone while routine contact in the form of market information reports, quality reports, payment notifications and general circulars are typically e-mailed. The one area of direct B2B contact where e-mail is increasingly being used is the transmission of digital photographs to growers in order to substantiate and verify quality problems that have developed during, or as a result of, transit. Three of the farmers remarked how ready access to these photographs promoted trust between themselves, their marketing agent and international buyers.

Typically farmers assign their crop to a marketing agent to sell on their behalf well before the start of the harvesting season. Supply agreements (contracts), which constitute a product order, set out the variety, volume and quality of product to be delivered as well as the exporters' payment schedules and commission structures. These agreements tend to be bulky and complex and as a result are normally negotiated and signed in person, consequently all respondents reported that they never used e-mail to accept a product order. One grower indicated he occasionally used e-mail for placing input orders, however he also noted that many input suppliers preferred to receive orders via facsimile and not e-mail

The farmers used the World Wide Web (WWW) infrequently. The Internet is seldom used to find information on input suppliers. Herbicide, pesticide and fertilizer company representatives market their products directly to farmers and offer some technical advice. Other inputs are normally purchased directly from farmers' co-operatives. One respondent indicated he used the Internet to obtain information on product market conditions, typically visiting industry specific sites. When farmers used the Internet, it was generally to obtain information on environmental conditions, especially during the harvesting season, and to conduct banking activities.

Two respondents had access to extranet password-protected websites. The first farmer used this facility to access financial data from his exporter on expected payouts during the harvesting season, while the second farmer used it to access consolidated market formation posted on his producer association's website. Both growers recognised the improved convenience that direct extranet access offered them, but the first grower mentioned the slow download time of the site and the timeliness of the information posted on the extranet site as factors detracting from the value of this service.

Only one of the four growers interviewed had used the Internet to sell produce internationally. This single transaction, which was for the sale of a secondary crop (nursery trees), was the result of an international buyer fortuitously coming across the grower's website and then contacting and negotiating with the producer via e-mail.

The principal reason why growers never used the Internet to sell their products internationally was that the existing horticulture marketing chain was entrenched as a business model and that no incentive to re-engineer the chain currently existed. More particularly, the growers argued that there was a need for intermediation due to the specific features of the fresh produce trade. Another important reason given by two of the respondents was their perception that web-based trading sites lacked credibility as legitimate business models.

It is clear, based on the responses, that e-commerce has not progressed far among primary agricultural producers on a transactional level. Producers have, however, not been left untouched by e-commerce developments, especially when looking at the frequency with which some network applications are being used. E-commerce has made some headway on a process level and is instrumental in supporting a number of transactions that are conducted off-line. The benefit of this support was identified by some of the respondents and included increased productivity, transparency and profitability due to the quality and speed at which information can be accessed and transmitted.

In terms of the future adoption pace and pattern of transaction-focused e-commerce in the South African agricultural sector, one respondent stated that he was of the opinion that a web-based transaction model would work better between local buyers and sellers given that the trustworthiness of the business partners and quality attributes of the product traded are common local industry knowledge. Similarly, another respondent noted the on-line purchase of farm inputs is a potential development area for B2B e-commerce; however, none of the local input suppliers appear to be operating on-line.

3.3 Marketing agents/brokers

When it comes to international sales, South African horticultural producers rarely market their crops independently. Typically the intermediaries are brokers who, for a fixed commission, undertake all marketing activities on behalf of producer. Aside from these brokers there are also a number of resellers. However, unlike brokers, these resellers assume ownership of the product, which they then on-sell.

Eight marketing agents/resellers were interviewed. While most acted as brokers for local farmers, a number also undertook reselling activities. With the exception of Capespan[3], all were established in the post-deregulation period (i.e. after 1997). Most of the marketing firms interviewed were locally owned companies that were further connected to the export chain by vertical and/or horizontal integration.

With the exception of one firm, which sold a small amount of fruit locally, all respondents only operated in international markets and traded almost exclusively in the European Union. Four respondents indicated that they were in the process of diversifying their market base and looking towards the Far and Middle East. However, this diversification is constrained to the extent that South Africa's product profile matches European demand patterns with respect to product varieties and fruit sizes.

All respondents had some form of Internet connection. Four were connected via ISDN lines while three had high-speed diginet connections. Four of the eight firms interviewed had their own website. With the exception of Capespan, all these web sites were rudimentary, resembling on-line brochures. In the case of Capespan, they own a number of websites for all their divisions including an intranet for employees as well as a grower extranet.

E-mail was more frequently used to maintain contact with international buyers than with domestic growers (suppliers). As already indicated, direct contact between grower and marketing agent is facilitated by marketing companies' field agents while routine or administrative B2B contact (transmission of items such as market reports and payment advice) is maintained by e-mail or facsimile, with the latter being more common. Estimates of the percentage of growers who have e-mail ranged from between 50 to 80 percent, with the percentage of growers who actively use it as a business tool being much lower, ranging from 5 to 30 percent. In explaining why so few growers who had access to e-mail are not actively using it, exporters cited the following reasons:

- Skills: Farmers lack IT skills to use the technology adequately;
- Limited telecommunications infrastructure: The typical farming operation has a single telephone line which serves as both telephone, fax and Internet connection;
- Business culture: Rural areas tend to lag behind with respect to technology adoption and farmers prefer personal communication.

E-mail contact with buyers is in many cases the only form of written communication between exporter and receivers and in many cases e-mail has largely replaced faxes. Product orders, in contrast, are only occasionally submitted via e-mail. More often than not, especially for those exporters supplying UK supermarkets, individual transactions are agreed on within the context of a pre-negotiated volume supply programme. These volumes are despatched on a consignment basis with the actual price (and thus the transaction) being determined (concluded) close to the time when the product is marketed in the importing country. These final negotiations between marketing agent and receiver are usually done over the telephone followed by an e-mail confirmation setting out the details of the transaction. As one respondent noted "E-mail tends to be very impersonal – I can't gauge the emotions of the market through an e-mail"

Almost all the marketing agents receive digital photographs of unloaded produce where

[3] Whose predecessors, Unifruco (deciduous fruit) and Outspan (citrus fruit) acted as the monopoly exporters before deregulation.

quality problems have arisen. These photographs are forwarded, if possible, to the relevant grower who is still technically the owner of the product and who has to absorb these losses. Digital photographs are useful as they give an indication of the seriousness of quality deterioration and give the exporter an indication of whether they need to personally resolve the problem by visiting the discharging port. One agent mentioned that he uses digital photographs to market South African fruit to new international clients.

Marketing agents use the Internet mainly to obtain product-market information and, to a lesser extent, customer information. It must be noted that exporters' main source of information on input and product markets is existing buyers and suppliers. A number of exporters noted that they preferred to use established partner networks as a source of information, given that the reliability and credibility of the information source is paramount and that one cannot always trust what you read on the Internet.

As was the case with producers, a number of exporters used the Internet for electronic banking, while three also indicated that they used the Internet to access real-time exchange rates. An Internet application that is growing in importance is product monitoring during transit. Digital temperature recorders can be placed in each container exported and temperature readings (semi real-time) can be accessed on-line via the website of the Perishable Producers Export Control Board (PPECB). The advantage is that exporters can identify which containers have gone off-temperature and at what point during shipment this occurred. This information facilitates quality claims as well as giving exporters the opportunity to timeously devise an alternative marketing strategy for product whose perishabilty profile has changed.

The Internet was also occasionally used to track the expected arrival dates of vessels at sea and/or the departure and arrival times of international flights, although some exporters still preferred to interact personally with the shippers. Furthermore, there was a general perception that information placed on the web is not necessarily updated on a continuous basis. In terms of airline cargo related websites, their functionality appears limited. One flower exporter noted that the system is designed only to accept on-line orders for cargo that is high paying (value and weight are in ratio) and rejects bookings that do not conform to these parameters. The exporter in question has to negotiate directly with the airline to ensure cargo space for his product.

Capespan operates a producer extranet where growers can access market reports, sales figures, estimated payouts, and internal mass communications such as protocols and quality guidelines. Through this extranet, growers can also obtain a quality profile of their deliveries to date and ascertain how they are performing vis-à-vis other suppliers in their locale and in their region. The perceived advantage of this extranet is that it gives producers a business tool to better manage their commercial relationship with Capespan. While this extranet may have initially given Capespan a competitive advantage over other export agents in South Africa, it must be noted that two other large exporters (who were not interviewed as part of this study), also have grower extranets and these are increasingly becoming the industry norm for firms who have a large and dispersed grower base.

All exporters who are members of the Fresh Produce Exporters Forum can also access this organisation's extranet. Here they can retrieve collective exporter information on the volume and variety of South African fruit that has been despatched and sold in the various export markets as well as current stock levels. This information is only available to those marketing agents who submit their own company information to the common data-pool.

Paltrack® is the main supply chain management system used by the South African horticultural export industry. Currently Paltrack® consists of a number of different modules which support a different area of the supply chain. For the most part the system is implemented at South African ports and it enables products to be traced from the various packhouses to the ports and *vice versa*. It thus gives trading partners the ability to capture information at the pallet level and to forward the information up the supply chain. None of the producers interviewed had installed Paltrack® producer while a number of the exporters interviewed either had Agri-port installed, or received Paltrack® files directly from the packhouses and ports.

Three of the eight exporters interviewed had used the Internet to sell fresh produce internationally. In the first case, the marketing agency in question was profiled on a food industry information portal when it ran a South African fruit industry promotion. An international buyer sent this firm an e-mail requesting product after reading this profile, and a once-off transaction worth R5m (10% of the company's turnover) was completed.

The second exporter registered his company with a trading portal and an on-line showroom was created for the company. For the year that the exporter was registered with this portal, he received approximately 20 enquires to buy his products. Serious negotiations were entered into with three of these potential clients and only after personally visiting all three was a transaction concluded with one of them. This buyer has subsequently become a regular client and currently represents 6 percent of the company's sales. While this exporter was satisfied with the business he generated through this portal, he has elected not to renew his subscription partly because he considers the additional costs incurred to assess the credibility of potential buyers excessive in light of the resulting business

The last of the three marketing agents who have used the Internet to sell product is a food and beverage trading house. This company's business strategy is to scan a large number of on-line food and beverage trading sites and/or market places for trade leads, and then attempt to source the requested product from local suppliers. The respondent claims that 1 in 50 to 100 such inquiries leads to a transaction, and this response rate compares favourably with using non-electronic means such as published trade directories etc. The benefit of using electronic sources is that significantly more firms can be contacted in a much shorter period of time.

Even though 3 of the 8 marketing agents interviewed had successfully used the Internet as a transaction medium, in general this group's perception of the value of the Internet and/or on-line marketplaces was overwhelmingly negative. In most cases this negativity stemmed from the belief that i) the product characteristics of fresh produce do not lend themselves to on-line trading, ii) the contact and industry structure does not favour arms-length, spot market transactions usually associated with e-commerce transactions and iii) e-commerce business models are not yet sufficiently developed.

One exporter captured the essence of many of the responses to the transactional side of e-commerce when he noted: *"This is a personal business. Think about it, farmers are **giving** you their fruit to sell. On the basis of this trust you have to ensure a fair price. As an exporter you don't have any real risks. I make money by being able to bring the producer of fruit in contact with the buyer in a real and personal way, without the two ever having to meet. The season is short and intense, you can lose money or make money – I have to ensure a win-win outcome* *for everyone. I'm a relationship manager - I doubt a trading site could replace me."*

Most of the benefits identified were of a process, cost- saving nature as opposed to transactional revenue generating. Cost savings as a result of e-commerce solutions include improved business administration capabilities, generation of electronic documentation, and improved supply chain management. One interviewee, in responding to a question on the extent of cost savings related to e-commerce enabling technologies, noted: "*It is costing us more and I'm not getting a direct return on it, we have a 24 hour open line and this is costing us a fair amount of money. I do it because it makes us accessible. It is not a question of choice- I couldn't be in business if I didn't have it. People expect that it is one of the communication tools you have, I cannot afford not to be on-line. It has largely replaced faxing, and the phone to a limited extent. It hasn't earned or saved me money, as I still have to have these as well. On-line banking is saving money in terms of time, it is convenient and much nearer but it is not saving me money in terms of direct cost reduction"*

It is clear that at this stage the main factors inhibiting the development of e-commerce in the South Africa horticulture sector relate to the characteristics of horticultural transactions and not e-commerce technology and institutional factors *per se*. However, as secondary considerations, a number of these factors emerged as being important. These include *firstly* bandwidth problems that cause e-commerce/or Internet applications to run very slowly in SA, *secondly* there is a lack of clarity on the legal status of e-mail communications. *Thirdly* it was noted that many farmers do not have the skills to come online and use e-commerce business tools constructively and this inhibits their usage by upstream and downstream partners. *Finally* there are financial considerations; telecommunications are relatively expensive in South Africa. However, it is expected that these costs will come down significantly when the sector is privatised.

In sketching the future of horticultural e-commerce, a number of respondents reiterated that it would grow in importance, but that it would take time (3-10 years) for people to become comfortable enough with the technology to use it as a transaction medium. As one exporter remarked, "*promote the process side of e-commerce and the trading side will follow*", primarily because process benefits are the easiest to take up and yield the most tangible benefits in the short run. A number of respondents went further to indicate that the transaction side of horticultural e-commerce very much hinged on finding the right application, an application that can accommodate the transaction features of horticultural trade.

3.4 Industry organisations

The final group of respondents surveyed were three industry organisations, namely the SA Mango Growers Association (SAMGA), the SA Avocado Growers Association (SAAGA), and the Fresh Produce Exporters Forum. These were included not only because they are able to offer an industry perspective on e-commerce issues, but also because they are increasingly assuming an important market co-ordination function and are relying on information technology to achieve this.

All three organisations were connected to the Internet. The Exporters Forum and SAMGA were connected via a dial up analogue modem, while SAAGA has an ISDN connection. All three organisations also operated their own websites. SAMGA has had an industry web site for the past 4 years but has struggled to update this site since its inception. This web site was conceived as a consumer promotion exercise and not as a vehicle to facilitate grower interaction or information. The interviewee claimed that SAMGA's active member corps was not only too small to warrant such a membership-driven site, but also too small to generate sufficient revenue to generate the necessary content. In contrast both SAAGA and the Exporters Forum have industry websites with extranet components.

In the case of both SAAGA and the Exporters Forum, e-mail was the primary way information was communicated to their respective membership corps. In the case of SAAGA, the fax machine was still used in less than 5% of cases. The situation in the mango industry is somewhat different, as contact with growers is maintained through the postal system – the information transmitted is mainly meeting notifications and/or the organisation's quarterly newsletter. SAMGA does not use e-mail as a rule, and the interviewee noted that the majority of growers are not on-line, or if they are, they do not check their e-mail regularly. The interviewee noted that the reluctance to use the new technology stemmed from farmers not being in touch with modern business practices, to the extent that they had been asked by a number of farmers to stop sending them e-mails.

Another important e-mail type of communication tool that is used by all three organisations is email via SMS format (i.e. batch email that is sent from a PC to a cellular phone). The type of information that is transmitted using this method consists primarily of reminders of meetings or information that is needed by the organisations for their respective web site.

One interesting e-mail application is its use by the South African avocado industry to better co-ordinate market supply into their main market, the EU. The main avocado suppliers to EU markets are Spain, Israel, South Africa and Kenya. Each of these countries has a very specific marketing window in the year with some overlap between supply countries. In the case of South Africa and Kenya, this overlap is complete while Israel has some overlap at the start of the South African season. The European Union market can absorb approximately 600 000 - 700 000 cartons of avocado's per week, and while it is a growing market, it is in the interest of all 4 countries to co-ordinate their marketing effort to ensure no single country oversupplies the market and drives the price of avocados down. SAAGA has interacted with the main role players (exporters) in these 4 countries and has designed an information sharing system that allows them to better co-ordinate their respective volumes. Briefly a spreadsheet gets e-mailed out to all the main exporters, on a country level, and on this template recipients are expected to indicate how much they have sent to the EU during the preceding week, how much of this volume is sold, and how much they plan to send in the coming week. This template is sent out on a Monday, all company and country information is collated, and if necessary, verified by SAAGA, and the final figures are sent out by Tuesday morning. This information serves as a guideline about how much to pack and send so as not to flood the international market with product.

Local exporters follow the same principal – they assess South Africa's potential exports for the week and then individually indicate how much of this volume they plan to take up. After this initial indication some will agree to send less and some more to ensure that not too much product is sent. This information is then sent through to growers (via e-mail) bi-weekly as the local industry's policy guidelines for picking and packing. It must be stressed that these guidelines are not fixed, rigid quotas – SAAGA embarked on its market co-ordination strategy due to the fact that in the past heavy losses were incurred due to co-ordination problems, losses that were ultimately borne by growers.

The SAAGA interviewee noted that his organisation would never have contemplated such an international market co-ordination strategy if e-mail did not exist, as this process could not be managed by fax - too many different role-players and too much information needs to be disseminated and processed in a very short time.

As indicated both SAAGA and the Exporter's Forum have member extranet components as part of their website. In much the same way as SAAGA co-ordinates its market through eliciting information on volumes sent to international markets, the Exporters Forum follows a similar strategy. However, this process occurs on-line, via the Internet. Briefly, marketing agents who are members of the Forum are requested to submit weekly on-line the type, volume and variety of fresh fruit they have exported to their respective markets. Only once exporters have submitted their own figures can they gain access to the common data pool. This system has only been operational for the past 4 months and it is thus too early to evaluate its impact. One exporter did refer to the benefits of this market supply information sharing concept as well as the user-friendly nature of the Forum's website.

SAAGA uses its extranet to make significant amounts of information available to its grower members. The range of information includes local avocado fresh produce market prices, general international market information, market research studies, summaries of South African export volumes for the season and average prices achieved, shipping schedules and industry quality reports. While this information is updated on a regular basis and growers can access it at will, the organisation claims many of its members are reluctant to go into the organisation's extranet and prefer that the information be e-mailed to them directly.

Interviewees were asked about their perceptions of the transactional side of e-commerce for their respective industries as well as possible barriers. Their responses reiterated a number of points already raised by growers and exporters, and included the following:

- **Product Characteristics**: The perishable nature of fresh produce and the supply chain co-ordination problems this raised was mentioned.
- **Contract structure**: Fruit from South Africa is normally sold on consignment - in e-commerce buyers and sellers require a fixed price. This conflicts with the fact that trade concessions only come about when firm deals are in place. Moreover, fresh fruit could be sold many times before it gets to the final consumer
- **Need for intermediation**: Once you eliminate market intermediaries such as exporters as a result of e-commerce business models, who will deliver the products? Export agents really should be called 'service providers'. They provide continuity in the supply chain (i.e. ensure that the right products get to the right destinations).
- **Industry structure**: The strength of the relationships in the existing fresh produce value chain should not be underestimated. Furthermore any shift towards e-commerce by the industry will have to be driven by European supermarkets. The market power in the fresh produce value chain rests in the hands of the retail trade where individual or country brands mean nothing. E-commerce fragments the seller side of the market, "If you want to make money in this business you cannot be a price taker, you have to consolidate your bargaining power on a local, regional and international level.

5. Summary and Conclusions

The objective of the research presented here was to provide quantitative and qualitative insight into the nature and extent of e-commerce in the South African horticultural export industry. The results show that despite a high Internet penetration rate (100%), the sector engaged in a limited amount of transaction-orientated B2B e-commerce. While 4 of the 12 firms interviewed indicated they had successfully concluded at least 1 Internet transaction, in 3 of these 4 cases this transaction constituted a negligible part of the firm's annual turnover. By contrast, a relatively high level of process-based B2B e-commerce was observed. The main focus appears to be the exchange of information orientated IT-based communications between buyer and sellers, with this information exchange aimed at supporting transactions that are conducted off-line. The use of email to access and exchange market information reports and to transmit and receive digital photographs is a good example, as is the use of the Internet to trace temperature readings in containers en route.

In explaining the lack of observed transaction based e-commerce, a number of the firms and organisations interviewed attributed this to:

- The perishable nature of fresh produce;
- The traditional character of the industry, which values and recognises personal relationships and trust;
- The need to ensure high product quality levels;
- The nature of the fresh produce contract structure where produce was being sold under consignment; and
- The short export season.

All these factors preclude selling fresh produce into spot markets where arm's-length relationships are the norm. Fresh produce typically reaches consumers via tightly controlled supply chains, as was illustrated in this research. Humphrey (2002) notes that the existence of these established supply chains does not necessarily rule out the use of B2B e-commerce, but it does imply that it has to be structured in specific ways to accommodate these industry characteristics. A number of respondents noted that the e-commerce business models currently available do not recognise this requirement and this is one area requiring further research.

B2B e-commerce is not constrained only by the structure of the horticultural trade, as there are also a range of technology factors that have to be taken into account. These include:

- High Internet costs;
- Limited bandwidth, leading to slow download times;
- Lack of rural telecommunications infrastructure;
- Unreliable telecommunications infrastructure, as well as slow repair times;
- The limited availability of IT skills;
- Lack of clarity on the legal status of e-mail communications;

In short, even if a potential user has access to the necessary technology and infrastructure, the process is slow and unreliable. No business could afford to risk reliance on the new technologies alone as a means of communication and of conducting business, hence there is little prospect that the cost will come down while existing methods have to be kept in place.

A number of other studies on South African e-commerce have arrived at a similar conclusion (see for example SAITIS 2000 and Bridges 2001). It is expected that the South African Government's plan to license a second fixed line telephone operator early in 2003 could bring increased competition to the telecommunications sector and that this in turn will bring down telephone costs and lead to improved service levels.

Finally, this research has shown that South African horticulture exporters will use e-commerce more frequently under the following circumstances:

- Where supermarkets in Europe (and especially the UK) take the initiative to conduct business in this manner;
- In 'new' markets (for South African exporters) where new supply chain relations have to be built;
- In the market for farm inputs;
- In the domestic market.

A key finding of this research project was that e-commerce has a major impact on horticultural export firms' level of competitiveness. Firms noted that it helps reduce their operating costs through its ability to improve their business administration capabilities, generate electronic documentation and allow for improved supply chain management. More importantly, it reduced the costs of accessing and managing business and market information. E-commerce should not be seen as a source of competitive advantage, rather the inability of a country's industries and firms to embrace e-commerce would see them lose market share.

6. References

Bridges, 2001. *South Africa policy brief: telecommunications overview, commentary, and statistics*. Available http://www.bridges.org/policy/sa/articles/telcom_report.html. Downloaded in June 2002

Holsapple, C and Singh, M., 2000. Electronic Commerce: From a Definitional Taxonomy Towards a Knowledge Management View. *Journal of Organisational Computing and Electronic Commerce* 10 (3), pp 149-170.

Humphrey, J., 2002. *Business-to-business e-commerce and access to global markets: exclusive or inclusive outcomes*. Mimeo, Sussex IDS. Available http://www.gapresearch.org/production/ecommerce.html. Downloaded in May 2002.

Leroux, N, Wortmann, M and Mathias, E., 2001. Dominant factors impacting on the development of buisnes-to-buisness e-commerce in agriculture. *International Food and Agribusiness Management Review* 4(2001), pp 205-218.

Moodley, Sagren, Mike Morris, and Justin Barnes. 2001. *Unlocking Value in the "NewEconomy": E-Commerce in the Apparel and Automotive Value Chains*. Paper read at TIPS Conference on New Directions in the South African Economy, at Johannesburg, South Africa. 10-12 September 2001.

Paré, D., 2001, *'Does This Site Deliver? B2B E-Commerce Services for Developing Countries'*, Available http://www.gapresearch.org/production/ecommerce.html. Downloaded April 2002

Saitis, 2000. *Saitis:A Survey of the IT Industry and Related Jobs and Skills in South Africa.* Available http://www.queensu.ca/samp/migdocs/Documents/2000/IT.htm. Downloaded in August 2002

Thompson, S. Hayenga, M. and Hayes, D., 2000. *E-Agribusiness.* Paper read at the IAMA Agribusiness Forum in Chicago, Illinois. 25 June 2000

Van Zyl, J., N. Vink and J.F. Kirsten, 2001. South African agriculture in transition: the 1990s. Journal of International Development, Vol. 13: 725-739

Vink, N, 2000. Farm profitability and the cost of production inputs in South African agriculture. A Report to the National Department of Agriculture