B2B E-Commerce and the South African Horticultural Export Industry: current status and future directions

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B2B E-Commerce and the South African horticultural export industry: current status and future directions[1]

1. Introduction

Over the past two decades dramatic developments in information and communication technologies (ICTs) have transformed the global economy from an industrial society into an information society. In this new economic milieu, firm and industry level competitiveness is increasingly a function of its "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). E-commerce includes all these dimensions and it is not limited to the Internet, it also includes transactions conducted over private computer networks such as electronic data interchange (EDI) systems.

E-commerce transactions can be segmented according to the partners involved in the transaction. These transactions may be between businesses and consumers (B2C e-commerce), or between enterprises - business-to-business (B2B) e-commerce). While B2C e-commerce is highly visible due to the strong marketing presence of on-line retailers such as Amazon.com, it is the smaller part of e-commerce. On-line shopping represents only 0.64% of all retail sales (Mueller 2000). B2B e-commerce, in contrast, accounts for 80% of the value of e-commerce and represents 9.4% of all B2B sales.

At the firm level, the potential benefits of e-commerce are significant. Moodley *et al* (2001) categorises these benefits based on their ability to a) reduce costs b) expand their network scale and c) to improve their service levels (Table 1.1). 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 countries with the better-developed ICT infrastructure and lower ICT unit costs. On an industry level, the winners will be those industries whose industry structure, product characteristics and business culture best lends themselves to e-commerce.

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Table 1.1.The Potential Benefits of B2B E-commerce

Reduced Costs	Network Scale	Improved service level
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 (industry co-ordination)	Target lucrative, particularly export, markets	Shorten delivery time
Shorten sales cycle	Access to new business: a larger pool of buyers create a larger market for developing country producers	Improved ability to compare Options
Reduced inventory	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: Moodley *et al* (2001)

Of all the theoretical benefits listed in Table 1.1., 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 accessing international markets in a relatively low-risk, low-cost manner. To date, however, the experience of B2B e-commerce has failed to support the theory - very few of the benefits of e-commerce listed in Table 1.1 above have been practically realised. With respect to agriculture, Leroux *et al* (2001) attributes this failure to a number of industry specific factors that have inhibited the development of e-commerce in the sector.

The *first* factor identified 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 also created a barrier to the development of transparent electronic market places. The *second* factor identified is the increasing complexity of agricultural produces 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. End user-driven product complexity has emerged over the past twenty years 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 and not pure economic considerations. Internet transactions limit personal interactions and thus the formation of trust based relationships and this can explain why B2B e-commerce has not been fully embraced by the agricultural sector.

The research presented here is an attempt to examine some of these issues as they pertain to the South African horticultural export sector. More specifically this research will assess the nature and extent of e-commerce within the sector, identify factors that have inhibited its development as well as sketch how it might develop in the future. Section 2 begins with a description of the horticultural sector and focuses on the main changes the sector has experienced over the past few years. This description serves as the context for the third part of the report that presents and discusses the results of a survey conducted among South African horticultural firms on the extent of e-commerce in their industry.

2. South Africa's horticultural export sector: an overview

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. The sector has, by all measures, relatively large linkage effects with the rest of the economy, and is a major earner of foreign exchange - currently more than 20% of the country's merchandised non-gold exports are primary agricultural products.

The policy and institutional environment in which the agricultural sector operates has changed dramatically over the past two decades and this has impacted on its structure and performance with certain sub-sectors being more acutely affected. The analysis that follows begins by sketching the major policy changes affecting the agricultural sector and then goes on to give an indication of how this has impacted on the horticulture export industry in particular.

2.1. The agricultural policy environment in South Africa

South African agricultural policy has changed radically in a process that started as early as the 1970s, and that has not yet been completed. The main highlights of this policy shift include:

- **Deregulation**: The comprehensive deregulation of the marketing of agricultural products on the domestic and international market through two phases, namely deregulation of the controls over marketing within the framework of the Marketing Act of 1968, and later the promulgation of the Marketing of Agricultural Products Act of 1996. The latter Act replaced the 1968 legislation, and resulted in the abolition, by early 1998, of the Control Boards that had been set up to administer marketing schemes.

- **Liberalisation**: The signing of the Marrakech Agreement of the GATT in 1993. The first effect was the conversion of all existing quantitative controls

over imports of agricultural goods into tariffs, and followed by the scaling down of those tariffs according to an agreed schedule. Despite the terms of that Agreement, however, South Africa's tariffs in agriculture are now considerably lower than the bound rates agreed in terms of the GATT, and now the WTO. The country has also affirmed its position on liberalised international trade by assuming membership of the Cairns Group, thereby signalling its intention to lower tariffs even further regardless of the progress made by the developed countries in withdrawing farm support.

- **Export driven growth strategy:** The liberalisation of foreign trade generally through a shift away from the import replacement strategy of the past decades toward more overt export-driven growth under the GEAR macroeconomic strategy of the new democratic government. In terms of this strategy, commodities such as those produced in agriculture are afforded less tariff protection than goods with a higher value-added component. For agriculture, this means that inputs into farming are protected, while in many cases farmers have to compete more directly against imports in an unprotected market. In addition, South Africa also participated in the renegotiation of the Southern African Customs Union treaty, agreed to the new SADC trade protocol, and negotiated a free trade agreement with the EU.

- **The introduction of the land and labour reform programmes**. The former, introduced in 1994, consists of land restitution, land redistribution and tenure reform. This initiative was aimed at settling small farmers on viable farming operations in the commercial farming areas. Recent reviews of the programme show that the pace of reform has been slow, and have resulted in a reorientation of the programme away from a strict focus on poverty alleviation. While labour legislation governing working conditions, wage rates, etc. has progressively become applicable to the agricultural sector over a period of more than a decade, certain aspects of the land reform programme have also impacted on the manner in which agricultural labour is managed. Here specific mention should be made of the introduction of legislation that governs the occupational rights of workers who live on farms.

- **Public sector restructuring:** The institutional restructuring of the public sector, including the 'provincialisation' of the Department of Agriculture, a change in the relationship between the Department and farmer lobby groups, the restructuring of important statutory bodies with a development mandate in the rural areas generally such as the Development Bank of Southern Africa and the Land Bank, and the reorientation of the mission of the Agricultural Research Council.

The results of these shifts in policy can best be measured in terms of the extent of State support to the agricultural sector. The simplest indicator is that of State spending on the farm sector, measured as the budgeted amounts for the national Department of Agriculture plus the agricultural budgets of the nine provinces: this amounted to some R2.0bn in 2001/02, in real terms less than 50% of the budget of the central plus homeland Departments of Agriculture in 1988. State resources to agriculture have declined significantly in the past decade.

A better indication is given by the Producer Support Estimate (PSE)[2] calculation, shown in Table 2.1. While also a partial measure, the advantage of the PSE is that the OECD audits the calculations for a country hence cross-country comparisons are possible. South African farmers receive less support than any other developed country barring New Zealand farmers. However, this result has to be placed in perspective: in most developing countries farmers are taxed and not subsidised, and of the countries included in the Table, South Africa can least afford to subsidise agriculture. Nevertheless, the low PSE provides evidence of the extent to which South African farmers are exposed to market forces in the domestic as well as the foreign sphere.

Table 2. 1: Global comparison between Public Support Estimates (PSEs)

Country	% PSE
Iceland	68.9
Japan	63.2
EU	45.3
USA	21.6
Czech Republic	17.5
Mexico	16.7
Canada	16.1
Hungary	11.8
Australia	6.8
South Africa	2.7
New Zealand	0.8

Source: Kirsten *et al* (2000)

2.2 The effects of policy shifts

These changes affected farmers, and the agricultural sector, in many ways, best summarised in Figure 2.1, which shows the trend in input use, in farm outputs, and in the resultant Total Factor Productivity (TFP) measure.

This conceptually simple but comprehensive indicator of productivity, which measures the ratio of the total value of output to the total value of inputs used in agriculture, is a measure of the efficiency with which resources are being used in the sector. The data show that:

- Total output in agriculture had been increasing for most of the past six decades. The data in Table 2.2 shows that most of this growth came from the increase in the production of horticultural products, where growth is measured as a simple multiple of the output in the most recently available year over the base year[3]. Figure 2.2 shows that this growth in horticultural output was sufficient to increase its share of total farm output by 10 percentage points since 1978/79.

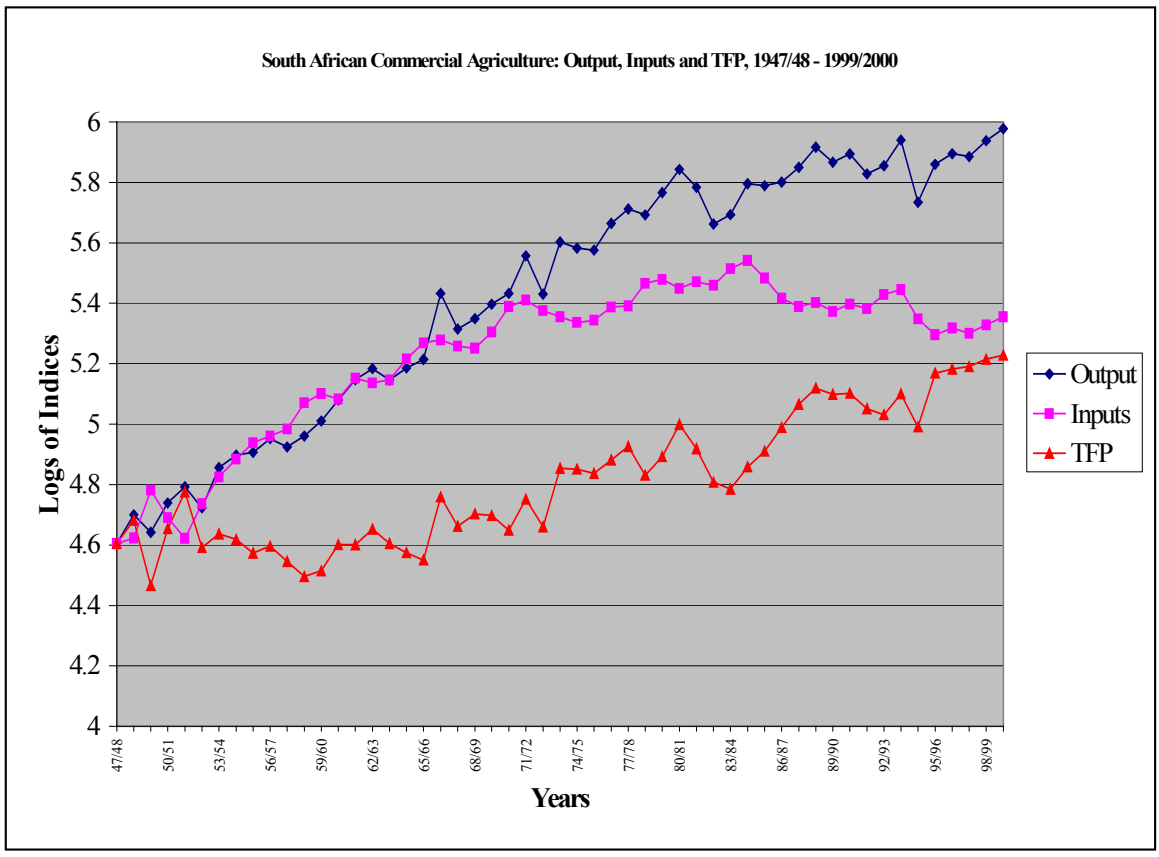
- At the same time there has been a decrease in the value of total inputs used in farming since the early 1980s. While this is partly the result of the decline in the numbers of people employed on farms, a relatively high growth in wages has resulted in an increased total wage bill in agriculture. Most of the decline

[2] The PSE measures the share of net farm income paid by taxpayers rather than earned in the market by estimating the value of the direct and indirect monetary transfers resulting from agricultural policies in a given year.

[3] These data were not adjusted for inflation, as comparisons are within the same sector and the emphasis is on relative performance within the sector.

has been the result of the extensification of field crop production, leading to a substantial decline in fertiliser and tractor sales since the mid-1980s.

The net result of these two trends is that productivity has increased in South African agriculture at a sustained rate since 1947, that this seemed to slow down during the first part of the 1990s, i.e. after the first phase of deregulation, but that it has accelerated substantially in the post-1994 period as exports have increased. On average, therefore, the agricultural sector as a whole has gained from these policy shifts. However, as in any such process of policy change, there have been both 'winners' and 'losers'. Thus, the relative position of the horticultural sector needs to be investigated further.



Source: Vink, (2000).

Figure 1: Outputs, inputs and TFP in South African agriculture, 1947-1999

Table 2.2: The composition of growth in farm output, 1965/66 to 2000/01

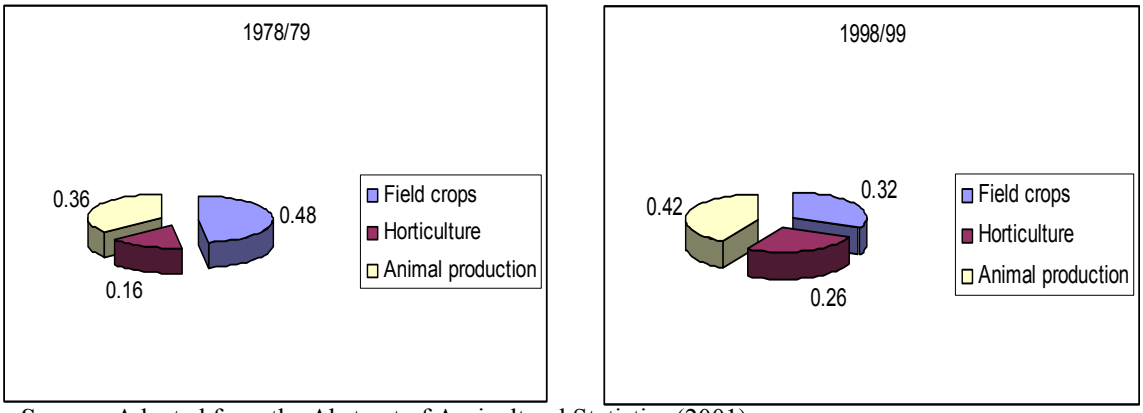
	Field crops	Horticulture	Animal production	Total
1965/66	407,2	181,2	487,8	1 076,2
2000/01	16796,6	12708	19485,8	48 990,4
Multiple	41.25	70.13	39.95	45.52

Source: Adapted from the Abstract of Agricultural Statistics (2001)

2.3 Deregulation in the horticultural sector

The first attempts to regulate the horticultural export industry began in 1899 when the Western Province Fruit Exporter's Association was established. The main aims of this

organisation included the standardisation of packaging and the appointment of a single shipping agent. The first legislation followed soon thereafter with the promulgation of the Fruit Export Act No.17 of 1914. This legislation laid the foundations for uniformity in terms of the quality of export fruit.



Source: Adapted from the Abstract of Agricultural Statistics (2001)

Figure 2.2: The changing composition of the value of agricultural output in South Africa

Exports increased rapidly after 1918, from 250 tons in 1900 to 12000 tons in 1922. However, poor infrastructure, especially cold storage facilities, contributed to weak quality and hence low prices. To remedy this situation, the Fruit Growers' Co-operative Exchange of South Africa Limited was established in July 1922, and a 'Low Temperature Research Laboratory' was opened in Cape Town in 1925. Ultimately, the PPECB was established in terms of the Perishable Products Export Control Act, no 53 of 1926 to address the problems that growers had in finding shipping space for fruit.

During the 1920s there was growing pressure to centralise the export marketing of both deciduous and citrus fruit. This was eventually accomplished with the creation of the Deciduous and Citrus Fruit Boards, proclaimed in terms of the Marketing Act of 1937. In accordance with the powers contained in that Act, the South African Deciduous and Citrus Fruit Regulatory Scheme was promulgated in October 1939. These Boards were given the monopoly right to export all types of deciduous and citrus fruits, and also controlled domestic sales of fruit during the Second World War, when exports to Britain were disallowed. By the 1946/47 season all fruit was exported under a common label with the bulk of the crop being sold in the UK.

It was only in the early 1970s that any real marketing changes came about when control over the domestic marketing of fresh fruit was abolished and export marketing power was delegated from the Citrus Board to Outspan (1970) and later from the Deciduous Fruit Board to Universal Fruit Trade (Co-operative) Limited (Unifruco) (1986). Note that both Outspan and Unifruco operated as single desk monopoly exporters for their respective industries. In 1995 these two organisations merged to form a single export marketing entity Capespan. In early 1998 the fruit Control Boards that had been set up in the 1930s were abolished and the South African fruit industry was deregulated. As a result of this process, Capespan became one of a

number of exporters marketing South African fruit internationally. Despite this industry fragmentation, Capespan has managed to maintain its dominant industry position and currently holds an estimated 60% market share. Note that neither vegetables (with the exception of potatoes) nor subtropical fruit (with the exception of bananas) were ever regulated and that the Schemes for potatoes and bananas were both abolished in 1993.

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2.4 The relative post-deregulation performance of the industry

The data in Table 2.2 showed the strong growth in output in the horticultural sector throughout the period of deregulation and trade liberalisation. This growth performance is decomposed for individual categories of horticultural products in Table 2.3, and for different types of fruit in Table 2.4.

Table 2.3: Growth in the value of output of certain horticultural products, 1990/91 – 2000/01

	1990/91	2000/01	Multiple
Rooibos tea	8,905	33,000	3.71
Nuts	12,500	42,225	3.38
Citrus fruit	541,123	1,624,558	3.00
Deciduous fruit	1,289,897	3,642,375	2.82
Flowers and bulbs	193,547	541,888	2.80
Vegetables	968,490	2,550,874	2.63
Subtropical fruit	327,290	748,739	2.29
Dried fruit	104,112	176,215	1.69
Total	**4816,993**	**12,708,041**	**2.64**

Source: Adapted from the Abstract of Agricultural Statistics (2001)

The data in Table 2.3 confirms that the growth in output of deciduous fruit has been higher than the average for the horticultural sector even though it was, and remains, the single largest component of horticultural output. Likewise, the data in Table 2.4 show that growth in table grape production has been higher than the average for all fruit types, and outpaced only by naartjies and lemons, while it is by far the largest single fruit type produced in the country.

Table 2. 4: Gross value of output of certain major fruits

	1987/88	2000/01	Multiple
Naartjies	13,833	184,865	13.36
Lemons	14,588	153,161	10.50
Grapes	170,959	1,670,944	9.77
Grapefruit	22,625	219,390	9.70
Mangoes	14,658	100,255	6.84
Oranges	181,643	904,927	4.98
Peaches	69,506	278,535	4.01
Avocados	44,524	171,374	3.85
Strawberries	7,428	26,322	3.54
Pears	114,892	390,527	3.40
Pineapples	30,488	101,067	3.31
Watermelons	12,484	40,288	3.23
Bananas	79,984	250,176	3.13
Musk-melons	11,849	34,739	2.93
Apples	294,973	773,556	2.62

Source: Adapted from the Abstract of Agricultural Statistics (2001)

The growth in exports of horticultural products has been even more impressive. The export performance is reflected in Table 2.5 below. More than half of the items on the Table showing the top 20 food and agricultural exports from South Africa are horticultural products. These exports have also been growing rapidly: the rates are show in Figure 2.3 below.

Table 2. 5: Food and agricultural exports from South Africa, 1990 - 2000

	1990	1992	1994	1996	1998	2000
Sugar	711840	0	433951	1320083	1738121	1861841
Wine	55669	122112	246747	797631	992220	1689557
Citrus fruit	335959	540382	763786	696553	1385017	1582225
Grapes	212884	273684	513555	504627	907338	1254665
Preserved fruit and nuts	324956	440563	505038	682621	814779	864625
Apples, pears and quinces	334124	595763	420480	536726	930794	702986
Fruit and vegetable juices	115403	214516	232411	336459	354721	657292
Cigarettes	8279	28663	44014	176347	303091	548624
Maize	593732	264607	1617577	1587466	781529	498675
Undenatured ethyl alcohol	28048	30711	407225	515749	243737	381413
Wool	536494	311765	298115	326348	335125	353035
Food preparations	19940	34181	43939	73930	109749	253627
Apricots, cherries, peaches, plums and sloes, fresh	40576	87843	88832	87518	169866	206298
Tobacco	42982	52213	75074	78553	174383	194903
Dates, pineapples, avocados, figs, guavas, mangoes	52011	60844	89493	103527	189276	183008
Raw skins of sheep and lambs	109510	122021	165758	302447	203831	180763
Sugar confectionary	28082	50743	60543	89226	124331	165851
Other meat and edible meat offal	10260	5897	13801	41576	97342	158361
Raw hides and skins of bovine	122900	83193	94330	140113	233377	143121

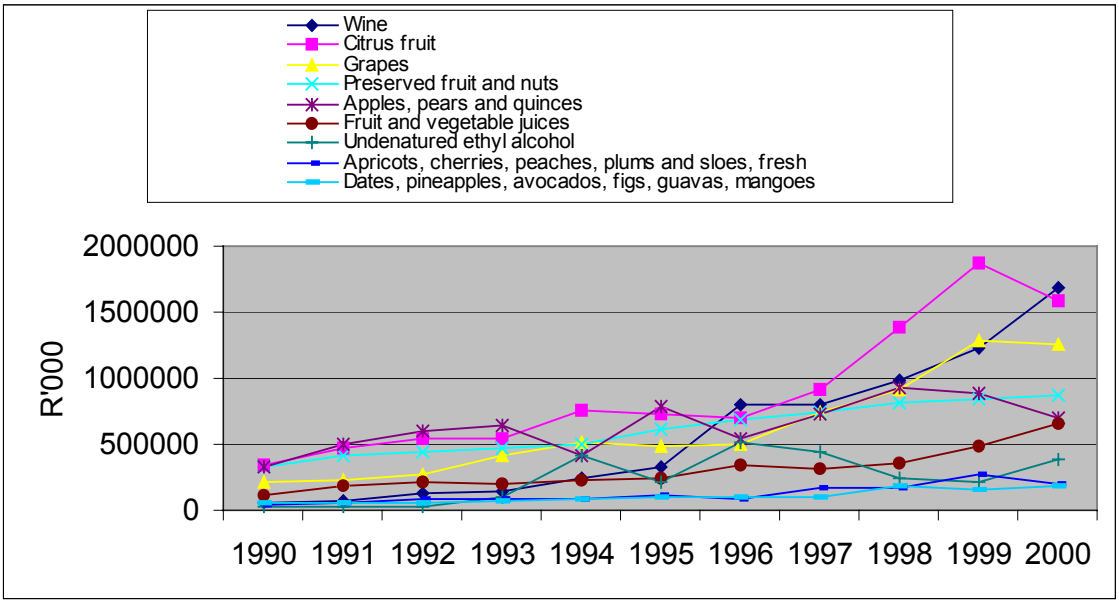

Figure 2.3: Horticultural exports, 1990-2000

A noticeable omission from the graph is vegetables, as South African vegetables are grown mostly for the relatively large domestic market, and only some 3% of vegetable production is exported.

One of the main features of the era of regulation was the concentration of sales to Europe, and specifically the UK and Germany, partly as a result of historically strong trade relations and familiarity with their export requirements[4]. For example, in 1997 almost 80% of apple exports were sent to Europe, while no other single market received more than 5% of the total. Table 2.6 below shows that while this pattern of market concentration has become less concentrated in the post-deregulation period, the EU and in particular the United Kingdom remain key markets.

Table2.6: South African Fruit Exports – Main destinations (2000)

	UK	Other Europe	Europe Total	North America	Middle East	Far East	Africa	Other
				%				
Naartjies	45	22	67	20	7	3	3	0
Lemons	12	23	35	1	38	19	2	3
Grapes	19	65	84	9	2	3	1	1
Grapefruit	5	66	72	5	2	11	9	1
Guavas & Mangoes	9	75	85	1	12	2	0	0
Oranges	6	21	27	11	32	16	3	10
Peaches	47	32	79	0	12	0	8	0
Avocados	19	79	99	1	0	0	0	0
Pears	24	59	83	7	1	6	3	0
Pineapples	21	69	91	0	7	0	0	1
Bananas	0	0	0	0	0	0	99	1
Apples	41	26	67	5	6	8	15	0

Source: Interactive Trade Map (2002)

3. E-commerce and South Africa horticultural export firms: Discussion of survey results

3.1. Methodology

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 primary agricultural producers (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 in such a manner as to ensure a spread between the various fresh commodity groups, geographical dispersion and firm size. It must, however, be emphasised that no attempt was made to obtain a representative sample of either sub-sectors or firms, consequently the results of this research project should be considered to be suggestive and not conclusive.

Figure 3.1 below provides a schematic overview of the South African export horticulture value chain and indicates the various role players active in the chain. As can be seen in Figure 3.1, after primary production and packing the fresh product is transfered to an exporter or marketing agent who sells this on behalf of the producer.

[4] Phytosanitary standards were, for example, more stringent in the USA and Asian markets.

The product is then physically exported and received into the importing country by an importer (receiver) who then either markets the product directly to supermarkets and other retail outlets or sells it into a wholesale market. At each point along the chain some degree of forward or backward integration by chain participants is possible. Furthermore ownership of the product can be transferred at each stage along the chain or, as more often is the case with South African products, only once it has been accepted for sale by a supermarket.

The right hand column in Figure 3.1 shows the different nodes at which respondents were interviewed for this study. Table 3.1 below provides additional information with respect to the horticulture product group represented by the respondent. Capespan is the only private company identified by name in the research since pragmatically its identity is hard to disguise. The discussion of the results that follows is organised as in Table 3. 1 by producer, exporter, trading hub and industry organisation. Paltrack, the industry's supply chain management system is included under the exporter section.

3.2 Producers

a) Description
As already indicated, four agricultural producers (farmers) were interviewed as part of this research project. Two of the respondents 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 farming businesses can be described as large owner-operated family-operations, acquired through inheritance.

As can be seen in Table 3.2 below, while some degree of product diversification was observed, each of the four farms had a clearly identified primary crop. The bulk of this crop (>70%) was marketed internationally, almost exclusively in the European Union with the United Kingdom being a key market. All four respondents made use of a marketing agent(s) to market and export their product. Only one farmer indicated a direct financial and managerial interest in the grower-owned marketing agency he made use of. This agency was set up by a group of growers in an attempt to re-engineer the export supply chain to reduce costs and better distribute risk among chain partners.

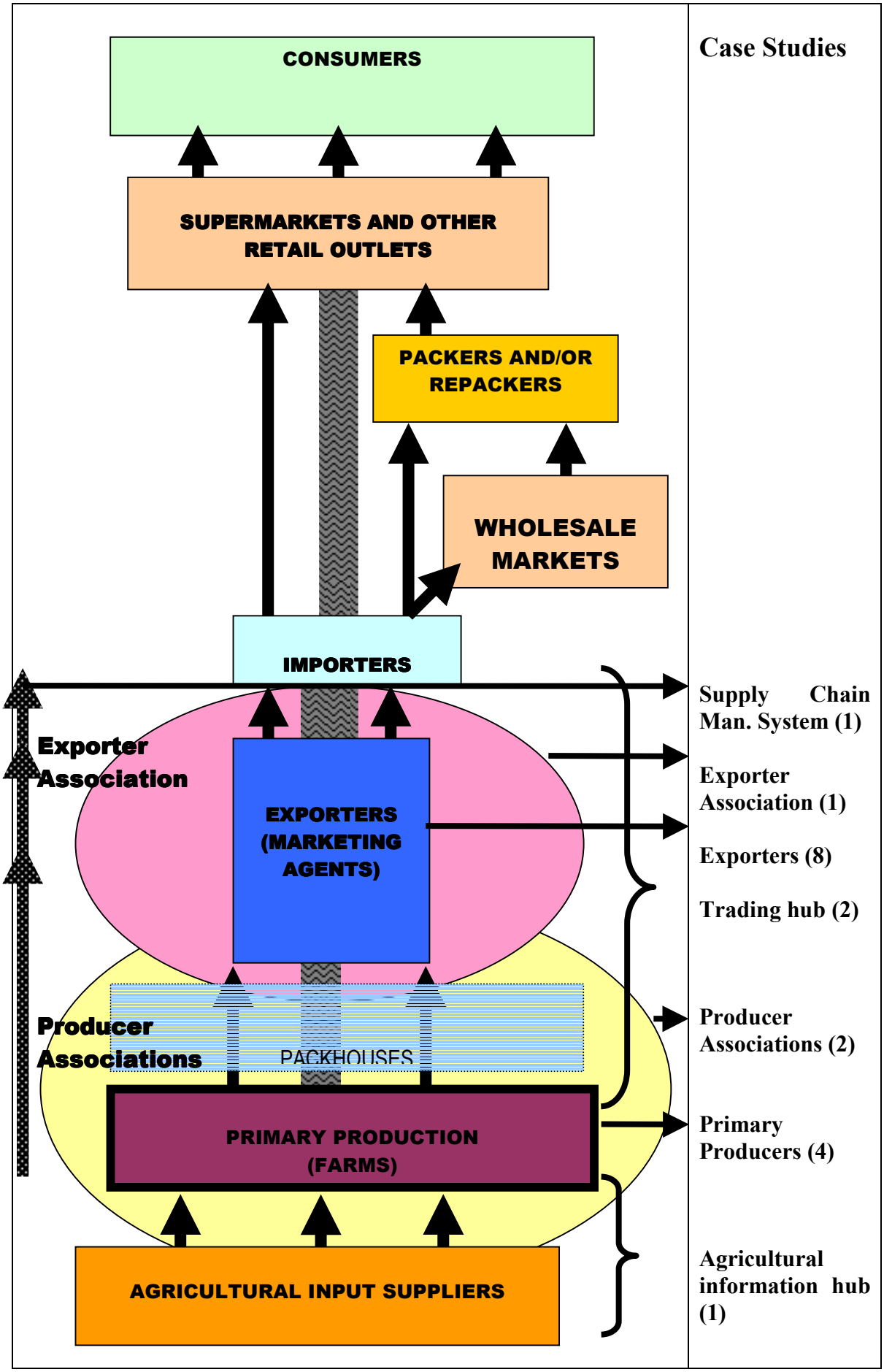

Figure 3.1: South African Horticulatural Value-Chain and Case-studies included in the study

b) Network Connection and Access

All four respondents indicated they had some form of Internet access. Two respondents were connected via an analogue modem while 2 had ISDN connections. One respondent indicated he would like to have a high-speed diginet line installed to improve data transmission speeds, however, the nearest access point to the diginet network was located in a local town, 40 km from his farm.

Only one of the producers interviewed had a website. This website 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 grower was linked to his marketing agent's website while the second grower was linked to his growers association.

Table 3.1: Respondents interviewed

Case Study	Value Chain Node	Product
1 2 3 4	Producer	Deciduous fruit (table grapes) Deciduous fruit (table grapes) Sub-tropical fruit (avocados) Deciduous fruit (plums and peaches)
1 2 3 (Capespan) 4 5 6 7 8	Marketing Agents Exporters	Deciduous fruit and vegetables Deciduous fruit All fruit products Citrus fruit Deciduous and citrus fruit Deciduous fruit Floriculture (indigenous fynbos) Food and beverage trading house
1 2	Trading hub	Agricultural information hub Flower industry trading hub
1 2 3	Industry Organisation	Sub-tropical fruit (mangoes) Sub-tropical fruit (avocado) All fruit sectors
1	Other	Paltrack (industry supply chain management system)

Table 3.2: Producers - General Information

	Primary Crop	Primary Crops % total production	Secondary Crops	Year Established	No farming units operated	Employees	
						Permanent	Seasonal
1	Table grapes	80	Citrus, wine grapes	1800	7	200	1000
2	Table grapes	100		1960	1	120	100
3	Avocadoes	60	Bananas, timber and nursery operation	1927	2	80	30
4	Stone Fruit	50	Wine grapes	1850	1	40	20

Table 3.3: Producers - Marketing Arrangements

	% of primary crop exported	% of exports to the EU (including UK)	Makes use of marketing agent	Number of different marketing agents used	Stake in marketing agent
1	100	85	Yes	2	No
2	93	100	Yes	1	No
3	80	100	Yes	1	Yes
4	70	100	Yes	2	No

Table 3.4: Producers - Network Connection and Access

	Type of connection	Website	Extranet
1	Analogue	No	Yes
2	ISDN	No	No
3	ISDN	Yes	Yes
4	Analogue	No	No

c) Network Applications: Frequency of use

- *E-mail*

As previously indicated all the farmers interviewed made use of a marketing intermediary to sell their produce. All the respondents described their relationship with these intermediaries as being close and personalised, facilitated by the fact that many of these marketing companies have technical personnel active in the field who liase with growers on a regular basis. All direct business-to-business (B2B) contact is thus conveyed in person or over the telephone while routine B2B 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 interviewees 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. With respect to placing a product (input) order, one grower indicated he occasionally used e-mail for this purpose however he also noted that many of the input suppliers he made use of preferred to receive orders via facsimile and not e-mail

- *World Wide Web (WWW)*

Overall farmers interviewed for this survey used the World Wide Web (WWW) fairly infrequently (see table 3.5 below). The Internet is seldom used to find information on input suppliers. Herbicide, pesticide and fertilizer company representatives market their product directly to farmers and offer some technical advice service. Other inputs are normally purchased directly from input farmers' co-operatives.

One respondent indicated he used the Internet to obtain information on product

market conditions – typically visiting industry specific sites.

The Internet was frequently being used by farmers for two main reasons. The first was to obtain information on environmental conditions especially during the harvesting season. The second was for carrying out banking activities. Two farmers indicated they frequently used the Internet to obtain environmental information such weather forecasts and the status of fruit fly outbreaks, while all four respondents indicated that they almost always use the Internet for banking purposes

Table 3.5: Producers- Network applications and frequency of use (N=4)

	Always	Frequently	Seldom	Never	N/A
E-mail					
To maintain contact with buyers/suppliers		75	25		
To place or accept product orders			25	75	
WWW					
To obtain information about input markets			100		
To obtain information about product markets		25	75		
To obtain information about specific customers				100	
To obtain information about specific suppliers			25	75	
To accept orders from international business customers				100	
To place order with international suppliers					100
To accept orders from local customer		25		50	25
Electronic Banking	100				
Information on environmental factors		50		50	
Extranet		50			50

- **Extranet**

As indicated, two respondents had access to extranet password-protected websites. The first producer used this facility to access financial data from his exporter on expected payouts during the harvesting season, while the second grower used this 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,

d) Internet Transactions
Only one of the four growers interviewed had ever used the Internet to sell any of their 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 this grower's website while conducting an Internet search and then contacting and negotiating with the producer via e-mail.

The principal reason the other growers gave as to why they had never used the Internet to sell any of their products internationally relates to the fact that the existing horticulture marketing chain is fairly entrenched as a business model and that no incentive to re-engineer the chain currently exist. Table 3.6 below summarises the

main reasons specified.

None of the producers interviewed had ever registered with a web based international trading site or marketplace. The primary reason given was the 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. The responses to this question are listed below, and it can be seen that these are related to growers' perceptions of the Internet as a transaction medium.

It is clear, based on these 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.

Table 3.6: Producers - Main reasons cited for not using the Internet to sell products internationally

Producer	Primary Reason
1	**Current marketing strategy is optimal** given that the firm's marketing agents have supply programmes with a number of major supermarket European and North American supermarket chains Need for intermediation with respect to the organisation of logistics and payment
2	**Marketing via the Internet is not the industry's way of doing business**. There is a difference between the selling and marketing of a product – marketing implies arranging the perfect match between the requirements of the buyer and the product of the seller With respect to **IT infrastructure**, the respondent noted that his business is not **e-commerce ready,** he needs a faster connection and an open e-mail line. Also indicated that telecommunications is a problem due to slow repair times, while bandwidth is a problem because it takes so long to download sites. He feels that business culture is the main barrier to its widespread adoption as a business model
3	N/A
4	The nature of the business is such that they have **longstanding relationships with their export agents**, relationships that they would like to maintain. The business has been in the family so long and they are quite happy with the current situation.

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. Horticultural Marketing Agents/ Brokers

a) Description

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

Eight marketing agents/reseller were interviewed for this research project. Table 3.8a below shows the main product group traded by exporter and indicates whether the firm acts as a broker or reseller. The year in which the marketing company was established is also listed. As can be seen in Table 3.8a), while most exporters acted as brokers for local farmers, a number also undertook reselling activities in combination with this.

Table 3.7: Producers - Main reasons cited for not registering with a web based trading site/market place

Producer	Primary reason
1	Fruit trading platforms are **not yet well-established business model** **End-user required product attributes** such as quality and traceability cannot be reflected nor revealed through negotiations and/or sales that take place on line (i.e. negotiations that are not conducted personally)
2	**Would lead to disintermediation**. The producer's marketing agent provides him with a number of services that a web-based trading site would have some difficulty replicating. These include: • Low cost shipping, insurance and freight costs due to economies of scale as exporters handle large volumes • Countervailing power: There has been a major consolidation of demand (buying power) in the EU (SA's traditional market). Fewer buyers are buying bigger volumes, there is also the trend towards category management. The only way to counteract the negative effect of this demand consolidation is to consolidate supply. A few big export agents are in a position to do this and bargain for a higher prices • Manage the transaction and ensure payment, exporters have a whole slue of accountants and lawyers on hand and are specialist administrators • Fresh fruit is not a commodity; price differentiation is possible. A product with the same specifications can be sold for a number of different prices depending on where you sell it, when you sell it and to whom you sell it. It is the job of the exporter to ensure that all the dimensions of the marketing process have been taken care of. **Values personalised "high-touch" business relationships** and transactions. The respondent was of the opinion that it is difficult to develop such relationships using a web-based trading site
3	The producer in question has never visited any e-commerce trading platform as he has never had to look for a buyer for his fruit. **Perception is that the potential buyers using these trading sites are not serious business partners** - people who are interested in building a proper professional long term business relationship.
4	Has **never needed to find an additional marketing channel** as his farm has no problem selling all their produce using existing channels. Moreover does not believe he would achieve higher prices for his fruit using an e-commerce trading site.

With the exception of Capespan, all deciduous fruit and citrus marketing concerns were only established in the post-deregulation period (i.e. after 1997). By looking at firm ownership and the nature of chain integration (Table 3.8b), most of the marketing firms interviewed for this study were locally owned companies who were

further coupled to the export chain by vertical and/or horizontal integration.

The relatively high turnover of these marketing companies should be seen together with their low employment levels, which is typical of service firms. Furthermore it must be noted that the income accruing to these firms as a result of their broking activities is between 3 and 7 percent of the CIF export value of the product they trade, i.e. of turnover.

Table 3.8a: Marketing Agents -General information

Firm	Product	Year Established	Intermediary Type	Part of larger business unit
1	Deciduous Fruit and Vegetables	2001	Broker	No
2	Deciduous Fruit	1997	Broker	Yes
3	Fruit (all) Capespan	1900	Broker	No
4	Citrus	1996	Broker and reseller	No
5	Deciduous Fruit and Citrus	1998	Broker	No
6	Deciduous Fruit	1999	Reseller	Yes
7	Flowers (indigenous flora)	1976	Broker and reseller	No
8	Food and beverage products	1996	Broker and reseller	No

Table 3.8b: Marketing Agents - General information Continued

Firm	Turnover R mill	No of Employees	Ownership	Chain integration
1	92	15	Local grower ownership, private company	Backward integration
2	100	12	Joint domestic and foreign ownership, private company	Backward and forward integration
3	4500	500	Local grower ownership, private company	Backward and forward integration
4	110	N/A	Local grower ownership, private company	Backward integration
5	87,5	15	Local ownership, private company	None
6	50	5	Local ownership, closed corporation	Horizontal integration
7	20	13	Local ownership, private company	None
8	N/a	1	Local ownership, closed corporation	None

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. A number of respondents (4) indicated that they were in the process of diversifying their market base and looking towards the Far and Middle East. However, it was also noted that this diversification process is constrained by the fact that South Africa's product profile matches European demand patterns with respect to product varieties and fruit sizes and this differs from what is being demanded in the East.

Table 3.9: Marketing Agents- Market Allocation

	Europe	North America	Middle East	Far East	Total
1	52	15	7,5	25,5	100
2	80	0	0	20	100

3	80	10	0	10	100
4	100	0	0	0	100
5	100	0	0	0	100
6	0	0	50	50	100
7	80	10	0	10	100
8	N/a	N/a	N/a	N/a	-

b) Network Connection and Access

All respondents had some form of Internet connection. Four of the respondents were connected via ISDN lines while three of the respondents had high-speed diginet connections. Four of the eight firms interviewed had their own website[5]. 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.

Table 3.10: Marketing Agents – Network Connection and Access

Broker	Type of connection	Website	Extranet	Intranet
1	ISDN	Yes	No	No
2	ISDN	No	Yes	No
3	Diginet	Yes	Yes	Yes
4	ISDN	Yes	No	No
5	Diginet	No	No	No
6	Diginet	Yes	No	No
7	ISDN	No	No	No
8	Analogue	No	No	No

c) Network Applications: Frequency of use

E-mail

As can be seen in Table 3.11 below, 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 later 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 have 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, moreover farmers prefer personal communications – "They need to hear your voice once a week. This makes them feel more involved"

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.

[5] One of these respondents technically had a web storefront rather than an independent website. The respondent considered this as a website.

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 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 in that they help 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.

Table 3.11: Marketing Agents Network applications and frequency of use % (N=8)

	Always	Frequently	Seldom	Never	N/A	Unspecified
E-mail						
To maintain contact with buyers		100				
To maintain contact with suppliers		25	75			
To place or accept product orders		37.5	50	12.5		
WWW						
To obtain information about input markets		12.5	25	62.5		
To obtain information about product markets	12.5	25	37.5	25		
To obtain information about specific customers	12.5		12.5	75		
To obtain information about specific suppliers			12.5	87.5		
To accept orders from international business customers			12.5	87.5		
To place order with international suppliers				100		
To accept orders from local customer		12.5			87.5	
Electronic Banking	62.5					37.5
Monitor container		37.5				63.5
Logistics and quality information	50	12.5				37.5
Currency rates	50					50
Extranet	25	12.5	50	25		12.5

- *World Wide Web*

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 with respect to 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 on-line banking. In addition 3 of the exporters indicated they used the Internet to access real-time currency 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 of this application is that exporters can very early 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 by exporters to ascertain the expected arrival dates of vessels at sea and/or the departure and arrival times of international flights. A number of exporters remarked how they prefer to personally interact with these transport companies to verify this information as it changes constantly. 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.

- *Extranet*

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 very large exporters, Dole and Delmonte (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.

- *Supply Chain Management System (Paltrack)*

Paltrack is the main supply chain management system being used by the South

African horticultural export industry. South Africa's single desk exporter Unifruco originally developed this system in the mid-1980s and it was designed to facilitate the tracing of pallets within the country and to link up all South African chain partners abroad (at that time Unifruco-owned receivers). During the 1980s it was considered the largest 'e-trading' network in the world. In Europe it was connected to other networks such as PalNet® and FreshNet®[6]. The latter were store and forward information systems.

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 visa versa. It thus gives trading partners the ability to capture information at the pallet level and to forward the information up the supply chain. In 1996 when the fruit industry was deregulated Paltrack was set up as an independent company offering a supply chain management solution to the agricultural export industry.

Currently Paltrack consists of a number of different modules which all support a different area of the supply chain. Table 3.12 below lists the various Paltrack modules as well as the main function areas.

Table 3.12: Paltrack Modules and Main function areas

Module	Supply chain focus area	Description
Agri-port	Exporter	Management tool monitoring the logistical and financial flow of fruit from the producer to the client.
Paltrack Lite	Depots and packhouses	Inventory management system for palletised fruit that operates at the various fruit intake points
Paltrack RF	High throughput ports and depot	Inventory tracking and tracing system.
Palpack	Packhouses	Packhouse management tool that stores and/or generates information with respect to fruit intakes, pack-outs, palletising and labelling.
Paltrack producer	Production	Management tool that stores and/or generates information related to crop estimates, orders, waybills and payments.

The Paltrack interface file layouts have been adopted as the standard within the SA fruit industry and various solution suppliers have adapted their applications to be able to read/write these layouts. A number of software developers have attempted to design an entirely new supply chain management system for the South African fresh produce industry. However, none of these ventures have been successful primarily due to high development costs that have prevented their completion.

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. The main problem identified with the Paltrack

[6] Both FreshNet® and PalNet® are registered trademarks owned by Nation,Wilcox & Associates Ltd,196 Boldmere Road,Sutton Coldfield, West Midlands.B73 5UE. United Kingdom.

system is the perception that it does not allow product to be traced internationally in a seamless manner, moreover Paltrack was seen as tainted given its history as a Capespan (previously Unifruco) product.

d) Internet transactions
As can be seen in Table 3.13, 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 attempts 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.

Table 3.13: Exporters – Internet and trading hub transactions

Exporter	Used Internet to sell internationally	Registered with e-commerce trading site/market place
1	Yes	No[7]
2	No	No
3	No	No
4	No	No
5	No	No
6	Yes	Yes
7	No	No
8	Yes	Yes

Despite the fact that 3 of the 8 marketing agents interviewed for this study 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

[7] This company was targeted for an interview as a result of their name appearing on one of the fresh producer trading sites www.hariyape.co.uk. The CEO of the company claims he never registered his company with this facility.

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.

Table 3.14 below lists the responses of the interviewees as to why they would neither use the Internet to sell their products internationally nor register with an e-commerce trading site.

Table 3.14: Producers - Main reasons cited for not registering with a web based trading site/market place

Exporter	Main reasons
1	**Product Characteristics**: Fresh fruit is not well suited to sale over the Internet due to the highly perishable nature of the product. **Contract structure**: supply according to pre-negotiated programmes with prices being determined by prevailing market conditions. **E-commerce business model**: Perceived e-marketplace technologies and systems as not being sufficiently developed to constitute a viable business model. Drew specific attention to the inability of e-commerce platforms to build trust and identified trust as being a key variable in the fresh produce business especially with respect to traceability issues. **Industry Character**: Noted that the "industry flies in the face of modernism". In the UK and Europe especially, a high premium is place on personal contacts and relationship building i.e. "high touch transactions".
2.	**End-user driven product characteristics**: Has the perception that e-commerce market places only cater only for price driven and not volume driven transactions and as such, does not recognise nor reward quality. **Contract Structure**: Given that international supermarkets do not purchase fresh produce via wholesale markets but work according to seasonal programmes, they will have some reservations about purchasing on-line.
3.	**Industry Character**: The fresh fruit market is still too traditional in that suppliers and buyers do not want to trade via such an impersonal medium **Contract Structure**: Supply programmes need to be secured well before the start of a season moreover the large UK supermarkets who are the firm's main clients are not the type of businesses who would trade via the Internet **Product Characteristics**: E-commerce in the fresh produce industry is hindered by a lack of product uniformity and grades. There is a complete lack of commonality in the industry of product definitions, which makes standardisation which is necessary for e-commerce almost impossible.
4	**Product Characteristics:** Company stressed they would never trade on the Internet as they would not be able to demonstrate their superb product quality and high service levels to the buyers prior to the transaction. **Contract Structure**: Business is geared towards building long-term relationships with a select number of buyers. Does not operate in the spot market and their perception is that e-commerce market places caters mainly for the spot market. **Untested business model**
5	**Product Characteristics**: Dealing with a highly perishable product that has to be sold before it is picked and packed. "Waiting for a buyer on the Internet is just not an option". **Industry Character**: Claims that registering with an Internet trading site is the same principal as having your company listed in a trade directory. Indicated that trade in agricultural products is not the same as trading in a manufactured product – "agriculture is a highly specialised and personalised business". Selling fruit on an Internet site does not allow one to value-add to the physical product in terms of providing the buyer and seller with high service levels.
6	**E-commerce business model**: Model lacks credibility in that normally little information is available about the person behind the transaction, and thus one is not always in a position to adequately evaluate transaction risks – it is only through

	personal interaction that one is able to make such an assessment. Moreover when looking at the offers made on these sites one gets the impression that everybody wants to buy but when it comes down to it, there is more often than not a lack of effective demand. **Product Characteristics**: Product standardisation and specification is problematic when it comes to on-line procurement. An apple, for example, is not just an apple. You need to know where it was grown, how it was treated and be able to believe the integrity of the party making the product claims.
7	**E-commerce business model**: Has looked at on-line flower trading sites but is reluctant to make use of these platforms in that they are in many cases too transparent and require you to place company-sensitive propriety information in a public domain. **Product Characteristics**: For standardised floriculture products such as roses and chrysanthemums some B2B applications may be appropriate, however the company deals with a diverse pool of products typically sold off in small lots. **Need for intermediation**: Claims that if wholesalers go directly to growers via on-line trading sites they will encounter a whole range of problems **"**if you shorten the chain you will likely short-change yourself**".** Marketing intermediaries supply a whole range of additional services, services an on-line trading site will have trouble replicating such as the organisation of logistics, ability to supply volumes and variety etc. In this sector e-commerce will never become seamless
8	N/a: uses the Internet as his only transaction medium

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."*

In terms of the benefits of e-commerce, as was the case with the producers interviewed for this study, 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. In terms of business expansion only respondent noted that it had "revolutionised" his business. The respondent represented a food and beverage trading house that conducted its business through pursuing trade leads. The respondent noted that as a result of e-commerce trade-led sites and e-mail he could contact a significant number of people and firms in a much shorter time at a much lower cost.

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, its convenient and much nearer but it is not saving me money in terms of direct cost reduction"*

Following on from this point when looking at the main reasons or motivations why

horticultural exporters started using e-commerce, 6 of the 8 respondents indicated that they did so in order to keep up with other firms in the sector who were already using these technologies.

Based on much of the preceding discussion, it is clear that at this stage the main factors inhibiting the development of e-commerce in the South Africa horticulture sector relates 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 over the next year 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" and this is 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 South African E-commerce trading hubs

Two B2B on-line marketplaces or trading hubs were also included in this study. The first of these was a South African based flower trading hub while the second was an agricultural information portal that is in the process of settling up the transactional components of its business model. The results from both these interviews are presented below as two separate case studies.

3.4.1 Flower trading hub

The South African floriculture sector is a relatively young industry and while there are a healthy number of growers (approximately 200), a large proportion of these are small-scale, part-time, hobby farmers. Given this industry model, accessing international markets has proved to be a major stumbling block for many South African flower producers given the high fixed cost associated with international market development. As a result, many of the South African flower growers who export have relied on the Dutch flower auctions at Alsmeer (VBH) as an outlet for their product and have not developed any direct relationship with the major European wholesalers. The main problem associated with this marketing strategy is that Alsmeer is an auction market with prices determined by prevailing supply and demand conditions for any given day. South African suppliers are geographically far from this market and the airfreight costs associated with sending product to Europe are extremely high relative to product value. The situation arose that many growers

ended up making substantial losses as the realised auction price for their product, in some situations, did not even cover their freight costs. In the late 1990's SA growers began exploring the possibility of marketing their product directly to wholesalers, but with limited success.
The CEO of the flower trading hub described here was involved in the cut-flower industry at the time and he recognised the potential benefit an e-commerce business models could offer the local industry. As a result he began to negotiate with the developers of VFM about using this technology to set up a local e-commerce site for cut flowers. This site, which had been operational for nine months, took approximately two years to develop and market, and was financed by loan funding sourced from the Industrial Development Corporation (IDC) of South Africa.

There were some difficulties associated with the functioning of this original site, primarily because it was an open market platform with all registered users being able to see all suppliers' information such as price lists etc. As most suppliers practice a variable pricing strategy that depends not only on the client in question but also on the size of the transaction, this business model was problematic for the user group and in 2001 the company began negotiating with IWS I-Deal and have subsequently replaced their existing platform with this new technology. I-Deal is an XML based platform that allows growers to send out different price lists to different clients that are not available to the rest of the user community. An additional benefit of the system is that it is fully integrated with Excel spreadsheets/templates. The company hopes this new improved platform will address the reluctance of the user base to use e-commerce technology.

The user base currently consists of approximately 50 growers and approximately 25 large wholesalers and florists. For both groups, 10% of participants generate 90% of the sites revenue. Roughly 70% of buyers/wholesalers are South African companies located outside Johannesburg while 30% are international buyers. No Johannesburg-based buyers are currently using this site primarily because there is a large cut-flower auction and wholesale market located in Johannesburg. This auction plays an important role in industry price formation as most sales prices are derived here.

The international/export component of the business has only really taken off in the last 6 months. The main international sales the company has concluded are with European buyers (primarily German and French buyers). The Middle East, and in particular Dubai, is another important international market for the company.

Because e-commerce is still relatively new to South Africa and the floriculture sector, the company is using its current e-commerce business platform in conjunction with off-line trading. For example when a growers notifies the company that they have product for sale, the company will upload this information on to the site and then actively call buyers they know are looking for this product or who normally would buy the produce. It was estimated that only 5% of all transactions that are executed via the site are pure e-commerce deals i.e. no intervention from the side of the company. Even though the trading system is in place, users of the system tend to want to personally verify that the transaction has registered and that they will be receiving or dispatching product.

With respect to the services that are offered to users of the site, these are fairly

limited. Technical information on the product for sale is not included. It was explained that the objective of the site was not the expansion of the flower market per se; rather it was to demonstrate product availability to a group of buyers who were already familiar with the South African product range. In terms of verifying product quality and standards, no such services were offered. The interviewee noted that there was a standard quality profile for the industry and all local industry participants are aware of this standard. International wholesalers tend to limit their risk of buying poor quality product by first requesting a sample order and then systematically deepening the commercial relationship as mutual trust is established.

Because of the transparency of the site, there is a possibility that buyers and sellers once introduced to each other will circumvent the trading platform and trade directly. This has happened in a limited number of cases (5-10% of the user group) and tends to happen when there is either a high demand for a certain product (i.e. shortage of product) or an oversupply of product at any given time.

Some information on trading partner trustworthiness is offered by the site in that traders are required to register before being allowed to trade. This registration process is fairly complex and requires a signed contract. To date none of the site's buyers or sellers have proved to be untrustworthy. The interviewee claimed that this can be attributed to the fact that the local industry is small and close knit, firms who trade using their system cannot afford to behave in an opportunistic way as their reputation and credibility will be damaged and they will find it difficult to trade again not only on the site, but in South Africa in general.

The site has effectively been operational for the past 6 months and its turnover has only been in the region of R1,1m. The owners of this venture believe that the relatively slow adoption of this B2B trading model has nothing to do with cost or service levels offered, rather it has to do with mindset. They went further to state that the use of an e-commerce trading engine is at least 2 years away and that this will be the result of more business people being comfortable with B2C transactions in a personal capacity, who will then progress to B2B. In addition it was repeatedly mentioned that arms-length relationships are not normal for the flower industry, especially in the South African context. The industry places a high premium on personal relationships and this is also inhibiting the adoption of e-commerce applications.

In terms of the financial sustainability of this venture, the project incurred substantial debt to develop the system, debt it is struggling to service given the relatively high South African interest rates. Furthermore the ability of the venture to generate income year-round is constrained by the seasonal nature of South African flower production and the firm is currently investigating the possibility of using the new I-Way system to start trading with other horticultural products such as fruit and vegetables.

Whether this product extension into fruit will generate additional revenue is debatable. In 2000 VFM attempted to set-up a trading platform for the South African fruit industry with limited success. According to the site's ex-manager very few transactions took place through this e-hub and the single biggest reason was its inability to attract a critical mass of users. In part this can be traced back to the difficulties the largely rural-based user group had in connecting to the Internet, as well

as the unreliability of the trading platform's technology. However, it was contended that the single biggest reason the venture failed was that the developers were out of touch with the formats for negotiating contracts in the fruit sector; issues of confidentiality, flexibility, volume discounts and consignment marketing could not be adequately incorporated into the business model.

3.4.2 Agri 24: Agricultural information portal

In 1998, South Africa's largest print media group Naspers launched an e-commerce venture that consisted of a number of information and lifestyle portals linked to their print media products. An agricultural information portal, Agri24, aimed at the local market was set-up as part of this venture, with the South African Farmers' Union (AgriSA) coming on board as a minority shareholder (5%).

Agri24 engages in four main activities. The first hinges around the provision of information. The company does not generate content, but instead provides web-links on its site to information content. The revenue from this portal is primarily generated through advertising. The second business activity and revenue source for Agri24 is a subscription service whereby the portal sells content. Once more the information it sells its not its own. Agri24 simply acts as an information 'broker'. At present, however, there are a limited number of paying subscribers and the company is hoping to expand its subscriber base. The third business activity of the portal is an online auction. This part of the business is still in the developmental/idea stage. The company plans to have an auction for 3 types of agricultural commodities - fresh produce, grains, and livestock. The fresh produce auction will be the first of these products to go on-line. The fourth and final element of the business focuses on the development and sale of e-procurement systems (i.e. bespoke software solutions) and the company has developed a number of applications.

As already indicated, the first two elements of the business have been operational since the portal's inception, while the last two are two are in the process of being developed. These two activities were conceived in an attempt to improve the financial sustainability of Agri24. As the business was originally structured it was a loss making entity, as the portal's manager described it a "financial black hole".

In explaining Agri24's failure to get off the ground, it was noted that the South African agricultural market is complex and adapts slowly to change. Furthermore it was contended that the country's low levels of Internet connectivity, slow download time and cost of the service have hampered this adoption. Despite these problems Agri24 believes that there is a need for a portal like this within South Africa but not structured as a business model relying solely on advertising revenues

3.5 Industry organisations

a) Description

The final group of respondents surveyed in this report were three industry organisations/bodies. These organisations 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 ICTs to achieve this. Table 3.15 lists the three organisations interviewed, and provides some background information.

As can be seen from the table, the first two organisations are relatively old, while the Exporters Forum is relatively new. The motivation for establishing this forum stemmed from the need to co-ordinate exports in a newly deregulated environment.

Table 4.1: Industry Organisations- General Information

	Sector	Year established	Turnover R mill	No of members	Source of income
1	SA Mango Growers Association (SAMGA)	1976	2.2		Levy on sales
2	SA Avocado Growers Association (SAAGA)	1968	5	550	Member contributions
3	Fresh Produce Exporters Forum	2001	N/a	72	Fee according volume exported

The main services these three organisations offer their membership is set out in Table 3.16 below. As can be seen, their main services all relate to the gathering, collation and dissemination of information.

It must be noted that SAMGA and SAAGA[8] are growers associations, and thus their main clients are farmers, while the Exporters Forum serves those marketing agents who sell South African fruit into international markets. In addition, while SAMGA and SAAGA both represent the sub-tropical sector, their respective industries differ markedly. In the case of mangos only 20% of the crop is exported, while the rest of the crop is processed (50%) into relish or sold into the local wholesale market. The avocado industry is roughly twice the size of the mango industry and in its case 55% to 65% of the crop is exported while the rest is sold locally.

3.16: Industry organisations -main services

	Organisation	Services
1	SAMGA	• Conducts product and, to a very limited extent, market research; • Carries out generic product promotion, • Provides extension services • Produces a quarterly newsletter and information brochure
2	SAAGA	• Initiates, plans and co-ordinates research aimed at improving production and post harvest practices to increase yields and reduce post harvest losses. • Provision of extension services to SA avocado growers • Promotes the consumption of avocados by developing existing markets both locally and aboard and through facilitating access to new markets • Promotes effective marketing (better matching of supply and demand) through providing growers with market intelligence and by facilitating intra and inter industry communication

[8] Although SAAGA is a growers association it also makes provision for exporters and other members. At present SAAGA exporter members export approximately 85% of the total avocado exports

3	Exporters	• Co-ordinates the export of SA fresh fruit internationally • Represents SA fresh fruit producers at international trade fairs. • Acts as industry liaison between exporters and government (specifically the Department of Trade and Industry) • Serves as a forum for SA fresh fruit exporters where they can learn more about international markets (ie. needs/standards of export markets, commodity prices, export volumes, what is selling and what is not because of excess stock levels).

b) Network Connection and Access and application
All three organisations were connected to the Internet. The Exporters Forum and SAMGA were connected via a dial up analogue modem, while SAAGA had an ISDN connection.

All three organisations 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.

c) Network Applications: Frequency of use

- *E-mail*

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, 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 ICT's stemmed from farmers not being in touch with modern business practices and he went further to note that his organisation has 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 (ie. 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 for the South African industry and other participating countries 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. "You only have 24 hours".

- *Extranet*

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.

d) Internet Transactions
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 (ie. 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 ICT alone as a means of communication and of conducting business. Hence there is little real prospect that the cost of using ICT will come down while existing methods have to be kept in place.

A number of other studies on South African e-commerce and the availability of ICT infrastructure 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 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.

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