

## *Chapter 1*

### Introduction

Quality has become a widely applied concept during the last decades. Many companies in different sectors of the world economy have started to apply ideas and techniques of quality management to improve their products and processes. The force behind this movement can be identified as being the increasing competition for market share, a competition that is no longer regional but globalised.

Quality management concepts can be applied not only to improve internal operations but also to guide relationships with commercial partners. A firm that has quality conscious suppliers and buyers has more chance of being part of a successful product chain.

The international fruit trade this reality is no different. Growers, exporters, importers, wholesalers and retailers are all trying to obtain a better quality product that is competitive in the world market. The fruit trade sector has however one additional problem: complexity. Unlike most industrialized products, fruit is a living merchandise, which means a highly perishable product that maintains its quality attributes only if handled properly. As a consequence fruit traders are compelled to commercialise their products within a limited period of time. They also need to observe strict post-harvest procedures about the control of temperature, control of atmosphere, packaging, use of chemicals, physical damage and microbiological injury.

Aiming to observe and to harmonise the technical factors mentioned, the organisations operating in international fruit commerce tend to design and maintain sophisticated product chains. In these chains, the quality achieved in the fruit offered

to the final customer will be the result of the quality management of each organisation within the chain. Consequently to be successful in the international fruit trade, a company needs to be judicious in the choice of its trade partners.

To form alliances in the international fruit market is no easy task. There is a relatively high number of origins and destinations for fruit in the world and not all organisations present in this trade are concerned with quality. This is a factor that adds to the complexity in the sector.

Taking into account the importance of the concepts of quality and the inherent complexity that can be found in the international fruit trade, a question arises. Which would be the most appropriate method to investigate the employment of quality concepts in the international fruit trade? To study the fruit sector, the main methods currently applied in the social sciences will not suffice. It is necessary to adapt different research techniques in order to capture the main characteristics and the peculiarities of this complex sector.

An adequate approach would be capable of distinguishing, from amidst all the apparent complexity, the prevailing patterns in the international fruit trade or in other words the prevailing transaction arrangements (It is important to remember that a complex structure is almost always composed of several parts that are simpler to describe and to understand).

This research applies an alternative approach to the analysis of the international fruit trade. It is based on concepts of quality management and transaction cost analysis. Its aim is to present the main characteristics of the Anglo-Brazilian fruit trade. Three main types of research techniques are employed for data gathering: secondary data collection, surveys and interviews.

The organisations active in the Anglo-Brazilian fruit trade are analysed according to their perceptions of quality management and their attitudes to overcoming quality

related problems. The thesis presents the results in seven chapters. The second chapter presents the research problem. The third chapter contains the literature review and the research hypothesis. The fourth chapter deals with the methods employed during the investigation. The fifth chapter presents the results of the surveys conducted in Brazil and the UK. The sixth chapter deals with the qualitative research results. Finally, the seventh chapter provides the main conclusions.

As an academic work, this thesis aims to contribute to advances in the research fields like Agricultural Marketing, Quality Management and Transaction Cost Analysis. However the main aim of this investigation is to provide a framework to support administration decisions.

To collect all the information necessary to write this thesis was a considerable enterprise or to be more precise a scientific adventure that required fieldwork in two countries (Brazil and the United Kingdom), visits to 22 cities (Lavras, Brasília, Belo Horizonte, São Paulo, Mossoró, Açú, Petrolina, Juazeiro, Catanduva, Conchal, Fraiburgo, Caçador, Baraúna, London, Spalding, Pinchbeck, Sittingbourne, Dartford, Chichester, Bracknell) 78,064 kilometres travelled (32,370 Km in Brazil, 6,702 Km in UK and 38,992 Km crossing oceans), 34 semi-structured interviews (19 in Brazil and 15 in the UK), discussions with 23 researchers working in 12 different institutions and conversation with executives from eight trade associations (four in Brazil and four in the UK).

A surprising fact emerged after the data gathered had been analysed. Despite the complexity present in the international fruit trade and despite the diversity of sources of information for this research it became clear that Brazilian exporters and British fruit importers make active use of concepts of quality management to organise their transactions. Even more important they tend to use predominantly only three types of transaction arrangements to organise their trade activities. At the end of this work come some discussions about possible future research and policy implications.

## *Chapter 2*

### The Brazilian Fruit Sector

#### 2.1 Introduction

Secondary data analysis is one methodology capable of helping in the characterization of transaction environments. Furthermore secondary data can help to reveal the complete production, logistical and trade sequences involving a product.

This chapter presents the results of the analysis of secondary data available on fruit production in Brazil. A brief overview of the Brazilian economy opens the chapter, and then emphasis is given to the main characteristics of the Brazilian agricultural world. Subsequently one specific sector of the Brazilian Agribusiness is analysed: fruit production and trade. Following that is a discussion concerning the six most exported types of fruit in Brazil; it is also the opportunity to present the production, post-harvest, logistical and commercial sequences used by Brazilian exporters in order to trade their produce. In addition, potential research issues in the Brazilian fruit export business are examined, with emphasis given to the importance of fruit quality management. The chapter ends with the formulation of the two main research questions of this investigation.

#### 2.2 Brazilian Economy

Brazil is a country with continental dimensions; it has an area of 8,547,403 Km<sup>2</sup>, with a great diversity of climates and ecosystems. The Brazilian population surpassed the figure of 164 million inhabitants in 1999. Most people now already live in urban areas (78% in 1996), only 22% of the population still live in rural areas (IBGE, 2000).

In 1998 the GDP reached the value of US\$777 billion. In the same year the Brazilian Institute of Geography and Statistics (IBGE) revealed the *per capita* income as being US\$ 4,802.00 (IBGE, 1999). The country is already a service economy where 57.6 % of the GDP are economic activities linked with to the service sector, 34 % of the national economy is connected with industrial production and only 8.4 % of the GDP can be linked to agricultural production (IBGE, 1999). Table 2.1 shows the composition of the Brazilian GDP.

**Table 2.1 – Composition of the Brazilian GDP by Economic Sector.**

Year	Composition by Economic Sector (%)		
	Agriculture	Industry	Service
<b>1994</b>	<b>14.2</b>	<b>36.1</b>	<b>49.7</b>
<b>1995</b>	<b>12.2</b>	<b>33.6</b>	<b>54.2</b>
<b>1996</b>	<b>12.2</b>	<b>33.4</b>	<b>54.4</b>
<b>1997</b>	<b>12.0</b>	<b>34.3</b>	<b>53.7</b>
<b>1998</b>	<b>08.4</b>	<b>34.0</b>	<b>57.6</b>

Source: IBGE, 1999.

As can be seen in Table 2.1 the service sector is increasing its relative weight in the Brazilian economy. In just five years it grew by 7.9% at the expense of the industrial and agricultural sectors. Agricultural economic activity in particular is losing its relative importance in the Brazilian economy. In 1994 for instance it represented 14.2 % of the Brazilian GDP. In 1998 it was responsible for only 8.4 % of the GDP, a relatively fast decline for a short period of five years.

It is important to remember however that agriculture is the basis for a considerable number of industrial and service activities.

## 2.3 Brazilian Agricultural Production

Heterogeneity is a word that can be fully applied to the agricultural sector in Brazil. It is possible to find in the country subsistence agriculture sharing the same space with sophisticated agriculture (which makes use of industrialised inputs such as tractors, defensives and irrigation equipment). Producers working in subsistence agriculture are mainly preoccupied with satisfying their primary need for food. On the other hand producers practising industrialised agriculture are making use of advanced production technologies in order to offer products capable of satisfying the needs of a consumer market (Pinazza and Alimandro, 1999).

The heterogeneity of Brazilian agriculture also derives from the considerable dimensions of the Brazilian territory. In the country it is possible to find tropical, semi-arid and temperate climates. There is also a great variety of soils and biodiversity. Such heterogeneity allows the cultivation of an extensive range of crops and consequently the breeding of several types of animals.

Some of the more prominent agricultural products in Brazil are soybean, corn, sugar cane, coffee, oranges and other fruits. In terms of animal production it is important to highlight cattle production (for meat purposes) and the poultry business.

In 1998 Brazil produced 31,377,914.00 tonnes of soybean. The grain produced in the Southern Region and the central savannas (cerrados) has one of the lowest production costs in the world. As a direct consequence the Brazilian soybean is intensively exported (FNP, 1999). According to Brazil Now (2001b) the soybean family of products is currently one of the most important groups of products exported from Brazil. In 2000 the soybean family of products generated a turnover of US\$ 4.2 billion, a figure that is almost 8% of total Brazilian total exports. Another crop that has the same level of importance as soybean is maize. Brazil is currently producing more than 36 million tonnes of this crop annually. The maize is used internally as animal feed, so that exports of this product is relatively low (Brazil Now, 2001b).

The production of sugar has been important for the Brazilian economy since the colonial period. Currently the country produces more than 330 million tonnes of sugar cane per year, used mainly in the manufacture of alcohol and sugar. In the agricultural year of 1997/98, Brazil produced a total of 14,976,620 m<sup>3</sup> of alcohol. This high figure is due to the fact that in Brazil alcohol is used as car fuel. In 1998 the country exported alcohol worth US\$ 35.5 million. Despite the importance of alcohol, sugar is still the main derivative from the sugar cane. In the agricultural year of 1997/98 Brazil produced a total of 15.7 million tonnes of sugar and in 1998 exported sugar worth US\$ 1.099 billion to a variety of countries (SECEX, 2000). These figures make Brazil the main producer and exporter of sugar in the world.

Another traditional crop is coffee, which has been cultivated in the Brazilian territory since the 17<sup>th</sup> century. The country is the largest producer in the world. For instance in the agricultural year of 1997/98 Brazil harvested a total of 1.41 million tonnes of coffee. In 1998 the country exported coffee to a value of US\$2.33 billion. These figures make coffee one of the most important agricultural products for the Brazilian economy (SECEX, 1999).

In the last two decades a new crop has taken place among the most prominent agricultural products of Brazil: the orange. The fruit is cultivated predominantly for the production of orange juice. Brazil harvests annually more than 16 million tonnes of this fruit. In 1998 the country produced 16,953,832 tonnes of oranges (IBGE, 1999). In the same year the Brazilian juice industry exported US\$1,266,424.00 in orange juice. Only a small fraction of the oranges are exported as fresh fruit, for instance in 1998 only US\$14.359 of oranges were exported *in natura* (SECEX, 1999).

There is also a dynamic animal production sector in Brazil. According to Brazil Now (2001a, p.8) “in the dynamic and competitive environment of animal protein, raising beef cattle is undoubtedly, the most important activity because it turns over around US\$ 30 billion per year in Brazil. The main indicators of the industry show Brazilian

cattle farmers operating with increasing efficiency. Meat productivity has grown by more than 15% since 1990, jumping from 5,224,000.00 tonnes of carcass to equivalent of 6,024,000.00 in 2000". In the same year Brazil exported beef worth US\$800 million, showing that the sector is competitive in the international market.

Poultry breeding shows the same level of vitality as cattle production. In 2000 5.5 million tonnes of carcass were produced, and of this total the country exported the equivalent of US\$ 805.7 million, a figure that makes Brazil the second main exporter in the world (Brazil Now, 2000b).

Another subdivision of the Brazilian Agricultural world that is showing a great dynamism is the fruit production sector. It is important to analyse the main characteristics of this sector.

## 2.4 Brazilian Fruit Production and Trade

The Brazilian federal government perceives the fruit production sector as strategic for the development of the country. This is not only because of the economic gains that it is capable of generating but also because of the positive social impact that fruit production is able to create. The Brazilian Ministry of Agriculture calculates that fruit production is capable of employing six people for each cultivated hectare. It is estimated that fruit growing already employs 4 million workers in Brazil (Brazil Now, 2000b).

Brazilian fruit producers are showing a capacity to supply the internal market satisfactorily, but they are finding difficulties in exporting their produce. This problem is considered by the government authorities as a barrier capable of compromising the full development of the fruit business. To better understand this and other problems of the sector it is essential to know the relative importance of the Brazilian fruit production in the world context; how the internal trade of fruit is

organised; and which types of fruit are most exported and their volume of trade. These issues are examined in the subsequent sections.

#### **2.4.1 Brazilian Fruit Production in the World Context**

Four countries lead the world in fruit production: China, India, Brazil and USA. China is the leader, and produced 37.3 million tonnes of fruit in 1997. The biggest production in China is apples. Actually China harvested more than 30% of the world apples production in 1997. India is the second main fruit producer in the world. In 1997 the Indian growers harvested 33 million tonnes of fruit. The country reached this position mainly because of its mango production, more than 50% of the world's mangoes are grown in India (Silva, 1999). Brazil is in third place in terms of production of fruit. In 1997 32.5 million tonnes of fruit were harvested in Brazil (mostly oranges). The USA produced 29.8 million tonnes of fruit in 1997, mainly apples and oranges. In the last four years the world fruit scenario did not change significantly.

Despite of being important producers of fruit China, India and Brazil are all demonstrating a limited capacity for export, with their produce being largely consumed internally. The USA on the other hand is the main fruit exporter in the world (Silva, 1999).

When compared with the three other main fruit production countries, Brazil presents two particular advantages. The first is the diversity of the climates that can be found in Brazil. Favaret Filho, Ormond and Paula (1999) observed that "advantages of climate refer to the existence of different climates within the country that provide production conditions for all kinds of fruit, both tropical and temperate, making it possible to produce fruit throughout the year. The semi-arid climate is particularly interesting as it is unique to Brazil, both on account of its high level of sunshine that is favourable to fruit production, since it permits a high level of productivity and

reduces harvest times, and due to the low incidence of infestations on account of low humidity, that consequently reduces the use of pesticides”.

The second main advantage derives from the fact that Brazil is in the Southern Hemisphere. When it is winter in the Northern part of the globe most of the northern hemisphere countries are unable to produce fruit. These countries need then to import out of season fruit from the southern hemisphere. This situation helps Brazilian exporters to sell their products and to obtain better prices.

#### **2.4.2 Fruit Internal Trade in Brazil**

Brazilian fruit production is increasing in terms of quantity but the sector still has problems like low yields techniques and wastage within the trade chain. These problems contribute to price instability of the fruit and its relatively low quality on the internal market (Carvalho, 1996). However the main problem in the Brazilian fruit sector is in the post-harvest stage.

Fruit can easily suffer post-harvest disorders and because of this it is highly perishable. In Brazil fruit can suffer extensive damage during all stages of post-harvest processing and trade. In fact the damage begins at harvesting when the fruit is thrown from the tree onto the ground. In addition the fruit has to endure excessively high temperatures under poor transportation conditions. Damage by bruising may occur when the fruit is taken to the urban markets and/or exported (Wainwright and Seymour, 1999; Prinsley, 1997).

When the internal market is analysed from the perspective of economics it is possible to notice substantial price variation or even scarcity of some products, when there is no technical or production reason in evidence. In addition the existence of an wholesale system not fitted to promoting quality and regularity of commerce, greatly affects the stability of the fruit trade. It is common to find intermediaries exploiting fruit growers with prices so low that it becomes almost impossible for fruit producers

to invest in the modernisation of their business. Under these circumstances a vicious circle is set up which is a serious obstacle to advances in the modernisation of the fruit sector in Brazil.

In the last decade new commercial arrangements have started to be used in the internal fruit trade in Brazil, with direct sales to supermarkets being one of these. Here fruit growers sell their produce directly to supermarkets without the mediation of wholesalers. This type of commercial transactions has as positive feature that negotiating becomes more technical and objective. Producers and supermarkets tend to discuss issues like: fruit quality, regularity of supply, logistics and price. Both sides aim at long term and stable commercial relations.

It is important to observe however that direct sales to supermarkets represents only a small fraction of the total commerce in fruit. The traditional wholesale system still predominates. As a consequence the instability and inefficiency in the internal market greatly affect the performance of the fruit sector. Few varieties of fruit are exported and in most of cases in low volume and mainly as a consequence of over-production and low prices on the internal market. As a direct outcome little fruit is exported regularly on a professional basis. Even when the export does take place, the exporters make limited use of marketing tools to promote their products.

### **2.4.3 Brazilian Fruit Exports**

The international fruit trade has a turnover of nearly US\$17 billion per year (Brazil Now, 2001a). Many countries sell on the international market with the leading exporters being the USA, with exports of US\$ 1.8 billion in 1997; Spain (US\$1.8 billion of exports in 1997); Italy (US\$1.32 billion in 1997) and Ecuador (US\$1.31 billion in 1997). Brazilian fruit exports are far from these figures, the country exported in 1997 a value of only US\$ 162.473 million a volume of trade that is less than 1% of the world's international fruit commerce (Silva, 1999).

The Brazilian fruit goes mainly to the European Union. In 1997 the EU bought 67% of fruit exported from Brazil, 25% of the fruit went to South American countries and the remaining 8% went to the USA and the rest of the world (Fernandes, 1998).

Brazil exports a great variety of fruits but unfortunately the country trades relatively low volumes of each type of fruit. Table 2.2 shows Brazilian fruit exports.

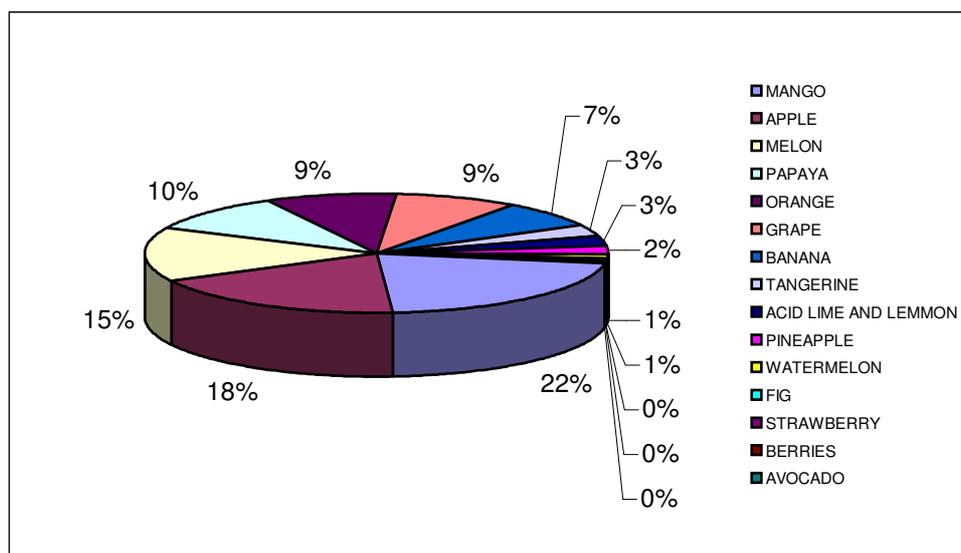
**Table 2.2 – Brazilian Fruit Exports, 1997 - 2000 (US\$1000)**

FRUIT	1997	1998	1999	2000
MANGO	20,182	32,518	32,011	35,763
APPLE	11,297	5,667	30,153	30,757
MELON	20,913	28,323	28,733	25,005
PAPAYA	7,277	9,453	13,578	17,694
ORANGE	23,092	14,359	21,108	15,248
GRAPE	4,780	5,823	8,614	14,605
BANANA	8,381	11,629	12,518	12,359
TANGERINE	4,693	2,523	3,763	4,977
ACID LIME AND LEMMON	909	1,423	2,962	4,642
PINEAPPLE	3,938	3,853	4,290	4,087
WATERMELON	739	1,031	1,798	1,809
FIG	1,599	1,438	1,535	1,269
STRAWBERRY	185	64	144	504
BERRIES	274	363	276	249
AVOCADO	160	155	422	214
OTHER FRUIT	351	342	460	645
<b>TOTAL</b>	<b>108,882</b>	<b>119,033</b>	<b>162,473</b>	<b>169,827</b>

Source: SECEX/IBRAF 2001.

As can be seen in Table 2.2 mangoes are the fruit with highest volume of exports. In 2000 Brazil sent abroad US\$ 35.763 million in mangoes. The export of this fruit has grown regularly in the last few years. Figure 2.1 shows the distribution of Brazilian exports in 2000, as can be seen mangoes accounted for 21% of the total of Brazilian fruit exports.

**Figure 2.1 – Distribution of Brazilian Fruit Exports**



Source: SECEX/IBRAF 2001.

The second most exported fruit in 2000 were apples. Brazil sold US\$30,757million worth of this fruit on the international market. It is important to observe however that there is no regularity in apple exports. During 1998, for example only apples to the value of US\$5.667 million were exported. This variation is in great extent due to climate instability in the apple production region.

During 2000 Brazil exported melons worth US\$30.757 million. This amount makes of melons the third most exported fruit in Brazil. Papayas come in fourth the ranking of exports. Brazil sold US\$17.694million worth of this fruit in 2000 on the international market. Papayas have shown a regular export growth in the last few years.

In the fifth place come oranges. In 2000 oranges worth US\$15.248 million were exported. Grapes come in sixth place. During 2000 Brazil exported grapes worth US\$14,605 million. This fruit has grown regularly in terms of exports since 1997. Banana exports reached seventh position in the ranking of Brazilian exports in 2000,

with the total value exported of US\$12,359 million. It is important to observe that Brazilian bananas go mainly to South American countries and not to the EU<sup>1</sup>.

All the remaining fruit exported by Brazil represents less than US\$5 million per fruit in exports. As it represents such a small volume of trade there is a high level of irregularity in the commerce of this fruit, yet it is possible to observe a rough tendency to growth in the export of this group of fruit.

Appendix D shows the main fruit production regions in Brazil.

### Mango Production and Trade

The mango tree, a plant that originated in India found a favourable environment for its development in Brazil. As a consequence Brazil can produce mangoes over almost its entire territory. It is possible to see from table 2.3 that nearly all Brazilian states have a significant production of mangoes.

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<sup>1</sup> It is due to this fact that the international commerce in bananas was not analysed in this research.

**Table 2.3 – Brazilian Production of Mangoes, 1991-1996 (tonnes)**

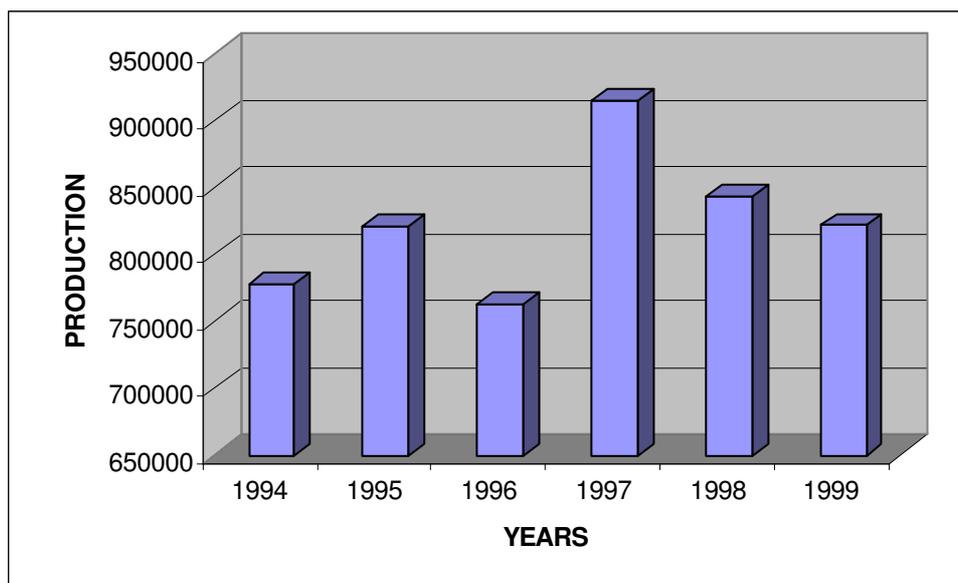
Region	1994	1995	1996	1997	1998	1999
<b>NORTH</b>	41778	47598	48959	33508	30557	32145
Rondonia	7003	6749	3021	2900	1904	1103
Acre	1669	1130	886	911	906	1185
Amazonas	2273	2273	4185	7554	7742	7572
Roraima						
Pará	30559	37188	39339	21404	19458	19534
Amapá						
Tocantins	275	259	1529	739	548	2752
<b>NORTHEAST</b>	402026	438174	363940	428495	430976	464731
Maranhão	25484	24465	10633	14219	15518	13584
Piauí	81947	79565	17922	27722	25314	35742
Ceará	54628	45265	50737	57513	47346	63318
Rio Grande do Norte	29867	35424	36369	35143	33324	32263
Paraíba	61430	83108	52578	69342	66115	60836
Pernambuco	40495	52116	66600	79767	86022	47077
Alagoas	9370	9570	9228	10931	10498	8748
Sergipe	23889	24187	26609	30816	30547	27879
Bahia	74916	84473	93265	103042	116264	175285
<b>SOUTHEAST</b>	314724	312484	331544	420647	354143	297935
Minas Gerais	92434	92374	102807	188789	109191	96547
Espírito Santo	10375	15103	7787	8188	7989	9167
Rio de Janeiro	1886	1768	3465	3851	3557	3583
São Paulo	210029	203239	217485	219820	233406	188639
<b>SOUTH</b>	5535	5615	6333	6645	5985	6901
Paraná	5382	5383	6103	6377	5555	6423
Santa Catarina						
Rio Grande do Sul	153	232	230	268	430	477
<b>CENTRE-WEST</b>	13674	16893	12181	25735	21806	19925
Mato Grosso do Sul	979	191	581	2879	2834	2976
Mato Grosso	1260	576	1680	4402	4845	4962
Goiás	2161	2156	3919	4485	5285	4034
Distrito Federal	9274	13969	6001	13969	8842	7953
<b>BRAZIL</b>	777736	820763	762957	915030	843467	821636

Source: IBGE 2000.

India is the main producer of mangoes. This country regularly harvests more than 50% of the world's production. In 2001 India produced 10 million tonnes of mangoes, China appear in second place with 3.02 million tonnes and Mexico is in

third place, producing 1.5 million tonnes of mango in 2001. Brazil is the ninth biggest producer of mangoes. In 1999 the country harvested 821.636 tonnes of this fruit (FAOSTAT, 2002). It can be seen in Figure 2.2 that there is a relative tendency to growth in the Brazilian production of mangoes.

**Figure 2.2 – Brazilian Production of Mangoes (Tonnes)**

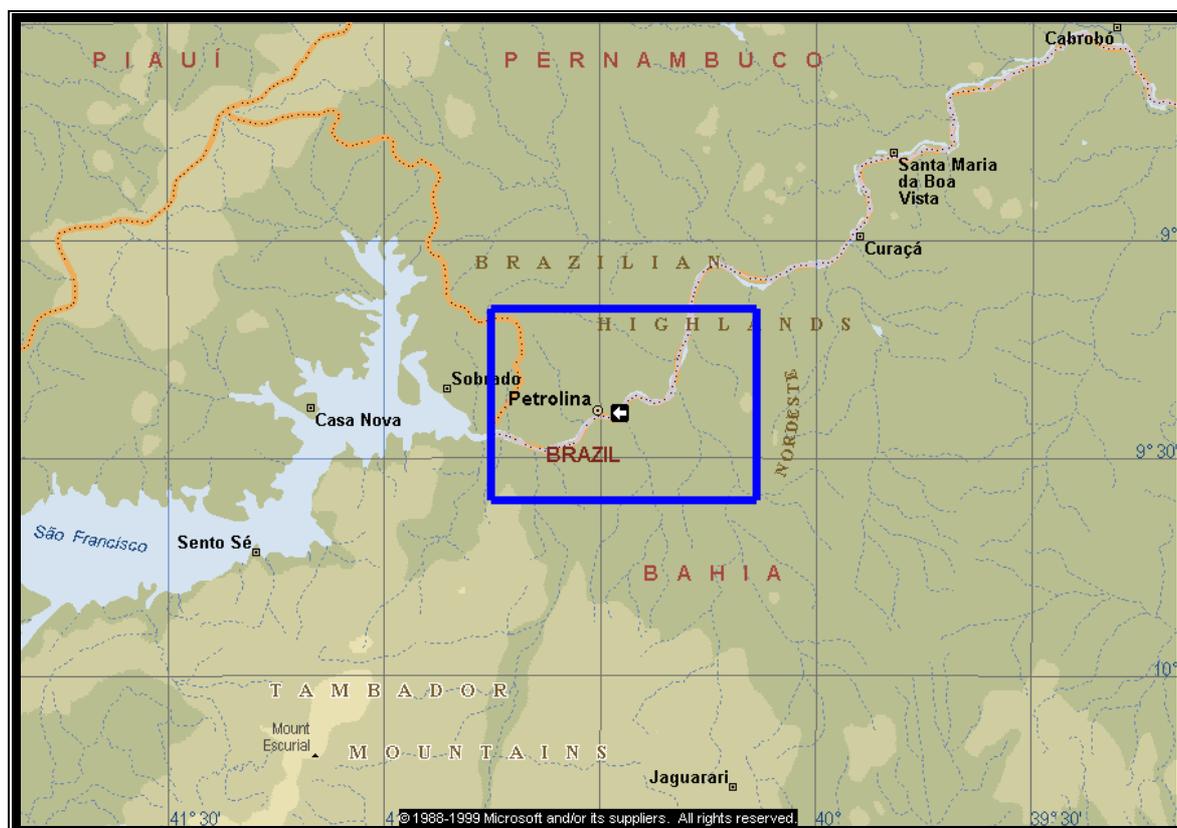


Source: IBGE 2000.

During 1999 576,413 tonnes of mangoes were traded on the international market. Mexico is the predominant exporter, being responsible for 35% of the world exports. In 1999 Mexico exported 204,006 tonnes of mangoes. In the same year Brazil exported 32,011 tonnes of mangoes, a volume of trade that makes of Brazil the sixth main world exporter (Silva, 1999; FAOSTAT 2002).

São Francisco Valley is the region of Brazil in which the production of mangoes destined for the international market is concentrated. Petrolina (in Pernambuco State) and Juazeiro (in Bahia State) are the main centres of production for the mango export business. These cities are in a semi-arid region that is crossed by the Sao Francisco River. In this area there are several irrigation projects that make the continual production of quality mangoes possible (see Figure 2.3 and Appendix D).

**Figure 2.3 – Mango Production Region in Brazil**



Source: Microsoft Encarta World Atlas 2000.

### Apple Production and Trade

The apple tree originated from temperate regions of the globe. This means that the plant needs a temperate climate (with four distinct seasons) to be sufficiently productive. The apple tree needs in particular a marked winter period with at least 700 hours of temperatures below 7.2°C (Hentschke, 1994). This is a serious limitation for the expansion of apple production in Brazil since tropical climates predominate the in the country.

The Brazilian production of apples is shown in Table 2.4. As revealed by the data in the table, most Brazilian apples are harvested in the South of Brazil. In 2000 the region was responsible for harvesting more than 99% of the Brazilian apples. Two states are the leading producers: Rio Grande do Sul and Santa Catarina.

**Table 2.4 – Brazilian Production of Apples, 1995-2000 (tonnes).**

Region	1995	1996	1997	1998	1999	2000
<b>NORTH</b>						
Rondônia						
Acre						
Amazonas						
Roraima						
Pará						
Amapá						
Tocantins						
<b>NORTHEAST</b>						
Maranhão						
Piauí						
Ceará						
Rio Grande do Norte						
Paraíba						
Pernambuco						
Alagoas						
Sergipe						
Bahia						
<b>SOUTHEAST</b>	9662	9399	9122	5876	4569	3677
Minas Gerais	139	277			109	
Espírito Santo	84					
Rio de Janeiro						
São Paulo	9439	9122	9122	5876	4460	3677
<b>SOUTH</b>	610430	615914	682188	702397	851211	965408
Paraná	21756	19953	25225	20540	23460	31005
Santa Catarina	280410	338913	362095	367869	379112	500131
Rio Grande do Sul	308263	257048	294868	313988	448639	434272
<b>CENTRE-WEST</b>						
Mato Grosso do Sul						
Mato Grosso						
Goiás						
Distrito Federal						
<b>BRAZIL</b>	620091	625313	691310	708273	855780	969085

Source: IBGE 2001.

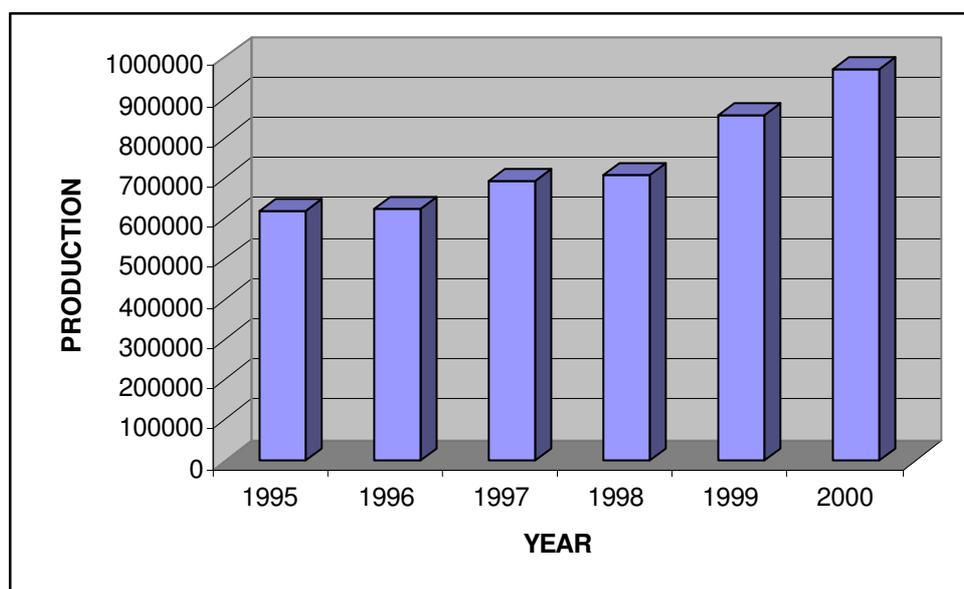
The apple production business is one of the more modern within Brazilian agribusiness. The internal market in Brazil for apples was dominated by imported fruit until the first half of the 1980's. This situation was only reversed when Brazilian apple producers intensified their investments in new orchards and post-harvest processing facilities. By the beginning of the last decade these producers had

managed not only to conquer the internal market but also to establish firm commercial relations with apple importers in Europe and North America (Carvalho, 1996).

Two varieties of apples are predominant in Brazil: Fuji (originating in Japan) and Gala (originating in New Zealand). Both varieties are regarded as quality apples, a positive characteristic that helped apple growers to succeed in their market expansion.

Since the fast expansion two decades ago, the production of apples in Brazil has seen more stable growth as shown in figure 2.4. There is a strong tendency for the concentration of the apple production in only two states, Rio Grande do Sul and Santa Catarina, which are in the extreme south of Brazil (see Table 2.4).

**Figure 2.4 – Brazilian Production of Apples, 1995-2000 (Tonnes).**

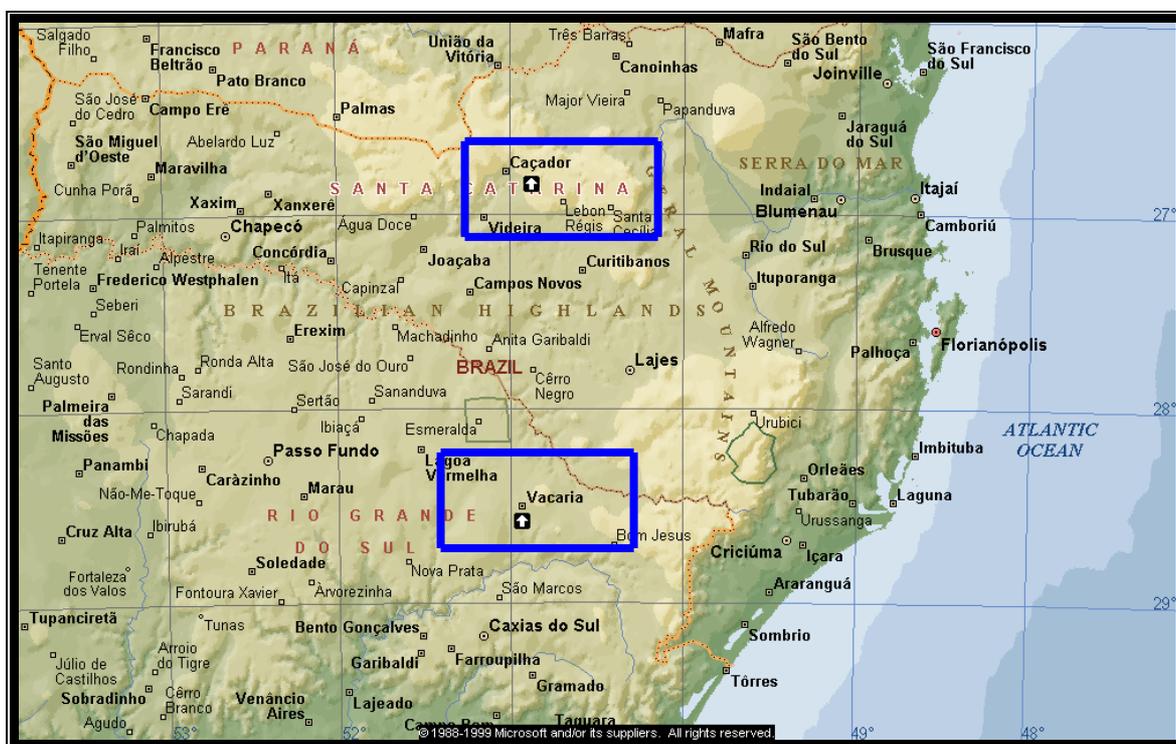


Source: IBGE, 2001; FNP, 2001.

Within the states mentioned, production is concentrated around two main cities only: Vacaria (Rio Grande do Sul) and Fraiburgo (Santa Catarina State). Fraiburgo is the

main centre of production, processing and trade in apples in Brazil (see Figure 2.5 and Appendix D).

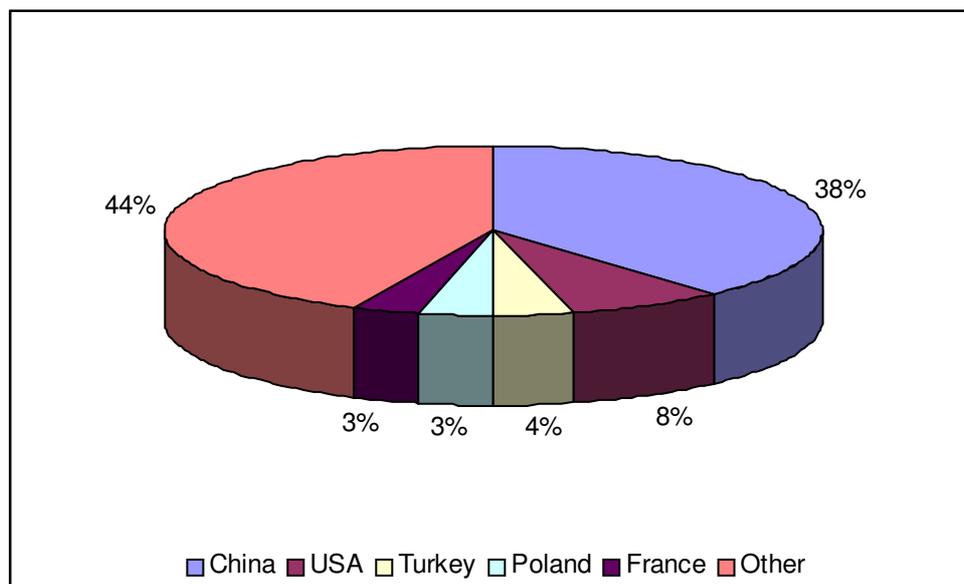
**Figure 2.5 – Apple Production Regions in Brazil**



Source: Microsoft Encarta World Atlas 2000

Brazil harvested 1,150,421 tonnes of apples in 2001, a volume of production that can be considered small when compared with the total production of the leading apple growers. For instance, China harvested a total of 24,01 million tonnes of apples in 2001 (see Figure 2.6). In the same year the USA produced 4,85 million tonnes, an amount that makes this country the world's second producer of apples. Third position is occupied by Turkey, which produced 2.5 million tonnes of apples in 2001 (FAOSTAT 2002).

**Figure 2.6 – World's Apple Production, 2001 (%).**



Source: FAOSTAT 2002.

To export apples is not an easy task, since the level of competition in the sector is particularly high. It is necessary to maintain sophisticated post-harvest processing units and refrigerated warehouses. To build and maintain these facilities implies high investments and a great dose of technical competence. This problem is a serious barrier to any increase in Brazilian apple exports.

In 1999 Brazil exported US\$30.757 million in apples, a tiny value when it is considered that in the same year US\$2.6 billion worth of this fruit was trade on the international market. The main exporter is France, which sold US\$419 million in apples on the international market during 1999. In second position is the USA (US\$372 million exported in 1999) and in third position is Italy, which exported US\$270 million of apples in 1999 (FAOSTAT 2002, IBRAF/IBGE 2001).

### Melon Production and Trade

The production of melons is widely dispersed throughout the globe. Since the fruit originated from a plant with an annual cycle, it is relatively easy to develop new

varieties of melon adapted to different regions. In 2001 world production was estimated to be 19,67 million tonnes of the fruit. China is the leading producer, being responsible for harvesting more than 34% of the world's production, which means 6.7 million tonnes. Turkey is the second largest grower of melons, yielding 1.8 million tonnes of the fruit in 2001. The United States harvested 1.32 million tonnes of melons the same year, a figure that makes the country the third producer of the fruit in the world (FAOSTAT 2002).

Brazil produced a total of 173,866,000 melons (see Table 2.5) in 1999 a volume of production that is considerably lower than the production of the other countries mentioned. The melon production fields in Brazil are concentrated in the Northeast Region of the country, an area that was responsible for harvesting 94% of the melon produced in Brazil. Within this area Rio Grande do Norte is the main producer of melons, and in fact this state alone harvested nearly 62% (108.622,000 fruit) of all the melons produced in Brazil during 1999.

**Table 2.5 - Brazilian Production of Melons, 1994-1999 (1000 Fruit).**

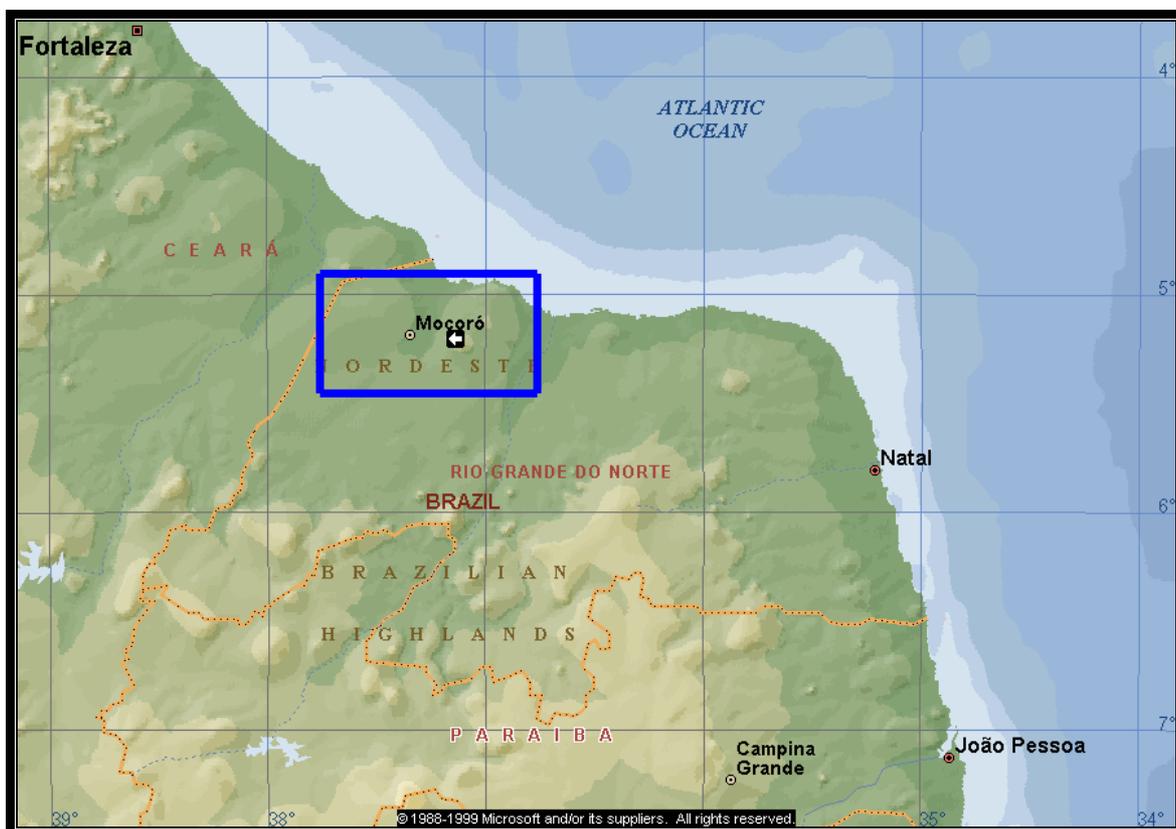
Region	1994	1995	1996	1997	1998	1999
<b>NORTH</b>	256	341	607	884	399	434
Rondônia			76			
Acre						
Amazonas	52	62	77	83	77	92
Roraima					140	210
Pará	204	279	446	801	182	132
Amapá						
Tocantins			8			
<b>NORTHEAST</b>	99873	151194	141559	138933	168911	164411
Maranhão	74	465	36	27	30	25
Piauí	84	145	240	202	148	40
Ceará	32120	33178	13898	25205	27594	30995
Rio Grande do Norte	34519	82633	89795	76517	115232	108622
Paraíba	676	1784	1031	654	14	36
Pernambuco	12935	13533	16520	15590	6754	4538
Alagoas						
Sergipe					216	306
Bahia	19465	19456	20039	20738	18923	19849
<b>SOUTHEAST</b>	2503	1803	2092	2536	2185	1895
Minas Gerais			21	19	165	66
Espírito Santo						
Rio de Janeiro	251	224	416	416	388	373
São Paulo	2252	1579	1655	2101	1632	1456
<b>SOUTH</b>	5841	5834	5006	5641	5819	6432
Paraná	191	244	201	349	311	370
Santa Catarina	38	31	207	78	91	414
Rio Grande do Sul	5612	5559	4598	5214	5417	5648
<b>CENTRE-WEST</b>	109	95	217	169	482	694
Mato Grosso do Sul	27	68	66	35	329	384
Mato Grosso	82	27	151	134	153	310
Goiás						
Distrito Federal						
<b>BRAZIL</b>	108582	159267	149481	148163	177796	173866

Source: IBGE 1999.

Inside the Rio Grande do Norte territory the production of melons is concentrated around the city of Mossoro (see Figure 2.7 and Appendix D). It is also possible to find in Mossoro most of the packinghouses destined to preparing melons for export. It is important to observe that a significant part of the melon production business in

Brazil was nurtured with the international market as its prime aim. Almost 40% of the melons produced in Brazil are destined for export (Carvalho, 1996).

**Figure 2.7 – The Melon Production Region**



Source: Microsoft Encarta World Atlas 2000

In 1999 US\$711 million worth of melons were traded on the international market. The leading exporter is Spain, which sold US\$157 million worth of melons on the international market. Mexico is the second main exporter (sending abroad US\$103 million worth of fruit). The United States exported US\$80.3 million of melons in 1999; this figure makes the USA the third main exporter in the world.

Brazil exported a total of US\$20.913 million in melons in 1997 (see Table 2.6). In the following year exports experienced substantial growth, with US\$28.323 million of melons sent abroad.

**Table 2.6 – Brazilian Melons Export, 1995-1998 (US\$1000).**

MELONS – BRAZILIAN EXPORT				
COUNTRIES	1995	1996	1997	1998
The United Kingdom	6685.0	13129.0	9121.0	13394.0
The Netherlands	3314.0	5448.0	5830.0	8253.0
Finland	4064.0	3729.0	3356.0	3814.0
Argentina	1197.0	1235.0	1136.0	1778.0
Germany	131.0	198.0	530.0	500.0
Italy	0.1	119.0	145.0	184.0
Sweden	0.0	0.0	3.8	168.0
Uruguay	105.0	97.5	111.0	155.0
France	0.0	10.9	6.7	32.5
Spain	18.3	63.1	152.0	28.1
Portugal	0.0	5.6	20.1	7.7
Cape Verde	0.0	0.0	2.4	5.7
Paraguay	14.4	0.1	0.0	4.2
French Guiana	0.0	0.0	0.0	0.0
United States	846.0	1231.0	487.0	0.0
Other	100.0	60.1	13.4	0.0
<b>Total</b>	<b>16475.0</b>	<b>25327.0</b>	<b>20913.0</b>	<b>28323.0</b>

Source: FNP, 1999; SECEX 1999.

As can be observed in the last line of Table 2.6, there is a general tendency for growth in the Brazilian export of melons. Between 1995 and 1998 exports experienced a growth of 72%. This increase was the result of substantial investments in improvement in melon production and logistics in Brazil.

The United Kingdom is shown to be the main destination market for Brazilian melons. In 1998 the UK bought 47% of the total Brazilian exports of melons. This volume of trade is an indication that British fruit importers and Brazilian exporters maintain firm commercial relations (see Table 2.6).

## Orange Production and Trade

The Orange a fruit originating in China is the most widely produced fruit in the world. Table 2.7 brings the world production of oranges. As can be seen in the agricultural year of 1997/98, 47.631 million tonnes of oranges were produced in the world. Such a high level of production can be partially explained by the fact that the orange tree has the capacity to be productive in both tropical and temperate regions of the globe.

**Table 2.7 – World’s Production of Oranges, 1994/95-1997/98 (Tonnes).**

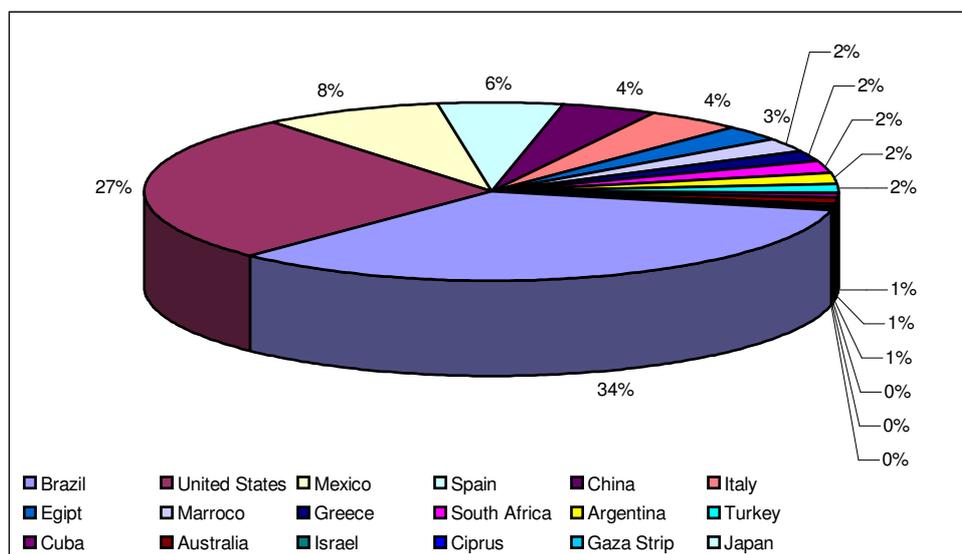
COUNTRIES	1994/95	1995/96	1996/97	1997/98
Brazil	16520000	16973000	18972000	15912000
United States	10474000	10454000	11605000	12495000
Mexico	3570000	3590000	3917000	3920000
Spain	2697000	2573000	2200000	2744000
China	1633000	1727000	1850000	2100000
Italy	1800000	2200000	2100000	2057000
Egypt	1513000	1555000	1613000	1350000
Morocco	657000	1013000	774000	1131000
Greece	930000	854000	946000	985000
South Africa	770000	930000	895000	961000
Argentina	712000	703000	841000	921000
Turkey	920000	842000	890000	740000
Cuba	350000	380000	482000	480000
Australia	416000	543000	556000	421000
Israel	405000	440000	394000	330000
Cyprus	166000	170000	165000	150000
Gaza Strip	87000	73000	73000	73000
Japan	30000	26000	25000	24000
<b>PRODUCTION</b>	<b>43650000</b>	<b>45046000</b>	<b>48298000</b>	<b>47631000</b>

Source: FNP 1999.

Brazil is the leading producer of oranges in the world. Figure 2.8 shows the distribution of world production. The graph reveals that Brazil was responsible for producing 34% of the world production of oranges in 1997/98. The second largest producer is the USA. This was responsible for harvesting 27% of the world’s oranges. Mexico is the third main producer, followed by Spain, China, Italy and

Egypt. All the remaining orange producing countries together account for less than 20% of the world's production.

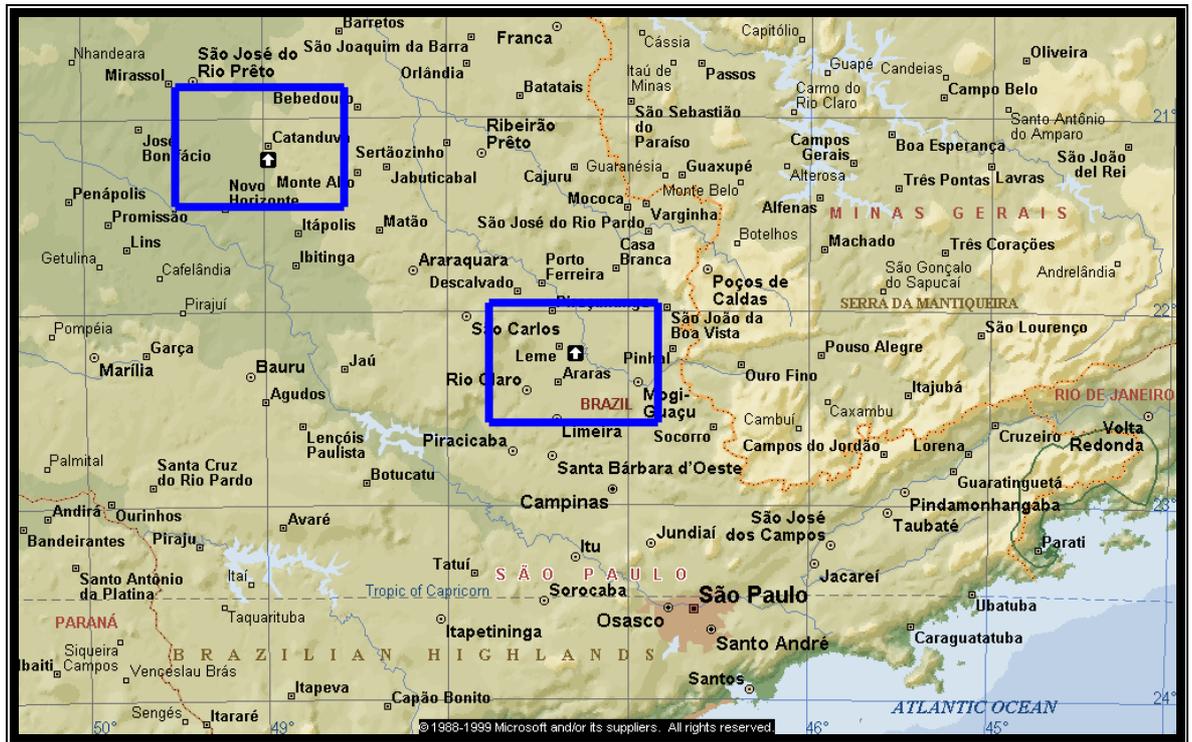
**Figure 2.8 – Distribution of the World's Production of Oranges, 1997/98**



Source: USDA/ FNP, 1999.

Most Brazilian oranges are produced in Sao Paulo State. The orange growers in Sao Paulo harvested 82% of the Brazilian oranges in 1998 (see Table 2.8). Figure 2.9 and the Appendix D show the main production region of oranges in Brazil.

**Figure 2.9 – Orange Production Regions in Brazil.**



Source: Microsoft Encarta World Atlas 2000

In São Paulo the fruit is used for several purposes being the main one the production of orange juice, which is exported to the USA, the EU, Japan, the Middle East and Eastern Europe. Only a small proportion of Brazilian oranges are used as fresh produce.

**Table 2.8 – Brazilian Production of Oranges, 1995 – 2000 (Tonnes)**

Region	1995	1996	1997	1998	1999	2000
<b>NORTH</b>	288166	286121	253132	245222	248902	231861
Rondônia	17896	8735				
Acre	2879	3778				
Amazonas	12802	10200	9712	18047	18712	19900
Roraima	2475	1166	1445	594	1856	1856
Pará	248843	256371	241974	226581	228334	210105
Amapá	1070	3729				
Tocantins	2202	2143				
<b>NORTHEAST</b>	1281131	1327937	1555215	1408133	1120378	1156233
Maranhão	34003	10859	33299	9947	9486	9119
Piauí	20698	21258	5894	17530	7476	7377
Ceará	12397	12282	12694	12316	13970	13616
Rio Grande do Norte	3603	3276				
Paraíba	9464	8194	8648	4306	5124	5665
Pernambuco	17016	12499	14288	8702	9748	8953
Alagoas	6581	8019	10319	28107	27978	30748
Sergipe	559336	614432	718565	626691	494378	523459
Bahia	617473	652481	739872	710648	552218	557294
<b>SOUTHEAST</b>	13841464	15005715	16164447	14502414	16412592	15094557
Minas Gerais	556828	521833	502840	462106	445437	422954
Espírito Santo	29402	29746	32972	28099	28268	28322
Rio de Janeiro	121508	153379	163195	130028	139133	139378
São Paulo	13133725	14300757	15465440	13882180	15800	14503903
<b>SOUTH</b>	695426	519693	694570	682570	696455	717668
Paraná	151172	176977	143616	172731	193882	215424
Santa Catarina	186014	94051	185558	169385	152313	173449
Rio Grande do Sul	358240	248665	365396	340454	350260	328794
<b>CENTRE-WEST</b>	121175	85701	122770	115493	129559	142378
Mato Grosso do Sul	7208	6494	10556	5857	6616	8330
Mato Grosso	17407	10834	10163	12094	13241	14160
Goiás	89076	62160	95086	88075	98649	108105
Distrito Federal	7484	6213	6966	9468	11052	11782
<b>BRAZIL</b>	16227362	17225167	18790134	16953831	17342697	17576772

Source: IBGE 1999.

Sao Paulo is responsible for producing most of the oranges destined for the international market. At the end of the agricultural year 1997/98 Brazil exported 82

million tonnes of oranges, a tiny value when compared with the volume traded by the leading fresh orange exporters (see Table 2.9).

**Table 2.9 – World’s Main Exporters of Oranges, 1994/95 - 1997/98 (Tonnes).**

COUNTRIES	1994/95	1995/96	1996/97	1997/98
Spain	1350000	1325000	1260000	1382000
South Africa	445000	595000	406000	443000
United States	576000	508000	601000	645000
Greece	375000	330000	358000	321000
Morocco	240000	378000	264000	405000
Egypt	183000	206000	240000	150000
....				
....				
....				
Brazil	82000	82000	98000	82000
Other	825000	773000	716000	662000
<b>EXPORT</b>	<b>4076000</b>	<b>4197000</b>	<b>3943000</b>	<b>4090000</b>

Source: FNP, 1999.

The main orange exporters in the world are Spain, the United States, South Africa, Greece, Egypt, Morocco, and Brazil. Spain alone in the agricultural year 1997/98 exported 16 times more than Brazil (see Table 2.9).

## Papaya Production and Trade

The papaya tree is a tropical plant originating in the western part of the Amazon Basin. It produces a fruit that has a rich flavor and a soft texture. Due to these reasons it is one of the preferred species of fruit in Brazil. The production of papaya is only possible in tropical regions of the globe. Table 2.10 shows the world production of papaya.

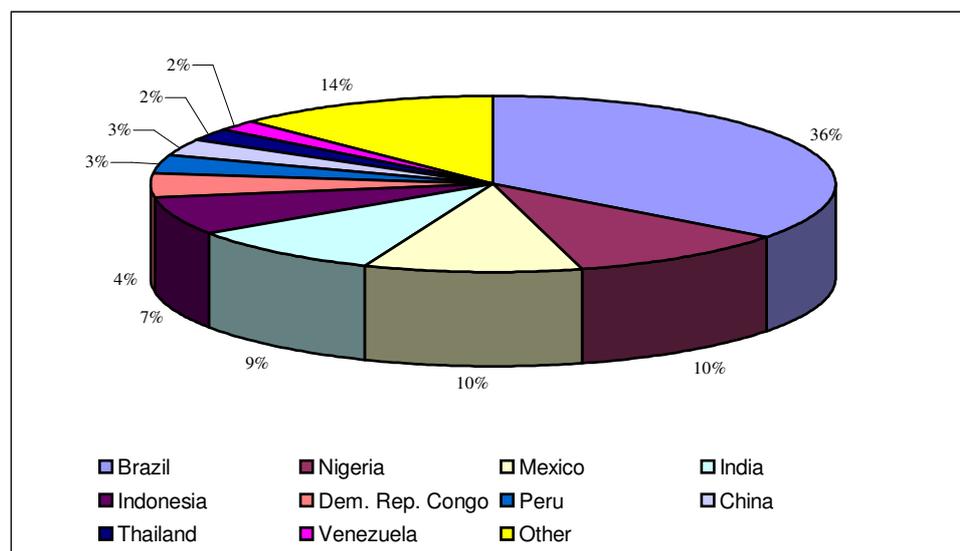
**Table 2.10 – World’s Production of Papaya, 1993-1998 (Tonnes).**

COUNTRIES	1993	1994	1995	1996	1997	1998
Brazil	1621548	1756763	1762500	1750000	1700000	1700000
Nigeria	500000	500000	500000	500000	500000	500000
Mexico	449691	489014	482968	496849	497130	498000
India	450000	470000	505079	422495	450000	450000
Indonesia	422400	371411	586081	381964	354745	336068
Dem. Rep. Congo	212000	214000	216000	213000	210000	205000
Peru	112521	119208	139548	136383	146561	164813
China	155674	120426	142332	141558	141558	141558
Thailand	120000	120000	120000	115000	115000	115000
Venezuela	34166	52149	72487	80559	87117	87117
Other	549867	520891	526009	537810	600404	603537
<b>Production</b>	<b>4628137</b>	<b>4733862</b>	<b>5053004</b>	<b>4775618</b>	<b>4802515</b>	<b>4801093</b>

Source: FAO, 2000.

As is revealed by Table 2.10 world production was estimated to be 4,801,093 tonnes in 1998. In this same year Brazil was responsible for harvesting 36% of the world production of papaya. This volume of production makes Brazil the leading grower of papaya (See Figure 2.10).

**Figure 2.10 – Distribution of the World’s Production of Papaya**

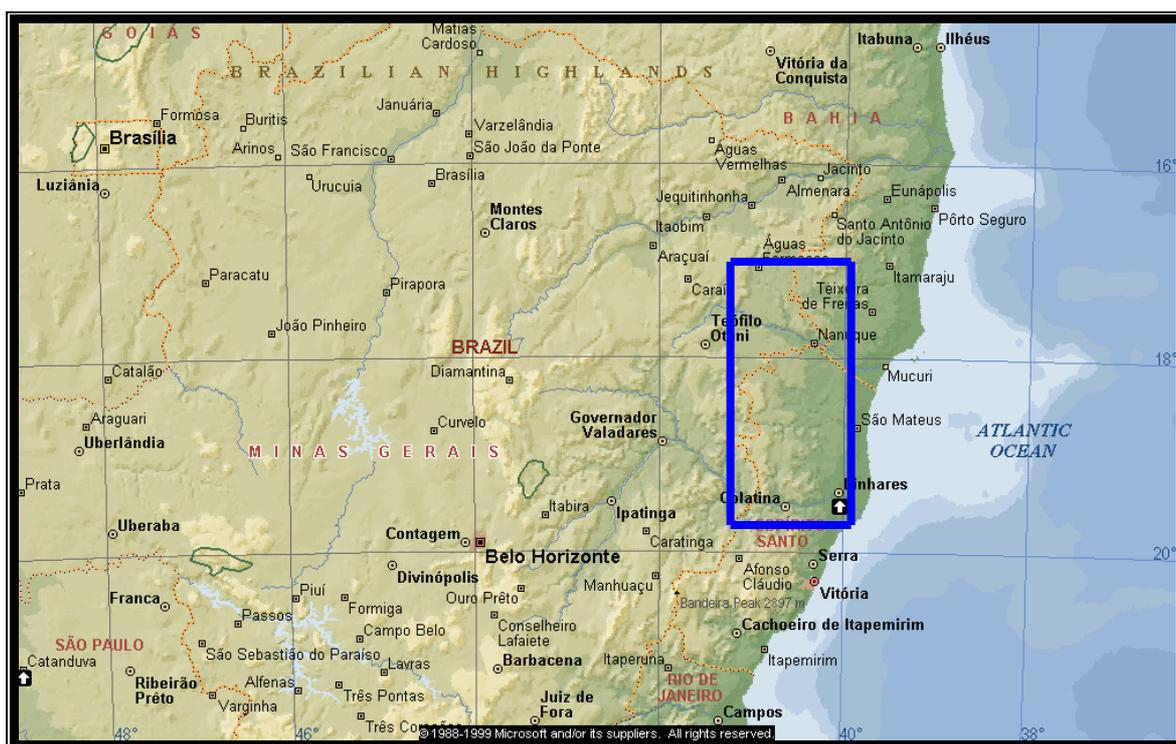


Source: FAO, 2000.

Nigeria is the second main producer of papaya, the country being responsible for yielding 10.4% of the total production of papaya in the world during 1998. In the third place is Mexico with 10% of world production, followed by India (with 9%), Indonesia (with 7%) and the Democratic Republic of Congo (with 4%).

The production of Papaya in Brazil is concentrated in only two states, Bahia and Espirito Santo. Together these states were responsible for producing 83% of the Brazilian papayas. In Bahia the fruit produced is predominantly destined for the internal market. Espirito Santo on the other hand produces most of the papayas that are exported (FNP, 1999). Figure 2.11 and Appendix D show maps of the main papaya production region in Brazil.

**Figure 2.11 – The Papaya Production Region in Brazil.**



Source: Microsoft Encarta World Atlas 2000.

Brazil is the main producer of papayas, but it is not the main exporter. In 1999 the country exported only US\$13.577 million in papaya, a modest amount that puts Brazil in the fourth position in the ranking of papaya exporters. The leading exporter

is Mexico, followed by Malaysia and the USA (with Hawaiian papayas) (see Table 2.11).

**Table 2.11 – World’s Papaya Exports, 1995-1999 (US\$1000).**

COUNTRIES	1995	1996	1997	1998	1999
Mexico	12632	20563	12578	51275	20832
Malaysia	13273	11980	12000	10338	15680
United States	18628	19984	16730	14374	14196
Brazil	4020	4724	7277	9454	13577
The Netherlands	4918	5123	3826	5287	6597
Jamaica	6685	6337	6400	5900	4900
Belize	469	1459	2104	2100	3000
Ghana	---	957	960	736	1040
Costa Rica	667	2350	2100	1934	770
United Kingdom	310	133	1570	62	296
Other	3280	4187	4143	5596	8752
<b>EXPORT</b>	<b>64882</b>	<b>77797</b>	<b>69688</b>	<b>107056</b>	<b>89640</b>

Source: FAO, 2001.

It is important to notice that a relatively small volume of papaya is traded annually on the international market. For instance in 1999 the world traded US\$ 89,640 million worth of papaya a tiny value when compared with the trade volume of bananas (US\$4.9 billion), apples (US\$2.8 billion) or grapes (US\$2.2 billion) (FAO, 2001). The fragility of the papaya fruit is probably one of the main barriers to the growth of the international commerce of this tropical fruit.

The Papaya is highly susceptible to physical injuries; in addition its thin and soft skin makes the fruit vulnerable to the attack of microorganisms. As a consequence papayas are likely to have a short shelf life. To overcome this serious restriction, producers and exporters of papaya need to maintain a distribution system capable of dealing with the fruit’s fragility with the necessary rapidity. Brazilian exporters of papaya are showing a capacity to overcome the problems mentioned by using airplanes in the transport of the fruit. As a direct consequence Brazilian export of papaya is revealing a consistent tendency to growth (see Table 2.12).

**Table 2.12 – Brazilian Exports of Papayas, 1995-1998 (1000 US\$)**

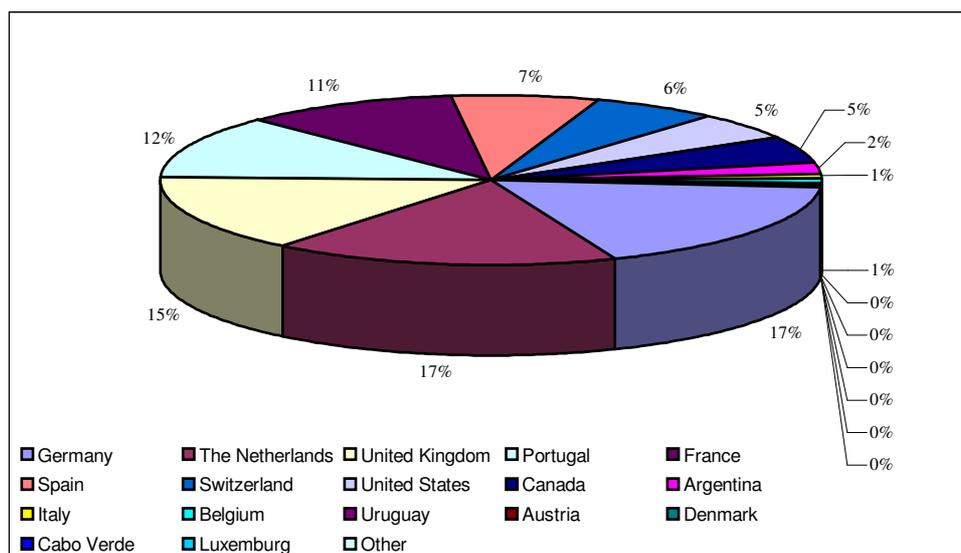
<b>COUNTRIES</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Germany	543,0	685,0	1099,0	1654,0
The Netherlands	1372,0	1468,0	1261,0	1612,0
United Kingdom	566,0	567,0	1286,0	1376,0
Portugal	455,0	608,0	937,0	1145,0
France	399,0	430,0	961,0	999,0
Spain	116,0	229,0	577,0	667,0
Switzerland	252,0	278,0	401,0	589,0
United States	1,2	0,0	6,3	500,0
Canada	20,0	40,0	319,0	467,0
Argentina	47,0	112,0	194,0	201,0
Italy	193,0	164,0	104,0	89,0
Belgium	10,3	84,9	81,0	87,8
Uruguay	14,8	24,4	21,5	40,8
Austria	10,6	23,8	19,3	18,0
Denmark	9,4	8,9	2,5	5,4
Cape Verde	0,0	0,0	6,0	3,1
Luxemburg	0,0	0,0	0,0	0,0
Other	11,3	0,0	2,1	0,0
<b>Total</b>	<b>4020,0</b>	<b>4724,0</b>	<b>7277,0</b>	<b>9453,0</b>

Source: FNP, 1999; SECEX, 2000.

As revealed by table 2.12, during 1995 Brazil exported US\$4.02 million in papaya. Four years later the country more than doubled its exports reaching US\$9.453 million worth of exports in 1998.

The papaya exported from Brazil goes primarily to Europe. Germany, The Netherlands, The United Kingdom, Portugal, France, Spain and Switzerland are the main importers of Brazilian papaya. Together these countries bought 85% of the papaya exported from Brazil in 1998 (See figure 2.12).

**Figure 2.12 – Brazilian Exports of Papayas, 1998 (%).**



Source: FNP, 1999; SECEX, 2000

## Grape Production and Trade

Grapes are the third most widely produced fruit in the world (after oranges and bananas). The production of this fruit is concentrated in Europe, with Italy being the biggest producer in the world (9.77 million tonnes), France the second (7.63 million tonnes) and Spain the fifth (6.68 million tonnes). Outside Europe the main producers are: The USA, Turkey, Argentina, and South Africa. These volumes of production are related to 2000 (FAOSTAT 2002).

Brazil does not belong to the leading group of the grape producers. In 2000 the country harvested 998,545 tonnes of this fruit (See Table 2.13).

Table 2.13 – Brazilian Production of Grapes, 1995-2000 (Tonnes).

Region	1995	1996	1997	1998	1999	2000
<b>NORTH</b>						
Rondônia						
Acre						
Amazonas						
Roraima						
Pará						
Amapá						
Tocantins						
<b>NORTHEAST</b>	118321	115972	114227	122265	131929	154318
Maranhão						
Piauí	15	25				
Ceará	295	383				
Rio Grande do Norte	1001	1410				
Paraíba	1000	1650				
Pernambuco	56672	47817	46596	52234	85162	86026
Alagoas						
Sergipe	12	12				
Bahia	59326	64675	67631	70031	46767	68292
<b>SOUTHEAST</b>	146258	155429	236068	191325	186940	210567
Minas Gerais	8956	4939	8928	10585	10750	12549
Espírito Santo	142	90				
Rio de Janeiro						
São Paulo	137160	150400	227140	180740	176190	198018
<b>SOUTH</b>	571805	413201	550684	422880	576096	633660
Paraná	43966	52726	50400	53010	70000	72000
Santa Catarina	48220	26837	45338	35419	30610	40541
Rio Grande do Sul	479619	333638	454946	334451	475486	521119
<b>CENTRE-WEST</b>	161	300				
Mato Grosso do Sul	124	194				
Mato Grosso	17	80				
Goiás		13				
Distrito Federal	20	13				
<b>BRAZIL</b>	836545	684902	900979	736470	894965	998545

Source: IBGE 1999.

Six different states account for the production of most of the grapes in Brazil. Rio Grande do Sul, Santa Catarina and Paraná, which are in the South of Brazil, are responsible for producing mainly grapes destined for wine production. São Paulo, which is in the South-east of Brazil, produces both wine and table grapes. Bahia and

Pernambuco in the Northeast Region produce mainly table grapes (see Figure 2.13 and Appendix D).

**Figure 2.13 – Table Grapes Production Region in Brazil.**



Source: Microsoft Encarta World Atlas 2000

Most of Brazilian grapes are destined for the internal market. In 1998 the country exported 5,856.00 tonnes of grape, a value that is less than 1% of national production. Most of the Brazilian grape goes to the Netherlands, from where they are distributed to the main European markets. The second most frequent destination is Argentina, which buys grapes from Brazil during the winter in the Southern Hemisphere (against-season grapes). It is important to notice that the Brazilian grapes do not reach the USA market, which is the main importer of grapes in the world (FNP, 1999).

The leading exporters of grapes in the world are: Italy, Chile, USA, South Africa, Mexico, Spain, Greece, Turkey, Argentina and France (see Table 2.14). In this group of countries it is important to highlight the position of Chile, South Africa and

Argentina; these countries exports against season grapes, which means that the grape is consumed fresh during the winter in the North Hemisphere.

**Table 2.14 – Main Exporters of Grapes, 1995-1999 (tonnes).**

<b>Countries</b>	1995	1996	1997	1988	1999
Italy	506000	533500	530000	539306	577344
Chile	443000	513000	450000	558620	473525
United States	219329	215009	268846	249303	280155
South Africa	90000	102000	100000	146140	183684
Mexico	83000	60400	79000	112718	107797
Spain	91600	96800	100000	89892	98255
Greece	93800	102171	102577	118389	87160
Turkey	28578	28410	33403	53945	47943
Argentina	8000	12250	14000	16492	21823
France	19200	14800	10000	22616	20416
<b>GROUP EXPORTS</b>	<b>1582507</b>	<b>1678340</b>	<b>1687826</b>	<b>1907421</b>	<b>1898102</b>

Source: FNP 1999.

## 2.5 Fruit Production and Export Sequence

A sequence can be defined as an arrangement of events in successive order. In most cases sequences are executed aiming a specific result in view. The fruit trade it is no different, producers and traders need to execute a sequence of technical procedures in order to offer a quality product to the final consumer.

The description of a technical sequence may be detailed or general. Detailed descriptions are advantageous only for those who want to examine the specificities of a sequence. On the other hand general descriptions is more useful for those who want to analyse a sequence in its entirety.

One of the objectives of the present scientific research is to analyse the export/import sequences of six different fruits (mangoes, apples, melons, papayas and grapes). The final purpose is to verify whether the trade sequences of the fruits mentioned have

any common characteristics or not. This task can be better executed with general descriptions of the production and trade sequences of these six fruit species. Detailed descriptions would only mean excessive information being imputed into the analysis.

The description and analysis of the production and trade sequences of the most exported Brazilian fruit was based on the following authors:

- **Mangoes** – Sao Jose, Sousa, Martins Filho and Morais, 1996; Silva, 1997; Botrel, 1994a; Resende and Paiva, 1994; Chitarra and Chitarra, 1990; UFLA/D4, 2000; FRUPEX, 1993; FRUPEX, 1994a; FRUPEX, 1994b; IBRAF, 1995; Agropress, 1999; FNP, 1999; FRUPEX, 1994c; Carvalho, 1996.
- **Apples** – Hentschke, 1994; Kreuz, 1991; Kreuz, 1992; Villwock and Giacomini, 1992; Chalfoun, Paschal and Hoffman, 1998; Chitarra and Chitarra, 1990; Carvalho, 1996; Chagas, 1994; Resende, Alvarenga and Paiva, 1994; FNP, 1999 UFLA/D4, 2000.
- **Melons** – Gorgatti Netto, Gayet, Bleinroth, Matallo, Garcia, Ardito, Garcia and Brodin, 1994; Pedrosa, 1991; Sousa, 1992; IBRAF, 1997; Carvalho, 1996; Chitarra and Chitarra, 1990; FRUPEX, 1994c; Agropress, 1999; FNP, 1999, UFLA/D4, 2000.
- **Oranges** – Costa, 1994; Resende, Alvarenga and Paiva, 1994; Ramos and Antunes, 1998; Chitarra and Chitarra, 1990; Agropress, 1999; FNP, 1999; FRUPEX, 1994c; UFLA/D4, 2000.
- **Papayas** – Mendes, Dantas, and Morales, 1996; Martins, 1999; FRUPEX, 1994d; Ruggiero and Durigan, 1996; Padua, 1986; Agropress, 1999; FNP, 1999; FRUPEX, 1994c; Chitarra and Chitarra, 1990; UFLA/D4, 2000.
- **Grapes** – Carvalho, 1994; Spagnol, Rocha and Park, 1994; FRUPEX, 1993b; Ministerio da Integracao Nacional, 2000; Botrel, 1994b; Chalfoun, Paschal and Hoffman, 1998; Heijbroek, Dijk, Pelt and Boot, 1997; Agropress, 1999; Carvalho, 1996; FRUPEX, 1994c; Chitarra and Chitarra, 1990; UFLA/D4, 2000 .

After the description of the individual production and trade sequences of mangoes, apples, melons, oranges and grapes it was possible to juxtapose and compare them. From this comparison and based on the above-mentioned authors it was possible to affirm that there is a technical sequence of production and trade that is common to the six types of fruit examined. It is important to observe however, that the technical sequence is common only in its general aspects. Each fruit has particularities in terms of processing that are not common to the other fruit.

The production and trade sequences of mangoes, apples, melons, oranges, papayas and grapes observe the following nineteen procedures:

1. **Pre-harvest activities** – This phase is concerned with the fruit cultivation activities necessary to produce fruit;
2. **Harvesting** – This is the one of the most critical moments in the whole fruit export chain. Fruit growers need to choose the right moment to harvest the fruit and then gather the fruit trying to cause a minimum of damage possible;
3. **Short distance transport** – At this stage the fruit is taken from the production fields to the packinghouse;
4. **Receiving operations** – The fruit is unloaded at the packinghouse platform at this time;
5. **Selection and grading** – At this point the fruit is separated into various categories according to weight, size or appearance;
6. **Treatments** – The fruit is submitted to different treatments according to destination. Most of the treatments aim at to extending the fruit's shelf life and also to improving appearance;
7. **Packing and labelling** – At this point the fruit is packed and the packs are labelled.
8. **Pallet consolidation** – The packed fruit is placed on pallets and arranged according to a previously specified method;
9. **Cooling** – At this stage the pallets of fruit are placed in the cooling facilities. The objective is to decrease the temperature of the produce to such a point that senescence of the fruit is diminished;

10. **Storage** – The pallets are disposed in cold storage until the moment of transport. The stores may be near the packinghouses or near ports or airports;
11. **Loading the ship or airplane** – The fruit is transferred from the storage place to the long distance transport vessel. This is a sensitive stage since the produce can suffer physical injuries or excessive exposure to environmental temperatures;
12. **Long distance transport** – This is the period when the fruit is inside a transport vessel (ship or airplane). During this time brusque movements of the cargo can damage the produce. Another problem is that during the long distance transport neither the fruit exporters nor the fruit importers have direct control over cargo conditions;
13. **Unloading the ship or aeroplane** – The pallets of the fruit are removed from the transport vessel and put under the importers' control. Some importers usually make their first inspections at this point;
14. **Transport to the distribution centre** – During this phase the cargo is transferred to the importers' facilities;
15. **Processing** – At this stage the pallets are dismantled and the produce is then inspected. Some importers perform a new selection and grading according to their own criteria;
16. **Packing** – The produce is packed again, this time in packs specified by the retailers. In most cases the packs bear the retailer's name;
17. **Distribution** – This practice is related to the dissemination of the produce to the retailers' stores or distribution centres;
18. **Retailers shelves** – Finally the fruit is arranged on display shelves and made available to the final customer;
19. **Final customer** – The consumer buys the fruit, making this stage the last in the commercial chain of the fruit.

Since the analysed group of fruits (melon, grapes, papaya, orange and mango) is produced and processed according to the same general sequence, it becomes then

possible to describe and analyse the common problems that affect the sector. This is a major advantage in terms of research.

## 2.6 Potential Issues In The Brazilian Fruit Export Sector

Brazil is one of the main fruit producers in the world, harvesting annually more than 32 million tonnes of fruit. The value of this production is estimated to be US\$11 billion per year (Pinazza and Alimandro, 1999). There is however a serious constraint in this branch of the Brazilian economy: fruit producers in Brazil are showing a limited capacity to export their produce. For instance, Brazil exported only US\$162.473 millions worth of fruit in 1999, a tiny value when compared with the value (US\$11 billion) of fruit produced and traded annually in the internal market (SECEX, 2000).

It is important to observe that almost US\$17 billion worth of fruit is traded on the international market per year (Silva, 1999; FAO, 2002). According to MAA (1998) there is an average growth of US\$1 billion in the value of fresh fruit traded in the international market. The main reason for this impressive growth is the growing need for a diet with low levels of calories and with high concentration of vitamins, fibre and minerals. This is the precise description of fresh fruit. It is also important that fresh fruit is easy to prepare.

Despite all efforts by the Brazilian government, the country is not showing the capacity to increase its fruit exports more aggressively. Only since the devaluation of the national currency (Real) in 1999 have fruit exports experienced relative growth.

It is not clear why the Brazilian fruit exporters are failing to conquer a more impressive share of the international market. In fact in the last decade a vast number of articles examined this issue using a great variety of perspectives. The majority of the analyses are concentrated on seven main issues: evaluation of fruit production

resources, evaluation of the support resources used in trading fruit, analysis of public policies that affect the fruit sector, analysis of the fruit consumption market, case studies, fruit price analysis and fruit quality analysis.

A considerable number of authors have focussed their effort on the evaluation of the different fruit production resources. In this case the analysis of fruit varieties, fruit production technologies, production regions, production costs and human resources used to cultivate fruit (Chalfun, Pasqual and Hoffmann, 1998; FRUPEX 1993; FRUPEX, 1994c; FRUPEX, 1994d; Hentschke, 1994; IBRAF, 1995; IBRAF, 1997).

Another group of Brazilian researchers are concerned with the evaluation of the support resources used in the fruit trade. In most cases these resources are: packing houses, refrigerated stores, ports, airports, motorways and transportation services (Botrel, 1994a; Botrel 1994b; BRAZIL NOW, 2001a; Carvalho, 1996; Carvalho, 1994; Chagas, 1994; Chitarra and Chitarra, 1990; Padua, 1996; Souza, 1992; Spagnol, Rocha and Park, 1994).

Public policies for the fruit sector have been analysed. In this case the Brazilian legislation was examined which regulates the fruit business (phitosanitary control, packing control and fruit export standards). The taxation system for the fruit business has also been scrutinised. However it is a macroeconomic aspect of the Brazilian economy that is discussed more frequently. The exchange ratio between the USA dollar (US\$) and the Brazilian Real (R\$) and its effects on the fruit export business is a frequent theme under discussion. Finally, the researchers specialising in fruit have shown that they are involved with the analysis of the public policies that are directly related to the fruit export business; policies like: public credit, technology development, and technical assistance (Villwock and Giacomini, 1992; SECEX, 1999; SECEX, 2000; SECEX/IBRAF, 2001; Silva, 1999; Resende, Paiva and Alvarenga, 1994; Ministério da Integração Nacional, 2000; Gorgatti Netto, Gayet, Bleinroth, Matallo, Garcia, Ardito, Garcia and Bordin, 1999).

Market research for the fruit export trade is a more recent issue. Often the most widely investigated themes are the characterization of market trends, the identification of the consumers' buying criteria, the identification of the main categories of fruit buyers and the estimation of market size (BRAZIL NOW, 2001b; Favaret Filho, Ormond and Paula, 2000; Fernandes, 1998; FNP, 1999; FNP, 2001; Pinazza and Alimandro, 1999; SECEX/ IBRAF, 2001; UFLA/D4, 2000).

Research involving the fruit prices on the international market is rarer. The main reason for this probably lies in the fact that fruit are not a commodity product, since each lot of fruit has its own characteristics. Due to this the price tends to be relative to each fruit lot only, making it difficult to produce price analysis applicable to other fruit (Silva, 1999; Pedrosa, 1991; Kreuz, 1992; Kreuz, 1991; FRUPEX, 1994c; Albuquerque, 2001).

Case studies and descriptions of commercial transactions are becoming a common method of analysis employed to characterize the fruit export business. The majority of authors tend to develop analytical categories of companies based on the description of cases or tend to analyse in depth a specific case that is representative of a population or of a circumstance. Since the number of fruit export organisations in Brazil is relatively modest, case studies are shown to be a major effective method of analysis (BRAZIL NOW, 2001a; BRAZIL NOW, 2001b; Favaret Filho, Ormond and Paula, 2000; Martins, 1999; Alimandro, 1999; Ministério da Ciência e Tecnologia, 1998; Zylbersztajn and Farina, 1997).

Finally, an issue that appears to be of growing importance for the fruit sector is quality. The majority of the authors quoted above, recognised the importance of this theme of research for the fruit trade, however only a limited number of articles devoted to this topic have been published in Brazil.

Pinazza and Alimandro (1999) observed that the quality of the Brazilian fruit is a serious obstacle to any substantial increase in the volume of exports. They argue that

the Brazilian fruit growers and traders are capable of identifying and satisfying the needs of the internal market but are less efficient at dealing with the international market.

Pinazza and Alimandro (1999) advocate an intensive use of marketing research in order to identify the specific needs of the different fruit importers. By adopting a more proactive marketing strategy it would be possible to develop quality standards better suited to the international market.

Fernandes (1998) recognizes the importance of the concept of quality for the development of the fruit export business. He maintains that the fruit exports will only increase after a diligent effort to improve the quality of the fruit exported and also the quality of the diverse production and processing sequences that are relevant for the fruit commerce. He maintains that a long-term policy to develop quality would be connected to training of producers and traders in the use of concepts of quality. Fernandes (1998) uses as reference for discussion the program PROCHILE, a successful plan developed and implemented by Chilean fruit growers and traders in order to improve the quality of the Chilean fruit product.

According to Silva and Tranquilini (1999) a considerable proportion of Brazilian fruit growers are capable of using advanced fruit production technologies, making it possible to produce a great diversity of fruit (temperate, tropical and subtropical) in the Northeast region of Brazil. The majority of these producers however are shown to have difficulties in using concepts of quality to organize their trade activities. Silva and Tranquilini (1999) mentioned that these fruit producers need to invest more resources in order to learn quality management concepts and to make more active use of fruit quality management techniques.

Quality management can be an effective instrument to reduce waste in the fruit trade. Garcia, Marques, Silva and Ferreira (1999) observed that waste is generally high during trade operations with fresh produce in Brazil. This market disorder

contributes greatly to the increase of the transaction costs of the whole fruit trade system and consequently has a negative effect on fruit export operations. Garcia, Marques, Silva and Ferreira (1999) argue that a more intensive use of quality management concepts to guide the trade operations will help to drastically reduce fruit wastage. Additionally they mention that a business environment more favorable to quality could also contribute to creating among fruit growers and traders an attitude more propitious to the increase of the fruit export activities.

A comprehensive analysis of the fresh fruit and vegetables sector in Brazil was carried out by Gonçalves, Amaro, Maia and Souza (1995). According to them there is a considerable distance between the production potential of the country and the efficiency of the intermediation system. In most the cases, technical dysfunctions during the post-harvest processing stages are responsible for compromising a significant quantity of the fresh produce traded. Gonçalves, Amaro, Maia and Souza (1995) recommended the intensive use of quality management tools in order to overcome these serious barriers. They mentioned in particular the imperative need to establish clear specifications for production processes and products. These specifications will then contribute to better direct all the necessary quality improvement efforts. The same general conviction is shared by the Brazilian Ministry of Agriculture, which advocates the creation of quality certification agencies. According to the ministry, these agencies are destined to analyse every stage (production of seeds, production of seedlings, fruit production activities, harvesting, post-harvest processing and transport) of the fruit business. The final objective is to certify those organisations that are adequately prepared to deal with fruit export activities (MAA, 1998).

It should be noted that despite the fact that a considerable number of authors (above quoted) recognize the importance of quality for the fruit trade, very limited research on this specific topic has been conducted in Brazil. In most cases these studies are focused on technical aspects of the fruit production and post harvest processing. Very

limited attention is given to the analysis of the use of fruit quality management concepts by fruit producers and traders. It is important to clarify this issue.

Fruit quality management is an issue that is used by fruit exporters and fruit importers at the same time. In addition, both sides need to agree about the quality management procedures used to handle the fruit traded. This fact offers the chance to characterize and to compare the perceptions of both sides (exporters and importers) regarding fruit quality management.

## 2.7 British-Brazilian Fruit Trade: The Importance of Quality Management

Quality management is an issue that is important not only for fruit producers and exporters. Fruit importers and retailers also make active use of concepts of quality management. In this section there follows a brief analysis of the importance of quality management for the traders (importers) operating in one of the main markets for the Brazilian fruit: the United Kingdom.

The United Kingdom has a dynamic economy, being a highly industrialised country and capable of maintaining an impressive volume of trade with numerous countries in the world. Traditionally the UK exports services and manufactured goods. Conversely the country imports raw materials and agricultural products.

The commercial relationship with Brazil follows a similar dynamic. According to the Brazilian Ministry of Foreign Relations, trade between Brazil and the UK is showing an average growth of 13% per year, reaching the value of US\$2,7 billion in 1997 (MRE, 1998). The UK is the 9<sup>th</sup> largest importer from Brazil, being responsible for absorbing 2.37% of the total Brazilian exports.

With respect to the international fruit trade the UK occupies a prominent position, as the country is the third largest fruit importer in the world. Silva (1999) observed that

in 1997 the USA imported US\$2.7 billion in fruit, this figure makes this North American country the largest fruit importer in the world. In second position is Germany, which imported US\$2.6 billion in 1997. The UK is in third position, and in 1997 the country bought on the international market US\$1.6 billion in fruit. Table 2.15 shows the main fruit imported in the UK and the respective value of imports of each fruit.

**Table 2.15 – Main Fruit Imported In The UK And The Value Of Import (US\$1000) In 1997.**

<b>Fruit</b>	<b>Value Imported</b>	<b>Fruit</b>	<b>Value Imported</b>
Bananas	484.041,00	Pineapples	25.137,00
Apples	397.387,00	Mangoes	21.803,00
Grapes	227.200,00	Watermelons	10.696,00
Oranges	192.423,00	Papayas	7.083,00
Melons	114.439,00	Figs	2.070,00
Peaches	107.176,00	<b>Total</b>	<b>1.639.776,00</b>
Lemons	50.321,00		

Source: FAOSTAT – Statistics database; Silva, 1999

As can be seen the country imports high volumes of both tropical and temperate fruits. It is important to notice that British customers more often buy temperate fruits (grapes, apples, different types of berries and peaches) since these fruit can be produced in UK or in continental Europe. However the country still needs to import high volumes of this type of fruit. This happens mainly because during the winter in the Northern Hemisphere it is not possible to harvest this fruit, making it necessary to import from countries in the Southern Hemisphere.

With regard to tropical fruit, production in the UK is not possible, making their import necessary throughout the whole year. This is one of the reasons why bananas are the most imported fruit in the UK.

In sustaining such a high level of imports British importers are showing the capacity to overcome serious logistical barriers. It is important to verify if they are using concepts of quality in their commercial activities.

Piercy, Katsikeas and Cravens (1997) analysed the relationship between British importers and United States exporters. According to them the importers expect their suppliers to ensure high and consistent product quality (in accordance with the specifications) as well as competitive prices. In order to reach the desired level of quality some of the British importers tend to adopt a collaborative and sustained relationship with their suppliers. In this case the strategy for competitive advantage is based on the development of joint programs with exporters, where the common objectives are established and the performance is checked by means of regular communication, and personal visits. Positive attitudes toward complaints and joint marketing projects are also characteristic of modern importers.

After analysing the EU legislation on fresh fruit trade Malins and Woodhead (1996) concluded that the fruit importers tend to persuade their suppliers to adopt an active use of quality management in their operations. They mentioned that there are latent commercial opportunities for those importers capable of making improvements in production and post-harvest processes that are critical for fruit quality.

Mallins and Woodhead (1996) also observed that the importers of fresh horticultural products operating in the EU need to convince their suppliers to:

- Adopt appropriate equipment for quality assurance purposes;
- Adopt techniques capable of promoting the correct use of pesticides in the field;
- Minimise the use of defensives during the post-harvest processing stages;
- Adopt modern methods for the inspection of the quality of fresh produce;
- Adopt administrative methods capable of providing information for quality assurance systems.

The commercial transactions organised by British organisational buyers of fresh produce with their suppliers were analysed by White (2000). She concluded that product quality is a prerequisite for the initiation of relationship with the British fruit traders. Only after acceptable levels of quality management were reached did fresh produce buyers consider the suppliers for the possible development of a further relationship. A similar view is voiced by Wilson (1996). According to her the trade of fresh produce in the UK is highly influenced by the supermarket chains and these powerful corporations are particularly demanding in terms of quality levels. Wilson (1996, p.29) mentioned that “there are obvious economies of information in reducing the amount of time in negotiation and monitoring the quality of the products concerned, and this has the effect of providing opportunities for increased control over the product supplied”.

Dolan, Humphrey and Harris-Pascal (1999, p. 36) analysed the influence of the British fresh produce importers in the African fresh vegetable industry. They concluded that the international trade of fresh produce “do not consist merely of flows of materials across national boundaries. They consist of networks whose key decision-makers influence the outputs of the chain and its composition. In this buyer-driven chain, the key decision-makers are UK supermarkets”. The authors also observed that for the British fresh produce importers, quality is an issue that need to be associated with year-round availability, presentation, product range, satisfactory packaging and innovation.

It should be noted that most of the references examined in this section support the conviction that quality management is a central aspect of the British fruit import trade. However none of the authors examined suggested that fruit quality management is the only relevant aspect of the fruit trade. In fact all the authors referred recognize that the international fruit trade is a highly complex type of transaction that is influenced by a great number of variables.

## 2.8 Research Questions

The literature review carried out in this chapter has shown that Brazil is a country with vast natural resources available for fruit production. In fact the country is already the third main fruit producer in the world, with the capacity to produce a great variety of fruit (tropical, subtropical and temperate) all year round.

Despite this big potential for fruit production the Brazilian fruit growers and traders are failing to increase the volume of fruit exports. The assessment of some of the main papers on the Brazilian fruit business indicates that this negative scenario is the result of a combination of a great variety of factors: fruit production technical problems, post-harvest processing problems, difficulties in identifying the specific needs of the fruit importers, public policy misconceptions and deficiencies in fruit quality management.

Quality management in particular was indicated as a topic of vital importance. Despite the significance of this issue, limited research has been carried out in Brazil into this specific topic. It is important to overcome this deficiency.

There are two basic approaches to analysing fruit quality management. The first is focused on technical aspects of fruit production and post-harvest processing. The second approach has broader scope of inquiry and is centred on the analysis of the employment of quality management concepts by fruit growers and traders. This is the chosen approach for the present research.

After characterizing some of the main problems of the fruit sector in Brazil it is possible then to express the two main research questions of this investigation.

**First Research Question:** Are the different factors that affect quality perceived as a cause of problems in the British-Brazilian fruit trade?

This question provides the opportunity to verify if the fruit traders operating in Brazil and in the UK perceive the management of fruit quality as an impediment for their commercial operations. It is important to highlight that this question is applicable to the Brazilian fruit importers and also to the British fruit importers. It then becomes possible to compare the views of both sides regarding quality management issues.

**Second Research Question:** Which are the strategies adopted by exporters and importers in order to guarantee product quality in the international fruit trade?

This question provides the chance to characterize the strategies adopted by British and Brazilian fruit traders in order to overcome quality problems in the fruit international commerce.

Before answering these two research questions using empirical data it is important first to construct the hypothesis based on a literature review of the themes relevant for the fruit quality management.

## 2.9 Summary

- i. Brazil is a country with vast natural resources available for agricultural production. However, agricultural activity is no longer the main sector of the country's economy. Brazil is already a service economy where agriculture represents less than 10% of country's GDP.
- ii. In Brazil, subsistence agriculture can be found sharing the same geographical space with highly industrialized agriculture simultaneously. Some of the most modern subdivisions of Brazilian agriculture are those related to the production of soybean, corn, sugar cane, coffee, oranges, cattle, poultry and fruit;
- iii. Fruit production is perceived by the Brazilian government as a strategic agricultural activity due to its capacity to generate high income and jobs per

hectare. Brazil, the third main producer of fruit in the world, has capacity to grow temperate, subtropical and tropical types of fruit.

- iv. Most Brazilian fruit is consumed by the internal market and only a small fraction of the national production of fruit is exported. There is a considerable potential for the increase of fruit exports;
- v. The six most exported types of fruit in Brazil are: mangoes, apples, melons, oranges, papayas and grapes. None of these types however has a substantial volume of exports. The destination market for most of the Brazilian fruit exported is the European Union;
- vi. An extensive literature review has shown that the production and trade of mangoes, apples, melons, papayas and grapes follow the same general sequence. To trade in the fruit mentioned the exporters need to observe these nineteen stages: Pre-harvest; Harvesting; Short distance transport; Receiving operations; Selection and grading; Treatments; Packing and labelling; Pallet consolidation; Cooling; Storage; Loading the ship or the airplane; Long distance transport; Unloading the ship or aeroplane; Transport to distribution point; Processing; Packing; Distribution; Retailers' shelves; Final consumer.
- vii. The potential research issues for the Brazilian fruit export sector are presented. Fruit quality management is selected as the main research topic of this investigation.
- viii. Two research questions are formulated at the end of the chapter; both of them are related to fruit quality management.

## *Chapter 3*

### Literature Review

#### 3.1 Introduction

Frequently the literature review in a piece of scientific work presents the opportunity for the author to select and highlight theories and facts that are relevant for him and his research. It is supposed to show some of the effort employed by the author to search out, read and understand previous contributions from other scientists to the theme under investigation. To organise a valuable literature review it is important to combine harmoniously different approaches created by distinct authors to study a particular topic.

In this literature review the theme under analysis is trade in agricultural products. The chapter starts with a brief review of fruit quality management. There follows a section on the various approaches that can be used to study fruit trade questions. Following that emphasis is given to a particular approach, Transaction Cost Economics. Discussion follows about how quality management concepts can be used to regulate trade relations; it is reasoned that quality management can be used as an instrument capable of reducing transaction costs. The chapter ends with the formulation of the two general hypothesis of this investigation.

#### 3.2 Fruit Quality Management

Fruit quality management is directly connected to a particular field of applied science: post-harvest technology. This specific area of knowledge has developed quickly over the last few decades and as a direct consequence it has been possible to develop technologies capable of supporting the fresh produce trade.

The main objectives of post-harvest technology are to increase the volume of the fresh produce traded, to improve the quality of the horticultural crops offered to the final consumer and to extend the shelf-life of fruit and vegetables. Post-harvest technology also aims to improve the transport and storage conditions of fresh fruit and vegetables (Kader, 1992). One can say that the dramatic increase in the international trade of fresh produce is directly linked to advances in the post-harvest technology.

There are two principal areas of concern for the post-harvest technology of horticultural crops. The first is related to physiological aspects of fruit and vegetables. The second is related to the commercial aspects of fresh produce. These two areas are examined in the next sections.

### **3.2.1 Physiological and Morphological Aspects of Fruit Quality**

To develop techniques or technologies for a specific field of research it is necessary first to develop the basic scientific knowledge about the field of research under analysis. This observation is also valid for the post-harvest technology. In other words it is only possible to develop post-harvest processing technologies for horticultural crops if there is enough accumulated knowledge about the physiology and the morphology of fruit and vegetables.

According to Chitarra and Chitarra (1990) and also Kader (1992) the scientific analysis of fruit in particular can be subdivided into four main areas:

- Fruit morphology – In this case there is an analysis of the different constituent parts of a fruit (peduncle, skin, pericarp, mesocarp, endocarp and seeds) and the general architecture of the fruit. Precise morphological descriptions will help to identify the most fragile parts of a fruit.
- Fruit development and growth patterns – This area is concerned with the physiological development of a fruit. A detailed study is made of all the diverse stages of the development of a fruit, from the fertilization of a flower

to the final stages of senescence. The analysis of the development sequence of fruits helps to define the best stages for harvesting, possible storage period and the shelf-life period.

- Fruit maturation – This particular period of the fruit physiological cycle is studied separately. This happens mainly because this is the most important stage of the fruit post-harvest processing period. In most cases the fruit maturation process starts when the fruit is still connected to the plant and finishes only when the physiological degradation starts. There are four main stages of the fruit maturation sequence: pre-maturation, maturation, ripening and senescence.
- Fruit metabolic activities – Here there is an analysis of the complete set of physiological processes of a fruit. In particular, the physiology of the fruit respiration is examined. A fruit is composed of living tissues which respire. These tissues need to intake oxygen and to release carbon dioxide. Respiration is the most important phenomenon for fruit maturation since it is possible to accelerate/ decelerate the maturation of a fruit by controlling the respiration ratio. It is important to remember that the living tissues of a fruit will die if the respiration activities are interrupted. The effects of the different plant hormones (ethylene, auxins and abscisic acid) are also part of the fruit's metabolic activities.

It should be noted that the physiological and morphological aspects of a fruit are specific to each type of fruit only. It is not possible to extrapolate from conclusions about the morphology and physiology of one specific fruit, to other fruit. This makes of the post-harvest technology a complex and vast field of research.

### **3.2.2 Commercial Aspects of Fruit Quality**

Information about fruit physiology and morphology is an essential requirement when the final aim is the development of technologies capable of guaranteeing the quality

of fresh horticultural crops. In most cases these technologies to protect fresh produce are present at every stage of the fruit and vegetable production and trade cycle.

There are various ways to group the different fruit post-harvest technologies. Here they are grouped according to the production and trade sequences.

There are four main factors influenced by fruit post-harvest technologies (Chitarra and Chitarra, 1990) and each of these factors is affected by the different activities that are part of the fruit production and trade cycles. These factors and activities can be categorised as follows:

- Production and harvest factors, which are affected by the production activities, by the use of the chemicals in field of production, by the activities to establish of the grade of maturity and by the harvesting activities;
- Fruit attribute factors which are affected by the fruit's appearance, texture, nutritive value and flavour;
- Post-harvest processing factors, which are affected by the safety requirements by the use of chemicals in post-harvest processing activities, by the packing activities and by the pallet consolidation activities;
- Transport factors, which are affected by the transport activities from the production fields to the main carrier, by the activities of loading the main carrier, by the transport in the main carrier, by the activities of unloading the main carrier and by the transport activities from the main carrier to the importers facilities.

It is important to discuss all these aspects of the fruit trade.

## Production and Harvest Factors

The quality of a fruit is directly affected by the way it is produced. A fruit will only have the desired characteristics if the appropriate cultivation practices are adopted. Watada, Kader, Romani and Staby (1984) observed that the different production

operations (irrigation, use of fertilizers, pruning and use of defensives) will also affect the fruit's shelf life.

In the tropics, due to climate conditions (high humidity and temperatures) fruit is an easy target for insects and microorganisms, necessitating the employment of chemical defensives. However the use of these defensives during the fruit growing stages is not a simple matter, since this practice is regulated by several legislation bodies.

The final objective of any legislation on the use of chemical products is to minimise the negative impact of these defensives in the environment and in the health of the fruit consumers. A Brazilian fruit producer, growing fruits for the British market needs to observe at the same time the international legislation, the EU legislation, the British legislation and the Brazilian legislation on the use of defensives (Morandini, 1999).

Another particularly sensitive aspect of the pre-harvest activities is the establishment of the grade of maturity for fruit. For most fruit there is an optimum stage of maturity for harvesting. A fruit in a more advanced stage of maturity will probably be more tasty and colourful. On the other hand this fruit will probably be more sensitive to the post-harvest processing activities and will probably have a shorter shelf life. A fruit in the early stages of maturity tends to be less tasty and colourful and is more resistant to the post-harvest processing activities and as a consequence is more likely to have an extended shelf-life (Kader, 1992).

Harvesting, for most fruit is recognised as the most critical moment in the fruit production and trade cycles. It tends to be a costly practice since it can only be executed by human hands. At this specific stage the chances are higher that the fruit will suffer a physical injury. Difficulties are also caused by the fact that all fruit in a production field tends to reach the optimal stage of maturity at the same time (Chitarra and Chitarra, 1990; Silva, 1997).

## Fruit Attributes

The quality of a fruit negotiated in the international market is not a subjective issue. In most cases, fruit importers and exporters need to deal with precise specifications of the product traded. These specifications are the principal reference for negotiations and control activities.

The specifications tend to be focused on four main types of fruit attributes, each of these main attributes can be decomposed into other attributes that are more specific. According to Chitarra and Chitarra (1990) and also Watada (1980) the components of fruit quality are:

- Appearance, which is affected by form, size, colour, brightness and morphological problems;
- Texture, which is affected by the firmness, fragility, juiciness, granulosity and fiber content;
- Nutritive Value, which is affected by the percentage of carbohydrates, proteins, lipids, vitamins and minerals; and
- Flavour, which is affected the sweetness, acidity, bitterness and aroma.

Appart from these four main components of fruit quality there are also the fruit safety requirements, which can be analysed as a part of the fruit post-harvest processing activities.

The fruit attributes are used as the main point of reference in selection and grading processes. It is also important to observe that the analysis of fruit attributes is specific to each variety of fruit only. Some components of fruit quality may be relevant for some types of fruit but are not necessarily important for other types of fruit.

## Post-harvest Processing Factors

When fruit arrives at a packinghouse it will be submitted to a series of processes in order to be qualified for export. Among the processing activities the most relevant are: fruit selection according to the safety requirements, use of chemical products (defensives and waxes) in post-harvest processing, packing and pallet consolidation.

Since the international fruit trade is regulated by strict legislation on safety requirements is necessary to verify the presence of contaminants in each shipment of fruit. The most common contaminants are: natural toxins, residues of defensives, micotoxins and biological contaminants. (Sao Paulo, 1998).

Another issue that requires full attention from the fruit traders is the use of chemicals in post-harvest processing. Here waxes are used to improve the appearance of some fruit and also defensives in order to control the development of microorganisms. MacDonald and Miller (1994) mentioned the need to adopt regular evaluations of contaminants, according to them these evaluations will help to develop better production and post-harvest procedures.

The objective of packing is to protect the fruit, extend its shelf life and to attract the attention of consumers. The predominant type of packaging used in the international fruit trade are cardboard boxes. In many cases they are used together with synthetic materials like PVC (Chitarra and Chitarra, 1990).

The fruit boxes are put together in the top of a pallet and are carefully consolidated according to international norms. These pallets are the basic units for the transportation purposes, they are easily transported by forklifts in different environments (packinghouses, fruit processing units and at the retail stores). It is relatively common to use plastic film to wrap the pallets, but in this case it should be observed that fruit is a living merchandise with a respiratory metabolism. This means that only appropriate plastic film should be used (Fleurat-Lessard, 1990).

## Transport Factors

Once the post-harvest processing activities have been completed, the fruit pallets are ready for the transport abroad. In fact, most of the post-harvest life period of a fruit is spent in transport, especially if a fruit shipment is transported by sea. It is important then to guarantee that all transport activities are capable of preserving the quality of the fruit shipment.

According to Kader (1992) and also Chitarra and Chitarra (1990) the success of the transportation is highly dependent on the temperature of the fruit shipment during transport. High temperatures tend to accelerate the metabolism of the fruit, increasing the respiration ratio and reducing the shelf-life. High temperatures are also favorable to the development of damaging microorganisms.

Temperatures excessively low are capable of ending the different metabolic cycles, causing the death of fruit tissues and the immediate degradation of a fruit (Kader, 1992).

Another crucial aspect during the transport is the air circulation system. It is important to remove the CO<sub>2</sub> (a result of the respiration activities) from the fruit shipment, otherwise the chances are high that anaerobic fermentation processes will start. In most cases cold air circulation systems are used. Another alternative is to make use of a modified or controlled atmosphere, in this case the fruit cargo is kept in an atmosphere rich in N<sub>2</sub>.

The main stages of the fruit transportation activities are:

- Transport from the fields of production to the main carrier;
- Loading the main carrier;
- Transport in the main carrier;
- Unloading the main carrier; and
- Transport from the main carrier to the importers facilities.

### 3.3 Quality Management

Nowadays the concept of quality management is widely recognised as important in almost all different industries. It is common to see large companies in the most diverse sectors reporting how is important quality for them. Currently quality management is used as a tool to gain and maintain market share, in the past however the situation was different. The majority of companies focused their strategies on conquering markets on low prices and high volumes. Quality was then only a marginal preoccupation.

It was only after the World War II that a considerable number of Japanese companies started to apply notions of quality management in their operations. By doing so these companies achieved the capacity to produce high quality products with low costs. As a consequence some of these Japanese firms achieved the leadership in various industries on a global scale (Davis, Aquilano and Chase, 1999). The Japanese success inspired American and European organisations to implement similar quality management systems in their business.

It is important to mention that the concepts of quality management so successfully adopted in Japan actually originated in the efforts of American researchers like W. Shewhart, W. Edwards Deming and Joseph Juran. It so happened that the concepts developed by them remained only theoretical until Japanese entrepreneurs put the ideas into practice (Davis, Aquilano and Chase, 1999).

#### **3.3.1 Distinguished Authors on Quality Management**

More serious discussions about quality management started with the contribution of Walter S. Shewhart, a statistician who employed quantitative methods to study the variability of production processes. His empirical approach allowed the differentiation between random and non-random variations in a production sequence.

If non-random variations were detected, adjustment procedures were then taken (Davis, Aquilano and Chase, 1999).

Many authors characterize Edwards Deming as the main individual contributor to the development of quality management ideas. He followed the steps of Shewhart, using statistics to develop his propositions for quality management. Deming's investigations of Statistical Process Control (SPC) resulted in the creation of an approach capable of analysing a whole organisation in its effort to improve the products and production processes (Acseirad,1994).

Deming also studied costs of quality management. He showed on several occasions that the costs of implementation of programs destined to raise quality standards are generally lower than the costs of maintaining low quality production lines. Deming believed that when production sequences are rectified it makes possible to avoid the costs of reworking, repair, and waste (Acseirad, 1994).

Joseph Juran is another highly influential author concerned with the development of the quality management construct. Like Deming, he also utilised cost analysis as an instrument to control quality. According to him the costs of managing quality can be divided into three distinct categories: costs of prevention, costs of detection-inspection, and costs of failure. However the main contribution of Juran was the creation of a framework designed for the analysis of the adequacy to the use of a product. The proposed framework is divided into five distinct areas: (a) quality of the project; (b) quality of conformity; (c) availability; (d) safe use; and (e) practical use (Juran and Gryna, 1980).

Total Quality Control, one of the most important concepts of quality management, was a proposed by Armand Feigenbaun. With this concept he maintains that quality is a responsibility of all members of an organisation. The author goes on to say that there is a need for a professional exclusively dedicated to the quality management in

each organisation. Feigenbaum is also convinced of the importance of the use of statistics and cost control in the management of quality (Feigenbaum, 1988).

In contrast to the previously mentioned authors, Philip Crosby is not in favour of the intensive use of statistics in the management of quality. According to his pragmatic approach few people in organisations are capable of understanding and using concepts of statistics properly. Crosby believes that the implementation of programs of quality could be an uncomplicated process. To help with this task he developed a 14-point program for quality management (Crosby, 1990; Acseirad, 1994).

Apart from the authors already mentioned, many other scholars have contributed to the development of quality management theory. Most of them however have based their ideas on the concepts created by Shewhart, Deming, Juran, Feigenbaum and Crosby.

### **3.3.2 Concepts of Quality**

There is a multitude of concepts of quality management; Dobler and Burt (1996) claim that almost all of them use one of the following perspectives:

- Quality is high specifications – in this case a product or service is evaluated in absolute terms according to the value of the material or specialised service that is a component of the product.
- Quality is relative to a perceived need – in this case it is not the absolute value of a product that is important but its capacity to satisfy a particular need at a specific moment.
- Quality is conformance with requirements – in this case the quality will be determined by the capacity of a manufacturer to deliver a product whose characteristics conform with previously stated specifications.

In this research work it is the third perspective that is adopted.

### **3.3.3 Quality Management: Some Tools**

Especially in the last three decades a myriad of quality management tools have been created. It is possible to find techniques formulated for generic use and others developed for specific purposes in specific industries. The discussions in this literature review are centred around two types of quality management tools: those created to guide relations with suppliers and those created to guide the relations with buyers, distributors or trade partners.

Before proceeding with the discussion of quality management it is important to notice that every product needs to obey a technical sequence or cycle in order to reach the final customer. Every cycle has at least three main stages: production, distribution and consumption. An organisation involved with a product needs to add value at one of these stages.

One can say that the successful delivery of a product to the final customer is the result of the work of several organisations that have added value at different phases of the product cycle. It is also possible to affirm that the final quality of a product traded is dependent on the quality management activities performed by each organisation that has some influence in the product cycle.

Based on this notion it is possible to argue that a company can guarantee the management of quality mainly during those periods when the product is under its responsibility. Before acquiring a product or the product's components the capacity of a firm to control quality is limited. The same logic is valid for the stages after the moment when a company sells the product.

The problem with this situation is that even with a firm adopting the most advanced internal quality management programs, the final product can fail in terms of quality as a consequence of negligence by trade partners. To overcome this obstacle the alternative for an organisation can be the careful selection of trade partners.

Discussion follows about quality management by suppliers and then quality management by distributors.

Dobler and Burt (1996) argue that there are four factors that are relevant for the management of relations with suppliers:

- **Creation of complete and appropriate specifications for quality requirements.** This is not an easy task since it involves a deep understanding of the customers' needs and the ability to transform needs into clearly stated specifications.
- **Selection of suppliers capable of delivering the desired quality level.** In most cases the suppliers are selected by testing their product and by analysing their business proposal, which takes into account price, conditions of payment and conditions of delivery. If a long running commercial relation is the aim, it is imperative to select suppliers capable of developing their production capacity, lowering costs and increasing production.
- **Development of a realistic understanding of quality requirements and creation of motivation to perform accordingly.** This task involves the adaptation of the product according to the market needs. It is also related to the adoption of production processes capable of delivering a quality-guaranteed product.
- **Monitoring the suppliers' quality performance and exerting appropriate control.** By periodically evaluating product quality, cost and availability it is possible to estimate the suppliers' competence as a trade partner.

The suppliers' performance can also be evaluated according to their capacity to control quality. According to Juran and Gryna (1980) there are two basic systems of controlling product quality. The first is the **Defect Detection System**; in this case the products are inspected only after they have been produced. Despite the fact that this method is more straightforward it has a propensity to be more permeable to product errors. The second method of controlling product quality is the **Defect Prevention System**. With this method a production process is monitored (in its

several stages) with the objective of identifying sources of imperfections. The results of these inspections serve to guide the modifications destined to eliminate (or reduce) the causes of errors. Statistical Process Control can be used as a tool to support this second method.

Suppliers who are capable of using the Defect Prevention System are preferable to those who adopt the Defect Detection system, mainly because those who systematically detect and correct sources of errors in the production process are capable of avoiding rework and waste. As a consequence they can offer lower costs associated with higher levels of quality.

In addition to the above-mentioned procedures it is also possible to adopt the Supplier Certification Strategy, a method employed to guarantee quality from suppliers. Dobler and Burt (1996) divided this strategy in three distinct steps: Qualification; Education; and Certification Performance Process.

The qualification step is actually based on rigorous selection since only those suppliers who already have a long and positive commercial relation with the buyer firm are considered qualified for certification.

In the education step suppliers and buyers exchange information about their management procedures for quality. As a matter of fact this stage is more related to transference of quality management concepts and practices from the buyer organisation to the supplier. The supplier is expected to adopt new and higher standards of quality in their operations.

The third step is the Certification Performance Process, a phase when suppliers are tested in their output. At the beginning the suppliers' products are totally inspected, the intention being to identify and correct unexpected failures. After a certain degree of confidence is gained, the full inspection is replaced by sampling inspections and periodical visits to the suppliers' site. When again a new level of confidence is

achieved, the supplier receives the status of certified company. From this point onward the seller is allowed to deliver the product directly to the point of use.

Dobler and Burt (1996) pointed out that even after certification a supplier should be tested by the buyer in one of these four ways:

- By reviewing the suppliers' process control charts for critical production operations;
- By using minimal sampling inspections;
- By reviewing test reports from the suppliers' laboratories; and
- By periodic visits to the suppliers' facilities.

The second group of quality management techniques discussed in this literature review are those developed to guide the relations of an organisation with its distributors or trade partners.

Distribution of a product is not an easy task especially because it implies in depth knowledge of each destination market, that is of customer preferences and specific logistics. It can be exceedingly onerous for a company to maintain its own distribution structures in all its destination markets. To avoid these two main types of problems a great number of companies choose to negotiate with a distributor or trade partner.

In the choice of partner the problem is to adopt the right criteria for selection. According to Dole, Lower and Philips (1994) the choice of a distribution collaborator should be based on the following characteristics of the partner:

- Sales volume and potential for sales growth;
- Customer coverage, which includes geographical dispersion of the distribution channel;
- Financial strength, that is the capacity to assume risks and pay debts;
- Managerial capability, which is the faculty to use and adapt new administrative techniques.

Especially in regard to this last topic Kuglin (1998) observed that quality management deserves a particular attention. He pointed out that a quality process methodology of analysis can be applied to logistic operations, to trade support activities, to the customer satisfaction measurement effort and to supply chain planning activities. Kuglin (1998) also mentioned that the results of the analysis could provide valuable input to raise quality standards of the whole product chain.

### **3.3.4 Quality Management Constructs**

The importance of the quality movement has risen to such a level that in the last few decades several bodies have been created to develop concepts and standards for the management of quality. Most of these institutions aim to elevate standards in a specific sector or industry.

Among the quality management constructs developed we find the ISO 9000 Series, Total Quality Management (TQM), Good Manufacturing Practice (GMP), Good Hygiene Practice (GHP) and the Hazard Analysis of Critical Control Point (HACCP). The first two approaches were developed for generic use. The others ones were created for use mainly in the food industry.

It is important to understand the main characteristics of these quality management constructs and their influence on trade relations.

#### **ISO 9000 Series**

The ISO 9000 series are standards developed for the management of quality. The acronym ISO stands for International Standardization Organisation, an international body created to provide an incentive to international trade through the development of standards, tests and certification procedures (Dobler and Burt, 1996; Wood and Urban, 1994).

Emphasis should be given to the fact that the ISO 9000 standards were developed not for product improvements but for those manufacturing processes that will deliver the products. In the ISO 9000 series there are two main groups of standards. The first group is composed of those standards (ISO 900 and ISO 9004) that serve as guide for other norms. The second group is composed of the standards (ISO 9001, ISO 9002, and ISO 9003) that serve as detailed contractual prescriptions (Davis, Aquilano, and Chase, 1999).

Dobler and Burt (1996) mentioned that the ISO 9000 standards are becoming competitive weapons in global business. Companies are using their ISO certification to establish partnerships and gain markets. The authors also maintain that the effort dispensed to achieve and maintain ISO certification brings as a positive consequence closer relationships between buyers and sellers. This outcome almost always means an extra effort to increase the exchange of information for the improvement of products and processes.

## Total Quality Management

Contrasting with the ISO 9000 Series, the TQM concepts have not been developed by a single institution. It is a construct based on the contributions of a great number of scholars, consultants and service companies. Due to this fact there is no single and final definition of TQM.

Davis, Aquilano and Chase (1999) and also Wood and Urban (1994) concluded an extensive literature review concerning TQM. Both groups of authors arrived at essentially the same outcome; they maintain that there are five critical elements to most of the TQM programs:

- Leadership –The involvement of the higher level of management of a company it is crucial in the implementation of the TQM program. This is a guarantee that barriers will be broken down in order to elevate quality standards;

- Involvement of all the work force – The commitment of all members of a company increases the chances of exposing and solving a higher number of quality problems.
- Excellence of products and processes – This element of TQM is related to the continuous evaluation of products and processes. The ultimate objective is the continuing improvement of manufacture.
- Focus on clients – It is vital to compare the quality achieved in a product with the requirements taken from the clients. This measure will allow verification of whether a product or service is really adequate to a specific purpose.
- Partnership with suppliers and clients – The cooperation between members of a product chain has the capacity to create an environment favourable to the circulation of information. When this condition is met it is easier to detect quality problems and to implement solutions.

It is important to notice that nowadays the use of TQM as an administrative and strategic instrument is not so intensive as it was in the last two decades. This is due to the fact that new and more specific approaches have been developed to deal with quality.

## Good Manufacturing Practice

Good Manufacturing Practice (GMP) is a quality management approach developed specifically for the food industry. It is based on the directives of the Codex Alimentarius, a document organised by different agencies of the FAO and national food agencies of several countries. GMP is destined to set the guidelines in terms of quality for food production and distribution (FAO/WHO, 1995).

Actually GMP is a family of several codes developed for specific food industries like dairy, bakery, meat and greengrocers. According to Hoogland, Jellema and Jongen (1998, p. 145) the majority of these codes “have been implemented on a national basis for a specific branch of industry. Although implementation is most often voluntary, companies which have not adopted the code – or an equivalent quality

system – may have problems staying in business, especially when vertical integration of food production chains occurs”.

There is also a code intentionally formulated to guide hygiene procedures in the food sector: ‘Good Hygienic Practices’ (GHP). This code regulates the hygienic design and construction of food manufacturing facilities and also the proper use of processing machinery. Furthermore GHP provides directives for cleaning and disinfection, establishing standards for safety practices, microbiological control and staff hygiene (Hoogland, Jellena and Jongen, 1998).

### Hazard Analysis of Critical Control Point

The system most widely used for quality control in the food sector is the Hazard Analysis of Critical Control Point (HACCP). It is a detailed code of procedures proposed initially by the International Commission on Microbiological Specification for Foods (ICMSF) and the World Health Organisation (WHO). As an international standard the HACCP system and its application has been described in documents of the Codex Alimentarius (Hoogland, Jellena, and Jongen, 1998).

An important point about HACCP is that the European Union has adopted this approach as a valid instrument for safety control. According to Sitter (1998) the European Union (EU) recognises in its “General Principles of Food Law” (known as Green Papers) the validity of HACCP as an instrument to control food safety.

The EU safety regulations (Directive 93/43/EEC) say that: “Food business operators shall identify any step in their activities which is critical to ensuring food safety and ensure that adequate safety procedures are identified, implemented, maintained and are reviewed on the basis of the following principles, used to develop the system of HACCP:

- analysing the potential food hazards in the food business operation;
- identifying the points in those operations where food hazards may occur;

- deciding which of these points identified are critical to the food safety – the critical points;
- identifying and implementing effective control and monitoring procedures at those critical points; and
- reviewing the analysis of food hazards, the critical control points and the control and monitoring procedures periodically and whenever the food business operations change”

Maia and Albuquerque (2000) maintain that the HACCP system can be applied to a whole product chain: from the raw material to the point of final consumption. The authors go on to say that the success of any application of this system by one organisation will be highly dependent on the full participation of all members of the organisation (management and operations personnel). Maia and Albuquerque divided the HACCP system into 12 distinct steps: (1) Formation of the HACCP teams; (2) Full description of the product; (3) Elaboration of the production process diagram; (4) Identification of hazards; (5) Identification of critical control points; (6) Detailed description of all procedures used to control the critical control points; (7) Determination of the frequency for checking and controlling the critical control points; (8) Determination of levels of control for each critical control point; (9) Creation of corrective measures to be adopted when problems are detected at critical points; (10) Creation and maintenance of a detailed register system; (11) Use of HACCP approach in the whole production process; and (12) Periodic evaluation of the HACCP as it is applied.

### **3.3.5 Analysing Quality Management Strategies**

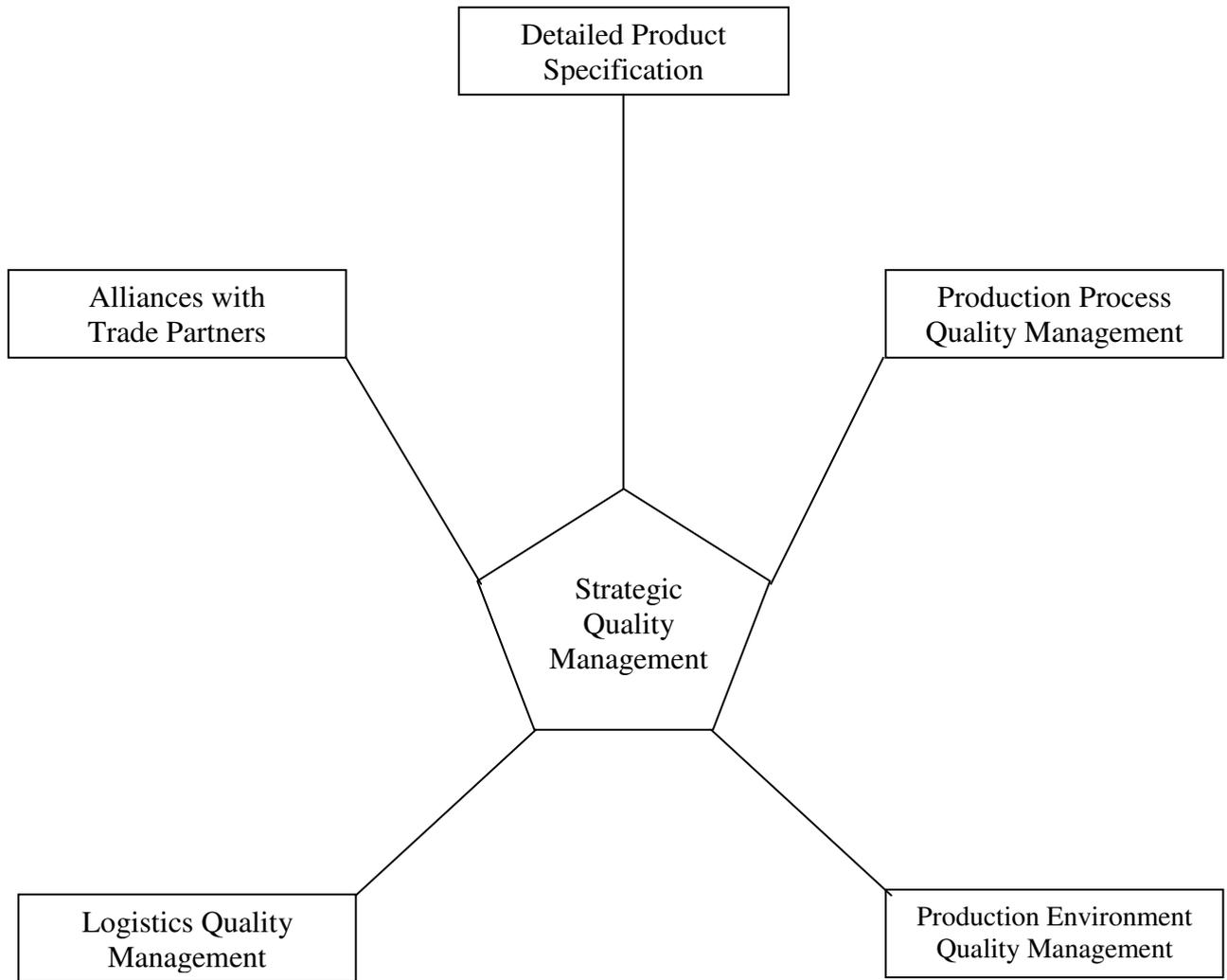
It is possible to analyse the management of quality at strategic, tactical or operational levels. The operational level is concerned with the efficiency of the production processes; the tactical level is related to the means by which objectives will be reached. Finally the strategic level involves the choice of objectives to be achieved (Gattorna and Walters, 1996).

In this scientific work the focus of the discussion is on the strategies for quality management. As a reference the definition of strategy proposed by Galbraith and Kazanjian (1987, p. 206) is adopted. The authors affirm that strategy “is the fundamental pattern of present and planned resource deployments and environmental interaction that indicate how the organisation will achieve its objectives”.

In the previous sections it has been seen that there are many different concepts and approaches that can be used for quality management. It is also clear that none of the concepts examined are universally accepted and adopted. This fact makes the analysis of quality management in a specific sector difficult, simply because it is not possible to use a construct like the ISO 9000 series or TQM or GMP or HACCP as a single point of reference for the analysis. To overcome this limitation it is possible to analyse the basic concepts that are common to all these constructs.

Dobler and Burt (1996) and also Wood and Urban (1994) have studied the primary circumstances that affect quality management. Based on their work it is possible to construct a framework adapted to the analysis of the central aspects of quality management. The framework is composed of five main elements, which are: Product Specification; Production Process Quality Management; Production Environment Quality Management; Logistics Quality Management and Alliances Between Trade Partners to Support Quality. A graphical representation of this framework is provided on Figure 3.1.

**Figure 3.1 Quality Management Strategy Analysis Framework**



Source: Developed by the author based on Dobler and Burt (1996) and Wood and Urban (1994).

These five basic elements of quality management are analysed in the following sections.

### Product Specification

A critical aspect of any commercial transaction is the characteristics of the product under negotiation. If the characteristics are clearly stated it will be easier for both

sides to the transaction (seller and buyer) to base their negotiation arguments on technical grounds.

Clearly stated characteristics mean ultimately clear specifications, descriptions that tell the seller exactly what the buyer wants to purchase. It is possible to follow two basic strategies in the development of specifications for a product. The first is founded on long-term forecasts. It is a push-based system where the producer develops the specifications based on production capabilities. The second strategy for specifications is demand driven. In this pull-based system the buyer (product seller to the final customer or the final customer themselves) takes the lead in the development of the specifications by accessing the needs of their clients (Sinchi-Levi, Kaminsky and Sinch-Levi, 2000). It is important to observe that really balanced specifications will result from the interaction between sellers and buyers, mainly because sellers (producers) know in depth the technical production potential and the buyers (wholesalers and retailers) have daily contact with the final customer.

Dobler and Burt (1996) maintain that most development of specifications developments follows this order:

- Study of quality requirements;
- Ensuring that quality requirements are completely and clearly stated in the specifications;
- Investigating the economical viability, and doing the cost analysis;
- Ensuring that specifications are written in a manner that permits competition among the potential suppliers;
- Verifying if the desired quality can be delivered by the potential suppliers;
- Ensuring the feasibility of the inspections and tests required to ensure quality.

A more complete approach to this topic was formulated by Slack, Chambers, Hartland, Harrison and Johnson (1998). According to them product specification is directly related to the management of quality standards, which can be divided into

four main parts: Defining which characteristics are important to product quality; Deciding how to measure each characteristics that is important for the product; Setting quality standards; Controlling quality according to the previously defined standards.

## Production Process Quality Management

Production quality management is fundamentally an internal matter in most organisations which can fully adopt a framework like the ISO 9000 series, TQM, GMP, GHP or HACCP. However the exclusive use of only one of these systems can prove to be excessively costly and not actually appropriate for a specific industry or firm.

It happens then, that some organisations partially adopt the procedures of one of the systems mentioned. One organisation may also select and adapt various quality management control techniques originating from several frameworks.

Processes are controlled against previously defined standards. Hence a considerable part of the job of process control is related to the determination of acceptable levels of quality (standards) in each distinguishable stage of the production process. After this task is concluded, Slack, Chambers, Harland, Harrison and Johnson (1998) have pointed out that three questions should be asked: At which point in the operations should the processes be periodically checked? Should every product be checked or can samples be taken? How should the checks be performed?

To answer the first question Slack, Chambers, Hartland, Harrison and Johnson (1998) observe that there are seven stages of any production sequence where quality should be preferably checked. They are:

- before a particularly costly part of the process;
- before a series of processes in which checking might be difficult;
- immediately after a part of the process with high defective rate or a fail point;

- before part of the process that might conceal previous defects or problems;
- before a point of no return, after which rectification and recovery might be impossible;
- before potential damage or distress might be caused;
- before a change in functional responsibility.

Should every product be checked? Preferably not, as product checking can be an expensive and time-consuming activity. Total product inspection is only indicated for those products where absolute precision is required; in most cases a sampling strategy is enough to control quality.

The final question is about how to perform the inspections. There is not a definitive answer, the majority of authors point to statistical methods. The most widely used is Statistical Process Control (SPC), a system that makes use of comparisons of mean and standard deviations. Davis, Aquilano and Chase (1999) observed that SPC should be used together with graphical illustrations of the production process and control activities. Along with the techniques indicated by the authors mentioned it is possible to find: process diagrams; control charts; check lists; dispersion diagrams; cause-effect diagrams; Pareto's diagrams; and histograms. All of these offer a visual aid that makes comprehension easy even for nonstatisticians.

## Production Environment Quality Management

The production environment is the locus where the production takes place; a permanent structure used repeatedly for manufacturing purposes. It has a long-term influence on the quality of the final product of a firm.

The quality level in the production environment is predominantly affected by the adequacy of the facilities, the proper use of machinery, the presence of quality control laboratories and the qualifications of the production personnel (Acseirad, 1994; Dobler and Burt, 1996).

The production facilities (buildings and stores) should offer adequate conditions for the development of the production process, for instance:

- Enough space for satisfactory disposition of the machinery;
- Adequate ventilation – A continuous supply of fresh air is important for healthy conditions of work. In some cases it is important to inspect the quality of the air (levels of dust, micro organisms and polluting gases).
- Hygienic conditions – The production facilities should always be kept clean with periodic disinfections. It is important to eliminate any possible hiding places for rodents and insects.
- Appropriate conditions for human work – This includes conditions at the production site (temperature, ventilation, light, and safety) and the supporting facilities like toilets, refectories and communal areas.

Another technical aspect highly influential in the quality level of the production environment is the proper employment of equipment. Proper employment means the choice of the equipment (type and processing capacity) followed by the adaptation of the equipment to production needs with the development of a production routine. Finally training should be provided for the operators of the equipment, in such a way as to guarantee efficiency and safety.

Quality control laboratories are not directly involved with manufacturing, they are mainly a supporting resource used to verify the efficacy of the production process and the quality of the final products. In most of the cases the laboratories perform just routine analysis (chemical, physical and microbiological) of the intermediary stages of a production cycle. By doing so the laboratories are able to indicate which procedures should be modified in order to prevent or remedy failures. Quality control laboratories can also assist in the development of production routines. Acseirad (1994) observed that production and laboratory personnel should stay in close relationship in order to overcome quality related problems.

Finally the production environment is influenced by the level of qualification and motivation of the production personnel. Actually this is the most significant factor, the one which sets the tone of the production environment. Acseirad (1994) maintains in his article that only qualified people are capable of understanding and properly applying concepts and tools of quality management. He argues based on data obtained from 11 case studies (in the Brazilian food industry) that firms which have tried to implement quality management programs with unqualified (and low paid) personnel have failed in their aim. The same author also observes that employing only qualified production personnel is especially important for the food industry mainly because those who have received training have more chance of following hygienic practices correctly.

### Logistics Quality Management

The logistics of a product may be organised by the production companies, or by the distribution partners (wholesalers or retailers) or the responsibility for this activity may be shared between producers and distributors. Before proceeding with the discussion of quality management of logistics it is important to establish a concept for logistics management. Brassington and Pettitt (1997) perceive logistics as a very comprehensive concept which embraces physical movements of raw materials (supply management) movement within the production plant and the distribution of the final product. The authors also mention that the functions undertaken by logistics include organising and processing orders, materials handling, managing warehouses and the selection of transportation methods.

When producers are responsible for the management of logistics they are also in charge of quality at these stages. On the other hand when the distributors are those responsible for logistics they are also responsible for the management of quality during the product's physical movements. Finally when logistics are a shared responsibility the responsibilities of each side need to be clear. The intention is that when a quality related problem is detected it will be easy to find who is responsible

for the fault. Any of the methods used for process quality control presented in the previous sections can be employed to control quality during logistics activities.

### Alliances Between Trade Partners to Support Quality

Traditional positions in the majority of trade relations are antagonistic in nature. Buyers tend to define exactly what they want then look for suppliers capable of delivering the product at the lowest price possible. It is common for buyers to instigate competition between suppliers on price concessions only. On the other hand the producers (suppliers) tend to search for buyers capable of paying the highest price possible for their product. In this state of affairs, both sides (suppliers and buyers) aim for only short-term gains for their transactions. Chadwick and Rajagopal (1998, p. 93) maintain that quite recently suppliers and buyers “realized the futility of the traditional concept of maximising short-term gains in each individual transaction.... Further they came to realize that there were vast potential benefits in developing stable and strategic partnerships with selected suppliers through mutual and long-term commitment of resources, common interests and loyalty. Such arrangements could save the energy expended on managing numerous small transactions individually to concentrate on handling much larger slices of the external resource pie. By working together organisations can make a much better job of satisfying the requirements of their end market and then increase their market share”. Chadwick and Rajagopal (1998) also observes that both sides in a partnership relation should be committed to a cost reduction effort by carefully monitoring all the relevant costs and by making the necessary investments in order to decrease them.

A framework developed for the analysis of strategic alliances, was proposed by Lewis (1990). Here this framework is adapted to the analysis of quality management of strategic alliances to support quality. According to Lewis (1990), strategic alliances should help with the following topics:

- Adding value to products – Partners should be capable of adding value to the product traded or at least maintaining its quality level. By doing so they increase the chances of properly satisfy the final customers' expectations.
- Improving market access – Partnerships that increase the exposure of a product have a chance of generating a more intensive trade flow, and as a consequence gains of scale and regularity of trade can be obtained. The trade partners will then have the resources and the time to improve quality in their business.
- Strengthening operations – Alliances can offer an environment propitious for conjoint development of the operations. Both sides have a chance to adopt compatible equipment, standards and management systems.
- Adding technological strength – The adaptation or the development of new technologies almost always means high investments. Long-term commercial relationships give the confidence that the investments in technologies capable of improving the product quality will be recovered.
- Enhancing strategic growth – Partners can use a mutually beneficial relationship to improve the quality of products and processes. By doing so they will have more chance to conquer new markets.
- Enhancing organisational skills – Alliances have the capacity to create an environment propitious to the exchange of information between the trade partners. Information in this case is not only that which is of a technical nature and directly related to the commercial relation but also information related to new organisational and managerial possibilities.
- Building financial strength – Alliances limit investment exposure to risks by allowing partners to share the risks of new enterprises.

Another important aspect of strategic alliances is the contractual relation between trade partners. Dolan, Humphrey and Harris-Pascal (1999) based on Sako (1992) organise a system to analyse these relations. According to them there are two main types of contracts: Arm's-length Contracting and Obligational Contracting. Table 3.1 shows their main characteristics.

**Table 3.1 – Arm’s Length and Obligational Contracting**

	<b>Arm’s Length Contractual Relation (ACR)</b>	<b>Obligation Contractual Relations (OCR)</b>
<b>Transaction dependence</b>	Buyer seeks to maintain low dependence by trading with large number of competing suppliers. Suppliers seek to trade with many customers.	For both customers and suppliers, avoidance of independence is not a priority. Buyers and suppliers have few customers.
<b>Ordering procedure and projected length of trading relationship</b>	Open bidding for orders. Short-term commitment desired and real.	Bidding may not take place; established suppliers tend to win continued business. Long-term commitment desired and real.
<b>Technical assistance</b>	Expertise rarely pooled, and assistance only when paid for.	Extensive unilateral or bilateral technology transfer over time.
<b>Communication</b>	Infrequent and through formal channels. Narrowly focused on purchasing department.	Multi-channelled, frequent and often informal.
<b>Risk sharing</b>	Risk resulting from price and demand fluctuations distributed according to explicit or prior agreement	Much sharing of risk. Gains and losses distributed on case-by-case basis according to some principle of fairness.

Source: Dolan, Humphrey and Harris-Pascal (1999) based on Sako, 1992.

The authors mentioned believe that relations which arise in the Obligational Contracting environment are those capable of promoting quality. On the other hand Arm’s-length Contracting is seen by them as a price centred type of relation, where there is little space for quality management discussions.

### 3.4 Alternative Theoretical Frameworks

Due to the complexity of fruit quality management in the international trade, different theoretical frameworks can be employed to analyse the sector. Some of these potentially useful frameworks are: Marketing, Agricultural Marketing, Strategic Management, Game Theory, Agency Theory and Transaction Cost Economics.

The main characteristics of these theoretical frameworks are discussed here in order to help with the selection of the most convenient reference for the theoretical and empirical discussions.

#### 3.4.1 Agricultural Marketing

There is some controversy about the employment of the expression “Agricultural Marketing”. This term can be used by both marketing professionals and agricultural economists.

As a marketing concept ‘agricultural marketing’ is utilized by agribusiness organisations to identify and address customers’ wants and needs in terms of agricultural products. As a concept of agricultural economics, ‘agricultural marketing’ aims to describe analyse and explain the main problems in the trade in agricultural products (Ritson, 1997). In this literature review only the agricultural economics perspective is adopted.

According to Scarborough and Kydd (1992) there are three main different perspectives used by economists to analyse the marketing of agricultural products:

- **The Internal Productive Efficiency of Marketing Enterprises** – From this perspective the concern is to analyse the efficiency of individual firms. The more common approaches using this viewpoint are the descriptive analysis of

accounting data, the use of econometric methods to estimate production and the cost analysis of production techniques.

- **Structure, Conduct and Performance** – This school is involved at a more general level, and the focus of its investigation is the relationship between functionally similar firms and their behaviour in the market. The word ‘structure’ refers to the structural market characteristics that influence competition, such as (amongst others): number of firms, size of firms and barriers to entrance. The word ‘conduct’ is linked to the examination of firms’ behaviour in a market. In most cases the analyses are of pricing, selling and competition tactics. Finally, the word ‘performance’ is associated with productive and allocative efficiency studies.
- **The Food Systems Framework** – This perspective focuses on systematic research into a sub-sector, in most cases from suppliers to ultimate consumers. This school is still based on the Structure, Conduct and Performance paradigm, despite the fact that it has some innovative analysis for vertical and horizontal relationships.

Agricultural Marketing, like any dynamic field of discussion, has space for new paradigms. Recently agricultural economists have adopted new perspectives to analyse the trade in agricultural products. Among these new approaches we can include: Game Theory; Behavioural Theory of the Firm; Agency Theory; and Transaction Cost Economics (Douma & Schreuder, 1998).

Transaction Cost Economics (TCE) has proved to be especially useful for the examination of agricultural marketing topics, mainly because it is a paradigm based on the supposition that transactions determine an organisation’s predominant mode of operation in a market.

### **3.4.2 Marketing**

Marketing, a very distinct part of the applied social sciences has experienced a fast and consistent development since the second half of the last century. From a peripheral and unimportant management function it has become the central issue for many organisations.

There are many definitions of marketing, and just two of them are presented here. The first was developed by the American Marketing Association (AMA, 1985), which affirms that “marketing is a process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to create exchange and satisfy individual and organisational objectives”.

The second definition was given by the Chartered Institute of Marketing (CIM), a British organisation. According to the CIM “marketing is a management process which identifies, anticipates, and supplies customer requirements efficiently and profitably” (Brassington and Pettit, 1997).

It should be noticed that these two definitions are very close to each other and both recognise that marketing is essentially a management process.

Many concepts were developed by the marketing professionals in order to identify and satisfy consumers’ needs and wants. One of these concepts is the marketing mix, which is composed of four main parts: product, price, place, and promotion (Kotler, 1994).

The concept of product is related to a physical good or service that is capable of satisfying a person’s needs. As a consequence, people are prepared to pay for the product in order to have access to it (Doyle, 1994). Price as a marketing issue is associated with the perceived economic value of a product in relation to the perceived economic value of a product or in other words, how the consumers analyse

the potential benefits of a good taking into account financial constraints (Lambin, 1993).

Place is one of the most complex and complete concepts of marketing mix. According to Brassington and Pettitt place is connected to the marketing channels used by producers and buyers in their trade relations. Place, as a marketing mix function is also linked to the physical distribution and logistics management of products.

Finally, the concept of promotion is related to the communication activities. The promotion function is considered to include all the communication resources that can be used in order to access and conquer the preference of potential consumers. Some of these communication resources are: advertisements, sales promotions, direct marketing, public relations, sponsorships and exhibitions (Fill, 1995; Brassington and Pettitt, 1997).

As in any management process, the marketing activities need to be planned and controlled. Plans of marketing, both strategic and operational are about the development of objectives and the organised deployment of resources in order to reach these objectives (Lambin, 1993). Brassington and Pettitt (1997, p. 909) observed that “as marketing plans are being implemented, they have to be monitored and controlled... Using information gathering in the monitoring process, the actual achievements of marketing strategies can be compared with planned or expected outcomes. Managers can then analyse gaps and decide whether they are significant enough to warrant corrective action”.

In addition to the main body of the marketing discussions there are diverse and important applications. Some of them are: Services Marketing, International Marketing and Marketing Research.

### **3.4.3 Strategy And Strategic Management**

Strategy is a concept that has been part of human life at least the time of ancient Greece. The term strategy was originally connected to the military world, meaning the art of planning and directing military resources in wars. As the concept of strategy evolved it assumed a broader meaning, becoming related to plans or actions designed to achieve long-term aims. A current and adequate definition of strategy states that “strategy is the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals” (Chandler, 1962).

It was only during the 1960’s that the concept of strategy started to be formally adapted to the business world. Three main authors were responsible for the task: Alfred D. Chandler Jr., Kenneth Andrews and Igor Ansoff (Moore, 1992).

Chandler created the most influential definition of strategy (above cited) and also associated to strategy the notion of organisational structure (Chandler, 1962). Andrews created the concept of corporate strategy. According to him “corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes, of goals, produces the principal policies and plans for achieving these goals, and defines the range of business the company is to pursue, the kind of economic and human organisation it is or intends to be, and the nature of the economic and non economic contribution it intends to make to its shareholders, employees, and communities”.

Ansoff wrote extensively about strategy and strategic management, he was one of the first authors to recognise the importance of process management for the strategy of organisations. Ansoff also coined the concepts of competitive advantage and portfolio strategy (Moore, 1992).

More recently Porter (1980) had considerable effect on the discussions about strategy by developing the concept of competition and by discussing how competition can affect the strategy of an organisation. In addition Porter also created the notion of value chain, an important tool for the specific administrative and productive efforts.

Apart from these main authors, many other scholars have also developed more elaborate ideas about strategy and strategic management. Most of them also tried to adopt the principal concepts of strategy to specific sectors or situations. It is important to emphasize that despite the fact that strategy and strategic management are broad concepts they are still a management process of organisations.

#### **3.4.4 Game Theory**

Game theory was originally developed by the mathematicians Jon von Neumann and O. Morgenstein with the aim of analysing situations of conflict, where one party's action induces a reaction from the others. According to Bannock and Davis (1992) "the theory of games is concerned with the study of the optimal strategies to maximise pay-offs, given the risks involved in judging the responses of adversaries, and also the conditions under which there is a unique solution".

Game Theory is only applicable to situations in which there are two or more players. Douma and Scheuder (1998) observed that two criteria are crucial for the classification of games: the number of players involved and the number of stages of the game.

Games with only two players and one stage are named co-ordination games. Games with multiple stages and two players are called entry games. Auctions is the name given to the games with only one stage and multiple players. Finally the games with more than two players and multiple stages receive the generic denomination: iterated prisoner's dilemma for many players (Douma and Schreuder, 1998).

It is important to make it clear that the Game Theory can only be employed to analyse external processes of organisations (conflicts). Internal processes are beyond the scope of Game Theory.

### **3.4.5 Behavioural Theory Of The Firm**

The Behavioural Theory of the Firm is a theoretical framework developed to analyse internal aspects of organisations. It is concerned mainly with the internal decision process. According to Bannock, Baxter and Davis (1992, p. 39) the behavioural theory is based on two main principles:

- “Firms attempt to satisfice rather than adopt maximizing behaviour;
- A firm is a set of individuals and groups each of which has its own aspirations; these groups, sometimes in coalitions, continuously bargain over the decisions the firm makes, leading to the pursuit of many complex goals.”

The principal groups which make up a firm are the inventors, distributors, consumers, suppliers, creditors and investors. Each of these groups is trying to contribute to the success of the firm, as a reward they expect to receive inducements (Douma and Schreuder, 1998).

As a theoretical framework the behavioural theory is only applicable to the study of intergroup relations or the examination of a firm in its integrity. Interfirm relations are not the object of the Behavioural Theory (Douma and Schreuder, 1998).

### **3.4.6 Agency Theory**

Agency Theory was developed to analyse the Principal-Agent problem “a problem that arises in many spheres of economic activity, when one person, the principal, hires an agent to perform tasks on his behalf but cannot ensure that the agent performs them in exactly the way the principal would like” (Baxter and Davies, 1998). In most of the cases the relations between the principal and the agent are regulated by contracts (formal and informal).

Within Agency Theory there are two main approaches: the Positive Theory of Agency and the Theory of Principal and Agent. In The Positive Theory of Agency contracts are central to the analysis since the firm is perceived as a network of contracts. There is investigation into how modifications on contracts would affect the behavioural participants (principal and agents). “In general it is assumed in the positive theory of agency that existing organisations are efficient. If they were not, they would not continue to exist. The positive theory of agency thus sets out to explain why organisational forms are as they are” (Douma and Schreuder, 1998, p. 99).

The Theory of Principal-Agent is focused in the examination of the reward structure designed by the principal to regulate the agent(s). The best reward structure for the principal is the one capable of obtaining the maximum effort from the agents within acceptable limits of risk. Mathematical models are part of this approach (Douma and Schreuder, 1998).

It should be noted that Agency Theory is employed to analyse interpersonal relationships, intergroup relationships and organisations. Interorganisational relationships are not analysed by the Agency Theory.

### **3.4.7 Evolutionary Approaches**

The evolutionary approaches to organisations are based on an analogy between the interactions of organisations with their environment and the Theory of Evolution. The ultimate aim of the evolutionary approaches is to verify why some types of organisations predominate in a specific environment.

The Theory of Evolution developed by Charles Darwin states that the living creatures are constantly adapting to their environment over time. The mechanism of evolution is based on the variation, selection and retention sequence. According to the theory only the best-adapted individuals prosper.

The evolutionary approaches to organisations state that organisations tend to follow the same basic mechanism of evolution (Baum, 1996). It is believed that there are some differences between organisations (variations) and that these organisations are competing to gain the consumers preference (selection). Only those organisations will prosper that are capable of capturing and retaining the consumers preference (retention).

The evolutionary approaches comprise two basic streams, Organisational Ecology and Evolutionary Theory. The former is focused on how the environment affects organisations. The latter is centred on how organisations react to modifications to their environment (Douma and Schreuder, 1998). All the different evolutionary approaches are preoccupied mainly with the analysis of populations of organisations, describing how they interact among themselves and how they interact with their general environment. Intraorganisational (internal processes) studies are not the object of the evolutionary approaches.

### **3.4.8 Selection Of The Theoretical Framework**

The main objective of this research is to analyse quality management in the British-Brazilian fruit trade. Since quality management is an internal administrative process it is possible to verify if fruit exporters operating in Brazil and fruit importers operating in the UK perceive the management of fruit quality as a barrier for their transactions. It is also possible to compare the views of both sides about fruit quality management problems.

The second main objective is more explanatory. It is about the characterization of the strategies adopted by British and Brazilian fruit traders in order to overcome quality problems in the international fruit trade.

Seven different theoretical frameworks were considered as alternatives for supporting the investigation and analytical procedures. Four of these theoretical

frameworks (Marketing, Strategic Management, Behavioural Theory of the Firm and Agency Theory) are best suited to analyse internal processes of organisations. The remaining three (Agricultural Marketing, Game Theory and Evolutionary Approaches) are more adapted to the analysis of interorganisational relationships.

In this research it is necessary to analyse both internal processes of organisations and interorganisational relationships. It then becomes essential to consider an alternative theoretical framework, one that is capable of helping in the analyses of both organisational and interorganisational issues at the same time. Transaction Cost Economics is this framework.

In the next sections are presented the origins and the main concepts of Transaction Cost Economics (TCE). A link is also established between TCE and quality management and finally applied studies of Transaction Cost Economics are presented that are relevant to this research.

### 3.5 Transaction Cost Economics

TCE is a scientific construct which has been developed by a great number of scholars with varying backgrounds and objectives. Some of these researchers have contributed to the enrichment of the theory with the creation and use of new constructs capable of analysing the complexity of economic transactions. Coase has achieved considerable merit in the development of the theory because of his early proposal to see markets and firms as alternative governance structures. Coase pointed out that there are costs involved in transactions in the market and when the market transactions are costly, institutions matter. The more common market transaction costs are: the cost of finding the relevant prices; the costs of writing transaction contracts; and the costs of reaching agreement. If the sum of all these costs is high, the alternative may be keeping the transaction within a single organisation. In this case all the problems of the price system are replaced by the co-ordination

mechanism of a firm. Conversely if the co-ordination mechanism is too costly the transactions will be executed at lower cost in market type negotiations (North, 1990; Douma and Schreuder, 1998; Coase, 1978).

Ronald Coase in his historical article (*The Nature of the Firm*) published in 1937, observed “as a firm gets larger, there may be decreasing returns to the entrepreneur function, that is, the costs of organising additional transactions with the firm may rise. Naturally a point must be reached where the costs of organising an extra transaction within the firm are equal to the costs involved in carrying out the transaction in the open market, or, to the costs of organising by another entrepreneur. Secondly, it may be that as the transactions which are organised increase, the entrepreneur fails to place the factors of production in the uses where their value is greatest, that is, fails to make the best use of the factors of production. Again, a point must be reached where the loss through the waste of resources is equal to the marketing costs of exchange transaction in the open market or to the loss if the transaction was organised by another entrepreneur. Finally, the supply price of one or more of the factors of production may rise, because of the other advantages of a small firm are greater than those of a large firm. Of course, the actual point where the expansion of the firm ceases might be determined by the combination of the factors mentioned above. The first two reasons given most probably correspond to the economics phrase of diminishing returns to management.”

Since the initial contribution of Ronald Coase many other authors have added to the TCE theory. Most of the contributions were centred on the two main poles of the transaction costs: market type transactions and hierarchical type transactions.

Market type transactions are related to discussions about contracting, hybrid form of transactions and information problems. Hierarchical type transactions on the other hand are directly connected to topics such as physical capital, vertical integration, employment of labour and organisational issues.

As the theory around TCE evolved, it became clear that the ideas of Williamson are at the epicentre of the discussions. The Williamsonian analysis of the structure of organisations, for instance, gives rise to the debate about the reasons behind the evolution of a small organisation into a multidivisional structure or even a multinational organisation. In the same manner he has clarified discussions about market structure (Williamson,1985).

According to Pugh and Hickson(1996, p.207) Williamson conceived that “markets and hierarchies are alternatives for conducting transactions. So transactions are brought within the hierarchical structures of organisations when the market mode is no longer efficient. For example, mergers or take-overs bring into a single organisation contracting parties whose transactions will then be regulated by the internal rules of a hierarchy and not by the rules of a market. Or organisations are set up to transact within themselves, business that might alternatively have been done by separate parties contracting between themselves in market terms”

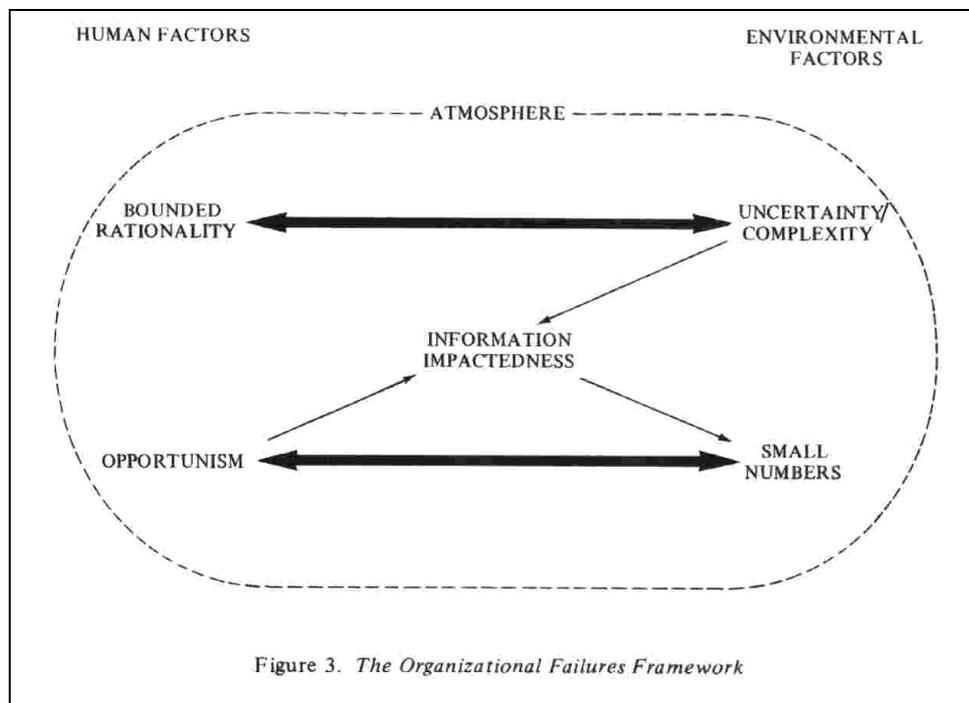
It is important to re-examine some of Williamson’s ideas, in particular the Organisational Failures Framework, a theoretical tool developed to analyse both hierarchical and market type transactions.

### **3.5.1 The Organisational Failures Framework**

The extensive writings of Williamson have approached several questions of economics with a new multidisciplinary perspective. He uses concepts of law, economics and organisation theory to analyse topics like vertical integration, peer groups, hierarchies, and organisation of work, corporate governance and other economic questions. The result is the creation of terms, concepts and new instruments for the analysis of transactions. One of these instruments is the organisational failures framework.

The central objective of the organisational failures framework is to understand why for a certain product in a certain place, transactions are predominantly either within a firm or market transactions. The framework is based on six main concepts known as: bounded rationality, uncertainty/complexity, opportunism, small numbers, information impactedness and atmosphere. Each one of them is centred in a particular aspect of the transactions universe (Williamson, 1975, 1985). Figure 3.2 shows a diagram developed by Williamson (1975, p. 40) to represent this framework.

**Figure 3.2 – The Organisational Failures Framework**



Source: Williamson, 1975.

**Bounded rationality** is a concept connected with limits in communication, language and intellectual ability. It is the recognition that human beings have a limited capacity to prevent and solve problems. Bounded rationality becomes a transaction problem only when it is paired with the predominance of **uncertainty and complexity** in a environment (Williamson, 1975, 1985). In this case being incapable of managing the risks and taking decisions can impair market negotiations.

Another serious threat for market transactions is the predominance of **opportunism**, which is defined by Goffman (cited by Williamson, 1975) as a false or empty statement, that is, self-disbelieved threats and promises. However according to Williamson (1975, p.27) “opportunistic inclinations do not imply that markets are flawed on this account. It is furthermore necessary that a **small-numbers condition** prevail. Absent this, rivalry among large numbers of bidders will render opportunistic inclinations ineffectual. Parties who attempt to secure gains by strategic posturing will find, at the contract renewal interval, that such behaviour is nonviable. Opposite parties will arrange alternative traders in which competitiveness are satisfied”. It follows that the transactions will stop occurring in a market only when the opportunistic behaviour is paired with small-numbers exchange relations, the so-called small-numbers condition.

To take into account interaction effects and to go beyond transaction-specific terms, the notion of **atmosphere** was created. It is assumed that the interactions are not neutral and that the exchange process itself is an object of value that can bring more accuracy or problems for the transactions. More accuracy or better relations will predominate when trust and goodwill prevail. On the other hand conflicts will naturally arise in a suspicious or even dishonest environment. Williamson (1975) declared that transactions will only receive the effects of a positive or a negative atmosphere when the transaction terms are already determined by the other elements of the organisational failures framework.

As a confluence of all these ideas, Williamson (1975, p. 31) forged the concept of **Information Impactedness**. This concept appears in his works on several occasions and is used in different contexts, but the main definition is as follows: “Information impactedness is a derivative condition in the organisational failures framework. It is mainly attributable to pairing of uncertainty with opportunism. It exists in circumstances in which one of the parties to an exchange is much better informed than is the other regarding underlying conditions germane to the trade, and the

second party cannot achieve information parity except at great cost - because he cannot rely on the first party to disclose the information in a fully candid manner.”

Pugh and Hickson (1996, p.27) in a interpretation of Williamson, say that: “transactions will be shifted out of a market and into the hierarchy of a firm or other form of organisation, when information impactedness is high, that is, when the uncertainties and distrust inherent in transactions become too great for prices to be acceptably determined at this point the advantage of hierarchy becomes greater”. In other words, the firms that operate in a market with high information impactedness will look for nonmarket transactions.

It is important to notice that information impactedness is mainly a consequence of the predominance of uncertainty and opportunism in a market, so to minimise the problems of information impactedness it is necessary to reduce both of these in the transactions.

In addition to the organisational failures framework, Williamson also employed the concept of **asset specificity** in his analysis of transaction arrangements. He states that “asset specificity refers to durable investments that are undertaken in support to particular transactions, the opportunity cost of which investments is much lower in best alternative uses or by alternative users should the original transaction be prematurely terminated, and the specific identity of the parties to a transaction plainly matters in these circumstances, which is to say that continuity of relationship is valued, whence contractual and organisational safeguards arise in support of transactions of this kind, which safeguards are unneeded (would be the source of avoidable costs) for transactions of the more familiar neoclassical (non-specific) variety” (Williamson, 1985 p.55)

Stukey and White (1993) recognise three main types of asset specificity. The first one is site specificity, which occurs when the investments are located in one region where they can be used for only one specific purpose. Technological specificity is a

second type of specialized asset. It associated to those equipments which are acquired to support the transactions with a specific partner. If the equipment is to be used in other purposes it has low value. Finally the third type of asset specificity is human asset specificity; in this case investments is made in the preparation of employees in such a way that they will develop the skills that are important only to a particular buyer.

### **3.5.2 Institutions And Transaction Cost Economics**

Market type transactions and hierarchical type transactions are not the only focus of the TCE; a considerable number of authors have also raised the questions about institutions, the superstructure that comprises both market and hierarchical transactions.

Alfred Chandler (1992) employed economic history to describe and to analyse how institutions can influence entire industries. Alchian (1950) developed the idea that societies do create institutions as antidotes capable of combating uncertainties. Klein and Leffer (1991) demonstrated that market forces are capable of developing institutions that are effective in assuring contractual performance.

Douglass North adopted history and economic history as the main frameworks for his discussions. His conclusions are nor far from those of Alfred Chandler. North (1990) clearly connects transaction costs and institutions, he argues that institutions are developed to decrease transaction costs and that institutions create the incentive structure in an economy. North (1990) observed that organisations will arise to take advantage of the opportunities provided by a specific institutional environment. North also observes that the predominant institutions in a specific market or society may lead to development, stagnation or even depression.

According to Douglass North (1990, p. 118) “institutions provide the basic structure by which human beings throughout history have created order and attempted to

reduce uncertainty in exchange. Together with technology employed, they determine transaction and transformation costs and hence the profitability and feasibility of engaging in economic activity. They connect the past with the present and the future so that history is largely the incremental story of institutional evolution in which the historical performance of economies can only be understood as part of a sequential story.”

### **3.5.3 Hierarchical Type Transactions**

Hierarchical type transactions are those transactions that happen inside the structure of an organisation or hierarchy. The concept of hierarchy, however is not so direct as the concept of hierarchical transactions. In fact there is some controversy about what a hierarchy is.

Moore (1992) argues that an hierarchy is an collection of assets. Aoki, Gustafson and Williamson (1990) maintain that a hierarchy is a nexus of contracts, where both formal and informal contracts are used to organise production resources. Sartori (1998) defends the idea that a hierarchy is directly associated to the concept of authority, or in other words the power or right to give orders and enforce obedience.

Mitchell (1998, p. 105) used the different interpretations about hierarchies to forge a complete notion of hierarchy. According to him “ in a market each element (individual, firm) pursues its own interest and the interaction between the elements produces a collective outcome – the market coordinates the separate activities. Coordination by hierarchy is different in that the actions of similar elements (individuals, firms) is to some extent constrained. Hierarchy presupposes an already determined outcome or purpose; the underlying idea of hierarchy is that such an outcome can be broken down into a set of sub-processes. So organisation depends upon ideas of organisation, task specialization and rationality. In addition hierarchies involve a stratification of authority and the following of rules.”

## Physical Capital And Vertical Integration

The control of physical capital (used for production purposes) is a crucial aspect of the hierarchical type transactions. If the physical capital is controlled by a single entity the transactions are of the hierarchical type only. If the physical capital is controlled by more than one entity the transactions are necessarily both of hierarchical and market types. It is important to identify the forces capable of influencing the ownership of the physical capital.

Hart (1998) supports the idea that vertical integration is capable of overcoming transaction difficulties when the assets involved with the production processes are transaction specific. Hart (1988) argues that transaction-specific assets are better controlled and managed when they are owned by a single entity. He observes that “firm 1 purchases firm 2 when firm 1’s control increases the productivity of management more than loss of control decreases the productivity of firm 2’s management”.

Klein, Crawford and Alchian (1978) clarified the notion of transaction specific assets. They observe that when the assets are transaction-specific (it is difficult to use the assets for alternative economic activities) quasi-rents may be appropriated by the contracting agents. The authors define quasi-rent as the difference between the original value of an asset and its alternative best value. Klein, Crawford and Alchian (1978) state that vertical integration is an alternative capable of overcoming contractual opportunism in transactions.

## Employment Of Labour

Another crucial aspect of vertically integrated organisations is the employment of labour. This issue has been widely examined as a transaction cost issue. Simon (1951) pioneered the discussions by creating two categories of labour contracts: sales contracts and employment contracts. According to Simon sales contracts are devised

to pay workers for a specific action freely offered by the workers. In the employment arrangement it is the employee who sets the actions that the workers should execute. Simon (1951) argues that the employment relation arises since it is almost impossible to contract and monitor all the individual actions that need to be carried out in an organisation.

Alchian and Demsetz (1972) observed that certain activities are not completely divisible, it then becomes very difficult to pay the workers according to their individual contributions. It becomes necessary the figure of a principal who supervises the workers with the aim to avoid shirking behaviour.

The transaction cost of the employment relation was examined by Baker and Murphy (1992). They pointed out that an extensive division of labour allow workers to focus their efforts on specific tasks, a situation that leads to an increase in productivity. There are, however, transaction costs associated with specialization of labour. Becker and Murphy (1992) maintain that more intensive specialisation requires supplementary coordination. Since these coordination activities are associated with various costs, the specialization process will be discouraged if there are additional costs.

In order to analyse the employment relation Williamson (1975) developed three main categories of contracts: contingent claims contracts, sequential spot contracts and the authority relation. The users of the contingent claims contracts need to predict all relevant circumstances able to influence their transactions and to devise contractual solutions to deal with the different circumstances.

Sequential spot contracts is one of the simplest types of contracts. In this case the users of the sequential spot contracts only need to agree about the tasks that need to be performed and the price that is acceptable for both sides. No further commitment is necessary (Williamson, 1975).

The authority relation is regarded by Williamson as an intermediate solution for the problems of both sequential spot contracts and the contingent claims contracts. In this case the employee agrees to accept the authority of the employer in return for which the employer agrees to pay the employee a stated wage. For this type of contract the employee will only accept the authority of the employer if both sides agree about a subset of activities that can be performed (Williamson, 1975).

It should be mentioned that there are many different approaches regarding hierarchical type transactions, some of them are: transaction costs and property rights organisational analyses and institutional analysis.

#### **3.5.4 Market Type Transactions**

Market type transactions are those transactions that happen in a market environment. There are many definitions of what a market environment is, though none of them can be considered conclusive.

The neo-classical conception of market is directly linked to the idea that it is the locus where buyers and sellers are attempting to maximize their profit by regulating their outputs and inputs. Price is perceived as the most important equilibrating mechanism of the market (Thompson, Frances, Levacic and Mitchell, 1998).

The Marxist notion of market is less indulgent. It considers market a place that promotes inequality, where the economically strong find the conditions to gain from the economically weak. Marxists consider unregulated markets as an unsound situation with undesirable cycles of expansion and contraction (Thompson, Frances, Levacic and Mitchell, 1998).

According to an institutional perspective, markets are perceived as organised and institutionalised exchange. Hodgson (1988) define market as a “set of social and institutions in which a large number of commodity exchanges of a specific regulatory

type take place, and to some extent are facilitated and structured by those institutions”.

The TCE notion of markets is less ambiguous. Levacic (1998, p. 23) considers market as a “decentralized coordinating device, in contrast to hierarchy. Its defining relationship is exchange motivated by individual self-interest, with prices crucial in signalling information, to which participants respond. However, it is important to appreciate that market coordination could not function in the observance of the other modes of coordination. It requires collective agreement in the form of government to define the property rights that are part of the exchange and to enforce contracts through the legal system”.

Levacic (1998) also recognises the importance of trust for market type transactions. According to her market coordination is more efficient when trust (built through networks and sustained by constructive social expectations) prevails. Market environments favourable to self-interested behaviour and to litigious legal actions tend to be less capable of promoting growth and development.

## Contracts

Contracts are a crucial aspect of market type transactions. They are used to regulate the relationship between buyers and sellers. Contracts can be formal or informal, written or verbal, in all situations they are employed as a major reference during commercial transactions.

It is important to notice that a transaction is not only a two-way transfer of goods, services or money between the transacting counterparts; it also involves a transfer of property rights (Hodgson, 1988). Williamson (1985) observed that property rights are important for transactions and contracts. The controller of the property rights of an asset has the right to use the asset, has the right to appropriate returns from the asset and has the right to change the asset.

Contracts need to be clear in order to specify the exact conditions under which the property rights exchange hands. Coase (1960) and also Hart and Moore (1990) studied the ownership of property rights, according to them the property rights will be better distributed when the transaction costs are low. It is then important to guarantee that the contracts are capable of generating frictionless transactions.

For market type transactions, Williamson (1975) distinguishes three main types of contracts: Contingent Claims Contracts, Incomplete Long-Term Contracts and Sequential Spot Contracts.

Contingent Claims Contracts are characterised by the attempt to design a totally comprehensive contract, which is capable of envisaging and dealing all possible outcomes of a transaction. Contingent Claims contracts are likely to be costly since it becomes necessary to exhaustively stipulate each potential transaction contingency and to devise procedures to deal with each of these contingencies. Due to their high costs and complexity the Contingent Claims Contracts were regarded by Williamson (1975) as impracticable.

Incomplete Long-Term Contracts is an intermediate solution between the Contingent Claims Contracts and the Sequential Spot Contracts. Williamson (1975, p. 91) observed “that incomplete contracts, without more, pose trading risks is obvious: the natural posture for each party is to bargain opportunistically when contractual ambiguities develop. But might the hazards of contractual incompleteness be overcome by (1) introducing a general clause into the contract to the effect that the parties agree to be guided during contract execution by joint-profit maximisation considerations, and (2) investing an appropriate sharing rule in order to induce the parties to adhere to the agreement? The purpose of such an arrangement is to encourage the parties to behave cooperatively in a joint maximizing way, when unforeseen contingencies develop”.

Sequential Spot Contracts or short-term contracts are the simplest form of contract. In this case no long-term commitments are kept between the transacting counterparts, instead both sides favour a higher degree of freedom (Williamson, 1975). Generally, the users of short-term contracts observe two main points. First to find products or services capable to satisfy their needs. Second to find the most favourable price. Freedom of choice is an important ingredient for the spot transactions since it is a guarantee that the best combination of specification and price will be found.

In addition to Williamson's views some other authors have contributed different important concepts. Goldberg and Erickson (1987) developed the idea of "relational" contracting. The authors analysed a sector with intensive transaction specific assets (the trade of petroleum coke in the USA). Goldberg and Erickson concluded that long-term contracts were developed to minimise the transaction costs and to avoid litigious price discussions.

Joskow (1987) studied another sector with intensive transaction-specific assets (the trade between coal suppliers and electric utilities). The author came to the conclusion that increases in the specificity of investments increase the duration of the contracts. Similar results were reached by Mulherin (1986) when he analysed the contracts of the natural gas sector in the USA.

## Interorganisational Transactions

Market and hierarchical are the two main types of transactions. There are however some transactions that possess characteristics of both market and hierarchical type transactions at the same time. They are a particular subgroup of interorganisational transactions.

Jan B. Heide (1994) observed that some organisations are capable of forging long-term alliances that are favourable to all sides directly involved. He maintains that an advantageous interorganisational transaction is able to control individual's utility

functions in favour of the global utility of the system, or in other words, joint efforts and concern for the long-run benefit of the system is a valid way to reach the goals of each organisation.

Heide (1994) even developed a governance typology for some types of interorganisational transactions. According to him interfirm governance can be divided along three main dimensions:

- Relationship initiation, which is marked by the evaluation of potential partners, initial negotiations and preliminary adaptation efforts;
- Relationship maintenance, which is marked by role specification, planning, adjustments, monitoring procedures, development of incentive systems and means of enforcement; and
- Relationship termination, which is marked by the determination of the mechanisms for transaction cessation.

Lusch and Brown (1996) analysed a specific category of interorganisational transactions, the transactions developed by wholesalers with their suppliers. The authors observed that when a wholesaler and a supplier find themselves involved with a mutually beneficial transaction they tend to develop a long-term orientation and to create contracts capable of increasing their transaction performance. The authors also maintain that in some cases the transacting counterparts are capable of developing specific managerial instruments to better guide their transactions.

Some specific categories of interorganisational transactions are called hybrid transactions, since they have characteristics of both market and hierarchical types of transactions. Clans, clusters and networks are some of denominations given to these particular types of transactions.

Ouchi (1980) characterizes clans as a group of hierarchies regulated by social mechanisms that are capable of reducing differences between individual and collective goals and are also capable of producing a strong sense of community.

According to Ouchi (1980), clans are marked by a strong sense of reciprocity, by a clear delimitation of a central authority and by the presence of common values and beliefs.

Menard (1998, p. 410) maintains that hybrid transactions “can be viewed as a specialized governance structure differing from markets as well as from hierarchies. They develop for dealing with bi or multilateral dependence, when this dependence is strong enough to require close coordination but is not strong enough to induce full integration”. Menard (1998) also maintains that hybrid transactions (including clusters) are characterized by clear contractual arrangements, by the presence of incentive mechanisms destined to leverage the allocation of residuals rights, and by the existence of specific forms of control since price regulation tend to have a limited importance.

Thompson, Frances, Levacic and Mitchell (1998) perceive the network as a particular type of relation that links a defined set of persons, objects or events. In contrast to vertically organised hierarchies, networks are considered a “flat” organisational form. The authors sustain that networks are coordinated in a less than open manner by a specific group. In most cases networks are not subject to any obvious accountability but take into account relational rules.

### **3.5.5 Transaction Costs Economics and Quality**

#### **Theoretical Links**

The association between quality management and transaction cost is direct for the hierarchical type transactions. Coase (1937), Williamson (1975, 1985), North (1990) and Hodgson (1988) recognise that managerial control activities are an indissociable part of the hierarchical transactions. Since quality management is essentially a managerial control activity, the link is established. Based on the previous ideas it is

possible then to affirm that quality management is a resource employed by hierarchical organisations in order to decrease internal transaction costs.

For market type transactions the connection between quality management and transaction cost is less direct. Some particular types of interorganisational transactions make use of market coordination as an alternative way of governing production and exchange. Quality management is employed then as a market coordination instrument.

Akerlof (1970) was a pioneer in the establishment of the theoretical links between quality and market type transactions. In his historic article “The Market for Lemons: Quality Uncertainty and the Market Mechanism”, he noticed that the uncertainty about the characteristics of a product under negotiation is capable of generating transaction barriers, some of them impossible to overcome. To illustrate his ideas, Akerlof (1970) assessed the market for used cars in the USA. He observed the existence of predominant prices (the market price) for the different categories of used cars. Akerlof (1970) argues that the owners of the cars with better technical specifications than the average cars, would not agree with the “market price” and tend not to offer their cars for negotiation. On the other hand the owners of cars with second-rate technical conditions (lemons) have an incentive to sell their cars according to the market price. This is a vicious mechanism which tends to drive the prices down until only the worst cars are transacted or until the market collapses.

Akerlof (1970) claims that the transacting parts can develop some institutional alternatives in order to stop the degenerative cycle described above. He maintains that in most cases these alternatives are centred on the concepts of quality guarantee and brand name quality. Akerlof (1970) states that “numerous institutions arise to counteract the effects of quality uncertainty. One obvious institution is guarantees. Most consumer durables carry guarantees to ensure the buyer of some normal expected quality. ...A second example of an institution which counteracts the effects of quality uncertainty is the brand-name good. Brand names not only indicate quality

but also give the consumer a means of retaliation if quality does not meet expectations. For the consumer will then curtail future purchases. Often too, new products are associated with old brand names. This assures the prospective consumer of the quality of the product.”

Stigler (1961) developed the concept of “search cost” as a type of transaction cost. According to him, buyers need to spend time and effort in order to find the highest quality product at the lowest price. Stigler (1961) maintains that buyers will pursue their search until the expected marginal gains from searching equal the marginal costs of continued searching. To avoid search costs the transacting organisations can develop quality assurance mechanisms.

Barzel (1982) observed that measuring and pricing all characteristics of a product can be difficult and costly. Occasionally these measurement costs can be a significant obstacle to the market transactions. Among other issues Barzel (1982) presented quality management as a market and organisational response to the measurement costs problem.

## Empirical Links

Quality management can be employed as a resource capable of reducing both internal and external transaction costs. A considerable number of authors have used empirical data to clarify this relation.

Bello and Gilliland (1997) conducted a comprehensive survey with American manufacturers and their foreign-based distributors. The final objective was to analyse the performance-enhancing effects of quality control and cooperation processes within the export channel. The authors concluded that distributors and manufacturers make extensive use of quality control mechanisms in order to reduce transaction costs.

Bessant, Levy, Sang and Lamming (1994) employed the concept of quality management aiming to analyse the relationship between a major UK organisational purchaser and its suppliers. The authors arrived at the conclusion that quality management has a pivotal role in supply relationships. According to them quality management concepts were employed to:

- Define the purpose for the relationship;
- Define the boundaries of the transacting organisations;
- Guide and monitor the progress of the relationships;
- Establish and develop behavioural norms;
- Identify people and attitudes capable of promoting relationship development;
- Ensure long-term development and learning within the relationship.

Mari Sako (1992) analysed price, quality and trust as elements of inter-firm relations in Britain and Japan. The particular sector analysed by her was the electronics industry, she concluded that in this highly dynamic and competitive sector, quality management is an indissociable part of the trust construction process. She mentioned in particular the quality inspection issue. Sako (1992) argues that conjoint quality management programs are capable of generating savings on transaction cost for both suppliers and users of electronics components. She also mentioned that the just-in-time (JIT) system is only possible when the transacted goods embody an acceptable level of quality.

Dolan, Humphrey and Harris-Pascal (1999) analysed a completely different sector, the international trade of fresh vegetables. The authors observed that African exporters and British importers of fresh vegetables make extensive use of quality management concepts. Dolan, Humphrey and Harris-Pascal (1999) mentioned that “success in the fresh vegetable chain depends on meeting (and exceeding) the exacting requirements of UK supermarkets. These are the non-negotiable conditions of market entry for the fresh vegetable trade. There is little scope for exporters who lack the investment capabilities to ensure a consistent, quality product that complies with regulatory requirements to participate in the current market.”

Loader (1997) found similar results to Dolan, Humphrey and Harris-Pascal (1999). He analysed the imports of fresh Egyptian potatoes to the UK. The empirical data collected by Loader (1997) revealed that the potato trade between Egypt and the UK is highly influenced by the British supermarket chains and that these organisations make use of quality management techniques in order to reduce transaction costs.

An interesting analysis of transaction costs and quality was carried out by Hobbs (1996). The sector he examined was UK beef retailing. Hobbs (1996) argues that “the desire for beef suppliers of consistent quality would tend to mitigate against short term supply relationships between retailers and a large number of occasional suppliers since the resulting information and monitoring costs in finding appropriate suppliers and ensuring that their products were of a consistent quality would be too high. Instead, long-term relationships between retailers and processors would reduce the transaction costs incurred by the retailer. This might take the form of strategic alliances partnerships with processors and producers marketing groups or long-term supply agreements (contractual and informal) with few processors”. Hobbs (1996) also argues that quality management concepts are a constituting element of the strategic alliances and the long-term agreements.

The French poultry industry was examined by Menard (1998 and 1996). He observed the existence of hybrid type transactions within the sector (clusters and networks). In this case poultry producers and traders are able to maintain their individuality and to make use of transaction features that are typical of hierarchies. Menard (1998 and 1996) analysed in particular the coordination processes implemented by the transacting parties. He noticed that quality management concepts (quality control in special) were extensively employed with the aim of reducing transaction costs between the negotiating counterparts.

Menard (1996 and 1998) noted the existence of certifying organisations. He argues that these bodies are present in the French poultry industry with the aim of guaranteeing quality standards and reducing transaction costs. According to him the

certifying organisations are responsible for setting and monitoring the quality requirements. Menard (1998, p. 415) maintains that these “requirements must be accepted *ex-ante* (through contracts), must be implemented during process (conditions of feeding, space, and ventilation), and must be confirmed *ex-post* (respect of duration of growth and delivery dates)”.

### **3.5.6 TCE: Some Limitations**

Despite the fact that TCE is becoming more frequently used as a framework for the analysis of agricultural marketing questions, it has some limitations.

The first limitation comes from the fact that TCE is based on a series of very subjective concepts and relations. This is a serious constraint in terms of research techniques that can be employed to raise data from the universe under investigation. A researcher using TCE as a foundation for his investigation will find it difficult to employ properly tools of mathematical modelling or statistics in the analysis of their information. The quantification of TCE concepts is a task that still needs to be done.

To deal with the subjectivity of TCE’s concepts it is possible to use qualitative research techniques. By adopting this strategy researchers will have the capacity to obtain data more suitable to be analysed by TCE. Quantitative research methods will only work if carefully tailored measurements are taken from reality.

The second limitation of TCE is related to the fact that transaction analysis is still mainly an academic topic. Few people outside academia are using (or even know about) TCE as a point of reference for their business. In other words TCE as a “language” is not employed in day-to-day trade activities. This situation has serious implications in terms of scientific research. For instance, a researcher cannot make use directly of TCE terminology in his questionnaires or interviews, simply because the chances are high that the interviewees (or respondents) will not recognise the terminology. To overcome this constraint it is possible to use conversion strategies.

In this case TCE terminology is converted into the trade jargon of a specific sector. In other words, a researcher who wishes to use TCE theory to raise data will need to create a sort of dictionary to translate TCE terminology into trade jargon and vice-versa.

A third limitation of TCE derives from the complexity of its theory. There is not a sole interpretation of the theory, in fact the construct is built around the contributions of three prominent authors: Ronald Coase, who set the foundations of the theory (Coase, 1937, 1984, 1991a, 1991b, 1991c); Oliver Williamson, who developed a framework to analyse transaction arrangements (Williamson, 1975, 1981, 1985, 1994, 1996, 1999); and Douglass North who developed a framework to analyse transaction environments (North, 1978, 1989, 1981, 1990, 1994). However these three authors developed their ideas based on concepts created by a myriad of other scholars, most of them with a broad range of backgrounds (law, economics, sociology, and management). The final outcome is that TCE is a complex and multilateral construct. To minimise this problem it is possible for a researcher to restrict the focus of his analysis, reducing the themes under investigation and the concepts utilized to analyse the data.

### **3.5.7 The Organisational Failures Framework and Quality Management**

TCE and quality management are independent theoretical constructs, which different authors with different objectives created independently. The literature review conducted in the previous sections shows that it is possible to establish links between some concepts of the two constructs. It is important to see that TCE aims to identify ways to decrease transaction costs and that quality management can be used as an instrument to decrease transaction costs. This relation is easily seen when the Organisational Failures Framework is utilized as a reference. The reasoning follows.

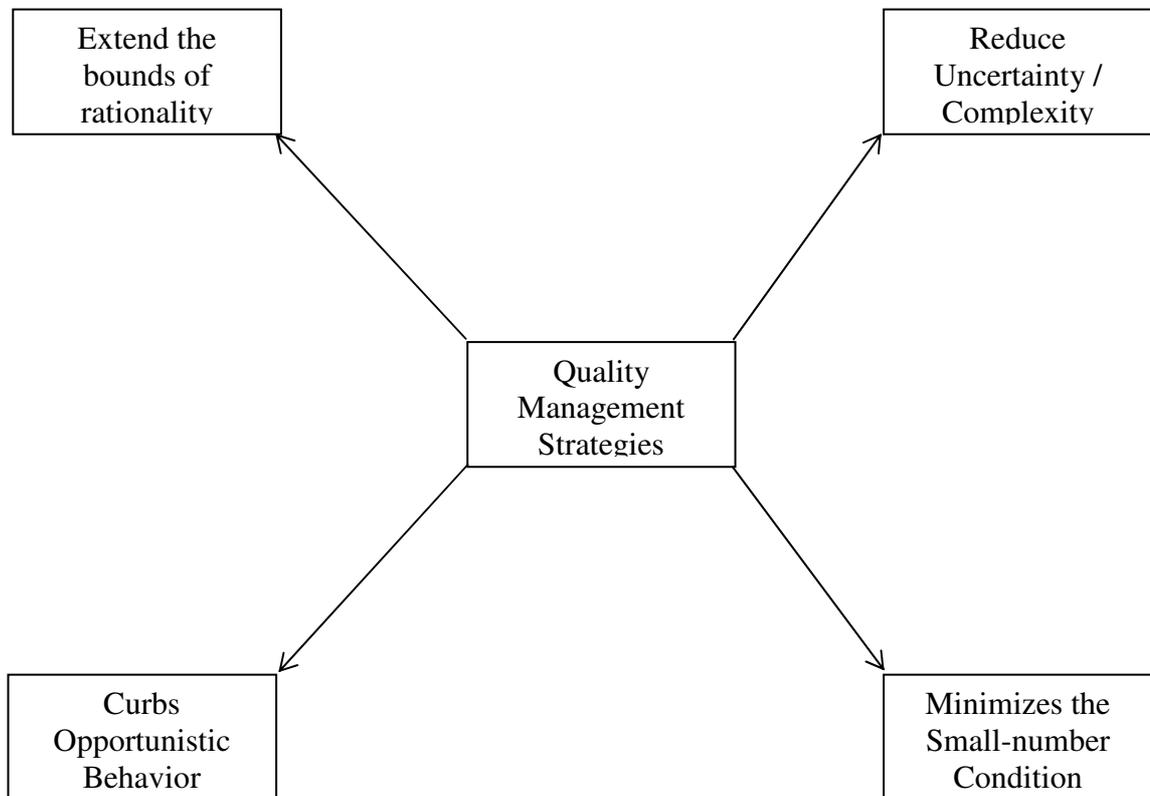
The central concept of the Organisational Failures Framework is information impactedness. This is an unfavourable condition for market type transactions, which

emerges when in a sector there are high levels of: bounded rationality, uncertainty/complexity, opportunism and the small-number condition (Williamson, 1975). It results that any measure adopted to minimize information impactedness will be favourable to the increase in the number of market transactions.

It was possible to see in the previous sections that quality is a concept actively used by trade partners (suppliers and buyers) to regulate their commercial relations. By elevating the quality levels of products and processes, trade partners achieve a capacity for reducing costs (including transaction costs) and consequently increasing their trade.

One can say that quality management is a favourable condition for market type transactions or in other words it is a resource that can be used to reduce information impactedness. By extending this idea it is possible to assume that quality management can be used as an instrument capable of minimising the difficulties posed by the constituents of information impactedness: bounded rationality, uncertainty/ complexity, opportunism and the small-number condition. In the following paragraphs each of these relations are examined. These relations are represented by Figure 1.3, which is inspired by the Williamson's graphical representation of the organisational failures framework (Williamson, 1975).

**Figure 3.3 – Quality Management Influence on the Organisational Failures Framework**



Source: Developed by the author based on Williamson (1975, p. 40).

**Quality management can help to reduce uncertainty/complexity in the trade of a product.** In most cases uncertainty arises in transactions when the buyers have doubts about the capacity of producers to deliver products with the required quality level. A way to guarantee the desired attributes in the products (and consequently reduce the level of uncertainty) would be to use quality management procedures in the production processes. It is important to observe that once uncertainty is under control the chances are high that the complexity of the trade relations will also decrease. This happens mainly for the reason that buyers and sellers do not need to negotiate or handle quality related problems.

**Quality management can help to extend the bounds of the rationality in the trade of a product.** It is common for buyers and sellers to have little information about each other, especially information concerning technical procedures. If quality management techniques are to be used, both sides have the incentive to learn about every technical aspect of the product cycle. This approach leads to a situation where trade counterparts have the capacity to trace the origin of problems when they materialize.

**Quality management can help to curb opportunistic behaviour.** It is not difficult to find situations where a buyer rejects a product alleging quality problems. The allegation may be true, or it may be only a strategy devised to obtain some gains from the seller (better prices, or better payment conditions). This type of opportunistic behaviour is unlikely to occur when buyers and sellers are using quality management systems to conduct their business. In this case any allegation of poor quality needs to be based on technical grounds, not on subjective evaluation.

**Quality management can help to overcome the small-number condition.** It is not difficult to find unbalanced business relations where one side has excessive ascendancy over the other side. The problem typically results in the prominent side using its power to obtain excessive gains from the weak side. This unbalanced situation can lead to the deterioration of the trade relationship. When the quality management approach is adopted both sides are committed to obtaining gains not from each other but from the improvement of the quality of products and processes. The efficiency gains obtained can then be divided between the partners.

Finally one can say that by reducing information impactedness in a trade relation, buyers and sellers have more chance of achieving a favourable business atmosphere. In other words the interaction will not be perceived as neutral anymore but as a valuable asset that has the capacity of resolving specific transaction problems with accuracy.

### 3.6 General Hypotheses

After concluding the literature review concerning fruit quality management, quality, and transaction cost economics, it then becomes possible to formulate the general hypotheses of this investigation.

In relation to the first research question (Are the different factors that affect quality perceived as a cause of problems in the British-Brazilian fruit trade?); it is possible to hypothesise that fruit traders tend to adopt quality management techniques in order to minimise transaction costs, or in other words, the viable international fruit traders are capable of dealing effectively with the different factors that affect quality in the British-Brazilian fruit trade<sup>1</sup>.

The simplest way to express the hypothesis would be: The different factors that affect fruit quality are not perceived as a cause of problems in the British-Brazilian fruit trade. It is possible to test this hypothesis by asking the fruit traders to indicate the perceived level of quality problems in each technical aspect that affects fruit quality. These technical aspects are: field production techniques; use of defensives (chemicals) in the production fields; grade of maturity, harvesting practices; fruit appearance; fruit texture; fruit nutritive value; fruit flavour; safety requirements for fruits; use of chemicals during the post-harvest processing activities; fruit packing; pallet consolidation; transport from the production fields to the main carrier (airplane or ships); transport in the main carrier; unloading the main carrier (at the destination port); and transport from the main carrier to the importer facilities.

In relation to the second research question (Which are the strategies adopted by exporters and importers in order to guarantee product quality in the international fruit

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<sup>1</sup> Numerous strategies can be used to overcome problems in the fruit trade; the adoption of quality management values is one of them. As we saw in this chapter, quality management is a concept that can be used to facilitate transactions in the most diverse sectors, or in other words, it is a construct capable of reducing the complexity of trade relations. It does this by helping the organisations to use a common “language” or a common set of procedures during negotiations.

trade?); it is possible to hypothesise that fruit traders in Brazil and the UK tend to make use of quality management strategies such as: Product specification, Production Process Quality Management, Production Environment Quality Management, Logistics Quality Management, Alliances with Trade Partners.

The second research question also creates a way to characterize the main transaction arrangements used by the organisations present in the international fruit trade. It is important to verify if fruit traders are using predominantly hierarchical or market type transactions (or even a combination of both) in their trade activities.

### 3.7 Summary

- i) Fruit quality management is directly influenced by morphological and physiological characteristics of fruit. Technical aspects of fruit commerce (production and harvest factors, fruit attributes, post-harvest factors and transport factors) are also important for fruit quality management.
- ii) Quality management is a construct developed empirically by a great number of scholars and consultants. The majority of them believe that continuous improvements in quality of processes, products and services will help to decrease costs and better satisfy customers' needs.
- iii) Traders (buyers and sellers) can adopt different quality management strategies to regulate their business. Most of these strategies are based on concepts like: Product Specification; Production Process Quality Management; Production Environment Quality Management; Logistics Quality Management; and Alliances Between Trade Partners to Support Quality.
- iv) Fruit trade is a dynamic theme of research that can be studied by employing of different analytical frameworks. Transaction Cost Economics (TCE) is one of these frameworks.
- v) The main idea behind TCE is that firms and markets are the two sides of the same coin. Transactions will be conducted within the internal organisation

when market type transactions prove to be costly and unsafe for buyers and sellers.

- vi) The Organisational Failures Framework is part of TCE theory. It was developed to help to identify the reasons why transactions in one specific sector are predominantly of the market type or of the hierarchical type. The framework is based on six main concepts: Information Impactedness, Bounded Rationality, Uncertainty/ Complexity, Opportunism, Small number condition, and atmosphere.
- vii) The employment of quality management concepts in trade relations can help to decrease transaction costs. Traders using quality management strategies in their transactions are likely to be capable of decreasing the level of uncertainty/ complexity in their business; of extending the bounds of rationality; of decreasing the level of opportunistic behaviour; and minimising the small-number condition. As a consequence information impactedness tends to be unimportant and the business atmosphere will be more favourable to an increase in transactions.

## *Chapter 4*

### Research Methods

#### 4.1 Introduction

It was possible to see in the previous chapters that there are a variety of theories that can be used to investigate commerce in agricultural products. Transaction Cost Economics is one of these theories. It is a construct capable of dealing with complex issues such as international trade. The problem with TCE is that it is based on highly subjective concepts that are difficult to measure. To overcome this limitation it was proposed that the discussion of transaction costs could be focused on a more specific concept. In the case of the present research that will be the management of quality. A framework was presented that links TCE with quality management. The following section of the thesis is about how the theoretical concepts discussed are realised in a specific sector: the international fruit trade.

This chapter provides the discussion on the methods employed to study the research questions (secondary data analysis, surveys and interviews). The chapter also introduces the analytical techniques used to interpret the data.

#### 4.2 Anglo-Brazilian Fruit Trade: A Complex Topic

The Anglo-Brazilian fruit trade is a theme of research that combines two complex topics: international trade and the commerce in fruit. International trade is an intricate topic mainly because it is affected by a considerable number of factors. A company or a person involved in international trade needs to handle issues such as: differing legislation; different cultures; difficulties in terms of contract enforcement, and distance (Phillips, Doole and Lowe, 1994). It is important to notice that each of these issues is again influenced by a high number of other variables.

The second subject approached in this investigation, fruit commerce, derives its complexity from two distinct factors, the technical fragility of fruit and the high degree of instability that can be found in the world fruit market.

Fruit is a fragile product, mainly because it is a living merchandise that can be handled only within a limited range of temperatures and atmosphere composition. If these limits are not met the fruit's metabolic activities tend to be altered, causing loss in quality and reduction of shelf life. Fruit is also highly sensitive to physical damage, requiring purpose-built packaging and pallets. However the main technical weakness of fruit is a restricted life time (maintaining desirable quality attributes) after harvesting. All these technical limitations combined impel fruit producers and traders to adopt costly and sophisticated post-harvest procedures (Chitarra and Chitarra, 1990).

The volatility of the world fruit market derives from several circumstances. Heijebroek, Dijk, Pelt, Boot, (1997) pointed to these as the most prominent:

- Fruit quality is easily affected by climate instability;
- There is a considerable variety of fruit negotiated in the world market;
- There is an wide variety of fruit sources around the world.
- There is an extensive range of markets around the world.

The combination of all the market difficulties mentioned contributes to increasing the complexity of the international fruit trade. This reality induces the adoption of multiple research methods in order to investigate the British-Brazilian fruit trade. These methods are exposed in the following sections.

### 4.3 Research Methods

In order to answer the proposed research questions an investigation programme was executed in Brazil and the UK. The objective of this strategy was to describe, analyse and compare the positions of fruit exporters in Brazil and fruit importers in the UK.

In this research, the trade in fruit is investigated by category of products. Six different fruit were used as the basis for the investigation: melons, grapes, mangoes, papayas, oranges and apples. These are the six most exported types of fruit in Brazil.

Three distinct research techniques were used in the investigation: secondary data analysis, surveys and interviews. Each of them is presented and discussed in the following sections.

### 4.4 Secondary Data Research

Secondary data analysis enables a researcher to put his investigation in the context of research conducted previously on the same or similar topics. There is also the advantage of economy since it is not expensive to use data already available.

According to Nachmias and Nachmias (1997) secondary data analysis can be performed in three distinct stages. The first stage is the choice of information sources and data gathering. The second stage is the content analysis; at this phase the data are examined with the intention to make inferences and identification of specific characteristics. The third stage is the coding of information and categories development.

In this specific study, the secondary data were obtained in two different fronts, the UK and Brazil. In Brazil it was possible to obtain statistics about fruit production, volume of exports and value of exports. The main sources of secondary data in Brazil were: The Brazilian Fruit Institute (IBRAF), The Ministry of Agriculture, Brazilian

Geography and Statistics Institute (IBGE) and the Food and Agriculture Organisation (FAO).

In the UK the secondary data research provided information about the buying behaviour of the main fruit importers. The information was obtained from an extensive group of articles and books that are listed throughout the thesis.

The principal objective of the secondary data research was however the characterisation and comparison of the production and export sequences of the six most exported Brazilian fruit types. In order to do so the following steps were observed:

- Technical books and articles about melons, grapes, mangoes, papayas, oranges and apples were examined in order to characterize their production and export sequences.
- The technical activities necessary to produce and export fruit were listed according to their order of execution.
- The lists were then compared. The juxtaposition of the lists allowed the formation of categories of technical activities.

The final aim of these comparisons was to identify what is common and what is not common in the export cycle of different fruits. The examination of these technical matters also made it possible to better focus other stages of the research such as the interviews, the questionnaire application and data analysis.

#### 4.5 Survey Research

Surveys are research instruments especially appropriate to provide a general picture across a universe of respondents (Drever, 1997). In the majority of cases surveys aim to characterize the respondents and measure their perceptions on one or more concepts.

These aims are exactly the same as the objective of the two surveys conducted in this scientific work. To be more precise, the first survey was conducted among Brazilian fruit exporters. Its main objective was to measure the exporters' perception about problems with quality management. The second purpose was to reveal the main characteristics of fruit exporters.

The second survey, with the same intentions as the first was conducted among British fruit importers.

The survey methodology adopted in this research was based on Nachmias and Nachmias (1997), Drever (1997), Spector (1992), Carmines and Zeller (1979) and DeVellis (1991).

#### **4.5.1 The Theoretical Construct Underlying The Survey**

One can say that a questionnaire has less validity or authenticity if it is not based on a solid theoretical construct (Spector, 1992). A group of questions only make sense together if there is an already accepted construct that links them harmoniously.

In this research the development of the main question was based on the Fruit Quality Evaluation Method, a technique of analysis developed by Chitarra and Chitarra (1990) founded on their extensive research into fruit post-harvest processing, especially the processing of Brazilian fruit. The authors recognise that fruit quality is a result of not only the fruit attributes; it is also influenced by logistics related factors.

Chitarra and Chitarra (1990) recognise the following activities and characteristics as significant in the final level of fruit quality: field production techniques; use of defensives (chemicals) in the production fields; grade of maturity, harvesting practices; fruit appearance; fruit texture; fruit nutritive value; fruit flavour; safety requirements for fruits; use of chemicals during the post-harvest processing

activities; fruit packing; pallet consolidation; transport from the production fields to the main carrier (airplane or ships); transport in the main carrier; unloading the main carrier (at the destination port); and transport from the main carrier to the importer facilities. All these concepts were used to formulate a multi-item question that is the key question of the questionnaire.

#### 4.5.2 The Survey Conducted in Brazil

##### The Questionnaire Design

The first version of the questionnaire was the result of extensive reading about agricultural marketing, transaction cost economics, quality management, fruit production and the fruit trade. It had in total 35 questions especially designed for fruit trade organisations. The questions were divided into four main groups:

- **First group of questions** – The intention here was to characterize the fruit trade organisations. It was composed of questions such as: number of employees, activities executed by firms in the fruit business, types of fruit exported, value of fruit exported, and main destination markets.
- **The second group of questions** – The aim was to characterize supply chain management in the fruit trade. It involved the following topics: communication management, transport management, price negotiation, quality management product monitoring during trade activities, and types of trade contracts. It is important to emphasise that in this group of questions only those related to quality management were analysed. The remaining questions are expected to be analysed in the future.
- **The third group of questions** – Aimed to characterise the business environment between Brazilian fruit exporters and British fruit importers. It is related to subjects such as: level of risk, ethics and perceived level of difficulty in trade relations.
- **The fourth group of questions** – This contains only two open ended questions at the end of the questionnaire. The first question is an incentive to

the respondent to make any comment that they think are important to the international trade of fruit. The second open question asks for suggestions for themes for future research.

The majority of the questions present in the questionnaire were closed choices, that means the respondent should choose the best answer from groups of alternatives offered to them. The main problem with this type of question is that sometimes it forces the respondent to choose an answer that is not really pertinent. Attempting to avoid this possible bias, the respondents were offered a space for comments at the end of each closed choice question. This space was also useful to collect more precise information about the question asked.

In addition to the content and the type of questions, the format of questions is another crucial aspect of the questionnaire. The format is related to the way a question is structured. In the questionnaire it was used three types of questions:

- **Rating questions** – Used when the intention was to classify the respondents on one category only. Examples: number of employees, value exported.
- **Ranking questions** – Used for those issues where it was necessary to know the order of importance of a group of alternatives in the respondent's opinion. These questions were used to rank the destination markets (or supply regions) according to their order of importance.
- **Matrix questions** – These multi-item questions are used for groups of rating questions that are part of the same theoretical construct, which means, they have the same instructions and the same group of possible answers.

The judicious choice of words used in a questionnaire is another important factor to avoid bias. It is crucial to employ words (terminology) commonly used in fruit commerce with the specific meaning they have in the trade. In order to do so the questionnaire was submitted to fruit trade specialists and piloted with fruit traders. An active effort was made to avoid strictly academic terminology in the questionnaire.

## The Questionnaire Development

Once the first version of the questionnaire was completed, it was necessary to refine it by exposing it to the evaluation of survey specialists, fruit trade experts and fruit traders. This procedure is a type of fine-tuning that is capable of detecting the defects not perceived by the questionnaire's author.

The first version of the questionnaire was submitted to survey specialists at the Department of Agricultural and Food Economics at the University of Reading. The intention of this measure was to detect technical problems in the format and organisation of the questions. The majority of collaborators perceived the questionnaire as excessively long. As a consequence of these consultations seven questions were eliminated.

Better graphical presentation was suggested together with changes in the format of ten questions. After the implementation of all these modifications a second version of the questionnaire was then obtained.

The second version of the questionnaire was translated into Portuguese and submitted for the evaluation of three fruit post-harvest specialists and two agricultural marketing specialists, all of them based at the Federal University of Lavras in Brazil. The objective of this operation was to verify if the questionnaire was truly adapted to the Brazilian situation. The outcome of these consultations with the specialists mentioned was mainly the amendment of words and expressions present in the questionnaire. One item was added to the multi-item question related to fruit quality management, none of the questions were eliminated. At the end of this process a third version of the questionnaire was obtained.

The third version was therefore used for piloting. The questionnaire was submitted to six fruit exporters in monitored sessions. There was perceived to be satisfactory understanding of the majority of the questions with the exception of two questions

about fruit trade monitoring. As a consequence these two questions were eliminated. The piloting session was also a valuable opportunity to detect any inadequate use of words in the questions.

After the piloting the fourth and final version of the questionnaire was obtained and was applied in Brazil. This version is presented in Appendix A.

### Questionnaire Application in Brazil

The procedure for applying the questionnaire was adapted from Dilman (1978) and Nachmias and Nachmias (1997). Mail was the chosen way to access the fruit exporters. It was chosen because of its low cost and capability to cover a large geographical area easily.

The mail list of fruit exporters was obtained at the Brazilian Ministry of Agriculture. To the initial list were added the addresses of fruit exporters obtained from the Brazilian Fruit Institute (IBRAF). Ultimately a list of 110 fruit exporters resulted. The questionnaire was sent to this total of exporters.

The names, addresses and telephone numbers of the respondents were used to create a database capable of generating diverse types of labels and control lists that were used during the period of questionnaire application and monitoring.

The questionnaire was applied during the first two months of 1999 in the following sequence of steps:

- **First mailing** – Sent to all listed exporters with an introductory letter only. The letter declared that the exporters would receive in a few days a questionnaire about the international fruit trade. It emphasised the fact that the questionnaire was simple and easy to answer, needing little time to complete. The letter also mentioned that there are no direct commercial

interests behind the survey, making it clear that its final aim is to subsidise public policies.

- **Second mailing** – Sent one week after the first letter. The envelope contained a cover letter, a copy of the questionnaire and a stamped and addressed envelope for returning the completed questionnaire. The cover letter announced that fruit traders who returned the completed questionnaire would receive a free copy of a publication about the British Fruit Market prepared by the Brazilian Embassy in London. Promising the mentioned publication was an attempt to increase the response rate.
- **Third mailing** – Sent two weeks after the second mailing and containing only a letter encouraging fruit traders to respond to the questionnaire. The main points of the message were: it would take only a few minutes to fill out the questionnaire; the identity of the respondents would be protected; a report on the British fruit market would be sent to those who replied to the survey. The third letter was also an opportunity to verify if all exporters had received the questionnaire.
- **Fourth mailing** – Sent only to those fruit exporters who had replied to the questionnaire. The envelope (posted as soon as the completed questionnaire arrived) contained the promised publication about the fruit market and a letter expressing the gratitude to those who had participated positively in the survey.

It is important to mention that all questionnaires contained the name, the address, the telephone number and the e-mail address of the researcher in charge of the survey. The fruit exporters were encouraged to make contact in case of any queries about the survey.

## Questionnaire Response in Brazil

The questionnaire was sent to a total of 110 fruit exporters. Six envelopes were returned with the post-office indication that the addressee is no longer at the posted address. Four companies informed us that they are no longer exporting fruit.

49 completed questionnaires were received. From this total three were completed by companies not trading in fresh fruit but in processed fruit. Five questionnaires were only partially filled out, having only a few questions answered at the beginning of the questionnaire. These two groups of questionnaires were not used for analytical purposes.

In the analysis stage the results of 43 completed questionnaires were used.

### **4.5.3 The Survey Conducted in the UK**

The survey conducted in the UK was intended to characterize the British fruit importers and to compare their perceptions regarding the international fruit trade with the perceptions of Brazilian fruit exporters.

#### The Questionnaire Adaptation

The questionnaire used in the UK was based on the final version of the questionnaire applied in Brazil. Most of the questions remained the same as their aim was to access concepts that are applicable to both sides of the fruit trade.

Six questions were modified. The questions concerning export procedures were converted into questions about import procedures. The questions investigating destination markets were replaced by questions investigating fruit origin locations. Finally the items enquiring about value and volume of fruit exported were adapted to reveal import volumes and values.

These modifications produced the fifth version of the questionnaire. This version was used for piloting, in supervised sessions with five fruit importers.

It was revealed during that the use of words was inadequate at seven distinct points in the questionnaire. As the last modification three questions about strategy were eliminated. This procedure was adopted mainly to reduce the size of the questionnaire, since all five respondents affirmed that the questionnaire was excessively large. The three strategy questions were chosen to be excluded because they were of secondary importance for the survey's purpose.

After the pilot the questionnaire obtained (the sixth version) was used in the survey conducted in the UK. A copy of this questionnaire is in Appendix B.

## Questionnaire Application

The lists of fruit importers in UK resulted from the matching of two lists. The first list was compiled by the "Fresh Produce Consortium", the biggest association of fruit and vegetables traders in the UK. The second list was produced by the Brazilian Embassy in London, which did a survey of the British fruit market. The final list had the names and address of 223 fruit importers in the UK.

The sequence of application used in the UK was similar to the sequence adopted for the Brazilian survey. In the last three months of 1999 the survey conducted in the UK used the following sequence of steps:

- **First mailing** – Contained only an introductory letter telling the fruit importers that they would receive a questionnaire about the international fruit trade in the following few days.
- **Second mailing** – Sent one week after the first, it contained the cover letter, the questionnaire and a stamped and addressed envelop for returning the questionnaire.

- **Third mailing** – Sent two weeks after the second, and containing an incentive letter to fruit importers. They were reminded about the questionnaire and asked to fill it out and return it.

All the correspondence sent to fruit importers contained the name, address and the e-mail of the questionnaire author. The respondents could call in case of any queries concerning the questions or the research.

### Questionnaire Response

From the total of 223 questionnaires posted, only 36 completed questionnaires could be used for the analysis. 19 envelopes were returned as they were sent, with a message from the postal service stating that the addressee was no longer at that address. Twelve importers sent a message informing us that they were no longer trading in fruit. Seven questionnaires were returned only partially completed and three questionnaires were filled out by companies trading in processed fruit.

## 4.6 Qualitative Research

In contrast to surveys, which are destined to provide the general picture of a reality, qualitative research aims at the details. It makes use of flexible research techniques that create the possibility of accumulating factual information about the circumstances of specific cases, of collecting statements and opinions and of exploring in some depth experiences, motivations and reasoning (Nachmias and Nachmias, 1997; Drever, 1997).

The two most widely used qualitative research techniques are interviews and direct observation. These two techniques were combined in this research to reveal the particularities of the Anglo-Brazilian fruit trade. The qualitative methodologies used

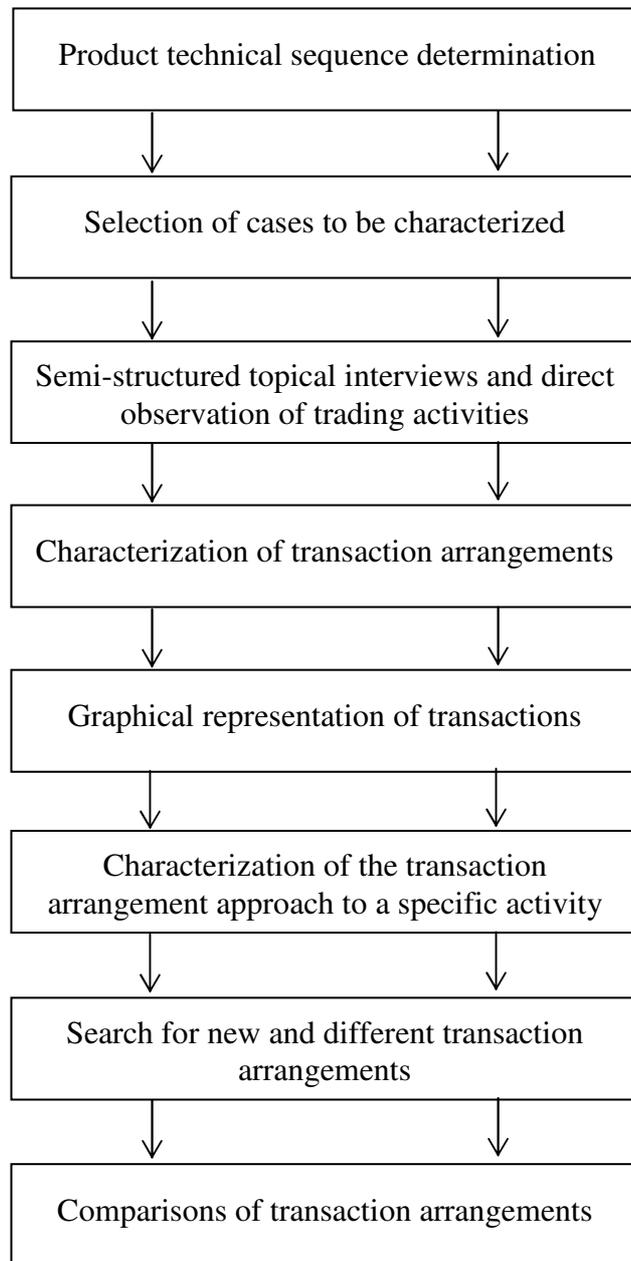
in this investigation were based mainly on Rubin and Rubin (1995) Drever (1997) and Nachmias and Nachmias (1997).

#### **4.6.1 Characterizations of Transaction Arrangements**

According to Williamson (1985) the organisations trading with a product or a group of products can use different transaction arrangements to carry out their commerce. It is important to characterize how diverse these arrangements are in order to understand trade patterns.

In order to adapt the different research techniques to the particularities of the international fruit trade a research strategy was conceived based on TCE. It was termed the Diversity of Transaction Arrangements Research Sequence. Figure 4.1 brings a representative diagram of this research instrument.

**Figure 4.1 – Diversity of Transaction Arrangements Research Sequence**



Source: Developed by the author.

As can be seen the Diversity of Transaction Arrangements Research Sequence is a multi-step procedure that is composed of eight distinct phases. Each of these phases is detailed in the following sections.

## Product Technical Sequence Determination

Each product or group of products need to observe a sequence of technical procedures in order to be ready for consumption. The description of these technical sequences can be detailed or generic, depending on the interests involved.

In this research the objective is only to know the main procedures of the fruit trade cycle. Detailed descriptions would produce an excessive amount of information to be analysed. It is important to remember that this research is concerned with the explanation of fruit trade patterns, an objective that would be better achieved if discussion are concerned with the general picture, not the details.

The sequence of fruit production and trade is described in Chapter 2.

## Selection of Cases

According to Rubin and Rubin (1995, p.66) "...when you first enter a research arena which you may not know that much, to get acquainted with the field you want to talk with a variety of people... you need to interview those who have particular knowledge or can discuss specific experiences that you want to know about".

The problem with the selection of cases to study in the Brazilian fruit export sector is that all the exporters are scattered around Brazil, making it difficult to select the relevant cases and to arrange the interviews. The support of someone who already knows the local reality of each fruit export region is essential to better select the cases.

Based on this perspective the strategy was adopted in this research of contacting local institutions (research organisations, universities or trade associations) that could help to better select cases to investigate.

In order to avoid possible bias with the case selection, the tactic was adopted of contacting at least three professionals in each fruit production region. They were asked to indicate cases to be described. The lists obtained were then compared to make the final selection. In the majority of cases the professionals had been contacted previously by telephone.

The institutions consulted in Brazil were:

- Brazilian Agricultural Research Company (EMBRAPA – Semi-Arido), Petrolina, Pernambuco State.
- Bahia State University (UEBA), Juazeiro, Bahia State.
- Agricultural College of Mossoro (ESAM), Mossoro, Rio Grande do Norte State.
- Santa Catarina State Agricultural Research Company (EPAGRI), Cacador, Santa Catarina State.
- Brazilian Fruit Institute (IBRAF), Sao Paulo, Sao Paulo State.

To select the cases for characterisation in the UK a similar procedure was adopted.

The informants contacted were:

- Western International Market (wholesalers and market administrators) – Heathrow area.
- Spitalfields Market (wholesalers and market administrators) – London metropolitan area.
- New Covent Garden (wholesalers and market administrators) – London metropolitan area.
- Fresh Produce Consortium – London.
- Brazilian fruit exporters.

## Interviews and Direct Observation

The main investigation method used in the qualitative research stage was the semi-structured interview. Drever (1997) states that in order to use the semi-structured interviews a interviewer needs to set up a general structure by deciding in advance what ground to cover and what questions are to be asked. This leaves the detailed structure to be worked out during the interview. The person interviewed can answer at some length in his or her own words, and the interviewer responds using prompts, probes and follow-up questions to get the interviewee to clarify or expand on answers.

From the four types of questions mentioned by Drever (1997), only three were used in the interview sessions: main questions, probes and follow up questions. Rubin and Rubin (1997) affirmed that:

- **Main Questions** – form the backbone of the interview. They are used to raise discussion of the principal topics to be covered. These should be few questions as otherwise it will be not possible to go into the questions in depth.
- **Probe Questions** – “encourage the interviewee to expand on a matter at hand, complete a statement, an example or a narrative, or explain on a statement that the interviewer did not understand” (Rubin and Rubin, 1997 p.208).
- **Follow-up Questions** – have as their purpose to scrutinise new lines of enquiry raised during the interview and to check new conjectures on the theme under investigation.

## The Interview Schedule

An interview schedule is one guide used to remind the interviewer about the “ritual” that needs to be followed in order to obtain a rich and useful interview. It is also a sign to the interviewee of the formal nature of the discussion (Drever, 1997). The

interview schedule should cover the whole session of the interview from the introduction of the interviewer up to the closing of the discussions.

The schedule was organised according to the main questions since these questions represent the main topics to be covered. To each main question can be linked several probe questions in the same way that it is possible to derive from a topic several subtopics.

For each main question it was also possible to establish directions for possible follow-up questions, or in other words, for new lines of enquiry that could be important for the research. It is not possible to formulate follow-up questions in advance since they are dependent on the course taken by the interviewer.

The interview schedule developed for the research into the international fruit trade is presented in Appendix C. As can be observed it shows in its first column the five main questions that cover the five main topics of the interview. In the second column there are the probe questions associated with each main question. In the third column can be found the general direction for elaboration with follow-up questions. It almost goes without saying that follow-up questions can be only formulated during the interaction with the interviewees.

The content of the semi-structured interview questions was determined based on the literature review of TCE, the international fruit trade and quality management (Chapters 2 and 3). The questions were carefully chosen to reveal the factors which are determinant for the configuration of transaction arrangements in the fruit trade.

The topics investigated were:

- The technical activities performed by the organisations operating in the fruit commerce;
- The main types of commercial clients (partners) of the firm;
- The nature of the market type relations maintained by the firm;

- The level of quality problems perceived by the firm; and
- The quality management strategies adopted by the firm.

These topics served as the foundation for the elaboration of the main questions and the probe questions. They also gave the direction, for possible follow-up questions.

## The Interview Session

The interviews were arranged by telephone at least one week in advance. The interviewee was given the prerogative of choosing the day, the time and the place of the interview.

The interview session kept to the following order:

- Introduction of the interviewer and presentation of the main characteristics of the research project;
- Monitored application of the questionnaire;
- Semi-structured interview; and
- Closing the interview session.

In order to better process the data obtained in each interview, the principle was followed of not doing more than one interview per day.

As soon as possible (preferably the same day) the data obtained in the interview were organised for analysis. This routine was followed because each interview could potentially help to refine the process of data gathering. This strategy for collecting data was developed by Rubin and Rubin (1997) and is called Iterative Design of Research. Box 4.1 brings its main characteristics.

#### **Box 4.1 – Iterative Design of Research.**

The iterative design means that each time you repeat the basic process of gathering information, analysing it, winnowing it, and testing it, you come to a convincing model of the phenomenon you are studying. In the early stages of the interviewing, the design emphasizes more the gathering of many themes and ideas, toward the middle of the research you concentrate more on winnowing to limit the number of themes that you explore. In the final stages, you emphasise more the analysis and testing of your understanding as you put them by your interviewees and critical readers in your field.

Source: Rubin and Rubin, 1997 p.46

At the end of the semi structured interviews the interviewee were asked to show the interviewer the main facilities used for fruit processing. Direct observation of the processing units (machinery, storage facilities and laboratories) helped to clarify the themes touched on in the research.

#### **Transaction Arrangement Characterization**

The characterization of the predominant transaction arrangements present in the Anglo-Brazilian fruit trade was based on the results of the interviews obtained in Brazil and UK. Two indispensable steps served as the basis for the characterization: data preparation and data analysis (Drever, 1997). In the data preparation stage the main facts obtained in each interview were transcribed. The information was then coded according to its relation to concepts used as a framework; finally at this stage a summary of the main ideas of each interview was produced.

The data analysis stage was concerned mainly with the development of categories. Categories were developed for individual organisations and other categories for groups of interrelated organisations.

The categories for organisations took as their point of reference the technical activities performed by each organisation within the product cycle (trading sequence).

The development of categories for groups of interrelated organisations observed the types of market transactions they had developed.

All the categories developed are presented in chapter six.

### Graphical Representation of Transaction Arrangements

Graphical illustrations or representations almost always have the advantage of simplifying and better focusing the discussion of a specific topic. They create a visual representation of a concept or phenomenon making the learning process easier for those who want to understand the subject under analysis.

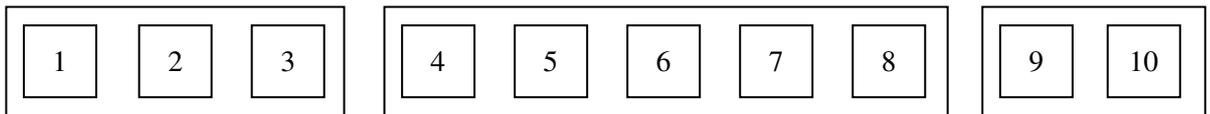
In this research a method was developed of representing transaction arrangements graphically. The four steps of this method are presented here using a hypothetical example as illustration.

The first step in the graphical representation is to illustrate each main technical activity present in the product processing sequence by a number inside a box . Using this system, a (hypothetical) product that needed ten distinct activities in order to be produced and traded would be represented by the figure:



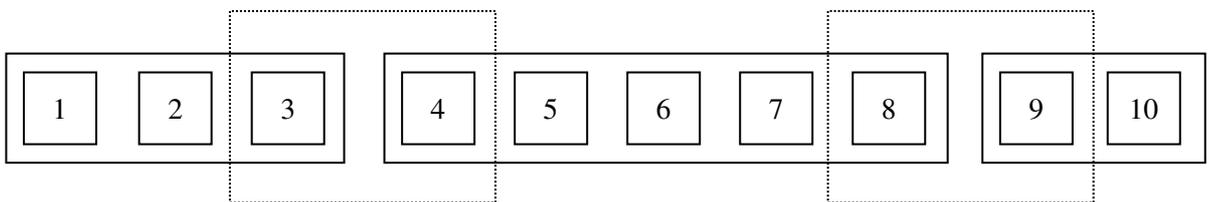
The order of the numbers gives the idea of the progression of events. The number 1 represents the early stage of the production and the number 10 represents the final stage of distribution (or consumption).

The second step is to represent the organisations that are making or trading a product. One can say that organisations are executing some of the technical activities of the product cycle. It is possible then represents each organisation by a rectangle  circumscribing a group of technical activities, exactly those activities executed by the organisation. In our hypothetical example it is possible to have the configuration below:



In this hypothetical example the organisation represented by the rectangle on the extreme left gives the idea that it is related to the production stages. The rectangle in the middle of the picture is giving the idea of a company doing the products' logistics and distribution. Finally, the rectangle on the right side of the figure gives the impression that the organisation is responsible for the final stages of the product distribution or retailing. The third step of the graphical representation is the illustration of the market type transactions or more precisely the trade operations in the product cycle. Here buying and selling operations are represented by a square .

In the following illustration it is possible to see that there are two market type transactions happening in the product cycle.

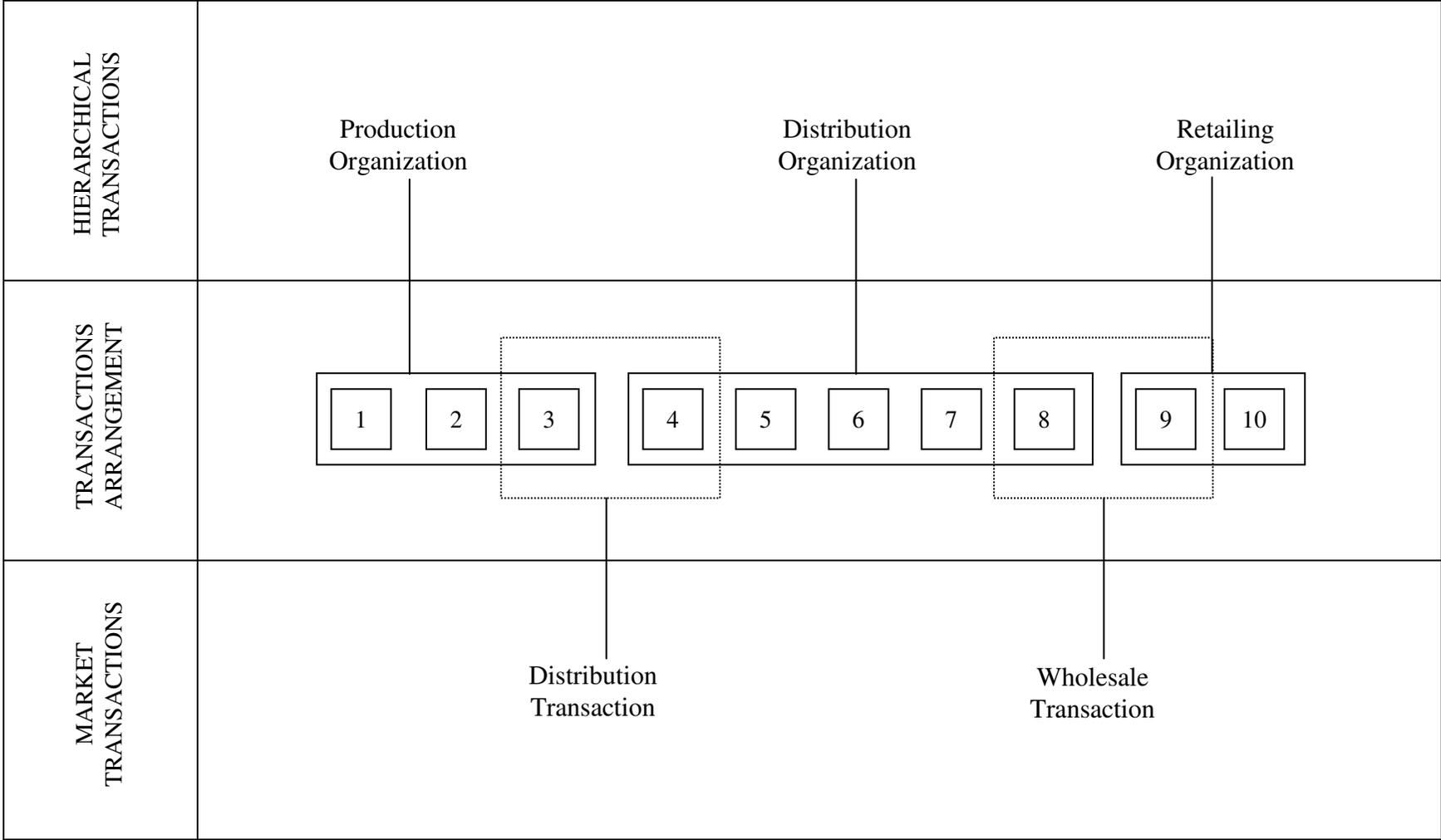


The final stage of graphical representation is to create a frame capable to identify each element of the visual illustration. In this case the frame is divided in three parts as follows:

HIERARCHICAL TRANSACTIONS	
TRANSACTIONS ARRANGEMENT	
MARKET TRANSACTIONS	

The upper section of the frame is a place to identify the organisations present in the product trade. The middle section is devoted to the illustration of transaction arrangements. Finally the lower section creates a space for the identification of the market type transactions.

The final graphical representation of the hypothetical example would have the appearance bellow:



This type of graphical representation can be used to illustrate the transaction arrangements existing in the Anglo-Brazilian fruit trade.

### The Transaction Arrangement Approach to a Specific Activity

After the TA is characterized and graphically represented it is important to verify how it deals with specific tasks such as quality management.

It almost goes without saying that a TA is the result of the interaction of a group of organisations coordinating their activities with a specific aim: trade. So the efficiency of their trade operations will be highly dependent on the level of efficiency of each member organisation in the TA. The efficiency will also be dependent on the way the TA members act together to overcome problems.

With regard to fruit quality management the situation is no different. The level of quality of the fruit delivered to the final customer will be directly related to the way each fruit producer or trader handles quality problems and also to the strategy they adopt together to overcome quality problems. As a result of these notions the TA characterized during the field-work can then be examined along two basic dimensions; first is how each member of the TA deals with the management of fruit quality, and second by dimension is how a group of organisations deals collectively with the management of fruit quality problems.

The basis used for the analysis was the Quality Management Strategy Framework (Chapter 3). To be more specific, the data obtained during the qualitative research were examined in respect of the following aspects of quality management: Product Specification; Production Process Quality Management; Production Environment Quality Management; Logistics Quality Management and Alliances Between Trade Partners.

It is also important to verify the position of a TA regarding the management of quality, according to topics such as: volume of trade, frequency of transactions, ethics, innovation, and food safety.

### Search for Different Transaction Arrangements

After the full characterization of a TA used by producers and traders to export/import their fruit it is fundamental to assume that there are probably other TA being used in the commerce of fruit. It is therefore necessary to search for and to characterize alternative TAs.

The diversity of TAs present in an economic sector is directly related to the diversity of firms present in the sector. The firms can have differing structures and sizes; they can also make multiples types of alliances. In international fruit commerce this is particularly true.

During the qualitative research fieldwork watch was kept continuously for alternative TAs used to trade fruit. Fruit producers, traders and fruit trade specialists were asked to indicate organisations that are trading with fruit in a “different way”, or, to be more precise, that are adopting procedures and market alliances different from the ones used by the majority.

The firms indicated were then visited and characterized according to the TA they used. This proactive search allowed the identification of three main types of TA present in the Anglo-Brazilian fruit trade.

### Comparisons of Transaction Arrangements

After the description of the main TA present in the Anglo-Brazilian fruit trade, they were compared in terms of their transaction advantages/ disadvantages.

The implications for quality management of each type of TA served as base for the comparison. In the comparisons the following questions were also considered:

- In which aspect are the described TA different?
- What the different TAs have in common?
- Which TA was used more in the past?
- Which TA is used more in the present?

#### 4.6.2 Interview Response

From the total of 26 calls for interview visits in Brazil it was possible to obtain 19 valid interviews. In the UK it was possible to get 15 valid interviews from a total of 22 interview calls. The results of the interviews are presented, analysed and commented on chapter six.

#### 4.7 Analytical Techniques

The interviews obtained were analysed according to the Diversity of Transaction Arrangements Research Sequence, a method specially developed to reveal the different transaction arrangements used in a specific sector.

It is important to clarify that a **Transaction Arrangement** (TA) is a pattern of relationships established by a group of organisations to trade a product. It is an informal agreement where the responsibilities of each commercial partner are clearly defined according to the sequence of production and trade in a good. In other words, a transaction arrangement is related to the way that commercial organisations interact among themselves to overcome market and internal problems.

The survey data were examined with the employment of the following statistical techniques:

- Cronbach's alpha coefficient of reliability – used to verify the reliability of the multiple item scales;
- Paired t-tests – used to analyse the interrelationships between the different items components of the scales;
- Crosstabulations (associated with chi-square) – employed in order to verify if there is a causality relationship between specific firms' characteristics (number of employees, degree of specialization, volume of trade and nationality) and the perceived difficulties in quality management.
- Ordered Probit Analysis – employed to assess the relation between fruit quality management issues and the ranking of distinct types of price negotiation contracts (Fixed Price Contracts, Incentive Contracts and Cost-type Contracts).

#### 4.8 Summary

- i) International fruit trade is especially complex, mainly because of the fragility of the merchandise and the multitude of organisations operating in the sector.
- ii) Three distinct research techniques were used to investigate the Anglo-Brazilian fruit trade: secondary data analysis, surveys and interviews.
- iii) The secondary data gathering in Brazil and the UK aim to describe the technical processing and logistical sequences used in the international fruit trade.
- iv) Two questionnaires were developed. The first was applied with Brazilian fruit exporters and the second was applied with British fruit importers.
- v) The Diversity of Transaction Arrangements Research Sequence was a method especially developed to guide the interviews with fruit exporters and importers. Its main intention was to characterize the diversity of TAs in the international commerce of fruit.
- vi) The main analytical techniques employed to examine the survey data were: Cronbach's alpha coefficient of reliability, paired T-tests, crosstabulations (associated with chi-square test) and Ordered Probit Analysis.

## *Chapter 5*

### Survey Results

#### 5.1 Introduction

One research question was raised in the preceding discussions of the international fruit trade. The question was how fruit traders (Brazilian and British) perceive the management of quality in the fruit trade. Is it perceived as a difficult task for them or not?

In this chapter it is possible to partially answer this research question. The first part of the chapter reveals the main characteristics of the Brazilian and British fruit trade business. The second part of the chapter is concerned with the fruit trader's perceptions of quality standards. The third part of the chapter presents the survey results regarding the level of difficulties perceived by exporters and importers in the management of fruit quality. The fourth part of the chapter provides the crosstabulations between the variables under analysis. The chapter ends with the evaluation of the results obtained in the survey.

#### 5.2 Characteristics Of The Brazilian And British Fruit Trade Sectors

##### **5.2.1 Characteristics Of The Brazilian Fruit Export Sector**

To find the main characteristics of the Brazilian fruit export sector a survey was conducted during the first three months of 1999. The data were obtained through interviews with a specific group of fruit exporters and through a questionnaire also applied in the totality of Brazilian exporters.

The list of fruit exporters was drawn up based on data obtained from the Brazilian Ministry of Agriculture, The Brazilian Fruit Institute (IBRAF), The Apple Exporters' Association (ABPM) and The São Francisco Valley Exporters' Association (Valexport).

The analysis of the list itself revealed important characteristics of the sector. It showed that the number of exporters is relatively small. Only 123 companies were found in the final list. This figure can be considered small especially if compared with the list of fruit producers for the internal market (thousands).

A second characteristic revealed by the direct examination of the list, was the geographical dispersion of the fruit exporters. They were found in 16 different states of Brazil (the country has 26 states). Considering the continental dimensions of the country this physical diffusion brings social, ecological and climatic diversity. However this geographical dispersion is not total. The exporters can be found mainly in a wide strip along the Atlantic coast, a natural configuration considering the fact that fruit is transported primarily by sea. Another important finding is the fact that fruit exporters are primarily encountered in groups around a central city in each fruit production region with a propensity for export.

The list also showed that the number of different types of fruit being exported is minute when compared with the number of types of fruit being cultivated in Brazil. In the list referred to, there were found exporters of only a few types of fruit, a tiny amount when one considers that in Brazil more than one hundred types of temperate, subtropical and tropical fruit are cultivated.

These initial findings obtained from the simple analysis of the fruit list of exporters' were confirmed by the results of the questionnaire used.

The first section of the questionnaire was designed to reveal the main direct characteristics of the fruit export companies. The items involved were: number of

employees per company, total value (US\$) of fruit exported, volume of fruit exported, types of fruit exported, percentage of the company's business dedicated to export activities, destinations in the international market, and the destinations within the European Union. Each of these items was subdivided into categories, as one of the intentions was to size the diversity of the sector.

Table 5.1 shows the different categories of fruit export companies according to the number of full time employees. As can be seen, there is no concentration in a specific category. It is possible to find small firms exporting fruit who have less than 10 employees, while at the same time as finding large firms with more than 1000 full time employees engaged in the same activity.

**Table 5.1 – Number And Percentage Of Fruit Export Firms According To The Different Categories Of Full Time Employees.**

<b>CATEGORIES</b>	<b>N</b>	<b>%</b>	<b>Σ%</b>
Less than 10 employees	4	9.3	9.3
10 employees or more and less than 100 employees	9	20.9	30.2
100 employees or more and less than 200 employees	7	16.3	46.5
200 employees or more and less than 500 employees	12	27.9	74.4
500 employees or more and less than 1000 employees	7	16.3	90.7
1000 employees and more	4	9.3	100
Total	43	100	---

Source: Field research data.

The fact that 60.5% of the respondents are found in the three middle categories reveals that the type of scale adopted was appropriate. This data supports the impression that fruit export companies are very diversified in their size or their role in export activities.

The analysis of the value exported per company reveals a scenario remarkably similar to the results of number of employees per company. Again the diversity of companies is evident.

Table 5.2, which presents the different categories of exporters according to the value of fruit exported annually, shows that firms are not clustered predominantly in one specific category.

**Table 5.2 – Number And Percentage Of The Export Firms According To The Different Categories Of Value Of Fruit Exported.**

<b>CATEGORIES</b>	<b>N</b>	<b>%</b>	<b>Σ%</b>
Less than US\$100.000	6	16.7	16.7
US\$100,000.00 or more and less than US\$500,000.00	9	25.0	41.7
US\$500,000.00 or more and less than US\$1,000,000.00	4	11.1	52.8
US\$1,000,000.00 or more and less than US\$5,000,000.00	13	36.1	88.4
US\$5,000,000.00 or more	4	11.1	100.0
Total	36	100.0	---

Source: Field research data.

At the lower extreme of this scale, it is possible to find that 16.7% of the respondents reported exporting less than US\$100,000.00 of fruit annually. It is a volume of trade that can be considered small, when account is taken of the gigantic values negotiated in international trade. This result indicates at least, that the entry level, in terms of volume of business (economies of scale) in the export activities, is not high.

The three middle categories accommodate 72.2% of the respondents, revealing that almost 2/3 of the Brazilian fruit exporters handle annually values between US\$100,000.00 and US\$5,000,000.00 of fruit exports, once more values which can be considered modest in terms of international trade.

At the upper extreme of the scale are the more prominent players. Only 11.1% of the respondents reported exporting more than US\$5,000,000.00. The wide range in terms of value exported per company found in this survey reinforces the idea of diversity of organisations present in this sector. An organisation dealing with less than US\$100,000.00 of fruit exports probably has an organisational structure different from the organisational structure of a company that exports more than US\$5,000,000.00.

The fruit export companies can be categorized according to the weight of fruit exported. Table 5.3 presents the results restricted to the six most exported types of Brazilian fruit.

**Table 5.3 – Percentage Of Fruit Export Companies According To Weight Of Fruit Being Exported.**

<b>FRUIT</b>	<b>Less than 1,000 tonnes</b>	<b>More than 1,000 tonnes and less than 10,000 tonnes</b>	<b>More than 10,000 tonnes and less than 50,000 tonnes</b>	<b>More than 50,000 tonnes and less than 100,000 tonnes</b>	<b>More than 100,000 tonnes</b>
Melon	16.7	33.3	33.3	---	16.7
Mango	61.1	38.9	---	---	---
Grapes	81.8	9.1	9.1	---	---
Papaya	25.0	75.0	---	---	---
Orange	---	---	100	---	---
Apples	75.0	25.0	---	---	---

Source: Field research data.

It is possible to see that grapes, apples and mangoes are mainly negotiated in small volumes of less than 1,000 t. For papayas the concentration falls one category above, 10,000t. Orange exports are concentrated in the category of more than 10,000 t and less than 50,000 t. In the case of melons the quantities of fruit exported are more diverse, with some companies managing to export more than 100,000 t annually.

The vast majority of companies export less than 50,000 t of fruit annually. This configuration strongly supports the idea that the Brazilian fruit export industry is not consolidated yet.

Regarding market destination, diversity is again present in the fruit sector. Table 5.4 shows the world market segmented into the eight main regional markets and the number of companies that are exporting to each of these destinations. Brazilian fruit exporters supply six of these markets.

**Table 5.4 – Destination Markets For Brazilian Fruit Exporters And Number Of Companies Exporting To Each Market.**

<b>FRUIT MARKETS</b>	<b>N</b>	<b>I<sub>md</sub></b>
European Union	42	1.12
NAFTA	18	2.22
European Countries Non-members of the EU	14	2.43
Japan and other Asian countries	11	2.73
MERCOSUL	7	2.44
Latin American countries non-members of MERCOSUL	3	4.67
Africa	---	---
Oceania	---	---

Source: Field research data.

The relative importance of each market can be determined by the number of companies sending fruit to it. Based on this criterion the European Union (EU) is the main destination. The EU receives fruit from 42 companies, in second position comes NAFTA which obtains fruit from 18 companies. In the third position come the European countries non-members of EU, which receive fruit from 14 companies. The fourth position goes to Japan and other Asian countries, receiving from 11 companies. The sixth and seventh positions are occupied by MERCOSUL (receiving fruit from seven companies) and the other Latin American countries, which are a

destination for only 3 fruit exporters. No companies reported sending fruit to Africa and Oceania.

### Box 5.1 – Indicator Of Perceived Importance

The significance of each market can be more precisely revealed by the market destination indicator of perceived importance ( $I_{md}$ ). This indicator was calculated according to how each company ranked the markets according to their importance.

The formula (F1) for  $I_{md}$  is:

$$I_{md} = \frac{\sum_1^{nc} C_p}{n_c}$$

where  $C_p$  denotes the company's perception of the importance of each market and  $n_c$  is the number of companies trading with each market.

The value of  $C_p$  was given by each company on a scale of one to eight, with the value one meaning the most important market and the value eight the least important market within the scale choices. A market destination that has a small  $I_{md}$  is regarded as an important market by the companies trading to it. On the other hand a market with high  $I_{md}$  is seen as a less important market.

Source: Nachmias and Nachmias, 1996.

The  $I_{md}$  indicator revealed the following order of importance: EU (perceived as the most important market), NAFTA (the second most important market), European countries non-members of the EU (third), Mercosul (fourth), Japan and other European countries (fifth), and Latin American countries non-members of MERCOSUL (sixth). No exports to Africa and Oceania were reported.

As can be seen the order of importance of each market is quite similar for both the criteria adopted. It is also clear that the EU is the key market for Brazilian exporters.

The fruit export companies were asked to indicate to which countries they export within the EU. The results are in Table 5.5.

**Table 5.5 – EU Countries That Are Markets For Brazilian Fruit, And Number Of Companies Exporting To Each Country.**

COUNTRY	N	COUNTRY	N	COUNTRY	N
The Netherlands	40	Portugal	19	Finland	08
United Kingdom	31	Spain	18	Ireland	05
Germany	27	Denmark	16	Austria	04
France	25	Sweden	13	Luxemburg	02
Belgium	19	Italy	11	Greece	01

Source: Field research data.

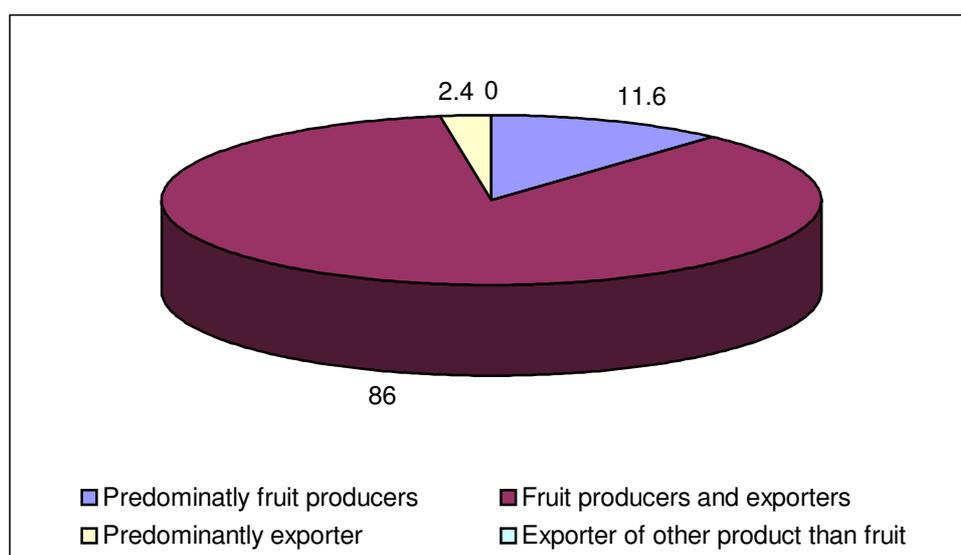
In the first place appears The Netherlands, a destination for 40 companies. Since The Netherlands is one of the most important centres for ports and distribution across Europe, this was the expected result.

The UK receives fruit from 31 exporters, reflecting the fact it is a cosmopolitan society with a long tradition in international trade. The presence of the UK in second position was not expected, since France and Germany import more fruit annually than the UK. This outcome shows to some extent the pertinence of this research. It is important to investigate the details of the transactions between Brazilian exporters and British importers since these transactions seem to be more successful than the transactions between Brazilian exporters and the importers in other European countries.

Germany and France appear in third and fourth place, receiving fruit from 27 and 25 Brazilian exporters respectively. An expected result since these two countries are the two biggest economies of the EU. Only 19 exporters send fruit to Belgium, this is a surprising fact, since this country is the home of some of the most active European ports shipping fruit.

A clear picture emerged when the companies were asked to choose the best category to describe their main activity. A small group (11.6%) perceived fruit production as of more importance than export activity. The vast majority (86%) of the companies saw themselves as specialized fruit producers and exporters. Only 2.3% of the companies said they were also exporting other products than fruit. None of the export companies were dedicated to exporting products other than fruit (see Figure 5.1).

**Figure 5.1 – Categories of Fruit Exporters**



Source: Field research data.

These results also support the idea that companies tend to be specialized in the activity of fruit exporting only. They are inclined not to be involved with the export of products other than fruit. On the other hand, firms which are predominantly exporting products other than fruit have the propensity not to maintain fruit export operations. This outcome is probably due to the inherent complexity that can be found in the fruit export sector.

In order to trade in the international market, firms have to maintain a staff dedicated to the management of recurrent negotiations with organisational fruit buyers.

Personnel are also required to deal with the technicalities of fruit handling, a complicated issue, considering that fruit is highly perishable.

It is also important to remember that firms need to maintain specialised assets in order to export fruit. Several of the fruit varieties cultivated for export do not have a strong appeal in the Brazilian internal market. This fact makes several fruit varieties a specialised asset, used mainly for export purposes. More than the export-dedicated fruit varieties, it is the cultivation practices that can be truly called a specialised asset

To grow fruit for the international market it is necessary to perform several practices, which are considerably different from the cultivation practices for fruit destined for the domestic market. The level of requirements for the international market are far more sophisticated and elaborated. To put it simply, the production cost of a fruit destined for the external market is higher than the production cost of a fruit destined for the Brazilian market.

The post-harvest processing activities and all the equipment and personnel needed to prepare a fruit for export, can also be called a greatly specialised asset, since the packing-house and all its apparatus are employed mainly to select and handle top quality fruit for export. To process fruit for the domestic market in such facilities would be considered a waste as the internal customers have a different perception of fruit consumption and are not prepared to pay a premium price for high quality fruit.

The examination of the trade destination details in this survey shows once more that diversity is prominent in the fruit export sector. It was found that Brazilian exporters trade with six out of the eight main markets of the world. This plurality of destinations necessarily implies a diversity of logistics and commercial relations.

In general the analysis of the main characteristics of the Brazilian fruit export sector leads to some basic conclusions. The first one is that diversity is predominant in all

aspects of fruit production (locality of production, volume of production and types of fruit being cultivated). Diversity is also predominant in terms of market destinations.

The second main result is that firms seem to adopt very similar approaches to the organisation of their export activities, despite all the diversity referred to. The survey shows that 86% of the firms produce the fruit they export; this is an indication that there is a predominant form of transaction arrangement which is weakly affected by production and market destination particularities.

It seems that there is a force capable of influencing how the transactions are performed. A force that is more influential than all the combined forces of fruit production and market destination.

## **5.2.2 Characteristics Of The British Fruit Import Sector**

With the aim of characterizing the British fruit import sector a survey was conducted during the last three months of 1999.

The list of fruit importers compiled was based on data obtained from the Fresh Produce Consortium, the Brazilian Embassy in London and from Brazilian Fruit exporters. The simple analysis of this list led to two important findings. The first is the relatively high number of fruit importers operating in the UK. The compiled list had in total 223 importers. This high number results from the fact that the majority of the British wholesalers of fresh produce consider themselves as importers of fruit.

The second important finding is related to the fact that the majority of import organisations are geographically concentrated in the southeast of the UK, near port areas, airports or near the London metropolitan area.

These two preliminary conclusions about importers were later confirmed by the results of the survey and the interviews.

The initial six questions of the questionnaire were formulated with the objective of disclosing some basic characteristics of fruit import organisations. These questions were related to the following topics: number of employees per company, value of fruit imported, volume of fruit imported, origin of the imported fruit and categories of fruit importers.

Table 5.6 presents the percentage of fruit import firms according to the different categories of full time employees. As can be observed there is a concentration of importers in two categories only, 75% of the firms reported operating with less than 100 employees. This is an indication that the majority of the importers do not maintain fruit processing units, being mainly responsible for commercial operations only.

**Table 5.6 – Percentage Of Fruit Import Firms According To The Different Categories Of Full Time Employees.**

CATEGORIES	%	Σ%
Less than 10 employees	27.8	27.8
10 employees or more and less than 100 employees	47.2	75.0
100 employees or more and less than 200 employees	08.3	83.3
200 employees or more and less than 500 employees	11.1	94.4
500 employees or more and less than 1000 employees	00.0	94.4
1000 employees and more	05.6	100.0
Total	100.0	---

Source: Field research data.

Only 25% of the respondents reported operating with more than 100 employees (see table 6.2). This relatively high number of employees per company is a signal that, these organisations are also responsible for executing several technical activities in the fruit trade (like logistics, storage and processing).

Table 5.7 shows the percentage of import firms according to the different categories of value of fruit imported. As revealed by the data, 75.9% of the respondents stated that they regularly import more than US\$1 million in fruit per year.

**Table 5.7 – Percentage Of The Import Firms According To The Different Categories Of Value Of Fruit Imported.**

CATEGORIES	%	Σ%
Less than US\$100.000	00.0	00.0
US\$100,000.00 or more and less than US\$500,000.00	13.8	13.8
US\$500,000.00 or more and less than US\$1,000,000.00	10.3	24.1
US\$1,000,000.00 or more and less than US\$5,000,000.00	24.2	48.3
US\$5,000,000.00 or more	51.7	100.0
Total	100.0	-----

Source: Field research data.

None of the importers reported importing less than US\$100,000.00 per year. These figures indicate that importers need to maintain a minimum volume of trade greater than US\$100.000,00.

Table 5.8, which presents the percentage of fruit import companies according to the weight of fruit being imported, shows that most fruit traders import less than 10,000 tonnes of each type of fruit per year.

**Table 5.8 – Percentage Of Fruit Import Companies According To Weight Of Fruit Being Imported.**

FRUIT	Less than 1,000 tonnes	More than 1,000 tonnes and less than 10,000 tonnes	More than 10,000 tonnes and less than 50,000 tonnes	More than 50,000 tonnes and less than 100,000 tonnes	More than 100,000 tonnes
Melon	38.0	12.5	37.0	12.5	-----
Mango	50.0	16.7	33.3	-----	-----
Grapes	42.9	28.5	14.3	14.3	-----
Papaya	100.0	-----	-----	-----	-----
Orange	41.6	25.0	16.7	-----	16.7
Apples	38.4	30.8	07.7	07.7	15.4

Source: Field research data.

More than 50% of the melon, mango and grape importers reported trading less than 10,000 tonnes of fruit per year. Without exception Papaya importers reported trading less than 1,000 tonnes of papaya per year. Only a few importers stated that they trade more than 100,000 tonnes of one individual fruit per year, in this case they are trading in oranges and apples.

It is important to mention that the fruit importers also stated that they trade a great variety of other fruit. In total the importers informed to trade 107 different types of fruit and vegetables.

The survey results associating origin of fruit and number of companies importing from each market are presented in Table 5.9. It can be observed that the world was segmented into eight different regions. British importers source their produce in all these regions, this is evidence that British fruit traders maintain connections with most of the fruit production regions of the world.

**Table 5.9 – Origin Of Fruit And Number Of Companies Importing From Each Market.**

FRUIT ORIGINS	N	I <sub>fo</sub>
European Union	29	1.83
Latin American countries non-members of MERCOSUR	15	2.53
African countries	20	3.05
MERCOSUR (Argentina, Brazil, Paraguay and Uruguay)	21	3.14
NAFTA (USA, Canada and Mexico)	20	3.75
European Countries Non-members of the EU	11	3.82
Oceania	14	5.21
Asian countries	11	5.91

Source: Field research data.

The relative importance of each fruit origin for the group of respondents is more precisely revealed by the fruit Origin Indicator<sup>1</sup> Of Perceived Importance (I<sub>fo</sub>). According to this indicator the countries which are members of the European Union are the main source of fruit for British importers. 29 companies reported buying fruit in this geographical area. In second position come the Latin American countries non-members of the MERCOSUR (I<sub>fo</sub>= 2.53). In third position are the African countries (I<sub>fo</sub>= 3.05). The MERCOSUR countries are in fourth position with the I<sub>fo</sub> reaching the value of 3.14. All the remaining regions presented a I<sub>fo</sub> greater than 3.5 (see Box 5.1).

Regarding fruit originating in South America it is possible to see that British importers source their fruit in four main countries. Table 5.10 shows that 24 traders reported that they buy fruit in Chile, 22 in Brazil, 21 in Argentina and 12 in Uruguay.

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<sup>1</sup> The indicator is calculated according to the formula F1 presented in Box 5.1.

**Table 5.10 – South American Countries That Are Suppliers To The UK, And Number Of Companies Importing From Each Country.**

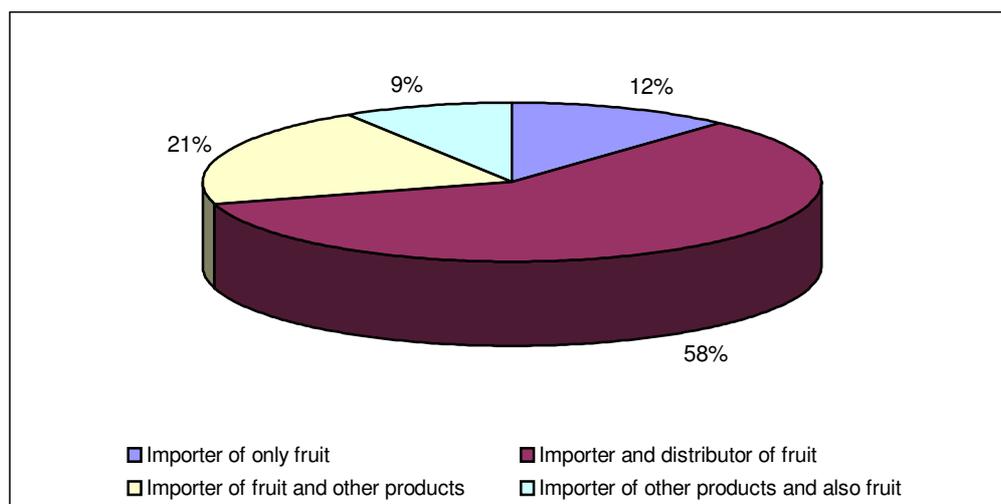
COUNTRY	N	COUNTRY	N
Chile	24	Colombia	9
Brazil	22	Paraguay	2
Argentina	21	Surinam	2
Uruguay	12	Bolivia	1
Venezuela	10	Guiana	1
Peru	10	French Guiana	1

Source: Field research data.

It should be noted that Chile, Argentina and Uruguay are mainly suppliers of temperate fruits. Brazil on the other hand supplies mainly tropical fruits. All the remaining South American countries are supplying 10 or less British importers.

The analysis of Figure 5.2, which presents four distinct categories of fruit importers, reveals that the majority of importers (58%) see themselves as importers and distributors of fruit. 11.8% of the traders said that they were exclusively importers of fruit. 20.6% of the respondents stated that they import fruit and also other products. Finally 8.8% of the traders affirmed to import predominantly other products and also fruit.

**Figure 5.2 – Categories Of Fruit Importers**



Source: Field research data.

The data presented above indicate that predominates in the British fruit import business those organisations that are specialized in the fresh produce trade only. This is probably a consequence of the technical complexity that is inherent to the international fruit trade.

An organisation which aims to be successful in importing fruit needs to maintain specialised assets and expertise that are only useful for the fruit trade, this fact makes it difficult to conciliate the fruit import activities with other activities.

### **5.2.3 Fruit Exporters and Importers: Some Basic Comparisons**

Secondary data analysis revealed that because fruit is a highly perishable merchandise it requires to be handled with extreme professionalism. A considerable number of technical activities need to be performed in order to bring fruit from production fields in Brazil to the British final consumers (see section 2.5).

Fruit importers and exporters are not at opposite fields. These traders need to have complementary business in order to perform accordingly all the technical activities inherent in international commerce.

There are some basic differences between exporters and importers; some of these were revealed by the surveys conducted in Brazil and the UK. Fruit exporters are more specialized, trading predominantly a limited number of fruit varieties. Fruit importers on the other hand are more eclectic, trading a great variety of fruit. This fact becomes an important aspect of the trade when both sides are negotiating since importers are less dependent on one specific type of fruit than the exporters are.

Fruit exporters in general need to deal with an extensive range of technical activities in fruit commerce and the majority of these activities are exposed to environmental hazards. Fruit importers are in a less risky position as they are responsible for a restrict number of technical operations in the international fruit trade.

Table 5.11 shows the percentage of Brazilian fruit firms and British import firms according to the different categories of full time employees. As can be see 68.8% of the Brazilian export firms need to maintain 100 employees or more in order to trade. 75% of the British importers reported that they employ less than 100 employees in order to trade. This result also supports the idea that exporters need to deal more frequently with technical activities than fruit importers do.

**Table 5.11 – Percentage Of Fruit Trade Firms According To The Different Categories Of Full Time Employees.**

<b>CATEGORIES</b>	<b>BRAZIL %</b>	<b>UK %</b>
Less than 10 employees	09.3	27.8
10 employees or more and less than 100 employees	20.9	47.2
100 employees or more and less than 200 employees	16.3	08.3
200 employees or more and less than 500 employees	27.9	11.1
500 employees or more and less than 1000 employees	16.3	00.0
1000 employees or more	9.3	05.6
Total	100.0	100.0

Source: Field research data.

When the value of fruit traded is analysed it is possible to see from Table 5.12 that 52.8% of Brazilian exporters trade less than US\$1 million worth of fruit annually. The majority of British importers were shown to trade higher volumes of fruit. 75.9% of the British importers trade annually more than US\$ 1 million worth of fruit (see Table 5.12). This finding reinforces the conviction that fruit importers trade higher volumes of fruit than fruit exporters do.

**Table 5.12 – Percentage Of The International Trade Firms According To The Different Categories Of Value Of Fruit Traded.**

<b>CATEGORIES</b>	<b>BRAZIL %</b>	<b>UK %</b>
Less than US\$100,000	16.7	00.0
US\$100,000.00 or more and less than US\$500,000.00	25.0	13.8
US\$500,000.00 or more and less than US\$1,000,000.00	11.1	10.3
US\$1,000,000.00 or more and less than US\$5,000,000.00	36.1	24.2
US\$5,000,000.00 or more	11.1	51.7
Total	100.0	100.0

Source: Field research data.

The four differences mentioned weaken the situation of fruit importers when they need to negotiate with fruit exporters. As a result fruit importers are in a position to be more influential in the international fruit trade than the fruit exporters.

### 5.3 Quality Management and Fruit Trade Activities

The intention of this section is to show directly the results obtained with the questionnaires. The statistical reliability of the results is also discussed in the next sections.

As was seen before, quality is not a monolithic construct; actually it is composed of several subparts such as: quality standards and quality management. These two topics are especially relevant in the organisation of recurrent trade operations such as those found in international fruit commerce.

Each one of the two components of quality mentioned can be again subdivided into several constituent activities. In fact the existence of a multitude of concepts involved in the concept of quality can cause confusion in any discussion about quality management.

To minimise the problem described and to make data exposure easier, a convention is necessary. From now on, each of the main components of quality will be referred to as a practice. Each of the subparts of each practice will be referred as an activity.

Based on this convention it is possible to state two of the most relevant objectives of this section. The first objective is to show how fruit exporters perceive the level of difficulty associated to each activity of each practice. The second objective is to characterize the overall perceived level of difficulty of each practice. Presentation of the results follows.

### 5.3.1 Quality Standards

Quality Standards is a critical aspect of fruit trading; it is a multifaceted issue that can be approached in many different ways. This research focuses on four aspects of quality standards practice. Each of these elements was assessed in terms of their perceived grade of difficulty. The objective of this tactic was to reduce the margin of inaccuracy in the measurement of the level of difficulty.

Since a quality standard is a subjective concept, the chance for less than objective interpretation would be high. The scope for misunderstandings can be reduced by asking direct questions about a group of activities that are components of the quality standards administration practice (see Chapter 4, Appendices A and B). This tactic also makes possible the development of more precise questions, which can be framed in the day-to-day terminology used by exporters and importers. Another additional advantage is the possibility to localize where the weaknesses and strengths of a specific part of quality standards administration lie.

### Results

A method was designed to better expose and comment on the results. The **tables of quality management indicators** present directly the answers obtained in the survey regarding the perceived level of difficulties in quality management (Tables 5.13 and 5.15). Box 5.2 illustrates how these tables are ordered.

#### **Box 5.2 – Level Of Difficulty Indicators.**

The tables are divided into four main parts. In their main body, on each row, are the different activities, which are components of the quality management. For every activity each company indicated a level of difficulties in a scale of one to five, with the level one meaning excessive difficulty and the level five meaning no difficulty. The numbers presented in this part of the table are the percentages of companies that chose a specific level of difficulty in each activity.

The column on the right of the table gives the activity indicators of perceived level of difficulty. This indicator ( $I_a$ ) is calculated based on the formula (F2)

$$I_a = \frac{\sum fl}{N_a}$$

where  $\sum fl$  is the sum of all categories multiplied by their respective frequency.  $N_a$  is the number of respondents in each activity.

The row at the bottom of the table gives the combined percentages ( $Fl$ ) of each level of difficulty.  $Fl$  is calculated by the formula (F3)

$$Fl = \frac{\sum_{a=1}^z n_a}{\sum_{a=1}^z N_a}$$

where  $n$  denotes the number of valid respondents in each level of difficulty in each activity.  $N$  is the total number of valid respondents in each activity,  $a$  is a specific activity, and  $z$  is the total number of activities.

The box on the extreme right of the bottom line shows the indicator  $I_p$  of perceived level of difficulty for the practice. Its objective is to show how difficult a practice is regarded as being by traders. This indicator is given by the formula (F4):

$$I_p = \frac{\sum Fl}{\sum_{a=1}^z N_a}$$

The indicators  $I_a$  and  $I_p$  can be compared with the descriptions specified in the top line of the table, given that they are of same nature. It can be said that an indicator with a value near one reveals that an activity or a practice is perceived as excessively difficult by traders. On the other hand an indicator close to the value five shows that an activity or practice is considered not to be difficult.

Source: Nachmias and Nachmias (1996); Malhotra (1997).

In the last decade quality has turned out to be a serious concern for fruit traders. The specifications for fruit have become higher and more stringent. As a direct consequence of such changes negotiations regarding quality have developed into being more technical and detailed.

Some concepts are fundamental in most of the negotiations involved with quality standards. They can be grouped into four main activities:

- Defining what characteristics are important for the quality of a product;
- Deciding how to measure each characteristic that is important for the quality of a product;
- Setting quality standards; and
- Controlling the quality according to the defined standards.

The Brazilian fruit exporters and the British fruit importers were asked about the level of difficulty they perceive for each of the activities comprising quality standards management. The results are presented jointly in Table 5.13.

**Table 5.13 – Quality Standards Indicators Of Perceived Level Of Difficulty**

ACTIVITIES	Excessive difficulty	Great difficulty	Some difficulty	Little difficulty	No difficulty	Indicators
Defining what characteristics are important for the quality of fruit.	01.3	06.4	21.8	46.2	24.4	3.87
Deciding how to measure each characteristic that is important for the quality of fruit.	000	07.7	28.2	47.4	16.7	3.73
Setting quality standards.	01.3	17.1	18.4	39.5	23.7	3.68
Controlling the quality according to the defined standards.	2.6	14.1	37.2	32.1	14.1	3.44
<b>QUALITY STANDARDS</b>	01.3	11.3	26.5	41.3	19.7	3.68

Source: Field research data.

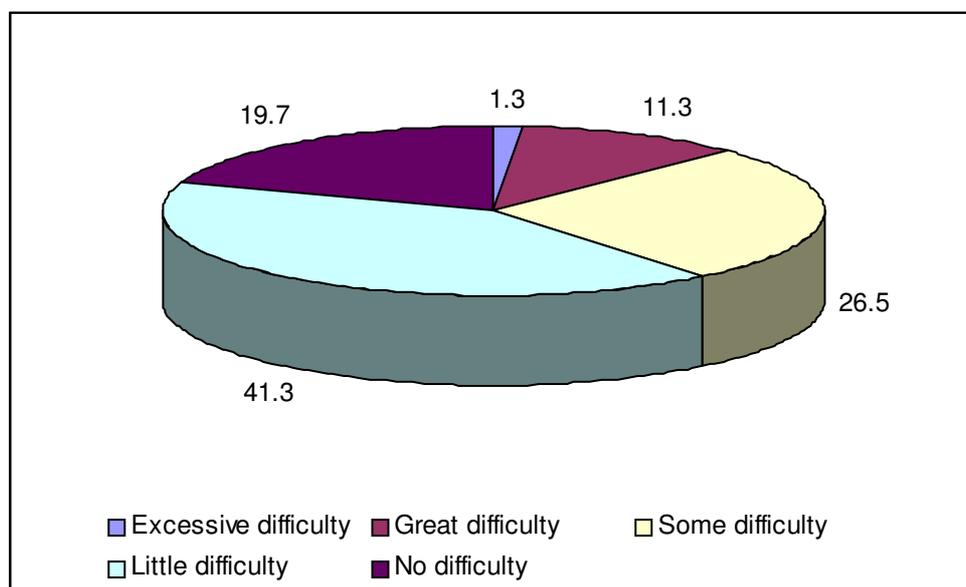
The results on Table 5.13 make it possible to affirm that the majority of respondents have little or no problem in terms of quality standards management. More than 63%

of all fruit traders (for the first, second and third item of the scale) chose the options “Little difficulty” or “No difficulty”. The item “Controlling quality according to the defined standards” presented the highest perceived level of difficulty, but even in this case only 16.7% of the respondents chose the options “Excessive difficulty” or “Great difficulty” for this item.

As a confluence of the results presented in the main body of the Table 5.13, the indicator ( $I_p$ ) of perceived level of difficulty for the practice of Quality Standards Management reaches the value of 3.68, a number that again shows that Quality Standards Management is not perceived as a barrier to the British-Brazilian fruit trade.

Figure 5.3 shows the per cent distribution of quality standards according to the respondents’ perception of the level of difficulty. As can be seen 61% of the exporters chose the options “Little difficulty” or “No difficulty”. This result is an indication that Brazilian fruit exporters do not perceive the management of quality standards as an impediment for their trade operations. Only 12.6% of the respondents selected the options “Excessive difficulty” or “Great difficulty”.

**Figure 5.3 – Respondents Distribution According To Their Perception Of Difficulty On The Quality Of Standards Practice.**



Source: Field research data.

Most of the traders are shown to be familiar with the terminology currently used in the supervision of quality. It seems that “natural selection” has already occurred in the fruit export sector. Only quality conscious exporters remain in the trade. These findings support the idea that quality is a decisive factor a *sine qua non* topic in the fruit export business.

### Reliability of the Results

The column on the extreme right of Table 5.13 shows the indicators of perceived level of difficulty of each component activity of the quality standards practice. The indicators suggest that Brazilian and British fruit traders do not perceive any of the quality standards activities as predominantly difficult. The direct consequence of this configuration is that the Indicator of perceived level of difficulty for the practice ( $I_p$ ) achieves the value of 3.68 a number that can be considered high on a scale that has five as its maximum.

The elevated  $I_p$  is a signal that Brazilian and British fruit traders do not face difficulties in the management of fruit quality standards. After accepting this affirmation the next step is to estimate the reliability of the indicator  $I_p$  (See Box 5.3). The statistics that can perform this task is the Cronbach's alpha coefficient of reliability, which is specifically used to assess internal consistency of a multi-item scale, as illustrated in Box 5.3.

### **Box 5.3 – Reliability Of Multiple-Item Scales.**

One of the main problems of the social sciences is to link numeric values to abstract and subjective concepts. One of the artifices conceived to perform this job is the use of multiple-item scales. In a multiple-item scale an abstract concept is divided into its distinct components, which are then more easily rated according to one graduation. This strategy avoids simplistic yes or no answers and allows a more precise delimitation of the abstract concept under analysis.

The components of one abstract construct in a scale are called items. If these items are really assessing the same dimension of one specific construct they are supposed to be perceived in the same manner by a group of respondents of a multiple item question. In other words multiple items designed to measure the same construct will intercorrelate with one another.

Given the above comments, the reliability of one multiple-item scale can be defined as the internal-consistency of its components items. If the internal-consistency is high the scale is probably more reliable. On the other hand, if the items are not intercorrelated the scale is most probably less reliable.

Cronbach (1951) developed one specific “instrument” to quantify the reliability of one multiple-item question. This instrument is universally known as Cronbach's alpha coefficient of reliability ( $\alpha$ ). This coefficient is calculated by the formula (F5):

$$\alpha = N / (N - 1) [1 - \sum^2 \theta^2 (y_i / \theta_x^2)]$$

Where  $N$  is the number of items;  $\Sigma\theta^2$  is the sum of the variances of the items and  $\theta_x^2$  is the total variance of all the items.

The values of alpha coefficients can range from 0.0 to 1.0. Values near 0.0 indicate poor internal consistency. On the other hand when the coefficient assumes values near 1.0 this is evidence of high internal consistency between the items of one scale. As a rule of thumb, a scale is only accepted as valid when its calculated coefficient  $\alpha$  reaches at least the value of 0.7.

The complete analysis of one scale also takes into account the influence of each item on the value of  $\alpha$ . If  $\alpha$  increases when one specific item is deleted this means that the item under analysis is negatively affecting the internal consistency of the scale. In general items are removed from the scale when they induce  $\alpha$  assume values under 0.7.

Source: Spector, 1992; Carmines and Zeller, 1979; De Vellis, 1991; Nachmias and Nachmias, 1996.

The calculated  $\alpha$  for quality standards practice is 0.8097. This value informs us that the scale under analysis is reliable which means that the indicator  $I_p$  (3.78) is calculated based on items that have high internal-consistency. These items, in other words are assessing the same dimension of one construct (quality standards in this case).

The software used to calculate  $\alpha$  was SPSS version 10.1 for windows. This program was also used in the statistical analysis of all the other indicators and coefficients of this research work.

Table 5.14 shows the quality standards reliability values. As can be observed, all the items which are components of the scale presented a high inter-item correlation. This result indicates that there is no significant statistical difference between the items (the complete SPSS output is on Appendix D).

**Table 5.14 – Quality Standards Reliability Results**

<b>ACTIVITIES</b>	<b>CORRECTED ITEM – TOTAL CORRELATION</b>	<b>ALPHA IF THE ITEM DELETED</b>
Defining what characteristics are important for the quality of fruit.	0.6871	0.8049
Deciding how to measure each characteristic that is important for the quality of fruit.	0.6791	0.8109
Setting quality standards.	0.7159	0.7946
Controlling the quality according to the defined standards.	0.6706	0.8117

Source: Fieldwork data.

Another important outcome of Table 5.15 can be seen in the column on the extreme right. All the items present the coefficient **Alpha If The Item Deleted** higher than 0.7. This denotes that none of the items should be excluded from the scale. Actually all items are contributing to an increase in the value of  $\alpha$ .

### **5.3.2 Fruit Quality Management**

#### **Results**

With quality being such an important aspect of the fruit trade it is essential to investigate which factors are possible obstacles to quality management practice. Table 5.15 presents technical aspects that can affect the quality of fruit.

**Table 5.15 – Fruit Quality Management Indicators Of Perceived Level Of Difficulty.**

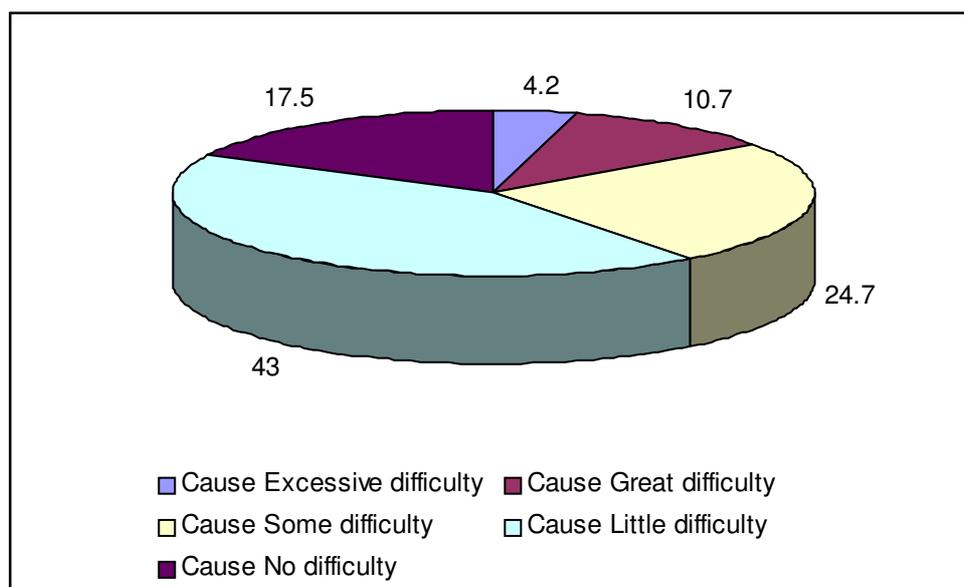
QUALITY AFFECTING FACTORS	Cause Excessive difficulty	Cause Great difficulty	Cause Some difficulty	Cause Little difficulty	Cause No difficulty	Indicators
Field production techniques.	03.8	11.4	36.7	43.0	05.1	3.25
Use of chemicals in field production.	07.8	13.0	32.5	36.4	10.4	3.16
Grade of maturity.	08.9	11.4	32.9	38.0	08.9	3.14
Harvesting.	06.4	10.3	23.1	47.4	12.8	3.51
Appearance.	05.2	18.2	39.0	28.6	09.1	3.12
Texture.	01.3	14.3	24.7	44.2	15.6	3.56
Nutritive value.	01.3	03.9	17.1	40.8	36.8	4.02
Flavour.	05.2	11.7	26.0	37.7	19.5	3.46
Safety requirements.	08.1	08.1	17.7	48.4	17.7	3.58
Use of chemicals in post harvest processing.	10.5	15.8	22.4	34.2	17.1	3.26
Packing.	00.0	16.7	23.1	42.3	17.9	3.58
Pallet construction	00.0	06.5	26.0	48.1	19.5	3.81
Transport from the fields of production to the main carrier.	03.9	09.1	19.5	48.1	19.5	3.68
Loading the main carrier.	02.6	06.5	18.2	50.6	22.1	3.91
Transport in the main carrier.	02.7	10.8	23.0	45.9	17.6	3.70
Unloading the main carrier.	00.0	06.5	20.8	50.6	22.1	3.95
Transport from the main carrier to the importer's facilities.	03.9	07.9	14.5	47.4	26.3	3.90
<b>FRUIT QUALITY MANAGEMENT</b>	<b>04.2</b>	<b>10.7</b>	<b>24.7</b>	<b>43.0</b>	<b>17.5</b>	<b>3.56</b>

Source: Fieldwork data.

The results in table 5.15 reinforce the findings of the previous question about quality. It shows that the majority of respondents regard almost all the listed technical aspects as not causing difficulties. More than 50% of the respondents chose the options **Cause little difficulty** or **Cause no difficulty** for all the items except three (“Field production techniques”, “Use of chemicals in field production” and “Appearance”).

The line at the bottom of the table simply reflects these results (see Figure 5.4). 60.5% of the respondents marked the alternatives **Cause little difficulty** or **Cause no difficulty**.

**Figure 5.4 – Respondents Distribution According To Their Perception Of Difficulty On The Practice Of Fruit Quality Management.**



Source: Fieldwork data.

### Reliability of the Results

In Table 5.15 can be found the indicators of perceived level of difficulty by activity. All the indicators support the idea that fruit quality management is not seen as an obstacle to international fruit trading.

The indicator with the lowest value ( $I_p=3.12$ ) are the one linked to the activity “Appearance”. Fruit exporters manifested comparatively more difficulties with the item “Appearance” probably reflecting the fact that appearance is of crucial importance for the fruit importers since customers to a great extent base their buying choice on the visual quality of the product. The relatively low value ( $I_p=3.14$ ) for the

activity “Grade of Maturity” was an expected outcome, mainly because it is difficult to determine the precise moment when a fruit reaches optimum harvesting stage.

It is important to highlight that the indicators of the two previously mentioned activities presented a relatively low value; despite this result these activities are predominantly perceived as not difficult. The main repercussion of this positive configuration is that the practice indicators ( $I_p$ ) reached the value of 3.56, a sign that Brazilian fruit exporters do not see fruit quality management as a barrier for their business.

Together the 17 component items in the Fruit Quality Management scale gave rise to an  $\alpha$  coefficient equal to 0.8755. This high value allows the scale to be classified as reliable. Table 5.16 brings the correlation coefficients and the reliability coefficients if the item is deleted. The majority of the items presented relatively high correlations with the other components of the scale.

**Table 5.16 – Fruit Quality Management Reliability Values**

QUALITY AFFECTING FACTORS	CORRECTED ITEM – TOTAL CORRELATION	ALPHA IF THE ITEM DELETED
Field production techniques.	0.4659	0.8702
Use of chemicals in field production.	0.5009	0.8690
Grade of maturity.	0.6748	0.8610
Harvesting.	0.6779	0.8615
Appearance.	0.5822	0.8655
Texture.	0.6270	0.8639
Nutritive value.	0.5066	0.8689
Flavour.	0.5895	0.8650
Safety requirements.	0.5863	0.8652
Use of chemicals in post harvest processing.	0.3164	0.8788
Packing.	0.3941	0.8729
Pallet construction	0.4647	0.8706
Transport from the fields of production to the main carrier.	0.5002	0.8689
Loading the main carrier.	0.3988	0.8726
Transport in the main carrier.	0.4973	0.8690
Unloading the main carrier.	0.3675	0.8736
Transport from the main carrier to the importer's facilities.	0.4659	0.8702

Source: Fieldwork data.

It can be seen from the column **Alpha if the item deleted** that all activities except one contribute to an increase in reliability of the scale. For instance if the item “Grade of maturity” were removed from the scale then the  $\alpha$  coefficient would decrease from 0.8755 to 0.8610. The relation is similar for other 15 items. Only the activity “Use of chemicals in post-harvest processing” causes a negative influence on the reliability coefficient of the scale, albeit very small. For example if the item “Use of chemicals in post harvest processing” were removed from the scale, the  $\alpha$  would increase, reaching the value of 0.8788. Notwithstanding the negative influence this

item will remain in the scale mainly because its adverse effect on the reliability coefficient is minute. Despite its presence on the list of items the scale still has a high  $\alpha$ .

### 5.3.3 Brazilian And British Fruit Traders: Similar Perceptions

The survey results were segmented. Data obtained with Brazilian fruit exporters were examined separately from the data obtained with British fruit importers. The main results are presented on Tables 5.17 and 5.18.

**Table 5.17 – Coefficients of Reliability by Geographical Regions**

GEOGRAPHICAL REGIONS	Cronbach's $\alpha$ - Coefficients of Reliability	
	Quality Standards	Fruit Quality Management
Brazil and UK	0.8470	0.8755
Brazil	0.8097	0.8708
UK	0.8829	0.8874

Source: Fieldwork data.

All the four distinct scales obtained were shown to have acceptable levels of reliability since all four calculated alpha (Quality Standards and Fruit Quality Management for both Brazil and UK) reached values superior to 0.7 (Table 5.17). The analysis of the reliability of the scale indicated that the 17 component items of the scales are largely similar to each other (both for Brazilian exporters and British importers).

**Table 5.18 – Practice Indicators of Perceived Level of Difficulty**

GEOGRAPHICAL REGIONS	Practice Indicators of Perceived Level of Difficulty ( $I_p$ )	
	Quality Standards	Fruit Quality Management
Brazil and UK	3.68	3.56
Brazil	3.78	3.48
UK	3.57	3.63

Source: Fieldwork data.

The most revealing results came from the analysis of Table 5.18. British fruit importers and Brazilian fruit exporters have very similar perceptions regarding Quality Standards and Quality Management.

The second column on Table 5.18 shows the indicators of perceived level of difficulty of putting quality standards into practice. Table 5.18 suggests that Brazilian fruit exporters do not perceive the practice of quality standards as predominantly difficult. The Indicator of perceived level of difficulty for the practice ( $I_p$ ) reaches the value of 3.78 a number that can be considered high on a scale that has five as its maximum. For the British importers the calculated  $I_p$  for Quality Standards Practice reached the value of 3.57, a number that denotes few problems with the management of quality standards (Table 5.18).

It should be noted that the matrix question related to quality standards addressed the main aspects of product specification. The relatively high values found for  $I_p$  are an indication that Brazilian and British fruit traders are demonstrating the capacity to:

- Define which characteristics are important to guarantee the fruit quality;
- Decide how to measure (or estimate) each of these characteristics;
- Set fruit quality standards; and
- Control fruit quality according to the defined standards.

The next question in the survey directly related to the research question was about the technical factors that affect fruit quality management. Again the results reinforce the impression that quality is not a cause of problems for Brazilian fruit exporters ( $I_p= 3.56$ ). None of the technical aspects of fruit quality addressed in the questionnaire was indicated as a particular restriction to fruit trade (Table 5.18).

Among British importers the calculated  $I_p$  for Quality Standards Practice reached the value of 3.57 (see Table 5.18), again an indication that this practice is not perceived as an obstacle to the trade activities.

It is important to mention that the matrix question that addressed fruit quality management was particularly comprehensive, in order to involve an extensive range of aspects. Four items (“Field production techniques”, “Use of chemicals in the field of production”, “Grade of maturity” and “Harvesting”), of the matrix question are related to production process quality management. Four items (“Appearance”, “Texture”, “Nutritive value” and “Flavour”) can be linked to the practice of product specification. Four other items (“Safety requirements”, “Use of chemicals in post-harvest processing”, “Packing” and “Pallet construction”) are associated to fruit preparation at the packinghouse. Finally the remaining five items (“Transport from the fields of production to the main carrier”, “Loading the main carrier”, “Transport in the main carrier”, “Unloading the main carrier” and “Transport from the main carrier to the importers facilities”) of the matrix question are connected to the practice of logistics management. In other words the results of the survey suggest that fruit traders (Brazilian exporters and British importers) have the ability to cope successfully with the elements of fruit quality management mentioned.

## 5.4 Comparing Variables

### 5.4.1 Comparing the Quality Affecting Factors

The items of the scale on perceived fruit quality management problems were compared with each other in order to disclose the possible associations between them. To proceed with this crosstabulation analysis, 136 different two-way tables were generated. The Chi-square statistic was employed to verify if there is association or not between the 17 items. In this analysis the null hypothesis ( $H_0$ ) assumes that there is no association between the variables. The null hypothesis would be rejected when the probability of the Chi-square statistic (P-value) had values equal or lower than 0.050%.

### Box 5.4 - Crosstabulations

Crosstabulation is a statistical procedure designed to look at the distribution of two variables at the same time. For analytical purposes the variables are arranged on two way tables, where one categorical variable is called the row variable (placed at the extreme left of the table) and the other is called the column variable (placed at the top of the table). Each combination of the two variables characterizes a cell.

The relationship between the row variable and the column variable is analysed by calculating and comparing percentages. If there is an association between the variables their percentual distribution “goes together” in a positive or negative association. Two variables are said to be positively associated when their values increase in the same direction. The association is negative when the growth in the values of one variable is connected to the decrease in the values of the other variable.

In general it is assumed during crosstabulation analysis that there is no association between the row variable and the column variable (Null Hypothesis =  $H_0$ ).

The Chi-square ( $\chi^2$ ) test is a statistic developed to help with crosstabulations. Moore and McCabe (1999, p. 630) define the chi-square statistic as the “measure of how much the observed cell counts in two-way table diverge from the expected cell counts. The formula for the statistic is:

$$X^2 = \sum \frac{(\text{Observedcount} - \text{Expectedcount})^2}{\text{Expectedcount}}$$

where observed represents an observed sample count, expected represents the expected count for the same cell, and sum is over all row x column in the table.”

Source: Moore and McCabe, 1999.

Table 5.19 summarises the results of the crosstabulations. It presents the P-values of the different paired crosstabulations performed. It is important to mention that the Chi-square approximation will be used whenever the smallest expected cell count is 1 or more (Moore and McCabe, 1999). In order to guarantee this condition for all 17 quality affecting factors, the categories “Cause excessive quality problems” and “Cause great quality problems” were combined. It was also necessary to merge the categories “Cause few quality problems” and “Cause no quality problems”.

**Table 5.19 – Crosstabulations: Quality Affecting Factors.**

QUALITY AFFECTING FACTORS	Field production techniques	Use of chemicals in field production.	Grade of maturity.	Harvesting.	Appearance.	Texture.	Nutritive value.	Flavour	Safety requirements.	Use of chemicals in post harvest processing	Packing.	Pallet construction	Transport from the fields of production to the main carrier.	Loading the main carrier.	Transport in the main carrier.	Unloading the main carrier.	Transport from the main carrier to the importer's facilities.
Field production techniques.	---	0.000	0.000	0.000	0.001	0.041	0.093	0.020	0.226	0.006	0.694	0.403	0.015	0.563	0.189	0.801	0.933
Use of chemicals in field production.		---	0.001	0.022	0.002	0.009	0.009	0.005	0.068	0.000	0.110	0.116	0.048	0.198	0.029	0.033	0.336
Grade of maturity.			---	0.000	0.000	0.001	0.001	0.000	0.005	0.024	0.001	0.016	0.014	0.083	0.050	0.357	0.156
Harvesting.				---	0.000	0.000	0.010	0.000	0.003	0.037	0.010	0.019	0.000	0.008	0.286	0.071	0.058
Appearance.					---	0.000	0.008	0.000	0.002	0.157	0.004	0.027	0.031	0.256	0.084	0.222	0.319
Texture.						---	0.000	0.000	0.003	0.018	0.004	0.008	0.150	0.057	0.060	0.073	0.189
Nutritive value.							---	0.000	0.005	0.001	0.002	0.013	0.026	0.017	0.041	0.019	0.008
Flavour.								---	0.001	0.016	0.022	0.142	0.268	0.043	0.273	0.013	0.179
Safety requirements.									---	0.021	0.012	0.315	0.893	0.990	0.720	0.020	0.215
Use of chemicals in post harvest processing.										---	0.033	0.070	0.193	0.493	0.027	0.094	0.797
Packing.											---	0.000	0.005	0.015	0.192	0.146	0.152
Pallet construction												---	0.000	0.010	0.117	0.066	0.045
Transport from the fields of production to the main carrier.													---	0.000	0.002	0.003	0.000
Loading the main carrier.														---	0.000	0.000	0.000
Transport in the main carrier.															---	0.000	0.000
Unloading the main carrier.																---	0.000
Transport from the main carrier to the importer's facilities.																	---

Source: Fieldwork data.

None of the items examined is completely distinct from the others. The item *Transport from the main carrier to the importers facilities* was show to be the most distinct. For this particular item the null hypothesis (independence) was not rejected for the 10 other items. Two other items (*Field production techniques* and *Unloading the main carrier*) had the independence hypothesis rejected for eight other items.

For all the remaining items on the scale the independence hypothesis was predominantly rejected. This result is an indication of the interrelationship between the 17 items.

No single item of the scale can be pointed as a particular cause of quality management problems, since no single item of the scale is statistically distinct from the others. One can also say that none of the items of the fruit quality management scale is markedly not causing quality problems.

The crosstabulation analyses inform us that the component items of the scale are predominantly interconnected. These results reinforce the previous findings of the reliability analysis.

#### **5.4.2 Comparing Means**

The mean of each component of the multiple item scale on perceived difficulty of quality management was compared with the means of all other items of the scale. This procedure was adopted with the aim of identifying quality affecting factors (items) that are perceived as more difficult (or less difficult) than the others.

The statistical procedure chosen to perform this comparison is the paired T-test. Box 5.5 presents the main characteristics of the T-test.

### Box 5.5 – T-test.

Comparison of means is a statistical technique developed with the aim to verify if the difference between two means is due to sampling error or is due to a sound reason.

The comparison is based on the idea that sample means tend to be normally distributed if the original population has a normal distribution. In most of the cases the t-test is used as the main reference during comparisons. To test the hypothesis that two means are the same, the following statistic (t) can be employed:

$$t = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

where  $X_1$  is the sample mean of group 1,  $S_1$  is the standard deviation, and  $N_1$  is the sample size.  $X_2$  is the sample mean of group 2,  $S_2$  is the standard deviation, and  $N_2$  is the sample size.

The determination of “t” allows the computation of a probability called observed significance level, which is the probability that a difference at least as large as the one observed, would occur if the two population means were the same.

Source: Moore and McCabe, 1999; Norusis, 1994.

When testing hypotheses about differences in means, the null hypothesis presupposes that the means of the items are the same. The null Hypothesis will be rejected when the observed significance level is smaller than 0.05%. Table 5.20 presents the significance level of each paired T-test conducted among all the component items of the fruit quality management scale.

None of the means examined is statistically different from all others. The item *Nutritive value* proved to be the most distinct amongst the 17 items. The mean of this specific item is statistically different from the means of 13 other items (Table 5.20). This happened mainly because 77% of the respondents chose the options “Cause few quality problems” and “Cause no quality problems”, as a consequence the item *Nutritive value* is the one with the highest mean (see Table 5.15).

**Table 5.20 – Paired T-tests.**

QUALITY AFFECTING FACTORS	Field production techniques	Use of chemicals in field production.	Grade of maturity.	Harvesting.	Appearance.	Texture.	Nutritive value.	Flavour	Safety requirements.	Use of chemicals in post harvest processing	Packing.	Pallet construction	Transport from the fields of production to the main carrier.	Loading the main carrier.	Transport in the main carrier.	Unloading the main carrier.	Transport from the main carrier to the importer's facilities.
Field production techniques.	---	0.626	0.457	0.128	0.164	0.025	0.000	0.081	0.047	0.857	0.048	0.000	0.003	0.001	0.018	0.000	0.001
Use of chemicals in field production.		---	0.831	0.075	0.521	0.150	0.000	0.024	0.006	0.479	0.016	0.000	0.005	0.000	0.011	0.000	0.001
Grade of maturity.			---	0.023	0.551	0.004	0.000	0.015	0.002	0.741	0.012	0.000	0.003	0.000	0.005	0.000	0.000
Harvesting.				---	0.002	0.620	0.000	0.724	0.725	0.271	0.441	0.024	0.092	0.011	0.252	0.002	0.015
Appearance.					---	0.000	0.000	0.001	0.001	0.310	0.001	0.000	0.000	0.000	0.001	0.000	0.000
Texture.						---	0.000	0.888	0.729	0.072	0.755	0.065	0.312	0.082	0.615	0.200	0.070
Nutritive value.							---	0.000	0.001	0.000	0.000	0.024	0.017	0.117	0.003	0.213	0.165
Flavour.								---	0.429	0.123	0.638	0.049	0.259	0.075	0.602	0.018	0.076
Safety requirements.									---	0.045	1.000	0.214	0.518	0.110	0.775	0.030	0.204
Use of chemicals in post harvest processing.										---	0.057	0.001	0.030	0.005	0.061	0.000	0.005
Packing.											---	0.005	0.436	0.101	1.000	0.028	0.145
Pallet construction												---	0.489	0.732	0.198	0.356	0.680
Transport from the fields of production to the main carrier.													---	0.080	0.823	0.125	0.118
Loading the main carrier.														---	0.099	0.567	1.000
Transport in the main carrier.															---	0.013	0.042
Unloading the main carrier.																---	0.590
Transport from the main carrier to the importer's facilities.																	---

Source: Fieldwork data.

Two other items (*Grade of maturity* and *Appearance*) are statistically different from 12 other items of the scale. Three items (*Field production techniques*, *Use of chemicals in field production* and *Unloading the main carrier*) are statistically different from 10 other items of the scale (Table 5.20).

All the remaining 11 items of the scale are predominantly undifferentiated (the null hypotheses were not rejected) from the other items of the scale. The means of these 11 items are statistically not significantly different from the means of 8 or more other items components of the multiple item scale. It becomes then difficult to affirm that one particular item of the scale is perceived by the majority of respondents as causing (or not causing) quality problems (Table 5.20).

In general the paired T-tests used on the 17 fruit quality affecting factors, support the idea that the items of the scale have for the most part means that are statistically very near to each other. This result partially confirms the high reliability calculated for the scale.

#### **5.4.3 Firms Characteristics and Fruit Quality Management**

The survey offered the opportunity to collect information about specific characteristics of the fruit trading organisations operating in Brazil and the UK. The obtained information about characteristics<sup>2</sup> such as *Number of full time employees*, *Value of fruit traded*, *Degree of specialisation* and *Nationality of the trading organisations* can be employed in order to understand why some firms perceive fruit quality management differently.

It should be noted that the majority of the fruit trading organisations do not perceive the fruit quality affecting factors as predominantly difficult (Section 5.3). There are,

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<sup>2</sup> It is important to recognise at this point a methodological misconception. The third question of the questionnaire was not well conceived. The question generates an excessively high number of categories (30 or more), making it inadequate for crosstabulation analysis. The small number of questionnaire respondents aggravated the situation.

however, some organisations that reported difficulty in dealing with fruit quality affecting factors.

Crosstabulations were organised with the aim of verifying if there is an association between firm's specific characteristics (number of employees, value of fruit traded, degree of specialization and nationality of the fruit trading organisations) and all the 17 quality affecting factors of the fruit quality management scale.

68 crosstabulations were performed and the chi-square statistic (level of 0.05%) was used to verify if there is independence or not between the variables. The null hypothesis ( $H_0$ ) presupposes that there is no association between the variables. It should be noted that, for the 17 quality affecting factors, the categories "Cause excessive quality problems" and "Cause great quality problems" were combined. It was also necessary to merge the categories "Cause few quality problems" and "Cause no quality problems". These measures were adopted in order to guarantee that the smallest expected cell count would be 1 or more (Moore and McCabe). Table 5.21 presents the P-values of the cross tabulations performed.

**Table 5.21 – Crosstabulations: Quality Affecting Factors and Characteristics of the Firms.**

QUALITY AFFECTING FACTORS	Number of Employees	Volume of Trade	Degree of Specialization	Nationality
Field production techniques.	0.594	0.487	0.725	0.555
Use of chemicals in field production.	0.859	0.413	0.367	0.151
Grade of maturity.	0.131	0.574	0.147	0.400
Harvesting.	0.740	0.743	0.149	0.235
Appearance.	0.571	0.321	0.170	0.610
Texture.	0.447	0.381	0.628	0.911
Nutritive value.	0.363	0.576	0.238	0.648
Flavour.	0.578	0.537	0.843	0.195
Safety requirements.	<u>0.028</u>	0.696	0.725	0.700
Use of chemicals in post harvest processing.	0.698	0.183	0.325	0.215
Packing.	0.274	0.549	0.142	0.326
Pallet construction	0.248	0.829	0.543	0.680
Transport from the fields of production to the main carrier.	0.911	0.490	0.929	0.510
Loading the main carrier.	0.250	<u>0.028</u>	0.857	<u>0.039</u>
Transport in the main carrier.	0.441	<u>0.019</u>	0.548	<u>0.001</u>
Unloading the main carrier.	0.656	0.357	0.740	<u>0.022</u>
Transport from the main carrier to the importer's facilities.	0.443	<u>0.024</u>	0.183	0.076

Source: Fieldwork data.

## Number of Employees

As can be seen from Table 6.21 the independence between the variables is largely established. When the variable *Number of employees* was analysed together with the 17 items of the fruit quality management scale, a clear picture emerged. The high P-values obtained allow us to say that there is an indication of no association between the number of employees of an organisation and 16 different quality-affecting factors. In other words, the null hypothesis (independence) was not rejected for these 16 crosstabulations.

Only for the item *Safety requirements*, the null hypothesis was rejected (the P-value being only 0.028). In this case it is possible to affirm that there is an indication of association between the number of employees of the fruit trading organisations and the perceived problems in dealing with fruit safety requirements. For this specific crosstabulation the statistic Somers'  $d^3$  was calculated, which reached the value of 0.250. This number indicates a fairly weak association between the variables. The association is positive or in other words the higher the number of employees the higher the number of firms with less perceived problems in dealing with safety requirements.

In general the crosstabulations show that both firms with a small number of employees and firms with higher number of employees are capable of dealing with the fruit quality affecting factors.

## Value of Fruit Traded

When the variable Value of Trade was compared with the 17 items of the fruit quality management scale, a marked relation of independence was disclosed. The high figures found for the P-values show that the null hypothesis (no association)

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<sup>3</sup> This measure of association ranges between  $-1$  and  $1$ . The positive values indicate positive associations and the negative values indicate negative associations.

cannot be rejected for the majority of the crosstabulations performed. The null hypothesis was rejected for only three transport items: *Loading the main carrier*, *Transport in the main carrier* and *Transport from the main carrier to the importer's facilities*.

The indicated association between the activity *Loading the main carrier* and the characteristic *Value of trade* is positive (Somers'  $d = 0.185$ ). This is equivalent to saying that an organisation trading higher values of fruit has a higher chance of experiencing only a few quality problems in relation to the activity *Loading the main carrier*.

The relation is also positive for the two other transport activities. The calculated Somers'  $d$  for the activity *Transport in the main carrier* reached the value 0.198. The calculated Somers'  $d$  for the activity *Transport from the main carrier to the importers facilities* is 0.160. It should be emphasized that the small absolute values of the Somers'  $d$  statistic indicate a fairly weak association between the three quality affecting factors and the variable *Value of trade*. These three positive associations also indicate that the organisations trading higher values of fruit are better capable of dealing with technical aspects of the transport activities.

The crosstabulations indicate predominantly that both firms trading high or small values of fruit are capable of dealing with the fruit quality affecting factors.

## Degree of Specialisation

For the characteristic *Degree of specialisation* none of the null hypothesis were rejected. All the calculated P-values are higher than 0.05%. These numbers supports the idea that there is a relationship of independence between the characteristic *Degree of specialization* and all the 17 items of the scale (Table 5.21).

## Nationality of the Fruit-Trading Organisations

Regarding the characteristic *Nationality* (Brazilian or British), a relation of independence predominates. 14 of the components of the fruit quality management scale were shown to be predominantly not associated with the nationality of the fruit-trading organisations. The P-Values of all these 14 items reached values higher than 0.05%, making it not possible to reject the null hypothesis (no association).

The crosstabulations between *Nationality* and the items *Loading the main carrier*, *Transport in the main carrier* and *Unloading the main carrier* indicated a tendency of association. In order to size intensity of association between these variables, it was calculated the Goodman and Kruskal's tau statistic. This measure of association ranges from 0 to 1. Values near 0 indicate weak associations and values near 1 indicate strong associations.

The Goodman and Kruskal's tau statistic for the crosstabulations between the variables *Nationality* and *Loading the main carrier*, reached the value of 0.055. The value of the tau statistic for the item *Transport in the main carrier* was 0.126 and for the item *Unloading the main carrier* 0.056. It is important to notice that the calculated tau values indicate a weak association between the variables.

Table 5.22 presents the activity indicators of perceived level of difficulty of Brazilian fruit exporters and British fruit importers (see Box 5.2). Only the indicators related to the transport activities are presented.

**Table 5.22 – Indicators of Perceived Level of Difficulty: Transport Activities**

Activities	Indicators (I <sub>a</sub> )	
	Brazilian Exporters	British Importers
Transport from the fields of production to the main carrier.	3.38	3.91
Loading the main carrier.	3.67	4.09
Transport in the main carrier.	3.13	4.12
Unloading the main carrier.	3.67	4.15
Transport from the main carrier to the importer's facilities.	3.58	4.12

Source: Fieldwork data.

It is possible to observe, for the transport activities, that all the indicators are suggesting that Brazilian fruit exporters perceive more difficulties in dealing with the transport than the British fruit importers (Table 5.22). It should be emphasized that the crosstabulations revealed that the difference between the indicators is significant for only three (*Loading the main carrier*, *Transport in the main carrier* and *Unloading the main carrier*) of these five items (Table 5.21).

### One Way Analysis of Variance

Additional analysis was carried out in order to verify the results obtained with the crosstabulations between *Nationality* and all the 17 fruit quality affecting factors.

The chosen technique was the One-Way Analysis of Variance. This statistical procedure analyses at the same time the variability within each group of respondents (British importers or Brazilian exporters) and the variability between the two groups. These two types of variability are then compared with each other, from these comparisons it is possible to infer about the similarities or dissimilarities between the means of the two groups.

The null hypothesis of the One-Way Analysis of Variance assumes that the means of the two groups are the same. The null hypothesis will be rejected when the P-values are less than 0.05. Table 2.23 gives the results.

**Table 5.23 – One Way Analysis of Variance**

QUALITY AFFECTING FACTORS	F Values	P-Values
Field production techniques.	0.31	0.861
Use of chemicals in field production.	1.014	0.317
Grade of maturity.	1.945	0.167
Harvesting.	0.415	0.521
Appearance.	0.284	0.595
Texture.	0.118	0.732
Nutritive value.	0.037	0.848
Flavour.	3.348	0.071
Safety requirements.	0.149	0.701
Use of chemicals in post harvest processing.	1.744	0.191
Packing.	2.106	0.151
Pallet construction	2.793	0.099
Transport from the fields of production to the main carrier.	1.149	0.287
Loading the main carrier.	4.027	0.048
Transport in the main carrier.	13.346	0.000
Unloading the main carrier.	5.442	0.022
Transport from the main carrier to the importer's facilities.	2.879	0.094

Source: Fieldwork data.

From Table 5.23 is possible to see that the majority of the significance levels are large, making it not possible to reject the null hypothesis for 14 different items of the

scale. These results support the idea that British and Brazilian fruit traders do not perceive differently these 14 fruit quality affecting factors.

The one way analysis of variance was however capable of showing that the null hypothesis (equality of the means) can be rejected for three items of the multiple item scale. The activity *Transport: Loading the main carrier* presented a low P-value (0.048). The observed significance level for the activities *Transport in the main carrier* and *Transport: unloading the main carrier* are respectively 0.000 and 0.022. These figures support the idea that British and Brazilian traders have different perceptions regarding the three transport activities referred to (Table 5.23).

The results of the one way analysis of variance largely support the findings of the crosstabulations (using the chi-square) between the variable *Nationality* and the 17 quality affecting factors. Both procedures lead to the general conclusion that Brazilian and British fruit traders have very few perceived differences regarding the fruit quality affecting factors. Both statistical procedures lead to the conclusion that the perceived differences are related to three transaction activities only (*Transport: Loading the main carrier*, *Transport in the main carrier* and *Transport: unloading the main carrier*).

## Partial Conclusions

It was not possible, based on the results of the survey only, to explain why a minority of the fruit trading organisations perceive the fruit quality management factors as difficult.

When four different characteristics of the fruit trading organisations were compared with the 17 fruit quality affecting factors, only no associations or fairly weak associations were found for all 68 crosstabulations performed.

This general result of the survey only suggests that quality management concepts can be employed by both:

- organisations with a big or small number of employees;
- organisations with a small or a big volume of trade;
- specialized organisations or not;
- Brazilian fruit exporters and British fruit importers.

These very interesting results reinforce the idea that quality consciousness is a predominant characteristic among the international fruit traders.

## 5.5 Fruit Quality Management And Contracts

An important aspect of the international fruit trade is the type of price negotiation within contracts adopted by exporters and importers. It is important to verify if there is a relationship between fruit quality management and the types of contracts adopted by fruit traders.

Dobler and Burt (1996) observe that there are three main categories of contracts according to the price negotiations: Fixed Price Contracts, Incentive Contracts and Cost-type Contracts.

The Fixed Price arrangements state that the supplier must deliver a previously specified product for an also previously fixed price. The supplier will not receive more than an earlier agreed-up on amount, even if a contingency forces a rise in costs. This type of arrangement is customarily employed in low risk situations, where the product specifications are clear for both sides of the transaction.

Incentive Contracts are designed to induce the transacting counterparts (buyers and sellers) to better control costs and margins. A responsibility-sharing rule is always present in incentive contracts and it states the liability of each side in case of

eventualities. Incentive contracts are used in business environments of moderate risks. A particular type of Incentive Contracts is the Fixed Price Incentive Contract; in this case the ceiling price is agreed during negotiations and the cost responsibility is shared by the buyer and seller. The supplier accounting system must meet commonly accepted standards and be open to customer review.

Cost Type Contracts specify that the buyer should pay the supplier for the incurred costs and pay a fixed fee. It is a type of contract employed when the product specifications are unclear and when the business environment has high levels of risk.

The fruit traders were asked to indicate (in order of importance) the preferred type of contract used by them in the trading of fruit. The main results are presented on Table 5.24.

**Table 5.24 – Types of Price Negotiation Contracts Used by Fruit Traders**

TYPES OF CONTRACTS	Used as the First Alternative (%)	Used as the Second Alternative (%)	Used as the Third Alternative (%)	Not Assigned (%)
Fixed Price Contracts	53.2	8.9	10.1	27.8
Incentive Contracts	19.0	31.6	8.9	40.5
Cost-type Contracts	15.2	7.6	25.3	51.9

Source: Fieldwork data.

As can be seen the, the Fixed Price Contracts are the main type of arrangement employed by fruit traders in order to regulate price negotiations. 53.2% of the respondents stated that they use Fixed Price Contracts as their first contractual alternative (Table 5.24).

The Incentive Contract is employed as the first contractual alternative by 19% of the fruit traders. Finally, only 15.2% of the respondents stated that they primarily use Cost-Type Contracts. It is also important to notice that the Fixed Price Contract is the only contractual arrangement employed as the first alternative by the majority of fruit traders, the other two contracts are used mostly as the second or the third contractual alternative.

The preponderance of Fixed Price Contracts leads to the conclusion that fruit importers and exporters are capable of generating a low risk business environment. Considering the fragile nature of the fruit, the massive diversity of fruit and the distances involved in international trade, this is a considerable achievement. In addition it should be mentioned that Fixed Price Contracts tend to predominate only when the specifications of the transacted products are clear for both sides of the market (buyers and sellers).

It is important to analyse the relationship between fruit quality management and the type of contracts used by fruit traders. The specific objective here is to verify if fruit traders with less quality management problems have a preference for Fixed Contracts or for the other types of contracts. The 17 component items on the fruit quality management scale will be employed as reference for the perceived level of difficulties in terms of quality management. In this context, the two most frequently applied statistical models are the multinomial probit model and the ordered probit model.

### **5.5.1 Theoretical Considerations: The Multinomial Probit Model**

The multinomial probit model (MNP) is a particular type of qualitative response models, which are models in which the dependent variable is discrete (that is discrete numbers are assigned to the responses such as “yes” or “no”). According to Greene (2000) it is not possible to apply directly regression analysis in order to examine the relationship between an independent variable that is discrete and potential

explanatory variables. However it is possible to develop probability models that are capable of linking a discrete variable to a set of related factors.

According to Geweke, Keane and Runkle (1994) the Probit Model can be expressed as follows:

$$U_{ij} = x_i\beta + Z_{ij}y_j + \varepsilon_{ij} ;$$

where,

$i$  – is an individual with specific characteristics;

$j$  – is a set of mutually exclusive alternatives;

$U_{ij}$  – is  $i$ 's utility from choice  $j$ ;

$x_i$  – is a  $k \times 1$  vector of individual characteristics;

$Z_{ij}$  – is a  $p \times 1$  vector of alternative-specific attributes;

$\varepsilon_{ij}$  – is the alternative-specific disturbance in  $i$ 's utility from choice  $j$ .

By assumption, the  $\varepsilon_{ij}$  have a multivariate normal distribution.

One major constraint in implementing the multinomial probit model, is that it is exceedingly difficult to calculate the direct MNP likelihood because, this involves the evaluation of a  $(j-1)$ -dimensional integral (McCulloch and Rossi, 1994). New strategies have been devised in order to make feasible the multinomial probit computations. One of these strategies is the Gibbs Sampler (Geweke, Keane and Runkle, 1994).

The Gibbs Sampler offers a method of simulating draws from a marginal distribution of interest when two conditions are met, namely (a) the marginal distribution of interest is not available in closed form and (b) its fully conditional distribution (meaning the distribution of parameter of interest assuming the other parameters in the model have given values) is both available and is easy to simulate from. In short, the Gibbs sampler makes possible the generation of random draws from a marginal density when that marginal density is impossible to calculate.

Greene (2000, p. 170) explains the basic idea behind the algorithm as follows: Consider a two variables case,  $f(x,y)$  in which the two fully conditional distributions  $f(x | y)$  and  $f(y | x)$  are known. A Gibbs sequence of draws,  $y_0, x_0, y_1, x_1, y_2, \dots, y_M, x_M$ , is generated as follows. First,  $y_0$  (a “starting value”) is specified “manually”. Then  $x_0$  is obtained as a random draw from the distribution  $f(x | y_0)$ . Then  $y_1$  is drawn from  $f(y | x_0)$ , and so on. The iteration is generically as follows:

- 1- Draw  $x_j$  from  $f(x | y)$ ;
- 2- Draw  $y_{j+1}$  from  $f(y | x)$ ;
- 3- Exit and return to step 1

When enough iterations are completed the final observations  $x_M$  and  $y_M$  are simulated draws from the marginal distribution of interest and the generated data set can then be employed as the base for calculations such as means, variances and other measures that characterize the marginal distributions of interest.

Within applying the multinomial probit model to the contracts data, the model could predict correctly only a very limited number of cell probabilities. In other words, a positive-valued latent variable (an expectation if the model is predicting accurately) was obtained for only for a few observations in the data. In view of this rather weak predictive performance, it became necessary to consider an alternative analytical approach.

The ordered probit model was chosen as a viable alternative mainly because it does allow one to assess the relationship between ordered endogenous variables (preferences for a particular contract) and a set of relevant explanatory variables (namely, the ranking of concerns about fruit quality management issues). It is important to mention however, that, unlike the multinomial probit model, an ordered probit analysis is not capable of matching choices across the multiple contracts to the concerns about quality in a single multivariate regression. Hence, in the ordered-

probit context, analysis is conducted on the ranking of the individual contracts themselves.

### 5.5.2 Theoretical Considerations: The Ordered Probit Model

The ordered probit model's appealing property for the fruit-quality data is its capacity of recognizing the ordered nature of preferences for the endogenous variables (Greene, 2000).

In the context of considering alternatives to standard regression, it is important to notice that ordinary regression analyses are not refined enough to recognise that the information obtained in the opinion survey on contracts are so-called "rank" data. Specifically, in the survey on contracts, the different response alternatives received a numeric code (1= least preferred, 2= second most preferred, and 3= most preferred). In a standard regression analysis these entries are treated as though they represent constant differences between each other where, in reality, this may not be the case. Essentially, the attractive feature of ordered probit analysis is that it relaxes this assumption of constant differences between the coded preferences (Greene, 2000).

Greene (2000, p.876) introduces the ordered probit model as follows:

$$y^* = \beta'x + \varepsilon_i$$

where  $y^*$  denotes a latent preference for the characteristic in question;  $\beta'$  denotes a vector of regression responses linking the covariates  $x$  to the latent response; and  $\varepsilon$  denotes a random error with mean zero and variance  $\sigma^2 = 1$ , where the variance restriction is applied in order to identify the model.

It is important to notice that  $y^*$  is not observed. Instead, we link the observed information to a set of ordered categories as follows:

$$\begin{aligned}
y = 0 & \text{ if } y^* \leq 0 \\
y = 1 & \text{ if } 0 < y^* \leq \mu_1 \\
y = 2 & \text{ if } \mu_1 < y^* \leq \mu_2 \\
& \vdots \\
y = J & \text{ if } \mu_{J-1} \leq y^*
\end{aligned}$$

Where,  $\mu_j$  – the so-called “bin boundaries” are the unknown parameters to be estimated.

Albert and Chib (1993) propose an algorithm for estimating the ordered probit model that, once again, relies on the concept of Gibbs sampling and is implemented as follows:

- 1- Draw the  $\beta$ 's from their fully conditional multivariate normal distributions;
- 2 - Draw an univariate latent random variable,  $Z$ , from its fully conditional univariate normal distribution truncated by specific bin boundaries ( $\mu_1, \mu_2, \dots, \mu_j$ );
- 3 – Draw the bin boundaries  $\mu_1, \mu_2, \dots, \mu_j$  from their fully conditional uniform distribution subject to specific restrictions.

Albert and Chib (1993, p. 673) give full details about how to implement the Gibbs Sampler. According to them the process should start by setting  $(\beta, \mu)$  equal to their maximum likelihood estimates. Then it is necessary to simulate from the specific distributions:

$$\begin{aligned}
\beta | y, Z & \equiv N_K(\hat{\beta}_Z, (X^T X)^{-1}) \\
Z_i | \beta, \gamma, y_i = j & \equiv N(x_i^T \beta, 1) \text{ truncated at left by } \gamma_{j-1}(\gamma_j) \\
\mu_j | Z, \beta & \equiv \prod_{i=1}^N [1(Y_i = j)1(\mu_{j-1} < Z_i < \mu_j) + 1(Y_i = j+1)1(\mu_j < Z_i < \mu_{j+1})]
\end{aligned}$$

The algorithm proved to be applicable to the empirical data and was applied in three separate regressions linking concerns about quality management and the types of price negotiation contracts (fixed price contracts, incentive type contracts and cost type-contracts).

### **5.5.3 The Ordered Probit Analysis: Empirical Results**

Preliminary regressions were performed using all 17 affecting variables and the three categories of price negotiation contracts. All the covariates that had significance levels less than 10% were removed. Only nine covariates emerged from the preferred regressions. The results of the ordered probit analysis are summarized in Table 5.25. Note that the positive coefficients in columns 2-4 imply that the greater the concerns about a specific fruit quality management aspect, the more inclined is the firm to favour a particular contract. Bracketed values denote the implied t ratios obtained from the Gibbs sample.

**Table 5.25 – Estimated Coefficients of Ordered Probit Regressions**

Variables	Types of Contracts		
	Fixed Price Estimate (t ratio)	Incentive Estimate (t ratio)	Cost Estimate (t ratio)
Field production techniques.	-0.13 (-0.54)	-0.52 (-1.38)	0.32 (1.33)
Use of chemicals in field production.	-0.50 (-2.24)	-0.03 (-0.09)	0.60 (2.48)
Grade of maturity.	0.46 (2.22)	0.52 (1.71)	-0.78 (-3.23)
Harvesting.	0.21 (0.69)	-0.52 (-1.21)	0.08 (0.25)
Texture.	-0.14 (-0.44)	-0.86 (-2.04)	0.53 1.66
Flavour.	0.23 (0.91)	0.39 (1.11)	-0.47 (-1.83)
Transport in the main carrier.	-0.41 (-1.34)	1.49 (3.30)	-0.34 (-1.16)
Unloading the main carrier.	0.36 (0.83)	-0.76 (-1.23)	0.04 (0.10)
Transport from the main carrier to the importer's facilities.	-0.68 (-1.64)	0.09 (0.14)	0.66 (1.66)
Dummy.	-3.25 (-2.37)	-0.60 (-0.32)	3.84 (2.55)
Constant.	3.65 (2.93)	2.69 (1.51)	-1.64 (-1.30)
$\mu$	2.09 (8.40)	4.39 (8.37)	2.17 (7.27)

Source: Field work data, 2000.

In the last line of Table 5.25 only a single bin boundary appears. This is because the boundaries for the truncations of the normal random variable are respectively,  $(-\infty, 0]$ ,  $[0, \mu]$  and  $[\mu, +\infty)$ . Thus only one estimated bin boundary is needed for the three-category ordered preferences.

The high t-ratios for the estimated bin boundary are a result of the fact that the boundaries themselves are restricted to reside in the strictly positive interval.

As can be seen the choice for Fixed Price Contracts is influenced mainly by three covariates. The greater the concerns about the “Use of chemicals in field of production” the less inclined is the firm to favour “Fixed price” contracts. This result indicates that problems with the use of chemical defensives affects negatively the level of confidence in transactions. As a consequence traders tend to look for contracts more adapted to higher levels of risks. The relation between concerns about “Transport from the main carrier to the importer’s facilities” and “Fixed price contracts” is also negative. Regarding the variable “Grade of maturity” the relation is direct. In other words, the higher are the perceived problems with fruit maturity levels, the greater is the chance of adopting “Fixed price” contracts. This result indicates that the other alternative contracts are less adapted to deal with fruit maturity problems than “Fixed price” contracts (Table 5.25).

Incentive contracts are best suited in business environments with moderate levels of risks. This type of contract is an alternative between Cost-type contracts and Fixed price contracts. The ordered probit analysis indicates that the greater are the concerns about “Fruit grade of maturity levels” and “Transport in the main carrier” the greater are the chances of adopting “Incentive type” contracts. These direct and positive relations show that fruit traders want to share responsibilities when they perceive relatively high levels of difficulties connected to the two previously cited aspects of the fruit trade. The ordered probit analysis also shows that “Fruit texture” is influential in the choice of incentive contracts, in this case the relationship is negative, which is to say that fruit traders tend to use less frequently “Incentive contracts” when they have high levels of concern related to fruit texture (Table 5.25).

Cost type contracts, it is sometimes argued, are employed mainly when the business environment is perceived by traders as having high levels of risk. It is important to notice that the ordered probit analysis shows that the choice for “Cost type” contracts is mainly influenced by five different variables (t ratio > 1.66). Three of these variables (“Use of chemicals in field production”, “Texture” and “Transport from the

main carrier to the importers' facilities") have a direct and positive relation, with the choice of "Cost type" contracts. This is the same as saying that the greater the concerns about these three particular fruit quality management aspects, the more inclined are the trading firms to favour "Cost type" contracts. Two of the covariates ("Grade of maturity" and "Flavour") have negative relationships to the ordered preferences; in other words, "Cost type" contracts tend to be rejected when the fruit traders have high levels of concern about these two specific aspects of fruit quality management.

It seems relevant to discuss jointly the results of these three regressions.

The covariate "Grade of maturity" was shown to be the most influential for the choice of the three types of contract. For two of the contracts ("Fixed price" and "Incentive") the relationship is positive; for the "Cost type" contract the relationship is negative.

The variable "Use of chemicals in field of production" is a determinant for the choice between "Fixed price" contracts and "Cost type" contracts. Fruit traders with high levels of concern about the correct employment of chemical products tend to prefer "Cost type" contracts. On the other hand, when fruit traders perceive low levels of problems in the use of chemical products they tend to prefer "Fixed price" contracts. The ordered probit analysis also revealed that the level of concern about the covariate "Transport from the main carrier to the importer's facilities" is of great importance for a fruit trader who is deciding between "Cost type" contracts and "Fixed price" contracts. The former type of contract will be chosen when there is a high level of concern about transport activities in the UK. The later type of contract is more likely to be selected when the perceived level of transport problems in the UK is low.

Collectively it seems reasonable to recognise one additional relevant aspect of the ordered probit analysis undertaken here. When the main  $\beta$  point estimates of the "Fixed price" contracts are compared to the equivalent  $\beta$  point estimates of the "Cost

type” contracts, it is possible to see that they have opposite signs. These specific relations indicate that fruit traders tend to use three particular aspects of fruit quality management issues to guide choices between “Fixed price” contracts and “Cost type” contracts. This specific output of the ordered probit analysis is consistent with the theory of contracts where it is generally considered that “Fixed price” contracts and “Cost type” contracts are designed to be employed in business environments that have opposite characteristics concerning the prevalence of risk (Dobler and Burt, 1996).

It is also important to notice that the main  $\beta$  point estimates of the “Incentive” contracts have the opposite signs to the correspondent  $\beta$  points estimates of the “Cost type” contracts.

Table 5.26 presents the prediction probabilities across the three levels of preference for the three types of contract considered in this study.

**Table 5.26 – Ordered Probit Prediction Probabilities**

Levels of Preference	Types of Contracts		
	Fixed Price	Incentive	Cost-type
Least Preferred	0	0	0
Second Most Preferred	1.0	1.0	1.0
Most Preferred	0.33	0	0

Source: Fieldwork data, 2000.

As can be seen the model performs quite well in predicting the middle categories, but not the two extreme categories. This specific result obtains from the preponderance of observations in the middle category and is not unsatisfactory based on the small number of observations and the results of similar studies (Koss, v.15, n.3).

#### **5.5.4 Managerial Implications**

The surveys conducted in Brazil and the UK revealed that the majority of fruit traders tend to make use of Fixed Price-contracts in order to mediate their commercial transactions. Incentive contracts and Cost-type contracts are employed mostly as the second or the third alternative.

Because Fixed price contracts are used mainly in low risk business environments, it is possible to infer that fruit traders are capable of generating low risk situations for their commercial transactions.

By using Ordered Probit Analysis it became possible to establish relationships between fruit quality management issues and particular forms of price negotiation employed by fruit traders. The ordered probit analysis suggests that the choice between Fixed Price contracts (somewhat more adapted to low risk environments) and Cost-type contracts (arguably somewhat more adapted to high risks environments) is basically influenced by the same set of covariates. These covariates, however, have opposite influences on the ranking of preferences across the contracts and this finding is important. The finding is important for two reasons. First, it suggests that the correct choice between the different forms of price negotiation within contracts is an important aspect of international fruit trade. Second, it suggests that fruit traders examine carefully particular aspects of quality as part of contract choice.

#### **5.6 Answering the Research Questions**

The first research question formulated in this scientific investigation was: “Are the different factors that affect fruit quality perceived as a cause of problems in the fruit trade?” To answer this question a survey was organised in Brazil and the UK.

The choice of survey as a method to investigate the question was shown to be appropriate. It was possible to obtain answers from 79 fruit traders operating in Brazil and the UK.

Regarding Brazil, the results produced by the survey were quite clear, some of the most notable findings are:

- There are relatively few companies exporting fruit in Brazil and these companies are dispersed in the territory;
- There is a great diversity of size of companies operating in the fruit export business in Brazil. It is possible to find companies exporting less than US\$100,000.00 per year and also companies exporting more than US\$5,000,000.00 annually;
- Most of the Brazilian fruit exported goes to the EU;
- Despite all the diversity mentioned in the Brazilian fruit export business, the exporters demonstrated that they use one predominant pattern to organise their trade operations. The survey indicated that 86% of the fruit exporters produce the fruit that they send abroad.

These conclusions are in line with the findings of Favaret Filho, Ormond and Paula (1999). They confirm that the Brazilian fruit business is geographically dispersed and composed of a great variety of small and medium size firms. The authors argue that such characteristics are negative since the distribution costs tend to be high and the majority of the firms do not have the economic resources necessary to overcome several types of technical problems.

Albuquerque (2001) also found similar results. He observed that despite the high logistics costs (a consequence of the lack of concentration in the sector) there is still a vast potential for the development of the Brazilian fruit export sector. According to the author, improvements are necessary in transport conditions and the modernisation of port facilities. With these conditions the exporters will have better chances to

intensify their operations and reach the necessary volume of operations to compete in the international market.

Two main questions in the survey were directly related to the above cited research question. The first one was organised as a scale and it addressed the management of quality standards. The analysis shows that the majority of fruit exporters do not perceive the management of quality standards as an obstacle to their trade operations. The results of the survey also suggest that fruit exporters have the ability to cope successfully with the diverse technical elements of fruit quality management.

Regarding the UK, the survey pointed out that there is not a single type of organisation operating in the British fruit import industry. It is possible to find firms functioning with less than 10 employees at the same time that is possible to find firms operating with 1000 employees or more. The value of fruit imports per firm also indicates that diversity predominates in the British fruit import business. There are organisations importing less than US\$500,000.00 worth of fruit per year sharing the same market with companies that have the capacity to import US\$5 million worth of fruit per year or more.

The great diversity of fruit and vegetables imported (British traders reported trading in 107 different types of fresh produce), also indicates the plurality that can be found in the British fruit import industry. Despite this considerable diversity the majority of British fruit importers indicate that they do not perceive the management of quality standards as an impediment to their commercial operations.

This result confirms the previous research by White (2000) and also Wilson (1996). These authors observed that British fruit importers have adopted long-term strategies to improve standards in the fruit trade, with part of their strategy being the creation of clear standards that serve as a guide to control products and production processes.

Wilson (1996) studied the banana import business specifically. According to him, in the UK ‘effective supply chain management places its emphasis on the consumer and what will bring most benefit to the end-user. This involves sending information on customer requirements back along the line – the most transparent chains will give the most feedback to the producers’.

The British fruit importers also revealed that they do not recognise fruit quality management as an obstacle to their commerce. This result of the survey is in line with the findings of Fearne and Hughes (1999). These authors mentioned that fresh produce buyers in the UK have adopted in the last decade a policy for selecting their suppliers. Only those companies capable of delivering quality produce have stayed in the business with a considerable volume of trade. It was relatively easy to implement this policy since competition among suppliers is considered to be high.

Malins and Woodhead (1996, p.280) observed that traders in horticultural products tend to use quality management systems to guide their actions and then to obtain more efficiency in their commercial operations. The author goes on to say that “quality management of produce will continue to be of ascending importance in continued development of the horticulture. Developing countries require maximum support to assist them in overcoming the many constraints to the implementation of quality management systems if they are to succeed in development of their export trade”.

Gray and Kleih (1997) pointed out that a considerable number of importers operating in the UK are capable of using advanced quality management techniques; therefore they require from their trade partners the same commitment to quality.

The choice of a survey proved to be an appropriate method to answer the first research question formulated for the present investigation (see Chapter 2). However it is important to remember that it was possible to obtain only 79 completed questionnaires. This modest number of respondents is a limitation in terms of the analysis that can be performed.

The results of the survey support the idea that quality consciousness is fundamental in the fruit trade. The majority of companies approached in the research were shown not to perceive as a problem, the several parameters that affect the quality of the final product. In other words, the results suggest that firms that are incapable of handling quality issues satisfactorily find little place in the fruit trade.

It should be noted that this specific section of the research showed only that quality management is not perceived as a restriction on the international trade. It is not possible, based on the survey results only, to establish which are the measures adopted by Brazilian fruit exporters in order to overcome quality problems. Further fieldwork was then necessary to answer the second research question of this study: “Which are the measures adopted by exporters and importers in order to guarantee product quality in the international trade of fruit?”. To clarify this issue a series of interviews with fruit traders was organised in Brazil and the UK. The results are presented in the next chapter.

## 5.7 Summary

- i) The analysis of the list of fruit export firms operating in Brazil that was compiled revealed that these organisations are dispersed over the Brazilian territory. It is also shown that only 123 firms are trading in the international market a number that can be considered relatively small when compared with the number of fruit producers in Brazil.
- ii) The analysis of a survey applied to Brazilian fruit exporters reveals that there is a great diversity among them. Great heterogeneity was found on issues like number of employees per company, value of fruit exported and volume of fruit exported;
- iii) The main export destination for Brazilian fruit is the EU market;
- iv) The majority of companies were shown to be specialized in the fruit exporting business only. They have a propensity not to trade in products other than fruit.

- v) A survey conducted among British fruit importers revealed that diversity predominates in the sector. It was found that fruit traders operating in the UK presented considerable diversity in terms of their: number of employees, volume of imports, value of imports, origin of suppliers and types of fruit being imported.
- vi) The majority of fruit importers confirmed that they were dedicated to importing mainly fruit. Few traders were shown to import products other than fruit and fresh vegetables.
- vii) The management of quality standards is not regarded as a difficult practice among British and Brazilian fruit traders.
- viii) British and Brazilian fruit traders do not perceive as causing difficulties the 17 different technical factors that can affect fruit quality management.
- ix) Four different characteristics of the fruit trading organisations were compared with the 17 fruit quality affecting factors; only no associations or fairly weak associations were found for all 68 crosstabulations performed.
- x) By using ordered probit analysis it became possible to see that the correct choice between the different types of price negotiation contracts is an important aspect of the international fruit trade and that fruit traders tend to examine carefully particular aspects of fruit quality in order to select the most adequate contractual relation.
- xi) The survey conducted among fruit traders in Brazil and the UK was shown to be an adequate instrument to reveal the important characteristics of the sector. However further research was necessary to describe the strategies adopted by traders in order to guarantee a satisfactory level of fruit quality in their commerce.

## *Chapter 6*

# Qualitative Research Results

## 6.1 Introduction

In the previous chapter it was possible to see that the management of quality is not perceived by the majority of Brazilian and British fruit traders as a barrier to their trade operations. However the survey conducted among fruit exporters and importers was not capable of revealing which are the strategies they use to overcome quality problems in the fruit trade. Further research was necessary, in this case interviews with importers and exporters.

This chapter presents the results of these interviews. It starts by showing the perceived quality management problems. The central sections employ diagrams, cases and interviews to describe the quality management strategies used by Brazilian and British fruit traders. The last sections clarify the differences and similarities among the quality management strategies found.

## 6.2 Organisations And Integrated Activities

Following the guidelines of the **Diversity Of Transaction Arrangements Research Sequence** (see Chapter 4) it was possible to describe the main transaction arrangements used by Brazilian and British fruit traders. It was also possible to characterize the main strategies employed by them in the management of the fruit quality. The results found are based on the 34 cases (19 fruit exporters and 15 fruit importers) presented on Table 6.1.

**Table 6.1 – Brazilian And British Fruit Traders**

ORGANISATIONS	INTEGRATED ACTIVITIES	EXPORTED FRUIT	FRUIT PRODUCTION REGION	DESTINATION MARKETS	COMMENTS
Exporter 1 E1	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Melons and mangoes	Mossoro, Rio Grande do Norte	The Netherlands, United Kingdom, Spain, France, Italy, Denmark and Argentina.	The company has more than 3500 employees and exports more than US\$5 million annually.
Exporter 2 E2	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Melons and mangoes	Mossoro, Rio Grande do Norte	Germany, France, Sweden, The Netherlands and The United Kingdom.	The company has more than 500 employees and exports more than US\$5 million per year.
Exporter 3 E3	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Melons and mangoes	Mossoro, Rio Grande do Norte	The Netherlands, United Kingdom, and Denmark.	The company has more than 200 employees and exports more than US\$1 million annually.
Exporter 4 E4	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Melons	Mossoro, Rio Grande do Norte	Spain, The United Kingdom and The Netherlands.	The company has less than 100 employees and exports less than US\$1,000,000.00 annually.

Source: Field research data

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

ORGANISATIONS	INTEGRATED ACTIVITIES	EXPORTED FRUIT	FRUIT PRODUCTION REGION	DESTINATION MARKETS	COMMENTS
Exporter 5 E5	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Mangoes and grapes	Petrolina, Pernambuco	The United States, The Netherlands, Germany, France, The United Kingdom, Sweden, Denmark, Belgium, Spain, Portugal and Italy.	The company employs more than 100 people. It exports annually more than US\$5,000,000.00 and less than US\$1 million.
Exporter 6 E6	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Mangoes and grapes	Juazeiro, Bahia	Japan, Sweden, Finland, Denmark, The Netherlands, Belgium, The United Kingdom, Germany, France, Portugal, Greece, Austria and Argentina.	The company maintain regularly 10 employees reaching more than 100 employees during the harvesting season. The company exports more than US\$1 million per year.
Exporter 7 E7	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Grapes	Juazeiro, Bahia	The Netherlands, The United Kingdom.	The company is a direct supplier of British supermarkets chains.
Exporter 8 E8	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Orange	Catanduva, Sao Paulo	Japan, The Netherlands, The United Kingdom, Germany, France, China.	The organisation maintains three orange farms and a centralized packinghouse that supports the farms. It exports more than US\$5 million per year.

Source: Field research data

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

ORGANISATIONS	INTEGRATED ACTIVITIES	EXPORTED FRUIT	FRUIT PRODUCTION REGION	DESTINATION MARKETS	COMMENTS
Exporter 9 E9	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Orange	Conchal, Sao Paulo	The Netherlands, The United Kingdom.	The company also produce orange juice. It employs more than 1000 people.
Exporter 10 E10	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Apple	Fraiburgo, Santa Catarina	Germany, Austria, Sweden, Denmark, The Netherlands, Belgium, United Kingdom, Ireland, The United States and Japan.	The company employs more than 1000 employees. It exports less than US\$500,000.00 annually.
Exporter 11 E11	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Apple	Fraiburgo, Santa Catarina	Finland, The Netherlands, United Kingdom, Ireland, Germany and France.	More than 100 people are employed in the company.
Exporter 12 E12	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Apple	Fraiburgo, Santa Catarina	The United States, The Netherlands, Spain, The United Kingdom Argentina, Uruguay, Paraguay and Japan.	The company employs more than 500 people.

Source: Field research data

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

ORGANISATIONS	INTEGRATED ACTIVITIES	EXPORTED FRUIT	FRUIT PRODUCTION REGION	DESTINATION MARKETS	COMMENTS
Exporter 13 E13	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Apple	Fraiburgo, Santa Catarina	Denmark, The Netherlands, The United Kingdom, Germany and Russia.	The company has more than 500 employees. Regularly it exports more than US\$500.000.00 per year.
Exporter 14 E14	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Apple	Fraiburgo, Santa Catarina	The Netherlands, United Kingdom, Germany, Spain Portugal, United States, Canada, Japan	The company employs more than 1000 people.
Exporter 15 E15	Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Mangoes, papayas, figs, ginger, limes, and avocados	Linhares, Espirito Santo; Petrolina, Pernambuco; Sao Paulo State	The United States, Canada, The Netherlands, Belgium, The United Kingdom, Germany, France, Spain, Portugal and Russia.	The exporter buys its fruit from specialised producers. The company sells more than US\$1million in the international market.
Exporter 16 E16	Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Mangoes and grapes	Juazeiro, Bahia	Germany, France, The Netherlands, The United Kingdom, Japan, Argentina and Uruguay.	The company regularly exports more than US\$1million.

Source: Field research data

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

ORGANISATIONS	INTEGRATED ACTIVITIES	EXPORTED FRUIT	FRUIT PRODUCTION REGION	DESTINATION MARKETS	COMMENTS
Exporter 17 E17	Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Melons	Mossoro, Rio Grande do Norte	The Netherlands, The United Kingdom, Germany, Spain and Ireland.	The company has more 200 employees. It exports more than US\$1million annually.
Exporter 18 E18	Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.	Mangoes, papayas and grapes	Petrolina, Pernambuco	The Netherlands, The United Kingdom, The United States	The company exports regularly more than US\$1 million per year.
Exporter 19 E19	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport; Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; Storage.	Melons and bananas	The operations in Brazil are cantered in Mossoro Region (Rio Grande do Norte State) and Ceara State.	All the EU countries, USA, Canada, Mexico, East Europe and Japan.	The company is a multinational based in USA. It employs 20,000 people in its global operations.

Source: Field research data

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

<b>ORGANISATIONS</b>	<b>INTEGRATED TECHNICAL ACTIVITIES</b>	<b>IMPORTED FRUIT</b>	<b>FRUIT SOURCE REGION</b>	<b>VALUE IMPORTED ANNUALLY</b>	<b>COMMENTS</b>
Importer 1 I1	Unloading: ship or aeroplane; Transport to distribution centre; Processing; Packing.	Apples and pears	NAFTA, Brazil, Argentina, Chile, Uruguay, China	£53 million	The importer is specialised in supplying supermarkets. More than 95% of its fruits goes to supermarket chains.
Importer 2 I2	Unloading: ship or aeroplane; Transport to distribution centre; storage.	Grapes, stone fruits, pineapples, avocados, melons, lychees.	EU, Ivory Coast, South Africa, Brazil	£90 million turnover	The importer maintains important commercial operations in France.
Importer 3 I3	Unloading: ship or aeroplane; Transport to distribution centre; Processing; Packing.	Papaya, mango, limes, melons and figs.	EU, Brazil, Mexico, Argentina, Chile.		The company maintains more than 1000 employees regularly.
Importer 4 I4	Unloading: ship or aeroplane; Transport to distribution centre; Processing; Packing.	Apples, pears, kiwis, melon, avocados, citrus, grapes, stone fruit, and mangoes	30 countries	£474.4 million turn over.	In addition to the fresh produce trade, the company is a major supplier of fresh prepared food.

Source: Field research data

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

<b>ORGANISATIONS</b>	<b>INTEGRATED ACTIVITIES</b>	<b>IMPORTED FRUIT</b>	<b>FRUIT SOURCE REGION</b>	<b>VALUE IMPORTED ANNUALLY</b>	<b>COMMENTS</b>
Importer 5 15	Unloading: ship or aeroplane; Transport to distribution centre; Processing; Packing.	Apples, pears, melons, stone fruits	India, Egypt, Brazil, EU, Mexico, Costa Rica and Israel.	£72 million turnover.	The company started as wholesaler at Spitalfields. In 1990 it sold this business and now concentrates its efforts on fresh produce import activities only.
Importer 6 16	Unloading: ship or aeroplane; Transport to distribution centre; Processing; Packing.	Bananas, grapes, stone fruit, citrus, vegetables and flowers.	35 countries	£220 million annual sales	Apart from the fresh produce import activities the company also has a wholesale division with branches in Birmingham, Bristol, Cardiff and Southampton.
Importer 7 17	Unloading: ship or aeroplane; Transport to distribution centre; Storage.	Smaller fruit and vegetables: lychees, sharon fruit, psalis, star fruit, berries	37 countries	£4 million	The importer maintains highly diversified line of fruits and vegetables.
Importer 8 18	Unloading: ship or aeroplane; Transport to distribution centre; Storage.	Mango, melon, citrus, and pears.	EU, South Africa, Venezuela and Brazil.	More than £5 million annually	The firm does not maintain fruit processing facilities.

Source: Field research data

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

<b>ORGANISATIONS</b>	<b>INTEGRATED ACTIVITIES</b>	<b>IMPORTED FRUIT</b>	<b>FRUIT SOURCE REGION</b>	<b>VALUE IMPORTED ANNUALLY</b>	<b>COMMENTS</b>
Importer 9 I9	Unloading: ship or aeroplane; Transport to distribution centre; Storage.	Cherries, melons, limes, figs, coconuts, dates and berries.	USA, Canada, Chile, Uruguay, Brazil, South Africa, Zimbabwe, Australia, New Zealand, India, Thailand and Morocco.	Volume of sales more than £23 million per year.	The company started as a wholesaler in London and moved on to become an importer of fresh produce.
Importer 10 I10	Storage.	More than 80 different types of fruits and vegetables.	USA, Canada, Mexico, Chile, Brazil, EU countries and Turkey.		The company imports fruit directly and maintains wholesale operations in Spitalfields and New Covent Garden.
Importer 11 I11	Storage.	105 different types of fruit and vegetables. The main are: melons, apples, tangerines, papayas and mangoes.	More than 25 different countries. The main are: EU countries, USA, Israel, South Africa, Turkey, Brazil and Chile.		The company is based at Spitalfields Wholesale Market.

Source: Field research data.

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

<b>ORGANISATIONS</b>	<b>INTEGRATED ACTIVITIES</b>	<b>IMPORTED FRUIT</b>	<b>FRUIT SOURCE REGION</b>	<b>VALUE IMPORTED ANNUALLY</b>	<b>COMMENTS</b>
Importer 12 I12	Storage.	More than 60 types of fruit & vegetables.	More than 20 different countries.		The company is a regional wholesaler.
Importer 13 I13	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection & grading; Packing & labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport; Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; Storage.	Bananas, pears, citrus, apples, grapes, papayas, pineapples,	Jamaica, Portugal, Chile, Brazil, Argentina, Honduras, Costa Rica, Spain, USA, Israel, Greece, New Zealand.	The company turns over more than US\$1 billion in its global operations.	The company is the main banana importer in the UK.
Importer 14 I14	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport; Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; Storage.	Banana, pineapple, melon, grapes, Stone fruit, Citrus.	Costa Rica, Equator, Colombia, Mexico, Guatemala, Panama, Philippines, USA, Brazil, Mexico, Cameroon, Chile and South Africa.	Annual sales of more than US\$1.6 billion annually.	The company maintains fruit production operations in more than 15 different countries.

Source: Field research data

**Table 6.1 – Brazilian And British Fruit Traders (continuing)**

<b>ORGANISATIONS</b>	<b>INTEGRATED ACTIVITIES</b>	<b>IMPORTED FRUIT</b>	<b>FRUIT SOURCE REGION</b>	<b>VALUE IMPORTED ANNUALLY</b>	<b>COMMENTS</b>
Importer 15 I15	Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport; Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; Storage.	Papayas, apples, melons mangoes, citrus, grapes, bananas and stone fruit.	Belize, Brazil, Jamaica, South Africa	Annual sales greater US\$1 billion in its European operations alone.	This company has a strategy of maintaining strategic alliances with its suppliers instead of producing its own fruit.
Importer 16 I16	Distribution; Supermarket shelves.	More than 100 different types of fruit.	World wide supply.	Does not import directly.	The company is one of the six main supermarket chains in the UK.

Source: Field research data

Twelve of the above mentioned cases are fully described in this chapter. Each one of them was selected to be representative of a category of exporters or importers. The criteria for presenting the cases was founded on the total score<sup>1</sup> (per case) on the perceived quality management problems scale. Details are given with each case.

### 6.3 Perceived Quality Management Problems

The survey analysis suggested that there is some relationship between the characteristics of the trading organisations and fruit quality management. The interviews conducted in Brazil and the UK offered an opportunity to clarify this point.

In this part of the chapter are presented the main fruit quality management problems in Brazil and the UK. First the technical aspects of the perceived problems are discussed then the relationships between the characteristics of the trading organisations and the perceived quality management problems are disclosed. Finally the differences between exporters and importers regarding quality management problems are presented.

#### 6.3.1 Perceived Quality Management Problems in Brazil

The interviews with 19 fruit exporters in Brazil confirmed that following activities<sup>2</sup> in the fruit export business are performed:

- a) Pre-harvest activities – This involves all cultivation activities;
- b) Harvesting – For three main reasons, this was recognised as one of the most critical periods in fruit production activities. First, it must be completed in a short period of time otherwise the fruit would be too ripe and consequently more liable to injuries. Second, it is difficult to recognise the right moment

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<sup>1</sup> The Total Score of each organisation was calculated from the sum of all chosen values of each component item of the Perceived Quality Management Scale.

<sup>2</sup> These technical activities were previously mentioned on Chapter 2.

for harvesting for each individual fruit. Third, harvesting is a labour intensive activity, this implies higher costs and administrative complexities;

- c) Short distance transport – The fruit is transported from a gathering point in the plantations to the packing houses;
- d) Receiving Operations – Tractors or lorries unload their cargo on the receiving platform at the packinghouses;
- e) Treatment – This is very specific to each fruit.
- f) Selection and grading – Fruit destined for the external market is separated from that which will stay in Brazil. Numerous criteria can be used in the selecting process. The export-selected fruit are mainly graded according to their weight or size.
- g) Packing and Labelling – In most cases the fruit is packed in an operation executed by human hands. The packs are labelled according to their content and destination;
- h) Pallet consolidation – The pallets are consolidated primarily to optimise transport and storage space. The pallet architecture is specific to each fruit and destination market;
- i) Cooling – Fruit is refrigerated to reduce metabolic activities and to prevent the attack of microorganisms. This activity was shown to be a bottleneck for a number of companies, primarily because the fruit temperature cannot be reduced abruptly. This situation leads the exporters to maintain cooling equipment of great capacity in order to process large volumes of fruit at the same time;
- j) Storage – All fruit destined for export needs to be maintained under controlled temperatures, some fruit even needs atmosphere control;
- k) Short distance logistics – This comprises the transport from the packinghouses to the ports or airports, the storage at port/airports and the loading of ships or aeroplanes.
- l) Contracting the long distance transport – This involves negotiations about the price for the transport service, the period when the service will be needed and which port/airport will be used.

These 12 activities were shown to be common to most of the exporters interviewed, however they mentioned having different levels of difficulty with each of them. It is important to mention these difficulties categorized according to the type of fruit exported.

### Technical Difficulties and Types of Fruit

Apple exporters (E10, E11, E12, E13, and E14) reported not having any problems with post-harvest activities. This favourable situation derives mainly from the fact that apples are relatively resistant during post-harvest processing. It is also important to remember that post-harvest technologies for apples (processes and equipment) were developed a long time ago.

Problems with pre-harvest activities for apples, on other hand were reported by all interviewees as causing the most serious limitations. The quantity and quality of apple production in one geographical region can be easily affected by climate. As the climate in the Brazilian South Regions is instable so is the apple production. All companies visited reported exporting very little during the 98/99 season, the result of an unfavourable combination of climate factors (few cold hours during the year and the incidence of hail).

Orange exporters (E8 and E9) described the same picture as apple exporters. They reported not having problems with post-harvest activities. Most of the fruit processing is carried out by machinery imported from Spain. The automation was made possible by the spherical shape of oranges and their natural resistance to physical injuries.

Orange production was characterized by exporters as problematic. The climate in the production region (Sao Paulo State) is not favourable to the development of the orange colour in the skin of the fruit. The fact that oranges remain green after harvest turns out to be a major limitation since fruit appearance is a crucial attribute to obtain

better prices on the international market. Exporters also mentioned the occurrence of “Black Spot”, an injury caused by fungus that also compromises the fruit’s final appearance.

The papaya export business was revealed to be more complicated than any other fruit business investigated in this research. This can probably be explained mostly by the fruit’s high fragility and perishability. Besides that, both production and post-harvest processing of papaya still need further technological development.

Exporters (E15, E18) found the only way to overcome the technical problems with papaya was by using a fast transport service: aeroplanes. Air cargo companies can do in hours a job that would take at least nine days for a ship to do.

The result of using aeroplanes in the export of papaya was a dramatic increase in the price of the product and, consequently, a decrease in the level of fruit consumption. Papaya exporters stated clearly that the main bottleneck in their export trade is the inexistence of refrigerated storage facilities at Brazilian airports.

Mango exporters (E1, E2, E3, E5, E6 and E16) revealed that production of mangoes could not be considered as problematic. They also expressed the same opinion about the post-harvest operations. Moreover they regarded the export procedures to the USA as costly. It was mentioned that is compulsory to provide for inspectors from the United States Department of Agriculture (USDA) during all post-harvest processing. The maintenance costs of these inspectors at the fruit-processing sites in Brazil can reach values of up to US\$105,000.00 per company in only one export season.

The main concern of mango exporters was the low prices in the international market. This depression of prices was caused by the fierce competition for market share amongst the various mango production regions around the world. To deal with this barrier, producers managed to harvest their mangoes in the period of the year when

competition is less intensive. This practice is made possible by using flower induction techniques combined with planned irrigation.

Grape exporters (E5, E6, E7 and E16) revealed that they experience complications at both production and post-harvest levels. First of all the grape business is labour intensive in almost every stage of its production and processing cycle. The vineyards need sequential pruning during the growth period. Grape bunches need to be shaped through pruning. Only trained hands can do these activities.

At the packinghouses, the fragility of grape bunches makes it almost impossible to use machinery for processing. Again only human hands can do most of the job. This intensive use of labour raises the production costs and causes administrative complexities for the grape business.

Another issue raised by grape exporters (E7 and E16) was the inadequacy of grapes varieties currently cultivated in Brazil. It was said that the international markets currently prefer seedless grapes while Brazilian growers still produce grapes with seeds.

Grape exporters (E5, E7 and E16) also mentioned having post-harvest problems. They need to maintain all grape packs in an atmosphere of relatively high humidity, as otherwise the grapes tend to detach from the bunch, a condition not acceptable to importers. Moreover the high humidity can cause problems like the development of post-harvest diseases. The uncertainty caused by this technical problem was reported to be a source of tensions in the relationship with fruit importers.

The melon export business was revealed not to have major problems in its production stage. The fruit grows on a plant with a short life-cycle, which can be cultivated most of the year in the main melon production regions in the Brazilian Northeast. This major advantage is used by exporters to adjust fruit production to demand. Brazilian growers are able to harvest and export melons during the periods of the year when

prices are higher in the international market. Melon growers are also capable of regulating the volume of production each year according to the level of demand.

Brazilian exporters send abroad mainly yellow melons, a type of fruit known to be resistant to post harvest processing. High quality melons are only a small proportion of the fruit trade. This situation is the result of deficiencies at the post-harvest processing and logistics levels.

Exporters (E4, E17 and E17) manifested the need to develop new post-harvest technologies to better process quality melons. They also mentioned that deficiencies in the Brazilian motorways and ports (lack of storage facilities) are serious barriers to any export growth. Box 6.1 illustrates the case of Exporter<sup>3</sup> 4 (E4), an organisation that exemplifies most of the points previously discussed.

#### **Box 6.1 – Melon Exporter: Perceived Technical Difficulties**

Mossoro (Rio Grande do Norte State) is the base of E4<sup>4</sup>. The organisation produces and trades mainly melons. The fruit are consumed mainly in the international market. The organisation also exports fruit to the Netherlands, the United Kingdom and Spain.

The interview took place on January 2000, at the head office of the company. The General Manager gave the interview.

E4 exports only yellow melons (melao amarelo) a type of fruit that is known to be resistant to the post-harvest processing activities but with a poor flavour appeal. The general manager observed that the exports of this type of fruit are decreasing yearly. He affirmed that the low demand for yellow melons and the competition with the African melons are forcing the prices down.

E4 tried in the past years to produce and export different varieties of melon (Charentais, Ogen and Cantaloup) which have a more attractive flavour but are more sensitive to the post-

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<sup>3</sup> Fictitious name.

<sup>4</sup> This case is described here because the company presented the lowest total score amongst the category Integrated Exporter.

harvest activities. All the export attempts failed. The interviewee said that the lack of appropriate infrastructure proved to be an obstacle impossible to overcome. He observed that the non-existence of cooled storage facilities at the Brazilian ports compromised irremediably all the shipments sent abroad.

At the end of the interview session, the general manager affirmed that exports of melon in Mossoro will decrease unless new varieties (more resistant to post-harvest processing) of melon are launched or better logistics (storage and transport) are made available.

Source: Fieldwork data.

In general the 19 interviews conducted in Brazil support the idea that the perceived technical problems related to fruit quality management are associated with each type of fruit. The interviews also lead to conclusion that each type of fruit has problems in a specific stage of the production and trade cycles. Apples and orange exporters manifested concern about the pre-harvest activities. Orange exporters also indicated that they were worried about the appearance of their product. Papaya exporters showed apprehension about transport factors. Mango and grape exporters mentioned problems with the post-harvest processing activities at the packinghouse. Finally, melon exporters expressed concern about their fruit attributes (appearance and flavour mainly).

### Technical Difficulties And Firm Characteristics

The survey conducted among Brazilian and British fruit traders demonstrated that the majority of them do not perceive fruit quality management as a barrier to their commercial operations. Nevertheless a minority of fruit traders pointed out that some activities related to fruit quality management are perceived as causing great difficulty or excessive difficulty. The survey also exposed an indication of association between firm characteristics and quality management problems.

The characteristic *Number of employees* appeared to be associated with the factor *Safety requirements*. It was possible to observe during the interviews that the

relatively small organisations (less than 100 full time employees) are poorly equipped to deal with safety requirements. Four of these organisations were visited. None of them had quality control laboratories or make regular use of the services of specialized laboratories. It then becomes difficult for these organisations to guarantee that all the safety requirements are respected.

The survey also revealed a positive relationship between the characteristic *Value of trade* and three transport factors (*Loading the main carrier, Transport in the main carrier* and *Transport from the main carrier to the importers facilities*). These relationships were largely confirmed by the interviews. The organisations trading higher volumes of fruit are able to obtain better discounts from the transport companies; on the other hand those organisations trading smaller volumes of fruit are forced to pay higher transport costs.

The survey revealed that the use of chemical products in particular perceived as a cause of concern. 23.3% of the Brazilian survey respondents pointed out that the **Use of chemicals in field production** cause “Great difficulty” or “Excessive Difficulty”. Even more respondents (29.3%) chose these two options for the activity **Use of chemicals in post harvest processing**. The interviews carried out in Brazil revealed that Export Agents constitute the category of exporters that is most particularly sensitive to these issues.

The four Export Agents interviewed reported that they have experienced problems in the activities related to use of chemicals at the production and post-harvest stages. This happens mainly because they do not have full control of the use of chemicals during the fruit production stage. The application of defensives in post-harvest processing was also revealed to be predominantly difficult since it is an activity that is dependent on the previous stages. Box 6.2 illustrates this situation.

### **Box 6.2 – Mango Exporter: Perceived Technical Difficulties**

Exporter 16 (E16)<sup>5</sup> is based in Juazeiro (Bahia State). It is an organisation that exports mainly mangoes and grapes. The main destination markets are: the EU (Germany, France, The Netherlands and The United Kingdom), the Mercosur countries (Argentina and Uruguay) and Japan (with less regularity).

The interview took place at the packinghouse of the company on 11 of February 2000. Two members of the company gave the interview, the executive responsible for export activities and the agronomist responsible for post-harvest processing.

E16 does not produce fruit; the firm buys it from specialised growers. As a consequence E16 does not have complete control over the use of chemicals during production activities. It thus becomes difficult to optimise the use of defensives during the post harvest processing stage. The interviewees used the example of mangoes to illustrate this technical problem.

In the region of Juazeiro and Petrolina mango growers make use of different irrigation techniques; since the application of defensives is directly connected to the type of irrigation adopted there is great variation as to when the defensives are used and how they are applied. Consequently mangos that arrive at E16's packinghouses tend to have different levels of infestation and defensives. It is also important to note that different growers tend to adopt differing dosages of defensives since they cultivate mangoes at distinct microclimatic conditions. For these reasons it becomes difficult to control the precise level of defensives in each lot of fruit.

It is important to remember that in the same packinghouse, E16 also process grapes, a factor that adds more complexity to the control of the level of defensives.

Source: Fieldwork research data.

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<sup>5</sup> This case is described here because the company presented the lowest total score amongst all Export Agents.

The survey also pointed out that harvesting is another activity that has the potential to be detrimental to export operations. 21.4% of the respondents affirmed that harvesting causes great or excessive difficulty. Again the interviews revealed that Export Agents form the category of exporters who suffer most intensively with regard to this activity.

The interviewees working for Integrated Production-Export Organisations and for the Integrated Multinational reported having fewer problems with these three previously mentioned activities.

The interviews revealed that the Integrated Production-Export firms and the Export Agents are the categories of organisations that suffer most intensively with regard to the management of the activity **Transport in the main carrier**. Regarding Integrated Production-Export firms this happens mainly with new entrants or in other words with those organisations that have started to export fruit recently. Two interviewees observed that it is difficult to obtain satisfactory conditions from the transport companies (frequency of transport, transport fares and the value for insurance) when a firm is starting its export operations.

Export Agents reported a different nature of problems related to the activity **Transport in the main carrier**. In this case the obstacle comes from the fact that distinct products require distinct transport and storage conditions. It then becomes difficult to reconcile the use of transport and storage resources.

### **6.3.2 Perceived Quality Problems In The UK**

It was possible to conduct 15 interviews with British fruit importers. The interviews revealed that these importers have different opinions regarding the technical factors that affect fruit quality. It is important to discuss these results categorized according to the type of fruit imported and according to the characteristics of the import organisations.

## Technical Difficulties and Types of Fruit

Melon importers (I2, I3, I4, I10 and I12) reported that the price of the Brazilian melon is becoming less competitive; it is possible to find similar products in Africa and Central America with better prices. The importers also observed that the Brazilian suppliers were not capable of introducing new and more attractive varieties of melon. Two of the interviewees added that their imports from Brazil are decreasing in the last few years.

Three importers of grape (I4, I6, and I10) mentioned similar problems to the melon importers. They affirmed that British consumers now have a preference for seedless grapes and that their Brazilian suppliers were unable to export higher volumes of this category of grapes.

Four mango importers (I3, I5, I8 and I11) showed concern about the post-harvest processing activities, they mentioned that problems with safety requirements are relatively common. It was said that this situation happens mainly because fungal diseases, which can compromise the appearance of the fruit, easily affect mangoes. To overcome this problem, mango growers and traders need to use defensives; it happens then that some of these producers and traders overuse defensives. Box 6.3 illustrates the case of a British mango importer.

### **Box 6.3 – Mango Importer: Perceived Technical Difficulties**

The commercial director gave the interview; it took place on December 1999. The main office of Importer 8 (I8)<sup>6</sup> is located in the London Metropolitan Area. The company trades mainly with mango, melon, citrus, and pears. In most cases the fruit comes from EU, South Africa, Venezuela and Brazil. The firm does not maintain fruit processing facilities, being responsible for the transport activities in the UK and for storing fruit shipments during limited periods of time.

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<sup>6</sup> This case is here described because the company presented the lowest total score amongst all Independent Exporters.

Regarding the mango imports from Brazil, the interviewee showed concern about safety requirements. According to him, the company experienced inconveniences in previous years. He mentioned that it is a common practice of the company to organise technical visits to the suppliers. When visiting a Brazilian mango supplier he applied a questionnaire in order to verify 16 different aspects of the fruit production and trade operations (*Company and site details; Proposed products; Workforce details; Employee records; Young workers; Apprentices; Hours of work/ Wages/ Salaries; Overtime working; Entitlements; Forced or Bonded Labour; Employee documentation and information; Health and safety; Agrochemical use; Employment, freedom of association and collective bargaining; Housing and amenities; General comments and observations*). Three of these aspects were shown to be inadequate: *Young workers; Health and safety* and *Agrochemical use*.

Five workers under 18 years were found working and none of them on an apprenticeship scheme. Regarding *Health and safety*, no fire fighting equipment was found and no safety notices were visible. In addition, the operational staff were not using protective equipment and clothing (ear protection, eye protection, headgear and footwear).

With respect to Agrochemical use, the Commercial Director observed that some chemicals were not properly stored and that the technician responsible for the employment of agrochemicals was not present during the post-harvest processing activities. Furthermore, no proof of pollution monitoring (residue testing) was presented.

The Commercial Director stated the Brazilian supplier visited received strict directions about how to proceed in order to regain commercial preference.

Source: Fieldwork data.

Three importers of papaya (I3, I11 and I13) observed that the main barrier to the any substantial increase in the volume of trade is the transport costs. They affirmed that

all the Brazilian papaya that arrives in the UK come by air. The air modality of transport is currently in use due to the high perishability of papayas. One of the British importers (I3) mentioned that the Brazilian exporters should make more effort in order to develop logistic systems based on sea transport. Actually, the company requested the Brazilian suppliers to develop such a system, but none of them were capable of using sea transport.

Orange importers (I4, I6, I10 and I15) unanimously criticised the appearance of the Brazilian orange. They mentioned that oranges originating in Brazil do not have an attractive orange colour. The fruit tends to keep green even when it is fully mature. As a consequence Brazilian oranges are mainly used in the UK for producing fresh orange juice in restaurants and hotels.

The importers of apples (I1, I4, I5 and I15) highlighted the fact that Brazilian apple exports are easily affected by climatic factors. Importers I4 and I5 observed that the absence of cold temperatures during the Brazilian winter affects the quantity of apples produced. Both importers also mentioned that the occurrence of hail in the production regions is capable of compromising the quality of the fruits. Finally, I5 observed that the total amount of Brazilian exports is greatly influenced by the exchange ratio between the Brazilian Real (R\$) and the US Dollar (US\$).

### Technical Difficulties And Firm Characteristics

The analysis of the survey conducted among fruit traders in Brazil and UK showed the existence of a relationship between the characteristic *Number of employees* and the quality management factor *Safety requirements*. The interview results validated this relationship only partially. It was found that both big (high number of employees) and small (limited number of employees) trading organisations are capable of dealing with safety requirements. Only three organisations (both with less than 100 employees) reported safety related problems.

The survey revealed a positive association between three transport factors (*Loading the main carrier*, *Transport in the main carrier* and *Transport from the main carrier to the importers facilities*) and the characteristic *Value of trade*. These relationships were only partially validated by the interviews conducted in the UK. The majority of the organisations visited reported not having problems with transport issues, only four organisations (I3, I10, I11 and I13) mentioned difficulties in dealing with transport. From this group, only the organisations I3, I10 and I11 have a relatively small volume of trade (less than US\$1,000,000.00). Importer I13 trades more than US\$1 billion in its global operations.

It is important to remember that some of the fruit exporters rated as relatively difficult five of the activities related to fruit quality. These activities are: **Setting quality standards**, **Grade of Maturity**, **Appearance**, **Flavour** and **Use of chemicals in post-harvest processing**. The interviews conducted in the UK offered a possible explanation for this specific result.

Precisely 20% of the respondents pointed out that **Setting quality standards** is a very difficult or excessively difficult activity. Three Regional Wholesalers confirmed these results during interviews. According to them it is difficult to set technical quality standards when they have no direct access to consumer needs or to all the technical information inherent in the fruit production and trade activities.

During the interviews Regional Wholesalers also indicated as particularly difficult the management of activities related to fruit attributes. This outcome supports the findings of the survey conducted in the UK where 25% of the respondents regarded the item **Grade of maturity** as excessively difficult or very difficult. The same survey also found that 28.6% of the British importers considered the item **Appearance** as quite difficult. A similar result was found for the item **Flavour**, which was noted as being difficult by 25% of the respondents. Box 6.4 gives a general picture of a company typical of the three organisations mentioned above. It is based on an interview conducted with an executive of the company.

#### **Box 6.4 – Regional Wholesale: Perceived Technical Difficulties**

Importer 10 (I10)<sup>7</sup> is based in New Covent Garden and also maintains trade activities in Spitalfields Wholesale Market. Currently I10 trades more than 80 different types of fruit and vegetables. The main suppliers of I10 are EU countries and Turkey. The company also buys fruit from USA, Canada, Mexico, Chile and Brazil.

The executive interviewed in I10 observed that it is particularly difficult to set fruit quality standards, mainly because the company has a wide diversity of clients and most of them with a specific need. In addition it was mentioned that the immense diversity of suppliers makes the standardisation process complicated.

Regarding fruit attributes, the interviewee confirmed that the three most difficult items are: **Grade of maturity, Appearance** and **Flavour**. To explain this outcome an argument was used similar to the previous paragraph. The interviewee affirmed that the considerable diversity of suppliers and clients makes it difficult to trade fruit with all the desirable attributes.

Finally the interviewee mentioned that the item **Use of chemicals in post-harvest processing** is a cause of special concern. He observed that the legislation is very specific about levels of defensives in the fruit traded in the UK, and for this reason the company wants to negotiate only with those suppliers capable of guaranteeing compliance with the pertinent legislation.

Source: Fieldwork data.

It should be mentioned that two independent importers also observed that they face difficulties when dealing with the previously mentioned fruit quality items. This happens mainly when the Independent Importers are “developing” (starting long-lasting commercial relationships) with new suppliers. In this case these new entrants in the British market need to receive all pertinent information in order to sell their products in the UK.

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<sup>7</sup> This case is here described because the company presented the lowest total score amongst all Regional Wholesalers.

Import Agents, Integrated Multinationals and Supermarket Chains reported less problems since these types of importers tend to trade only with well established fruit suppliers. The results of the interviews support the idea that Regional Wholesalers and Independent Importers are the categories of importers that are most sensitive to the technical factors related to fruit quality.

### **6.3.3 Preliminary Conclusions Regarding Perceived Quality Management Problems**

In general the 15 interviews conducted in the UK, endorsed the results of the interviews conducted in Brazil. It was found that there is an association between the type of fruit traded and the perceived technical problems related to fruit quality management.

Importers of melons, grapes and oranges indicated that they were worried about the attributes of the Brazilian fruit. Mango importers expressed concern about safety requirements. Papaya importers manifested apprehension regarding transport issues. Lastly, apple importers showed concern about the field production activities.

The analysis of the survey conducted in Brazil and the UK indicated that fruit exporters and importers have very similar views regarding the majority of the component items of the scale on perceived quality management problems. Between the two groups, no statistically significant differences were found for 14 items of the scale. Significant differences were indicated for three items only (*Transport: loading the main carrier*, *Transport in the main carrier* and *Transport: unloading the main carrier*). The 34 interviews conducted in Brazil and the UK offered an opportunity to explain why British Importers and Brazilian exporters have different perceptions regarding transport issues.

The British importers tend to delegate the management of the transport activities to the Brazilian exporters, as a consequence the exporters have to contract the services

of the transport company, supervise the port operations in Brazil and supervise the port operations in the UK. It is precisely these three activities (all connected to the transport companies) that are perceived as more difficult by the Brazilian exporters.

It is also important to observe that British importers trade higher volumes of fruit (see Chapter 5) throughout the entire year. This fact allows the importers to obtain more favourable contracts with the international transport companies. It is also crucial to remember that the transport infrastructure in the UK is already adapted to the international trade of fresh fruits and vegetables.

#### 6.4 Diversity Of Transaction Arrangements

Fruit production and export organisations use a variety of transaction arrangements in order to export their fruit. The semi-structured topical interviews conducted among Brazilian traders revealed that three distinct Transaction Arrangements (TA) are more frequently used by them to export fruit.

The TAs were categorized according to the fruit trade activities that were executed by the fruit exporters. The analysis of the column 'Integrated Activities' in Table 6.1 shown that fruit exporters can be placed into three distinct groups:

- Integrated Production-Export Companies, which execute the following activities in the fruit trade: Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.
- Agent Exporters – Differently from Integrated Production-Export Companies, Agent Exporters do not produce the fruit that they trade. They execute only these activities in the fruit trade: Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport.

- Integrated Multinational – This type of fruit exporter execute all the activities performed by the Integrated Production-Export Companies and also the import operations in the destination market. They integrate the activities: Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport; Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; Storage.

These three types of exporters demonstrated to use three distinct transaction arrangements in their commercial operations. These three transaction arrangements are presented and discussed in the sections bellow.

#### **6.4.1 The Integrated Production-Export Transaction Arrangement**

The Integrated Production-Export Transaction Arrangement (I-ETA) is composed by one hierarchical type of transaction followed by a market type of transaction. The hierarchical type of transaction is performed mainly by a category of organisations that can be called Integrated Production-Export Companies.

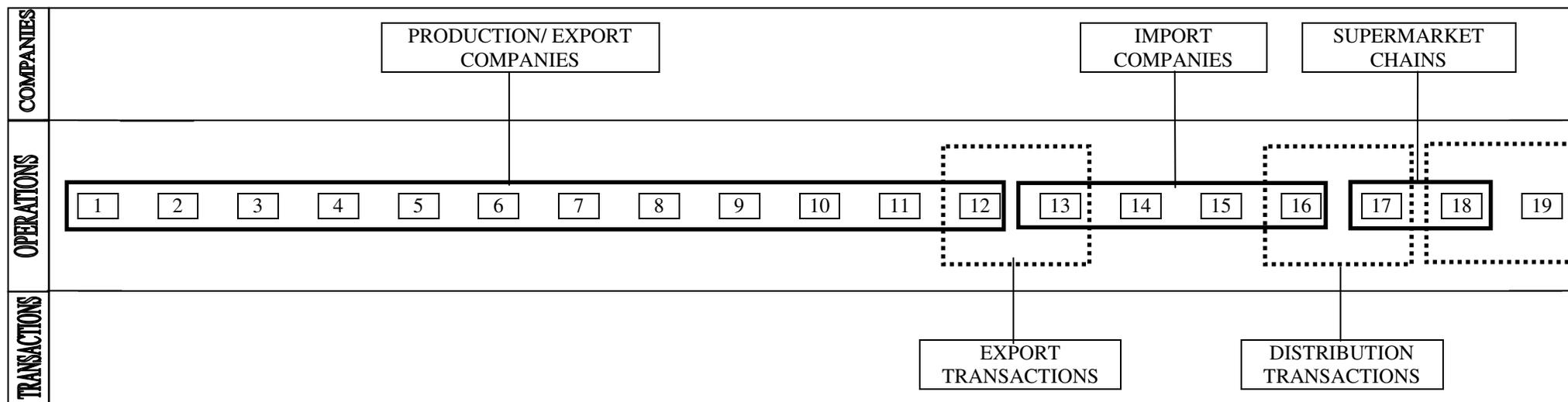
In the I-ETA the fruit are traded according to the following order of transactions: Production-Export Companies (hierarchical type of transactions); Export transactions (market type of transaction); Import companies (hierarchical type of transaction); Distribution transaction (market type of transactions); Supermarket Chains (hierarchical type of transactions).

Figure 6.1 shows the graphical representation<sup>8</sup> of the Integrated Production-Export Transaction Arrangement.

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<sup>8</sup> The diagram was prepared according to the guidelines of the “Graphical Representation of Transaction Arrangements” at Chapter 4.

**Figure 6.1 - Integrated Production-Export Transaction Arrangement**



**NOTES:**

- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1. Pre-harvest activities   | 11. Loading: ship or aeroplane       |
| 2. Harvesting               | 12. Long distance transport          |
| 3. Short distance transport | 13. Unloading: ship or aeroplane     |
| 4. Receiving operations     | 14. Transport to distribution centre |
| 5. Selection and Grading    | 15. Processing                       |
| 6. Treatments               | 16. Packing                          |
| 7. Packing and labelling    | 17. Distribution                     |
| 8. Pallet construction      | 18. Retailers Shelves                |
| 9. Cooling                  | 19. Final Customer                   |
| 10. Storage                 |                                      |

## Integrated Production-Export Companies

Integrated Production-Export companies form a group of organisations that is quite different from the normal fruit producers in Brazil. Their main characteristics are presented in Table 6.2. They have the flexibility to sell their produce in the internal and external market. Most of the conventional fruit producers are restricted to the local or regional markets.

**Table 6.2 – Integrated Production-Export Companies Characteristics**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Produce and trade fruit to the internal and external markets.
Specialized Assets	Fruit plantations; Short distance transport fleet; Cooled storage facilities; Packinghouses.
Integrated Activities	Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Port operations; Contracting long-distance transport.
Transaction counterpart	Fruit importers abroad
Quality Management Strategies	Detailed product specification; Quality control during the production and post-harvest processing; Production environment monitoring; Integrated logistics management; Strategic alliances with trade partners.

Source: Field research data.

Integrated Production-Export companies maintain a number of specialized assets that are not maintained by the majority of fruit producers. The most visible being the specialized fruit plantations. The plantations can be called as specialized because only few fruit varieties are cultivated, precisely those that have already proved to have all the attributes required by importers.

Packinghouses are the other specialised resources maintained. These facilities are kept fully equipped with all the equipment necessary to select, grade, treat, pack, cool and storage fruit.

Although less visible than plantations and packinghouses, the specialised personnel employed by integrated exporters constitute another very dedicated investment. In most cases agronomists, post-harvest processing specialists, international trade professionals, marketing specialists and supporting administrative staff compose the human resources. All these investments are far from the reality experienced by the common fruit producers in Brazil.

As the name suggests, Integrated Production-Export companies do almost all the activities related to fruit production and export. Table 6.2 and Figure 6.1 shows that the 12 distinct activities components of the fruit export process are performed mainly by this type of organisation.

Box 6.5 illustrates the case of Mango Exporter One<sup>9</sup>, an organisation that exemplifies most of the points previously discussed.

#### **Box 6.5 – Integrated Production-Export company**

Exporter 5 (E5)<sup>10</sup> is situated in Petrolina, one of the biggest cities of Pernambuco State in the Brazilian Northeast. It is a semi-arid region with poor soils. Fruit production is only possible through irrigation that uses the abundant waters of Sao Francisco River.

The general manager of the company and the executive responsible for the post harvest processing operations gave the interview. It took place on 24 February 2000, in the main office of the company; which is at the edge of an extensive mango and grapes farm.

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<sup>9</sup> Fictional name

<sup>10</sup> This case is here described because the company presented the highest total score amongst all Integrated Exporters of mangoes.

E5 is specialised in the production and export of mangoes. It also produces and exports grapes, but on a smaller scale when compared with the mango business.

The number of full time employees working for the company fluctuates from a minimum of 100 to a maximum of 200.

The main destination for the fruit produced by E5 is NAFTA (Canada, USA and Mexico). The European Union is regarded as the second destination; the other European countries non-members of EU are the third. Japan and other Asian countries are the fourth destination. It was reported that all EU countries except Greece receive mango from the company.

The climate in Petrolina allows the production of mangoes all year around. Through irrigation and flower induction techniques it is possible to regulate the mango tree cycle. This is a considerable advantage for E5, which uses it to produce mangoes when other regions of the globe are unable to do so. This technical opportunity increases the chances for E5 to find demand and reasonable prices for its fruit. The chance to regulate the mango tree cycle brings also the advantage of reducing the pressure on all physical and human resources of the company during the harvest period.

The quality of fruit being produced by E5 is a daily concern for the general manager. It is possible to find in his office a notice board full of soil analysis results. He explained showing different graphics that it is crucial to maintain the nutritional balance in the production fields, otherwise a problem called “internal breakdown” can appear. He also mentioned that various other factors (soil preparation, varieties, plant spacing, irrigation, pruning, pests and diseases) could affect fruit quality.

Post-harvest processing is also an activity that receives full attention at E5. As the packinghouse is near the head office building, the general manager invited to visit it. Inside the building, which is the biggest in the property, seven key activities are executed: Fruit reception; Fruit treatment; Fruit packing; Pallet consolidation; Cooling; Storage; and Dispatching.

A general explanation of the fruit processing sequence was given by the company’s post-harvest specialist. She paid special attention to the “hot water treatment”, saying that all mangoes destined for the USA market need to be submitted to this treatment in order to eliminate possible contamination with the eggs of fruit flies.

The post-harvest processing technology is regarded as having been mastered, or in other words, it is not perceived as a source of problems for the company. At the end of the operations in the packinghouse the mangoes are packed, cooled and ready for the next stage, transport.

The first stage of the logistics activities is to take the fruit to the port. E5 subcontracts the services of transport companies to do this job. Two different systems are used, refrigerated lorries and or refrigerated containers. In both cases the fruit are loaded through the day, travel during the night and arrive at the port next morning. This procedure is adopted to avoid possible damage caused by the high temperatures of the day.

At the port, the mangoes are maintained in refrigerated containers or in temperature controlled store until the ship becomes ready to receive the cargo. All the logistic activities in Brazil are directly controlled by E5, even the shipment. It is known that mango quality is easily compromised by physical injuries or by rise in temperature.

The long distance transport services are directly contracted by E5, however the price negotiations with the sea transport companies are conducted by Valexport, the association of the most prominent fruit exporters in Sao Francisco Valley. This strategy makes it possible to obtain more reasonable shipping prices.

At the same time that physical activities (fruit production, post-harvest processing and transport) are being executed in Brazil, the negotiations with fruit importers are taking place. In fact, the interaction with mango importers starts even before the annual production procedures. The interaction has two different levels.

The first level is related to the regular administrative procedures of each export transaction. Here both sides deals with issues like:

Effects of the weather on fruit quality; Specification of quantity of mangoes to be transacted; Transport to be used; Time, place and conditions of fruit delivery; Price; Payment procedures; Insurance; and Evaluation of fruit quality at arrival.

The second level of interactions between E5 and mango importers aims to design and implement long term strategies such as: The choice of new varieties of mango that are more kin to the consumers preferences; Decision to invest or not in new mango plantations; Investment into new post-harvest treatment machinery; Adoption of different pack or pallet systems; and Implementation of innovative quality control systems.

The general manager said that most of the company's mangoes are sent to importers that already have a tradition of negotiating with E5. The transactions are made easier if both sides know each other. It was also said that the company prefers to deal with few importers abroad, only those capable of buying large volumes of fruit.

E5 uses services such as telephone, fax and e-mail to maintain close relationships with fruit importers. Mutual visits are also common especially importers' visits to Brazil. The importers' objective is to verify if all requirements posed on the negotiations are properly observed.

The general manager affirmed that E5 maintains three representatives abroad, one in the USA and two in Europe. Their main role is to make the communication procedures easier; they also help to sort out specific problems that occasionally take place in the logistics activities abroad.

In general the interview revealed that since its foundation E5 has developed several competencies to produce and export fruit, these technical and transaction competencies have allowed the company to become one of the most prominent fruit exporters in Brazil.

Source: Field research data.

The case presented in Box 6.5 is quite representative of the way several different companies organise their export business. From 19 interviews conducted in Brazil, 14 companies were revealed to adopt the same transaction arrangements as the case presented in Box 6.5. These organisations, here called Integrated Production-Export Companies, are shown to dominate in the exports of most of the fruit investigated in this research. It was also found that they are predominant in all of the regions visited.

Three other mango exporters were visited and interviewed. One is based in Petrolina (same region as the case presented in Box 6.5); a company that also produces and exports grapes. The other two are based in the Mossoro region and apart from mangoes they also export melons. All the executives interviewed in these three companies depicted a picture very similar to the case presented in Box 6.5. All three organisations were shown to be Integrated Production-Export Companies.

Apple exporters show themselves to be very homogeneous in terms of the transaction arrangements they adopt to export fruit. All five organisations visited in Fraiburgo (the main apple production region in Brazil) were revealed clearly to be Integrated Production-Export Companies.

The four melon exporters visited were shown to be Integrated Production-Export Companies. All of them are based around the Mossoro region, the central pole of the

melon business in Brazil. Three of these companies also produce mangoes but melons are their main occupation. It was revealed by the interviews that it is relatively easy to integrate the production and the post-harvest operations essentially because the variety of melons exported does not require sophisticated post-harvest handling.

The two orange export companies that were revealed to be Integrated Companies are situated in the interior of Sao Paulo State. The first company is the main orange exporter in Brazil; it maintains three large orange farms specialized in the production of oranges for export. This case presented a singularity when compared to the other integrated exporters investigated in this research: the company does not maintain the packinghouse in any of its farms. The post-harvest facilities are located close to a motorway near the three farms. The executive interviewed pointed out that this decision was taken in order to minimise logistics costs. The second orange exporter was shown to have its production and post-harvest facilities integrated at the same site.

The interviews conducted with two grape exporters revealed that they are both Integrated Production-Export Companies. Grape exporters tend to maintain integrated production and export operations because of technical constraints. Grape bunches need to be processed (graded, treated, packed and cooled) shortly after harvesting, as otherwise their quality will be compromised.

It was not possible to arrange interviews with Integrated Production-Export Companies that deal with papaya. However their presence in the Brazilian fruit export industry was revealed by the results of the questionnaire sent to fruit exporters (See Chapter 5).

## Quality Management Strategies

The semi-structured interviews organised with the executives of 14 Integrated Production-Export Companies showed that this group of organisations adopt several strategies to guarantee the quality of their produce. Five types of quality management strategies were identified: Detailed product specifications; Quality control during the production processes, Production environment monitoring; Integrated logistics management; Strategic alliances with trade partners.

### Detailed Product Specifications

The exporters affirmed to observe the product specifications posed by their clients abroad. In this case fruit importers stipulate the characteristics they want (fruit size, colour, weight, texture, flavour, appearance and grade of maturity). Based on these specifications the exporters said to establish the quality standards that serve as guide for the several stages of the fruit production and trade sequence. It was mentioned that detailed product specifications are crucial to control the quality of the fruit traded.

It is possible to recognise on the above mentioned measure the main point of the management of quality standards raised by Slack, Chambers, Hartland and Johnson (1998) and Dobler and Burt (1996). This is an indication that Brazilian fruit exporters are conscious about the importance of specifications in the fruit trade.

### Quality Control During the Production Processes

The interviewed Brazilian fruit exporters emphasised that they control the quality of products and processes at strategic stages of the fruit processing and trade sequences. The following phases were pointed as the most sensible:

- Harvesting – It is necessary to establish clear criteria for harvesting fruit with the appropriate grade of maturity. If fruit are harvested too early they will not develop a desirable flavour. If are harvested with an advanced grade of

maturity the chances are higher that the produce will be more sensible to injuries;

- Receiving operations at the packinghouses – At this moment, physical damages easily happen. It is necessary to adopt measures to avoid these damages;
- Selection and grading – Most of the fruit has a irregular shape, making it difficult to use only machines for selection and grading. In this case it is necessary to use human skills to select the fruit that will be exported.
- Storage – Fruits are a living product which has metabolic activities. If they are kept under unfavourable conditions (like high temperatures) their quality will decrease.
- After the long distance transport – Physical injuries are common during the long distance transport, so it is important to verify the fruit general condition when they arrive at the destination market. To check quality at this point is also important because it is at this stage when the produce exchanges hands.

It should be noted that it is important to have previously established standards to check the quality of products and processes. The exporters affirmed that fruits do not always immediately externalise injuries caused by problems in the processing activities (for instance injuries caused by uncalibrated machines). The injuries will be only evident later when the fruit are in the supermarket shelves. That is why it is important to control not only the quality of products but also the quality of processes.

The situation above described is a sign that fruit exporters are capable of recognising critical points in their production process and to adopt measures to minimise fruit damages at these points. In other words, the interviewed fruit exporters are showing the ability to follow empirically the main points of the production process quality control described by Slack, Chambers, Hartland, Harrison and Johnson in 1998 (see Chapter 3).

## Production Environment Monitoring

The totality of the fruit exporters stated to adopt measures for monitoring the production environment. They demonstrated to implement strategies for:

- Controlling the adequacy of the production facilities;
- Controlling the use of machinery;
- Keeping quality control laboratories or using the services of external quality control laboratories; and
- Contracting qualified production personnel.

Integrated production export companies need to maintain fruit production fields, packinghouses and refrigerated store facilities. It is apparently difficult to control quality in these three different types of environment but the interviewed exporters revealed that there are advantages in the integration of these activities. The integration allows synchronising and harmonising the production processes. For instance if it is predicted an exceptionally high level of fruit production in a specific year, it will be necessary to prepare the packinghouse (contracting people and calibrating the machinery) to receive and process the produced fruit.

All the visited Integrated Production-Export companies evidenced the employment of specialised equipment to treat, select, grade and pack their produce. The interviewees confirmed that all equipment is regularly monitored and calibrated.

Quality control laboratories were not found in all visited companies. Only eight companies demonstrated to maintain this type of laboratories. The remaining companies revealed to use the services of specialised quality control firms. The analyses of the laboratories (chemical, physical and microbiological) are used in the monitoring of fruit quality and in the monitoring of processing sequences.

The interviewed executives unanimously recognised that the presence of qualified people is the most strategic resource for an adequate production environment

monitoring. By employing specialised people, the fruit exporters have more chance to supplant technical barriers to their trade. Fruit production experts, post harvest processing specialists, logistics specialists and international trade experts are the type of professionals that can be found working in the Integrated Production Export companies.

#### Integrated Logistics Management

Integrated Production Export-Companies evidenced to execute most of the logistics of their fruit trade. The majority of the exporters confirmed that the following logistics activities are under their responsibility:

- Fruit transportation in the production fields during the harvesting period;
- Short distance transport from the fields of production to the packinghouse;
- Physical movements of fruits through the packinghouse;
- Short distance transport from the packinghouse to the port or airport;
- Short period storage in the port or airport;
- Loading operations of the ship or airplane;
- Contracting the long distance transport.

All the integrated fruit exporters stated that they are not responsible for the logistics operations at the destination market, however 11 companies revealed to maintain agents in their destination markets. These agents are not responsible for coordinating the logistics activities; their task is mainly to verify the fruit general state when they arrive. The agents also help to evaluate the service of the transport company.

It was said that the integration of all these logistics activities makes possible a more satisfactory use of the transport and storage resources. By monitoring the fruit production and post-harvest processing stages, the fruit exporters are in a position to better control the quality of their produce.

#### Strategic Alliances With Trade Partners

The totality of the interviewed executives of the integrated Production Export Companies manifested their preference for strategic commercial alliances instead of the traditional spot transactions.

It was said that spot transactions are sporadic and in most of the cases a low volume of fruit is negotiated in each transaction. They perceive as a risky form of commercial relation where few space is given for the discussions concerning quality. Main issue of the spot transactions' negotiations is the price of the product negotiated.

Strategic commercial alliances on the other hand create the opportunity for addressing to the quality management question. Nine fruit exporters spontaneously mentioned that long-term commercial alliances with fruit importers make possible to adopt long-term strategies for quality improvement. Strategies that affect the characteristics of the fruit traded, the fruit production processes, the post-harvest processing and the production environment (including fruit production fields, packinghouses, storage and transport).

Six fruit exporters observed that strategic commercial alliances have the advantage of generating a business atmosphere, which is more permeable to the flow of information from both sides (exporters and importers).

Three executives pointed out that long-term commercial relationships increase the chances for learning new managerial possibilities that can be used to improve the quality in the trade.

It is import to mention that the majority of the Brazilian fruit exporters affirmed not to exclusively adopt a framework like ISO 9000, TQM, GMP, GHP or HACCP to guide their fruit commerce activities. None of the exporters also demonstrated to use Statistical Process Control (SPC) in their operations.

## Export Transactions Of Integrated Companies

The interviews conducted with 14 Integrated Production-Export Companies revealed that each one of them uses a market type transaction to complete their export operations.

As can be seen in Figure 6.1, the commercialised fruit is kept under responsibility of the exporter until it arrives at the destination port. Only then, do the importers assume control of the merchandise. This market type transaction revealed various characteristics that are common to all integrated exporters; these are presented in the Table 6.3.

**Table 6.3 – Export Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise fruit in the international market.
Transaction type	Market transaction
Negotiation concerns	Quality management strategy; Price; Fruit volume; Regularity of supply; Period of supply.
Contract	Incomplete long-term contract;
Predominant Type of Contract	Obligational Contracting

Source: Field research data.

The interviewees proclaimed that most of their export transactions are conducted with previously known importers or in other words the transactions tend to be based on long term relationships. Two factors are probably contributing to this situation. The first is that fruit export transactions are complex by nature. The number of variables that need to be confronted in the negotiations with a new importer is high, making the initial negotiations costly. The second factor is that fruit exporters have a

propensity to avoid the risks of dealing with new importers that might turn out to possibly be dishonest or unprofessional.

Exporters manifested in the interviews the preference for building mutual confidence with a fruit trader over the years rather than trying to find new trade partners. One exporter reported having maintained a commercial relationship with his main importer in Europe for more than 20 years.

In the export transactions organised by Integrated Production-Export Companies predominates contracts with the characteristics of Obligational Contracting.

In the Obligational Contracting regime, a relation of mutual dependence is created. The fruit importers rely on the ability of restricted group of exporters to fulfil its fruit need. Fruit exporters on the other hand rely on the capacity of a small number of importers to absorb their produce. Both sides are probably trying to avoid costs and risks of looking for new commercial partners periodically.

Eight of the interviewees mentioned to maintain regular communication with their clients abroad. They observed that these information exchange serves not only to coordinate a specific commercial transaction but also to develop the bases of a long-term relationships.

Five managers pointed out that there is a constant need for adapting to modifications in the legislation of the destination markets and also to new advances on technology (communication, transport, information technology and post harvest processing). It was said that fruit importers are in privileged position to help with those questions since they are placed in the consumption market and also trade with higher volumes of fruit.

Most of the managers interviewed affirmed that the majority of their fruit is sold on a commission basis with a minimum price guaranteed. They also stated that contracts

are mainly verbal. Written contracts are rare and tend to have little enforcement value.

Two other important characteristics of Obligational Contracting are present in the export transactions conducted by integrated companies:

- Intention of joint-profit maximisation – Both fruit importers and exporters generate their gains from the volume of fruit traded.
- Presence of a sharing rule – The commission that importers receive for mediating in the fruit trade is the sharing rule. It is an incentive for importers to trade the maximum volume of fruit possible for the best price.

Contracts with the properties mentioned above are designed to stimulate cooperative behaviour between the negotiating parties.

#### **6.4.2 The Export Agent Transaction Arrangement**

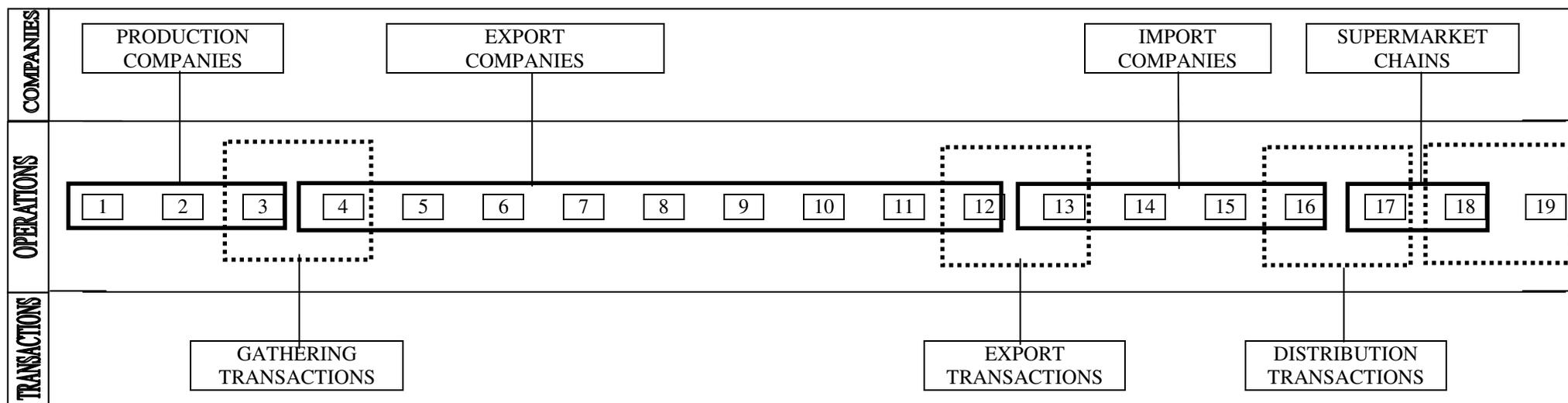
The second export arrangement used by Brazilian fruit exporters can be called the Export Agent Transaction Arrangement (E-ATA). In this arrangement the export activities are organised by an agent.

The interviews conducted in Brazil indicate that this is the second most common arrangement adopted by the organisations present in the Brazilian fruit export industry. Four different organisations exporting four different types of fruit (melon, mango, grapes and papaya) revealed that they adopt E-ATA as their main scheme to export fruit.

It was also found that Integrated Production-Export Companies also adopt E-ATA as an alternative arrangement to export fruit. Executives in five of these organisations declared that their companies also export fruit produced by specialised growers. These five executives also affirmed that E-ATA forms only a small part of their fruit trade, an alternative used only to complement their own fruit production.

Figure 6.2 gives a graphical representation of the arrangement mentioned.

**Figure 6.2 - Export Agent Transaction Arrangement**



**NOTES:**

- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1. Pre-harvest activities   | 11. Loading: ship or aeroplane       |
| 2. Harvesting               | 12. Long distance transport          |
| 3. Short distance transport | 13. Unloading: ship or aeroplane     |
| 4. Receiving operations     | 14. Transport to distribution centre |
| 5. Selection and Grading    | 15. Processing                       |
| 6. Treatments               | 16. Packing                          |
| 7. Packing and labelling    | 17. Distribution                     |
| 8. Pallet construction      | 18. Retailers Shelves                |
| 9. Cooling                  | 19. Final Customer                   |
| 10. Storage                 |                                      |

It can be seen that E-ATA is composed by a hierarchy (fruit producers) followed by a market transaction (fruit gathering activities) followed by a hierarchy (agent exporters) that is finally followed by a market transaction (export activities). Each one of these stages is presented and discussed in the following sections (Figure 6.2<sup>11</sup>).

## The Fruit Production Companies

Fruit production companies are the basis of E-ATA. Agent exporters revealed that their suppliers show several characteristics of a fruit grower who produces also for the Brazilian internal market. The main difference is that part of their productive effort is guided by the specifications posed by fruit importers.

Table 6.4 shows the main characteristics of fruit growers that supply agent exporters. It can be seen that they produce fruit both for the internal and external market. These fruit growers keep a few assets exclusively dedicated to export activities: specialised fruit plantations and dedicated fruit production processes.

**Table 6.4 – Fruit Production Organisations Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Produce fruit to the internal and external markets.
Transaction type	Hierarchical transaction
Specialised assets	Fruit plantation; Dedicated fruit production processes.
Integrated activities	Pre-harvest; Harvesting; Short distance transport.
Transaction counterpart	Export Agents; Wholesalers and retailers in Brazil.
Quality Management Strategies	Observance of the product specification; Processes quality control; Production environment monitoring; Integrated logistics; Alliances with Export Agents.

Source: Field research data.

<sup>11</sup> The diagram was prepared according to the guidelines of the “Graphical Representation of Transaction Arrangements” at section 2.7.1.

Only three activities that are part of the fruit export cycle are integrated by these specialised fruit producers, they are: Pre-harvest (whole production cycle), harvest and short distance transport. All the other activities that are components of the fruit export cycle are performed by Export Agents.

The Fruit Production Companies are also zealous about quality management. The interviewed agent exporters mentioned that their suppliers adopt the following measures to guarantee acceptable levels of quality in the fruit export trade:

- Observance of the product specification – During the fruit growing stage, producers need to adopt yielding techniques capable of delivering a fruit, which incorporate all the requirements put by Export Agents. For example, if a determined insecticide is restricted in a specific destination market. The fruit growers need to find acceptable alternative techniques to control insects.
- Quality control during the production stage – It was said that fruit growers are required to obey previously specified levels of quality during the execution of different processes which are components of the fruit production phase. Harvesting was pointed as the period which requires a more meticulous quality control being necessary to inspect the ability of the people who is harvesting, the adequacy of the equipment used and the efficiency of the harvesting sequence adopted.
- Production environment monitoring – Fruit Production Companies are required to synchronise their activities with the post-harvest processing executed by Export Agents. In order to do so both sides need to know in advance, the quantity of fruit that will be produced, the characteristics of the fruit that will be harvested (easily affected by environment factors) and when the fruit will be ready for harvesting.
- Integrated logistics – Fruit producers are in charge of managing the transport from the production fields to the packinghouses of the Export Agents. The logistics need to be integrated since the exporters have a limited capacity of fruit processing and storage. The four interviewed managers affirmed that physical injuries are especially common during the transport from the fields

of production to the packing-house therefore it is important to guarantee satisfactory transport conditions.

- Strategic alliances with agent exporters – Since the fruit production companies are dedicated in the growing activities only, they do not have the necessary resources or the specialized knowledge to export fruit directly. The alliances with agent exporters allow the producers to reach the international market with relatively low investment and risks. The strategic relationship also helps to establish the parameters for quality management.

Agent exporters also informed that their suppliers are not totally dedicated to producing fruit for export. In most cases these fruit production companies also deal with wholesalers and retailers that operate in the Brazilian internal market.

### The Gathering Transaction

The aim of the gathering transaction is to select and accumulate fruit that has the required attributes for exporting. As can be seen in Figure 6.2, the gathering transaction happens between specialised fruit producers and Export Agents. The last only assume responsibility for the fruit when it is delivered at the packinghouse. Table 6.5 gives the main characteristics of these market type transactions.

**Table 6.5 –Characteristics of the Fruit Gathering Transaction**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise fruit in the international market.
Transaction type	Market transaction
Seller	Fruit producer
Buyer	Agent exporter
Negotiation concerns	Quality management strategies; Price; Fruit volume; Regularity of supply; Period of supply.
Predominant type of contract	Incomplete long term contract;.
Quality Management Strategies	Obligational contracting

Source: Field research data.

Four interviews were conducted among organisations that perform Gathering Transactions. They showed a preference for sustaining durable relationships with their suppliers. In these relationships five different issues are negotiated: price, quality management strategies, fruit volume to be traded, regularity of supply and period of supply.

From the negotiation concerns mentioned, price was pointed out as the one that causes most disputes. This situation is probably a result of the price instability in the Brazilian internal market. It was informed that when prices in the internal market are high, fruit producers tend to neglect their relationships with agent exporters.

In most of the cases Export Agents reported that they buy their fruit on a commission basis, using informal contracts that can be described as Obligational Contracting.

Since the Obligational Contracting aims long-term relationships both sides (producers and exporters) are committed to find ways to improve the commercial relationship. It was said that mutual visits are common and the information exchange frequent. This continual interaction makes possible the transference of technologies and managerial expertise between both sides.

The Export Agents showed the preference for paying with a fixed price however they can also buy fruit on a commission base.

## The Export Agent Companies

Export Agents are the dynamic part of E-ATA. These organisations buy fruit from specialized producers in Brazil and sell them to importers overseas. Figure 6.2 shows the graphical representation of these companies in the fruit export cycle.

It was possible to interview four traders who could be characterized as Export Agents. These organisations showed a range of characteristics in common (Table 6.6).

**Table 6.6 – Export Agent Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Buy fruit in Brazil and trade them to the international market.
Transaction type	Hierarchical transaction
Specialised assets	Packinghouses; Human assets; Dedicated fruit logistics; Dedicated post-harvest processing; Cooled storage facilities.
Integrated activities	Fruit receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance operations; Contracting long-distance transport.
Transaction counterparts	Fruit producers in Brazil and Fruit importers abroad.
Quality Management Strategies	Detailed product specifications; Quality control during the post-harvest processing; Production environment monitoring; Integrated logistics management; Strategic alliances with fruit producers; and Strategic alliances with fruit importers.

Source: Field research data.

Export Agents keep five main types of specialized assets:

- Packinghouses – These are fully equipped to prepare fruit for exports. As Export Agents trade in more than one product, their packinghouse needs to be more flexible to process various types of fruits and vegetables.
- Human assets – Export Agents employ professional buyers, post-harvest specialists and international trade experts. All these professionals develop the expertise necessary to export fruit.

- Dedicated fruit logistics – Export Agents need to coordinate two types of logistics. The first is related to the supply side. As Export Agents have multiple suppliers, it is necessary to guarantee that the produce will arrive at the packinghouse in a ordered manner otherwise fruit losses are likely to happen at the production fields or during the post-harvest processing. The second type of logistics coordinated by agent Export Agents is related to the demand side. In this case the management of fruit transport and storage is conducted in accordance with the importers needs.
- Dedicated post-harvest processing – As Export Agents shown to deal with multiple products it is necessary to harmonise the processing of various types of fruit at the same time. This is a complicated process, mainly because each type of fruit requires specific handling.
- Cooled Storage Facilities - The produce needs to be cooled and then stored until its dispatch to the destination markets. It happens that some fruit cannot be stored in the same place as other types of fruit. This is due to the fact that each type of fruit has different storage requirements (temperature or atmosphere composition). As a consequence Export Agents have to invest in storage facilities capable of receiving separate lots of fruit.

Nine activities are components of the fruit export cycle integrated by Export Agents: Fruit receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; and Contracting long-distance transport.

As can be seen most of these activities take place inside the packinghouse. Nevertheless a significant part of the Export Agents' work is related to operations outside the packinghouses. For example Export Agents need to evaluate the quality of the fruit that they are intending to buy. It is a process that involves visits to suppliers and continuous negotiations. Another example is the interactions with fruit importers, in which buyers and sellers exchange information about the complete product cycle (production, trade and consumption).

The case of Exporter 15 (fictitious name) is presented in Box 6.6. It exemplifies various points previously discussed.

### **Box 6.6 – Export Agent**

Exporter 15 (E15)<sup>12</sup> is based in Sao Paulo, the biggest business centre in Brazil. From the company's headquarters its executives coordinate trade activities in various fruit production regions in Brazil.

The interview was given by the general manager in his office and took place on 9 February 2000.

The company deals mainly with six different products: mango, papaya, ginger, figs, limes and avocados. E15 trade more than 1,000 tonnes of mangoes yearly, all the other products have an annual volume of trade smaller than 1,000 tonnes. The general manager informed that the company trade not less than US\$1,000,000.00 per year.

NAFTA was described as the main destination market for the E15 fruits. EU comes in second place and European countries not members of EU in third place. The company does not send fruit to Asia, Latin America, Oceania or Africa. Inside the European Union, E15's fruit goes to The Netherlands, Belgium (distribution countries), The United Kingdom, Germany, France, Spain and Portugal.

E15 can be characterized as an Agent-Exporter, mainly because it does not produce any of the fruit traded by the company. All the produce dealt in is obtained from specialized fruit producers.

Fruits and vegetables arrive at E15's packinghouses in transport contracted by the producers and coordinated by the company. The general manager revealed that three packinghouses are maintained by the organisation. The first is situated in Pernambuco State (mango production region). The second one is in Espirito Santo State (papaya production region) and the third packinghouse can be found in Sao Paulo State (various products).

All the post-harvest activities necessary to export fruit are executed in E15's facilities. The general manager justifies this choice saying that the firm need to guarantee quality in post-harvest processing. He affirmed that post-harvest processing problems do not turn up during the processing stage. Any injury only emerges when the produce arrives at the destination market.

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<sup>12</sup> This case is here described because the company presented the highest total score amongst all Export Agents.

By doing the post-harvest processing E15 has also a chance to better select the fruit that is going to be exported by the company. Among the fruit traded by the company, papaya was indicated as the most sensitive to post-harvest processing. The problems start at the production fields. It is difficult to choose the precise moment for harvesting papayas. If the fruit is harvested when physiologically immature, later it has little chance of developing the characteristic flavour of a matured papaya. On the other hand if fruits are harvested in an advanced stage of maturity it is likely that these papayas will not stand up to the post-harvest processing.

During the harvest operations it is also important to avoid contact of the fruit skin with the fruit's own latex. The latex can easily damage the fruit appearance.

Papayas have a highly sensitive skin, which can be easily damaged when the fruit is manipulated. Due to this problem E15 has instructed its suppliers to avoid any kind of brusque handling. Physical injuries in most of the cases open the door for post-harvest diseases such as anthracnose, black rot or phytophthora rot.

All these problems can develop during the production and harvest stages reinforces the need for E15 to maintain a close relationship with its suppliers. The general manager stated clearly that the policy of the company is to build a relationship of mutual confidence with suppliers. He emphasizes the need to induce strategic changes that will make both sides (producers and exporters) more competitive in the international fruit trade. To illustrate the point the example was given of a new variety of papaya, Solo Golden. E15 is trying to induce its suppliers to cultivate this new variety of papaya mainly because it produces fruit more suited for international trade.

At E15's packinghouses, papayas are received, selected, graded, treated, packed, labelled, cooled and stored. The fruit is maintained in refrigerated stores until time for transportation.

Aeroplanes are the long distance transport means used in the papaya trade. It is a costly solution that is unavoidable when account is taken of the high perishability of papayas. Transport by sea was considered previously, but the technology proved not to be viable.

The pallets of papayas are loaded into a refrigerated container that is then taken to the airport. Two airports are used in the papaya trade: the International Airport of Rio de Janeiro and the International Airport of Sao Paulo. The general manager revealed that the airports do not have an appropriate infrastructure for the fruit trade. He emphasized the fact that it is not possible to find refrigerated stores at these airports. This problem is only overcome by keeping the refrigerated containers plugged into the electricity supply system at the airports.

The general manager also raised another problem connected to logistics, the lack of regularity of the air-transport companies. This is a difficulty that derives from the

fact that the Brazilian papaya trade is still relatively insufficient to justify the allocation of regular cargo flights departing from Brazil.

Finally on logistics, there was mention of the delays caused by the cargo inspections at the airports. According to the Brazilian Export legislation the Ministry of Agriculture is supposed to inspect each fruit shipment send abroad. It happens that there are not enough inspectors to guarantee prompt inspection, as a consequence delays occur.

When the interview turned to the issue of the relationship with fruit importers, the general manager revealed that E15 aim to establish partnerships with its clients. Both sides of the papaya international trade weekly exchange information about fruit production and market tendencies. Mutual visits are also regularly paid.

The final issue tackled in the interview was the type of contracts used by papaya exporters and importers. The executive indicated that papaya importers prefer to use commission contracts.

As the interview ended the general manager commented that Brazil is already one of the main papaya exporters in the world and the country has the potential to produce and export considerably more. E15 is positioning itself to get a significant share of this growing business.

Source: Field research data.

Three other organisations (exporting melons, grapes and mangoes) revealed that they do adopt the same pattern of transactions as E15. The main difference between them and E15 comes from the fact that none of these three companies use air transport in their fruit trade.

Five Integrated Production-Export companies revealed that they complement their trade exporting business by acting as Export Agents. However they do so only when their own fruit production is not sufficient to supply the importers demand.

### Quality Management Strategies

The interviews with the firms acting as Export Agents revealed that the following strategies are adopted by them in the management of quality:

- Detailed specifications – the four Export Agents informed to follow specifications established by their clients abroad. The Export Agents are also in charge of transmitting these specifications to their fruit suppliers.
- Quality control during the post-harvest processing – The interviewees affirmed that their companies need to be especially zealous to control fruit quality during the post-harvest processing stage. This happens mainly because Export Agents do not have full quality control of the production and harvesting stages. It was said that it is crucial to eliminate those fruit which do not have all the necessary attributes for exporting.
- Production environment monitoring – Agent exporters mentioned that is necessary to maintain a clear understanding about fruit quality with their suppliers. It is also important the monitoring of the suppliers performance through the analysis of their fruit and also through periodical visits. Furthermore, Export Agents informed the need of monitoring their own production processes which includes: fruit selection, grading, treatment, packing, pallet consolidation, storage, and transport.
- Integrated logistics management – Four interviewed managers reported this activity as complex, since it is necessary to coordinate the fruit influx with their capacity of processing and storage. To maintain fruit quality during the transportation, Export Agents observed that is crucial to pack the fruit properly.
- Strategic alliances with fruit producers – Export Agents revealed the preference for organising alliances with their suppliers. They tend to select as transaction counterparts those fruit growers capable of producing large volumes of fruit which incorporate all the specifications posed by them. Two executives spontaneously mentioned the preference for those suppliers that also have an administrative system capable of detecting quality problems in advance.
- Strategic alliances with fruit importers – The interviewed managers expressed their preference for maintaining long term alliances with fruit importers in each destination market. They mentioned that are preferable those importers

capable of buying large volumes of fruit. One Agent-Exporter also observed that it is important to maintain partnership with importers which have an advanced managerial capability, being capable of bring positive innovations for the fruit trade.

### Export Transaction Characteristics

The objective of the export transactions organised by Export Agents is to sell in the international market the fruit gathered in Brazil. This market type transaction materializes only when the exported fruit arrives at the port in the destination market (Figure 6.2). However, before and after this moment, the negotiating parties (Export Agents and Importers) deal with several different issues.

Table 6.7 is based on the results of nine interviews conducted among organisations that adopt E-ATA to export their fruit. It shows that five different issues are discussed in the negotiations with importers: price; quality management strategy; fruit volume; regularity of supply; and period of supply.

**Table 6.7 – Export Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise fruit in the international market.
Transaction type	Market transaction
Negotiation concerns	Quality management strategy; Price; Fruit volume; Regularity of supply; Period of supply.
Seller	Fruit producer
Buyer	Agent exporter
Predominant type of contract	Obligational contracting

Source: Field research data.

These market transactions are remarkably similar to the export transactions organised by Integrated Production-Export Companies. The main difference was disclosed by

Agent Exporters. These reported having less control over the quality issues, mainly because they rely on production by a third party. This is a factor that raises the level of uncertainty in the export transactions and affects negatively the relationships with importers.

Agent exporters also informed that they predominantly adopt contracts with the characteristics of Obligational Contracting.

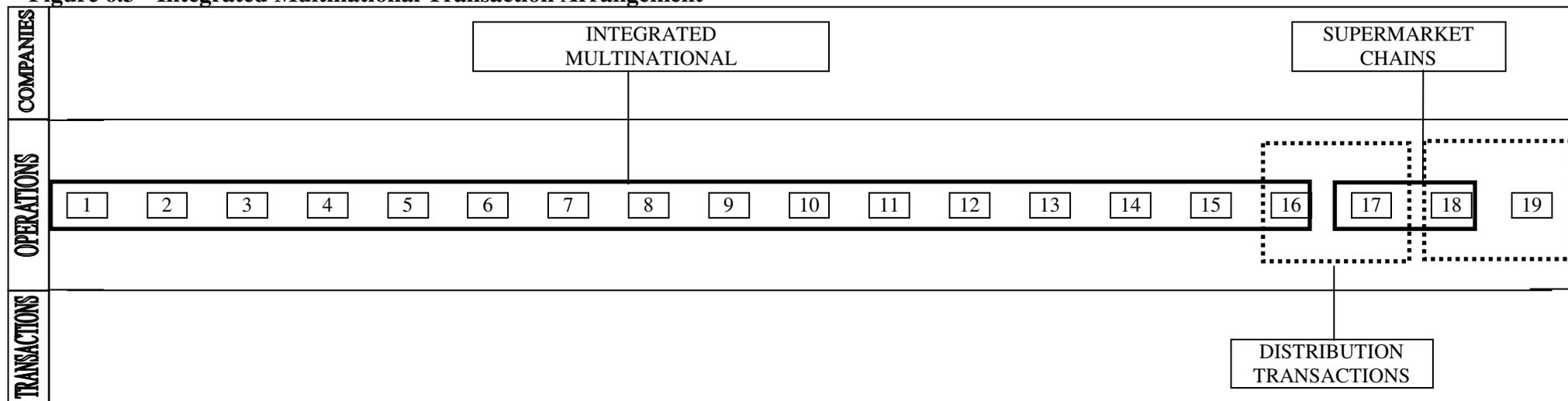
### **6.4.3 The Integrated Multinational Transaction Arrangement.**

The third export arrangement identified in the Brazilian fruit export sector was the Integrated Multinational Transaction Arrangement (I-MTA). This is a name that can be adopted mainly because production, export and import activities are all performed by a multinational organisation.

Only one company was identified in Brazil as adopting I-MTA as its predominant form of export arrangement. The following discussions are based on this case only.

A graphical representation of I-MTA is presented in Figure 6.3. As can be seen the structure of this transaction arrangement is very simple. It is composed of a comprehensive hierarchical transaction (the Integrated Multinational) followed by a market transaction (fruit distribution at the destination market). These two stages are presented and discussed in the next two sections.

**Figure 6.3 - Integrated Multinational Transaction Arrangement**



**NOTES:**

- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1. Pre-harvest activities   | 11. Loading: ship or aeroplane       |
| 2. Harvesting               | 12. Long distance transport          |
| 3. Short distance transport | 13. Unloading: ship or aeroplane     |
| 4. Receiving operations     | 14. Transport to distribution centre |
| 5. Selection and Grading    | 15. Processing                       |
| 6. Treatments               | 16. Packing                          |
| 7. Packing and labelling    | 17. Distribution                     |
| 8. Pallet construction      | 18. Retailers Shelves                |
| 9. Cooling                  | 19. Final Customer                   |
| 10. Storage                 |                                      |

## Integrated Multinational

The general objective of a multinational involved in the fresh fruit business is to produce and trade fruit on the international market. This type of organisation normally maintains worldwide operations both on the fruit production and consumption sides.

Table 6.8 shows the main characteristics of the Brazilian branch of an Integrated Multinational exporting fruit. The table was built up based on the results of an interview conducted with a company's trade executive.

**Table 6.8 – Integrated Multinational Characteristics.**

<b>TRANSACTION ISSUE</b>	<b>CHARACTERISTICS</b>
Objective	Produce and trade fruit to the international market.
Transaction type	Hierarchical transaction.
Specialised assets	Fruit plantations; Dedicated fruit production processes; Packinghouses; Dedicated post-harvest processes; Cooled storage facilities; Dedicated logistics; Human assets; Fresh fruit processing units at destination markets
Integrated activities	Pre-harvest; Harvesting; Short distance transport; Fruit receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet consolidation; Cooling; Storage; Short distance logistics; Contracting long-distance transport; Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; Storage.
Transaction counterpart	Fruit wholesalers, retailers and catering companies abroad.
Quality Management Strategies	Detailed product specifications; Quality control during the post-harvest processing; Production environment monitoring; Integrated logistics management; Strategic alliances with Supermarkets, wholesalers and catering companies.

Source: Field research data.

As can be seen the integrated multinational has invested in seven main types of specialised assets in Brazil:

- Fruit plantations – These are high technology plantations, where melons, pineapples and bananas are the only three kinds of fruit cultivated by the company. These three cultures have in common the fact that they can produce fruit during the whole year. Melon was indicated to be the main fruit exported.
- Dedicated fruit production processes - The firm has already established a network of clients in the main fruit importing countries of the world. That is why all production efforts in Brazil are totally focused on obtain the fruit appropriate for exports. It is important to remember that these production processes always need to take into account clients' specific demands and government regulations (Brazilian government and destination markets governments).
- Packinghouses – This is perceived as a strategic resource in the company and for that reason it receives full investment in order to process top quality fruit.
- Dedicated post-harvest processing – As the integrated company has a long tradition in dealing with fruit processing, this is not perceived as a source of problems for the business.
- Cooled storage facilities – Because melons, bananas and pineapples are relatively large fruit, the refrigerated facilities need to have the capacity to receive big volumes of produce.
- Dedicated logistics – Short distance logistics is very simple since fruit production and post-harvest processing are located near each other. Long-distance logistics on the other hand is a much more complex issue. The logistics professionals need to observe not only the production side but also the company's capacity to receive fruit in each destination market. Aiming to harmonise its global logistics, the integrated multinational has centralized all management of its long-distance logistics' in its headquarters in USA.
- Human assets – Few specialised professionals are maintained in Brazil, mainly fruit production experts and post-harvest specialists. All the other

professionals (logistics, marketing, law, and information technology) are dispersed among numerous offices of the company around the world.

Apart from the above-mentioned specialised assets, the integrated multinational also keeps fruit processing units in key destination markets. At these processing units, fruits are processed according to each client's demands and then stored until the moment of distribution.

From the total of 19 technical operations which make up the international fruit trade cycle, 16 operations are performed by the integrated multinational. These technical activities are: Pre-harvest; Harvesting; Short distance transport; Fruit receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet consolidation; Cooling; Storage; Short distance logistics; Contracting long-distance transport; Port operations in the destination market; Transport to the fruit processing centre; Fruit processing; and Storage.

The vertical integration of fruit production and export activities brings a series of advantages to the multinational organisation. These advantages are almost the same as those experienced by the Integrated Production-Export Companies. However it is important to remember that Integrated Multinationals and Integrated Production-Export Companies have a fundamental difference. The former is also responsible for organising the fruit import operations in each destination market, the later not.

The integration of import operations by the multinational helps to guarantee compatibility among all the stages in the fruit trade.

In the destination market the Integrated Multinational negotiates its products directly with retailers, wholesalers or catering companies.

Box 6.7 gives a general picture of the company mentioned above. It is based on an interview conducted with an executive of the company.

### **Box 6.7 – Integrated Multinational**

Multinational Exporter 19 (E19)<sup>13</sup> is one of the main fruit trade companies of the world. Its headquarters are in USA and its production and trade facilities are dispersed around the globe.

E19 regularly employs more than 20,000 people around the world. Its personnel run a business that sells more than US\$1.6 billions annually.

The interview was given by the executive responsible for importing fruit from Brazil to the UK. It happened in the main office of the British division of the company. The interview took place on 13 October 1999, at the meeting room of the organisation. It is important to mention that all the company's executives working in the Brazilian branch declined when contacted for an interview, apparently on instructions from the central management.

E19 produce and trade four main types of products: bananas, pineapples, melons and deciduous fruit. Apart from these the firm also trades fresh vegetables, however on a limited scale.

Bananas are the company's main business. The fruit is produced for E19 in Costa Rica, Cameroon, Colombia, Ecuador, Guatemala, Mexico, Panama and Philippines. In the last four years E19 has also invested in Brazil to produce Bananas.

E19 is particularly strong in the pineapple business. The firm claims to be the world leader in the production and trade of this fruit. Costa Rica, Hawaii and Philippines are the main sources of pineapples. The interviewee revealed that the firm is currently investing in Brazil in order to produce pineapples.

E19 sources its melons in Brazil, Costa Rica, Guatemala, Mexico and the United States. The company specializes in the varieties Cantaloupe and Honeydew.

Deciduous fruit is a name used by the firm to categorize a group of fruits composed of: grapes, plums, nectarines, peaches, apricots, cherries, apples, pears and citrus. This fruit is sourced by E19 in Chile, South Africa and the United States.

Annually E19 trades more than 2.5 million tonnes of fruits and vegetables. The executive affirmed that the majority is produced by the company. The remaining produce is obtained from specialized fruit producers, which are in most cases subcontracted by the multinational.

E19 uses various criteria to select its suppliers but the capacity to produce quality fruit was named as the main one. Quality in this case means the strict adherence to the company's specifications for each fruit.

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<sup>13</sup> This case is here described because the company is the only Integrated Multinational producing fruit in Brazil.

Three issues related to fruit production were raised during the interview. The first was the use of pesticides in fruit production fields. It was emphasized that the company observes all governmental regulations on this topic.

The second production related issue raised during the interview was employee safety. The interviewee informed that company policy is to provide good work conditions for all its employees around the world.

Environment protection was the third production related issue touched on by the interviewed executive. In this case he affirmed that the company adopt a policy for responsible environment management, with initiatives such as: protection of biodiversity, reduction and management of waste, monitoring of natural resources and restricted use of agrochemicals. It was also highlighted that E19 requires from all its suppliers the same commitment to environmental protection.

After production the fruit are processed at the packinghouses near each fruit production site. The company aim is to guarantee that only quality fruit are selected for export at packinghouses. After processing the produce is stored under temperature-controlled conditions until it can be sent abroad. E19 is currently trying to implement ISO 9002 as the quality management system for its post-harvest operations. The final intention with this initiative is to improve efficiency and to reduce costs.

After the packinghouses the fruit is transported by lorries to seaports. There the pallets are transferred to a refrigerated ship that then takes the fruit to the consumption market.

It was revealed that E19 transports 99% of its products by sea. In fact the company maintains 42 refrigerated vessels for sea transport. These ships are treated by the company as an independent business unit since they are used to provide services to any cargo customers.

It is important to mention that the company's ships are not the only transport alternative. E19 also uses the services of sea transport companies, especially for those fruit production regions that do not export high volumes of fruit.

E19 global logistics are managed from the company's headquarters in USA. The aim of this strategy is to optimise and harmonise the use of the company's transport and storage resources. It is also easier for the central management to obtain better insurance and transport agreements.

After the long-distance transport, the fruit arrives at the destination market, where in most cases, E19's own staff receives the shipment. The produce is then taken to a fresh-produce processing unit where it will be technically evaluated. If the fruit maintains its qualitative attributes, then it will be prepared according to the clients' needs.

The interview revealed that E19 deals with three main types of clients; supermarket chains, regional wholesalers and catering companies. The relationships with supermarket chains were recognised as strategic for the company, since these retail organisations negotiate large volumes of fruit all year around.

As the interview ended the executive referred to the company's brand as an important asset. He mentioned that it is one of the most widely recognised brands in the fresh fruit industry and E19 plans to keep using it to trade quality fruit.

Source: Field research data.

The case presented in Box 6.6 gives a notion of the scale of the operations conducted by the integrated multinational. It is clear that this type of organisation needs to dominate an extensive range of technologies in order to vertically integrate fruit production and trade. It is also clear that to maintain such an extensive and complex range of business requires from central management a sophisticated administrative system.

None of the other 18 fruit exporters visited and interviewed in Brazil turned out to operate a business as big and complex as the Integrated Multinational global fruit trade.

### Quality Management Strategies

The integrated multinational demonstrated to adopt the following strategies to guarantee fruit quality in their trade operations:

- Detailed specifications for fruits and production processes – Since the Integrated Multinational maintains extensive trade operations and also has a closer relation with the final customer, it is easier for the company to know which characteristics the customers want in their fruit. This knowledge is fundamental in the establishment of the specifications for fruits and production processes. It was said that the company follows rigid specifications in all its actions since the organisation needs sustain a positive corporate image.

- Quality control during fruit production and post-harvest processing – The interviewee mentioned that the policy of the company is to adopt the ISO 9000 as guide for the quality control. As a consequence all members of the organisation are required to follow rigorous standards.
- Production environment monitoring – The interviewee pointed out that the company has a long tradition in trading fruit. It was therefore possible to accumulate experiences and technologies along time. The accumulated knowledge is employed to better plan and manage production resources such as: fruit plantations; packinghouses; fruit processing units and quality control laboratories. The interviewed executive also mentioned that during the company's existence it was possible to establish standards for the fruit traded and for the production processes.
- Integrated logistics management – Since the company trades high volumes of fruit it is possible to negotiate favourable transportation fares and also favourable transport insurance conditions. The executive mentioned that the multinational has the policy of evaluating the quality of the service of the transport company. If the quality of the service show to be inadequate, the multinational either find an alternative transport company or negotiate improvements with the contracted transport company.
- Strategic alliances with supermarkets, wholesalers and catering companies – The interviewee observed that these alliances serve to guide all the trade operations. They are also a guarantee that most of the produce will be acquired by clients which has a high volume of trade. The strategy of the company is to avoid intermediaries in its fruit commercial operations. It should be noted that the integrated multinational usually trade high volumes of fruit in a global scale, this fact creates better conditions for negotiating prices with clients.

## Distribution Transaction

The aim of the distribution transaction as organised by an integrated multinational is to commercialise its fruit at destination markets. It is a market type transaction where buyers are supermarket chains, fruit wholesalers and catering companies.

Figure 5.3 shows a graphical representation of this distribution transaction. As can be seen the produce is only delivered to the organisational buyers after an extensive range of activities have been performed by the Integrated Multinational.

The interview conducted with the executive of the Integrated Multinational revealed the main characteristics of this type of transaction (Table 6.9).

**Table 6.9 – Distribution transaction characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise and distribute fruit in the international market.
Transaction type	Market transaction
Seller	Integrated Multinational
Buyers	Supermarket Chains, Regional Wholesalers or Catering Companies.
Negotiation concerns	Quality management strategies; Price; Fruit volume; Regularity of supply; Period of supply.
Predominant type of contract	Obligational contracting and Arm's Length contracting.

Source: Field research data.

As can be seen the negotiating parties conduct multifaceted discussions that take into account the following issues: quality management strategy, price, fruit volume, regularity of supply, and period of supply.

The presence of these five points in the negotiations indicates that buyers and sellers are interested in maintaining long-term relationships.

Supermarket chains and catering companies were revealed preferring to use Obligational Contracting on the other hand wholesalers were indicated to use mainly Arm's Length Contracting.

The interviewed executive of the integrated multinational emphasised the importance of the strategic alliances with supermarkets and supermarket chains. It was mentioned that these type of organisation have a growing importance in the fruit commerce since they are responsible for most of the fruit sales to the final customer.

## 6.5 Diversity of Import Organisations in the UK

The main conclusion that can be drawn from Table 6.1 is that fruit traders can be categorised<sup>14</sup> into the following distinct groups:

- Integrated Multinationals – These organisations are responsible for executing 16 technical component activities in the fruit trade sequence (Pre-harvest; Harvesting; Short distance transport; Receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet construction; Cooling; Storage; Short distance logistics; Contracting long distance transport; Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; and Storage). Since Integrated Multinationals have a considerable volume of trade they maintain commercial operations (fruit production or fruit distribution) in a large number of countries;
- Import Agent – This group of firms tend to execute only four technical activities in the commercial fruit chain, namely: Unloading: ship or aeroplane; Transport to the distribution centre; Fruit processing; Packing. It is important to mention that

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<sup>14</sup> The categories were organised according to the activities that are performed by each group of organisations.

Import Agents in most cases sustain close relationships with a limited number of buyers, namely those who buy large quantities of fruit.

- Independent Importers – Unloading the ship or aeroplane, transport to the distribution centre and fruit storage are the main technical activities executed by this group of organisations. This type of organisation was shown to maintain strategic alliances with fruit exporters abroad.
- Regional Wholesalers – This category of fruit traders showed a preference for buying from those exporters capable of delivering their produce to the wholesale store. Regional wholesalers have limited technical capacity for handling fruit logistics. In the majority of cases they are responsible for storing fruit for a limited period of time.
- Supermarket Chains – This type of company imports a limited volume of fruit directly. In most cases, Supermarket chains delegate the responsibility for fruit importing to specialised companies (Import Agents or Integrated Multinationals). However the supermarket chains execute two important technical activities in the fruit trade sequence: Fresh produce distribution to the retail stores and display of the fruit on the supermarket shelves.

The commercial transactions organised by each type of these organisations are presented in the following sections.

### **6.5.1 Integrated Multinational**

Among the traders present in the international fruit commerce, the Integrated Multinationals are those organisations which trade the highest volume of fruit. They tend to concentrate their efforts in the commerce of fruit that can be produced throughout year in a single geographical region (fruits like bananas, pineapples and melons). This probably happens because the multinationals want to generate a continuous fruit trade and also a high volume of commerce. Table 6.10 presents the main characteristics of the Integrated Multinationals.

**Table 6.10 – Characteristics Of Integrated Multinationals**

<b>TRANSACTION ISSUE</b>	<b>CHARACTERISTICS</b>
Objective	Produce and trade fruit to the international market.
Transaction type	Hierarchical transaction.
Specialised assets	Fruit plantations; Dedicated fruit production processes; Packinghouses; Dedicated post-harvest processes; Cooled storage facilities; Dedicated logistics; Human assets; Fresh fruit processing units at destination markets
Integrated activities	Pre-harvest; Harvesting; Short distance transport; Fruit receiving operations; Fruit treatment; Selection and grading; Packing and labelling; Pallet consolidation; Cooling; Storage; Short distance logistics; Contracting long-distance transport; Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; Storage.
Transaction counterpart	Fruit wholesalers, retailers and catering companies.
Quality Management Strategies	Detailed product specifications; Quality control during the post-harvest processing; Production environment monitoring; Integrated logistics management; Strategic alliances with Supermarkets, wholesalers and catering companies.

Source: Field research data.

Most of the transactions conducted by the Integrated Multinationals are of a hierarchical type, in other words they carry out the majority of technical activities inherent in international fruit commerce (see Table 6.10). By integrating all these activities these multinationals are in a better position to harmonise production and distribution activities.

The integrated Multinationals maintain specialised assets like fruit plantations, packinghouses and storage facilities in diverse fruit production regions. Apart from these physical assets the fruit trade corporations employ a large number of

professionals capable of managing fruit production, post-harvest processing, and logistics problems.

At the different destination markets the Integrated Multinationals also keep specialised assets like fresh fruit processing units and temperature controlled stores.

The main clients of these fruit corporations are the supermarket chains, independent supermarkets, wholesalers and catering companies. A professional sales force is responsible for managing the relationship with these organisational buyers. In most cases these professionals need to know a great deal about all technical aspects inherent in the fruit business.

Box 6.8 gives a case study of one of the Integrated Multinationals described in the account of the fieldwork in the UK<sup>15</sup>.

#### **Box 6.8 – Integrated Multinational**

Fruit Importer 15 (E15)<sup>16</sup> maintains more than 100 business units in Europe. The interview took place in one of these units, more precisely in Dartford, Kent. The executive responsible for importing tropical fruits to the UK gave the interview.

E15 is specialised in trading bananas. The company also trades stonefruits, citrus, apples, grapes, mangoes, papayas and melons. To maintain regularity of supply in such a diversified line of products the company sources in more than 32 countries. It was mentioned that E15 adopted a strategy of diversification of its sources aiming to minimise weather problems like hurricanes, floods or frost.

The interviewee affirmed that E15 prefers to buy fruit from independent growers (on long term arrangements) instead of producing its own fruit. The company however gives technical assistance to all its suppliers. In order to do so E15 employs a group of specialists who visit the fruit growers regularly. The executive interviewed also observed that the company has several experimental fruit production fields where new fruit varieties and new production techniques are regularly tested.

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<sup>15</sup> Box 5.3 also describes how an Integrated Multinational operates to export fruit.

<sup>16</sup> Fictitious name.

Apart from fruit production, E15 is responsible for most of the post-harvest activities linked with the international trade. The company maintains complete packinghouses and storage unit in each of its fruit source regions. E15 also assumes responsibility for organising the transport of its produce to the different destination markets. The company owns 17 refrigerated vessels that do a significant part of the transportation.

The executive interviewed observed that E15 keeps fresh fruit processing units in its most significant consumption markets. These units (more than 100 in Europe) are responsible for receiving the fruit and for preparing it according to specific needs of clients.

It was said that supermarket chains buy most of the fruit traded by E15. The company also sells its produce to regional wholesalers, catering companies (airlines, hotels and restaurants). A small fraction of the produce is bought by industries (to produce avocado and banana facial cream).

E15 has a brand with the aim to promote its produce. This brand was mentioned to have a high level of recall (85%) among British consumers. The interviewee observed that the company supports its organisational clients by providing instructions about how to store and display the merchandise.

Source: Field research data.

It should be noted that the company described in Box 6.8 has an important particularity when compared with the other two Integrated Multinationals characterised during the fieldwork. E15 does not grow fruit, preferring to buy them. The remaining two companies on the other hand grow most of the fruit they traded.

## Import Transactions

The three interviews conducted among Integrated Multinationals revealed that they use predominantly hierarchical type transactions to import their fruit. In other words they bring to the UK fruit which they already own (whether produced or bought). Table 6.11 presents the main characteristics of the fruit import transactions conducted by the Integrated Multinationals.

**Table 6.11 –Import Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise fruit from abroad to the British market.
Transaction type	Hierarchical type
Negotiation concerns	The negotiations take place in the internal environment of the company.
Predominant Type of Contract	There are no contracts.

Source: Field research data.

The negotiations take place within the company which means that they are based on technical grounds. Production and logistics costs together with fruit prices at the different fruit markets serve as reference for the negotiations. The transactions are of hierarchical type. The Integrated Multinationals do not use contracts to regulate their fruit import operations.

Since the Integrated Multinationals execute the majority of the technical activities linked to the fruit trade directly, it becomes possible for them to harmonise production and consumption (both quantity and quality of the fruit traded). Multinationals are also in a better position to optimise the usage of transport and storage resources.

### Distribution Transaction

Table 6.12 shows the characteristics of the fruit distribution transaction organised by the Integrated Multinationals. As can be seen these transactions are of the market type, which means that the fruit is sold to other organisations at this stage of the fruit trade chain.

**Table 6.12 –Distribution Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise fruit in the British market.
Transaction type	Market transaction
Negotiation concerns	Quality management strategy; Price; Fruit trade volume; Regularity of supply; Period of supply.
Predominant Type of Contract	Obligational Contracting

Source: Field research data.

The executives interviewed at the three different organisations revealed that the objective of distribution transactions is to sell the highest possible volume of fruit in the British market. In order to do so they prefer to negotiate with clients capable of buying big quantities of fruit. Among the clients we can find supermarket chains, wholesalers and catering companies. It was mentioned that clients of this type are professional negotiators.

Supermarket chains and catering companies want to maintain long-term commercial relationships, and they try to adopt common quality management strategies. Buyers and sellers are both committed to increasing the volume of the fruit traded and then gain with the economies of scale achieved. Price determination takes this fact into account.

Regularity of supply was also confirmed to be an issue discussed with the supermarket chains and catering companies. One interviewee said that clients of this type want to reduce transaction costs by narrowing their supply base. They prefer to trade with only a few suppliers capable of regularly delivering quality fruit during the whole year period.

When compared with supermarkets the Regional wholesalers are more volatile in commercial relations. In general Regional Wholesalers are more concerned with price discussions. Two executives mentioned that in most cases fruit wholesalers

cannot guarantee to meet a firm demand for fresh produce. The predominant type of contract used by the integrated multinationals can be characterised as Obligational Contracting.

## Quality Management Strategies

The results of the semi-structured interviews conducted with executives of the three Integrated Multinationals support the conviction that this group of fruit importers actively employ quality management strategies in order to obtain high quality in their imported produce. The probe questions utilised during the interviews confirmed that these traders make use of the following strategies: Detailed product specifications; Quality control during the production stages; Production environment monitoring; Integrated logistics management; Strategic alliances with trade partners.

### Detailed Product Specifications

The accumulated experience of the Integrated Multinationals allowed them to establish specifications for all traded products. One of the interviewees mentioned that his organisation periodically organises market research with the aim of assessing directly consumers preferences. Based on the results obtained from this research it is possible to create strategies capable of delivering the desired product. According to this interviewee if a company is capable of detecting consumption tendencies it will have more time to adopt the measures capable of fulfilling these tendencies.

Two executives observed that their company employs a group of technicians who periodically visit the fruit production regions. Their aim is to verify which production routines need to be altered in order to guarantee that the traded produce is within the specifications previously determined.

The three interviewees said that clear product specifications are essential for the success of the operations of their respective organisations. Wilson (1996) studied the trade in bananas in the UK; according to her “effective supply chain management

places its emphasis on the consumer and what will bring most benefit to the end-user. This involves sending information on customer requirements back along the line – most transparent chains will give most feedback to the producer. The fruit and the vegetable supply chain has traditionally been fragmented, but the last decade has seen rapid structural change”. This conclusion is in accordance with the results found in this research.

#### Quality Control During The Production Processes

The executive of the first Integrated Multinational visited affirmed that his organisation adopted the ISSO 9002 quality management system as a guide to control the different production processes that are inherent in the fruit international trade.

The executives of the other two organisations mentioned that principles of HACCP are used in their operations with the aim of controlling quality of products and production processes. The results found confirm the previous research by Mallins and Woodhead (1996). In their article on total quality management of horticultural products they observed that “the implementation of a well designed quality assurance system should ensure that attention is given to quality right throughout the production process and that quality is “built in” rather than “inspected in”. With this approach the quality assurance system can provide the disciplines which actually help to increase productivity and reduce costs of wastage”.

#### Production Environment Monitoring

All three executives interviewed confirmed that their respective organisation adopt the following measures for monitoring the production environment:

- Controlling the adequacy of the production and processing resources which include fruit production fields, packinghouses (fruit production regions) and fresh fruit processing units (at destination markets).
- Controlling the use of machinery – It is important to calibrate all the machinery used in the fruit trade otherwise the fruit can easily be damaged.

- Keeping quality control laboratories – The multinationals maintain quality control laboratories in fruit production regions and also at the destination markets. Their aim is to verify the quality of the produce traded and also the efficiency of different production processes executed by the company.
- Contracting qualified personnel – since the fruit trade is a complex business it is important to employ qualified people. These professionals include: fruit production specialists, post-harvest processing experts and experienced fruit salesmen and buyers.

#### Integrated Logistics Management

Regarding logistics management the three executives spontaneously mentioned that their organisations maintain specialised staff to centralise the management of transport and storage. Two of the integrated multinationals centralised their logistics management in Florida, USA. The third Multinational has a central logistics office in Ireland.

The results of these interviews are in line with the findings of Cooper and Ellram (1993). They affirmed that consistent evaluation of costs is necessary in the management of logistics. The authors go on to say that this task can be better accomplished if there is clear leadership capable of harmonising the use of transport and storage resources.

#### Strategic Alliances With Trade Partners

The main trade partners of the Integrated Multinationals (Supermarket Chains, Regional Wholesalers, Catering Companies and Independent Retailers) are localised in each national market.

The establishment of these alliances was said to be of fundamental importance in the fruit trade. Two executives mentioned that their organisations were chosen (by the different supermarket chains) to be the category management leader for various

products. The third executive pointed out that his company cultivates strategic alliances with the five main supermarket chains operating in the UK.

The three executives interviewed confirmed that the aim of the alliances is to create a business environment favourable to the exchange of information in the fruit commerce.

### 6.5.2 Import Agents

Some of the fruit importers cultivate close relationships with specific clients, receiving from these buyers orders to import considerable quantities of fruit. These importers are here termed Import Agents. Table 6.13 shows the main characteristics of this type of organisation. This table was based on the results of six interviews conducted among Import Agents.

**Table 6.13 – Import Agents Transaction Characteristics**

TRANSACTION TOPIC	CHARACTERISTICS
Objective	Import fruit in the international market for clients in the UK.
Specialized Assets	Fruit processing units; Cooled storage facilities; specialised personnel.
Integrated Activities	Port operations at the destination market; Transport to the fruit processing centre; Fruit processing; Storage.
Transaction counterparts	Fruit exporters abroad; Retailers, wholesalers, catering companies and industries in the UK.
Quality Management Strategies	Detailed product specification; Quality control during production and post-harvest processing; Production environment monitoring; Integrated logistics management; Strategic alliances with trade partners.

Source: Field research data.

Unlike the Integrated Multinationals, Import Agents do not produce fruit or do any of the fruit post-harvest activities in the fruit production regions. The only technical activities carried out by Import Agents are: Port receiving operations in the UK;

Transport to the fruit processing units; Fruit processing (unpacking, selection, grading and packing), and Fruit storage.

In most cases Import Agents own specialised assets like, fruit processing units and cooled storage facilities. To operate accordingly Import Agents need to maintain specialised staff, which has experience with the idiosyncrasies inherent in the international fruit trade.

Import Agents, in general, are intermediaries between fruit exporters and fruit retailers or wholesalers. However it should be clear that Import Agents showed a tendency to give priority to the relationship with their clients in the UK. During the interviews conducted among executives of six different Import Agents it was mentioned that this type of company are agents for the fruit buyers not for the fruit exporters. Box 6.9 illustrates how Import Agents operates.

### **Box 6.9 – Import Agent**

Import Agent 1<sup>17</sup> (I1)<sup>18</sup> is based in Lincolnshire, a region strategically located near the ports of Sheerness and Dover. The company is also placed near the main fruit consumption regions of the UK. The interview was given by the Managing Director of the company and took place on 25/08/1999.

E1 trades mainly in temperate fruit, to be more precise apples and pears. In 1999 E1 reached a turnover of £25 million.

A 5400 m<sup>2</sup> building is the main base of E1, containing the company offices, cooled storage facilities, ripening chambers, packing area and quality control laboratories. In the packing area is found all the equipment necessary to receive fruit, unpack, select and pack it again according to the fruit buyers specifications.

The location of the building takes into account of the distance to the continent, the distance to the main British ports, the distance to the main consumption markets and labour costs.

The main clients of E1 are the supermarket chains. The interviewee affirmed that less than 5% of the company traded produce goes to wholesalers. In most cases the fruit

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<sup>17</sup> Fictitious name.

<sup>18</sup> This case is here described because the company presented the highest total score amongst all Import Agents.

that is not capable of fulfilling the retailers requirements is directed to the wholesale market.

TESCO, Safeway, Mark and Spencer, Aldi, Costco and Morrisons were named as the main clients of the company. The Managing Director affirmed that it is an aim of the company to maintain strategic alliances with these clients. It was said that E1 was chosen as apple category manager for two of these retailers. To be a category manager means that the company will be responsible for supplying apples and also for monitoring the consumption of these products.

At one point in the interview the executive showed different reports with the apple consumption statistics for one retailer. He mentioned that E1 is responsible for monitoring the apple consumption of this client and for devising strategies to fulfil the consumption need and to make it grow.

The interviewee said that to guarantee a continuous supply of fruit is not an easy task, as it is necessary to establish partnerships with reliable suppliers. The suppliers are selected according to their capacity to offer fruit capable of fulfilling all the specifications (colour, weight, shape, brightness, texture and flavour) posed by the clients. The suppliers' capacity to offer high volumes of fruit is also taken into account. The managing director affirmed that E1 prefers to deal with only a few exporters (two or three) in each fruit production region. This strategy allows the company to economise on transaction costs and makes it possible for the suppliers to reach a volume of trade capable of generating economies of scale.

The interviewee affirmed that E1 expect from their suppliers a continuous commitment to improving products, production processes and also to offering competitive prices. The executive interviewed spontaneously appointed out the following concepts as important in the relationship with suppliers: honesty, integrity, reliability, consumer focus and capacity to assume responsible risk.

Besides these requirements the fruit suppliers need to pay attention to items such as: adequacy of the materials used in the production process; quality of water, clear signs of no smoking areas; adequacy of facilities; adequacy of lighting; calibration of the equipment; cleaning condition; condition of cloakroom and toilets; staff health; condition of transport vehicles; infestation (insects and rodents). All these mentioned items are evaluated according to the following scale: 1 = unacceptable; 2 = poor; 3 = acceptable; 4 = good; and 5 = excellent.

Source: Field research data.

## Import Transaction

The main characteristics of the import transactions carried out by Import Agents are presented on Table 6.14. As can be seen the main objective of these transactions is to fulfil the need of specific clients. Since the sale of the imported produce is almost guaranteed this commercial operation presents low levels of risk, a considerable advantage in the international fruit trade.

**Table 6.14 –Import Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Find and buy fruit in the international market that suits the specifications of their clients.
Transaction type	Market transaction
Negotiation concerns	Quality management strategy; Price; Fruit trade volume; Regularity of supply; Period of supply.
Predominant Type of Contract	Obligational Contracting

Source: Field research data.

The import operation is a market type transaction, in other words the Import Agent buys from specialised growers. None of the organisations visited are producing fruit abroad.

The executives interviewed confirmed that their negotiations with suppliers are based around several topics. When the probe questions were asked the interviewees affirmed that the following topics are taken into account during the negotiations of: quality management strategy; Fruit price; Fruit trade volume; regularity of supply and period of supply. Obligational contracting was indicated to be the main type of contract used by Import Agents in order to import fruit.

## Distribution Transaction

Table 6.15 shows the characteristics of the fruit distribution transactions carried out by Import Agents. The objective of distribution transactions is to deliver the imported fruit to specific clients. When asked the six interviewees confirmed that in the fruit distribution transactions conducted by Import Agents the following topics are important during negotiations: quality management strategies; price; volume of fruit traded; regularity of supply and period of supply.

**Table 6.15 –Distribution transaction characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Distribute fruit to clients in the UK.
Transaction type	Market transaction
Negotiation concerns	Quality management strategy; Price; Fruit trade volume; Regularity of supply; Period of supply.
Predominant Type of Contract	Obligational Contracting

Source: Field research data.

The distribution transactions are of the market type since the produce changes hands at this stage. It should be noted that this kind of transaction is between organisations which have a considerable volume of trade. Both sides of the commercial relation have had the opportunity to develop a substantial number of managerial expertises. As a result Import Agents and their clients (retailers, wholesalers or catering companies) were found to make use of advanced transaction relationships.

In particular the transactions between Import Agents and Supermarket Chains can be characterised as advanced. One interviewee affirmed that in most cases both sides need to establish first the general terms of the alliance, including decisions concerning the topics of negotiation previously mentioned. In a second stage the Import Agents and the Supermarket Chains are committed to establishing monitoring and forecasting techniques for the fruit trade. In a third stage a management system is

implemented which is capable of guarantee the continuity of the transactions between both sides. Finally decisions are taken about how to harmonise the information systems of Import Agents and Supermarket Chains.

It was said that transactions with catering companies are similar to transactions with supermarket chains. Three interviewees affirmed that among their clients the catering companies are those who want the highest standards in their fresh produce. This happens mainly because caterers are very concerned about microbiological contamination since several of their products (fresh fruit salads, fresh fruit juices or ready to eat meals) are very vulnerable to microbiological attack.

The relationship with regional fruit wholesalers was said to be of a different nature. Clients of this type do not have a consistent uptake of fruit. It is therefore difficult for them to guarantee long-term partnerships. The prices of the produce negotiated with regional wholesalers were said to be more volatile.

The predominant type of contract used in the distribution transactions has the characteristics of Obligational Contracting.

## Quality Management Strategies

The interviews conducted among Import Agents support the conviction that quality management strategies are employed by them to make their commercial activities operational. Among the quality management strategies used in the fruit trade we can find:

### Detailed Product Specifications

Since Import Agents do not grow fruit, they need to use clear fruit specifications in order to trade. At the first stage the specifications are settled in agreement with fruit buyers. In a second stage these specifications are negotiated with fruit exporters abroad. The majority of the executives interviewed confirmed that clear

specifications help to evaluate the product that arrives in the UK and also brings more objectivity to the negotiations (both with suppliers and clients).

### Quality Control During The Production Processes

Import agents have a limited capacity to control quality in the fruit production regions. However the interviews revealed the two main strategies that are used by Import Agents in order to guarantee quality in their imported produce. The first is visits to the fruit suppliers. The second is a careful examination of the products (which includes the pallet, the packaging and the fruit itself.) that arrive in the UK. After the fruit arrives in the UK, the Import Agent can fully control how the different processing activities are executed.

### Production Environment Monitoring

Import Agents mentioned that production environment monitoring is an indirect way to raise quality standards. The interview results indicated that Import Agents aim to supervise the production environment at three different stages in the fruit trade sequence. At the first stage, the fruit production fields and the packinghouses are visited by technicians working for the Import Agents. At the second stage the Import Agents have the opportunity to supervise more closely the fruit processing activities that happen in the UK. At the third stage fruit display conditions on the supermarket shelves are monitored. The ultimate aim of this monitoring phase is to verify if supermarket display conditions are favourable to fruit sales.

### Integrated Logistics

The majority of interviewees stated that they need to deal with a considerable diversity of fruit sources around the world. This fact brings complexity to the fresh fruit business. It is not a simple task to co-ordinate all the fruit growers in such a way that the fruit supply will be continuous throughout the whole year. In most cases the fruit exporters are required to arrange long distance transport. The Import Agents will only assume responsibility for the fruit shipment when it arrives in the UK. Two

executives observed that when fruit growers do not have experience in the fruit export business, they receive help to handle logistics problems. The two executives added that as soon as these suppliers have developed the necessary managerial skills, they are required to assume complete responsibility for fruit export logistics. In Britain, the logistics management is regarded as simple mainly because the supermarket chains take responsibility for distributing the produce to their own network of stores.

#### Strategic Alliances With Trade Partners

Import Agents are the intermediaries between the needs of the organisational fruit buyers in the UK (supermarket chains, catering companies and Wholesalers) and the fruit exporters. Great ability is needed to maintain alliances with both sides of the fruit trade. The interviews support the conviction that Import Agents give priority to their strategic alliances with organisational fruit buyers in the UK. In general Import Agents receive orders, from organisational fruit buyers in the UK, to import a certain quantity of fruit. The Import Agents proceed to the selection of the suppliers capable of delivering the produce at competitive prices. The selected suppliers are contacted and the order requirements are given. The next responsibility of Import Agents is to control the suppliers' performance by monitoring the traded fruit, the production and trade environments and the production processes.

#### **6.5.3 Independent Importers**

Independent Importers are those organisations which maintain strategic alliances with fruit producers abroad. In most cases Independent Importers bring to the UK fruit from these trade partners and sell them on a commission basis. Unlike Import Agents, the Independent Importers do not have firm strategic alliances with specific clients like supermarkets, wholesalers or caterers. The main characteristics of Independent Importers are presented on Table 6.16.

**Table 6.16 – Characteristics Of Independent Importers**

TRANSACTION TOPIC	CHARACTERISTICS
Objective	Commercialise fruit of foreign exporters on the British market.
Specialized Assets	Cooled storage facilities;
Integrated Activities	Storage
Transaction counterpart	Fruit exporters abroad; Retailers, wholesalers, and catering companies.
Quality Management Strategies	Detailed product specification; Integrated logistics management; Strategic alliances with trade partners.

Source: Field research data.

Independent Importers keep a few specialised assets in order to sustain their commercial operations. In most cases they have cooled storage facilities or rent them. The aim of these installations is to keep the imported fruit under controlled conditions until the time that the produce is delivered to the organisational buyers in the UK.

The technical activities carried out by the Independent Importers are only the following three: port operations in the UK, transport to the fruit storage centre and fruit storage.

On the supply side the main transaction counterpart of the Independent Importers are selected fruit exporters. On the consumption side the main transaction counterpart are organisational buyers like retailers, wholesalers, and catering companies.

Box 6.10 shows the description of one Independent Importer as encountered during the fieldwork in the UK.

### Box 6.10 – Independent Importer <sup>19</sup>

Independent Fruit Importer 8 (I8)<sup>20</sup> is based in the London Metropolitan Area. The company is one of the main importers of Brazilian melons to the UK. I8 also trades mangoes and citrus from Spain and Africa.

The commercial director of the company gave the interview, which took place on 1<sup>st</sup> of November 1999 in the company office.

I8 does not own fruit plantations abroad or even fruit packinghouses. The company also does not maintain fresh fruit processing units or storage facilities in the UK. When it is necessary the company rents cold storage deposits from other organisations. The strategy of the firm is to focus on commercial mediation only, few technical activities (fruit production, post-harvest processing and logistics) are integrated by I8.

I8 expects from its suppliers the ability to manage most of the technical issues inherent to the international fruit trade. The interviewee mentioned that exporters are preferred who are capable of generating high volumes of trade and also capable of handling the fruit logistics.

The executive interviewed observed that one of the most important objectives of the company is to find fruit exporters abroad and to establish commercial partnerships with them. The Commercial Director pointed out that the role of I8 is to open and 'develop' the British market for those exporters capable of delivering quality produce at competitive prices. It was mentioned that the company already maintains long-term relationships with suppliers in South Africa (more than 20 years), Venezuela (more than 15 years) and Brazil (more than 8 years).

I8 aims to offer to its suppliers a programme of market support which includes information about fruit consumption tendencies of the British market. Price variation reports are also sent to the fruit exporters. In addition, the Commercial Director of I8 affirmed that his organisation gives expert advice on issues like: British and EU legislation, environment protection, work conditions and pest control.

The main type of commercial agreements adopted by I8 in its import operations are of the Obligational Contracting type. It was said that I8 trades on a commission basis, which means that the firm tries to sell the highest possible volume of fruit for the best possible price. The interviewee mentioned however that this strategy is limited by the prices practised in the British market.

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<sup>19</sup> This case is here described because the company presented the highest total score amongst all Independent Importers of melons.

<sup>20</sup> Fictitious name.

The interviewee mentioned that the main problems of I8 are not on the supply side but on the consumption side. He observed that it is becoming increasingly difficult to find UK organisational buyers willing to pay prices able to cover adequately the company's services and the fruit suppliers.

Source: Field research data.

## Import Transactions

The objective of the import transactions organised by the Independent Importers is to commercialise fruit from selected suppliers abroad on the British market. It is a market type transaction since the Independent Importers buy fruit from specialised fruit exporters (see Table 6.17).

**Table 6.17 –Import Transaction Characteristics.**

TRANSACTION TOPIC	CHARACTERISTICS
Objective	Commercialise fruit from suppliers abroad in the British market.
Transaction type	Market transaction
Negotiation concerns	Quality management strategy; Price; Fruit trade volume; Regularity of supply; Period of supply.
Predominant Type of Contract	Obligational Contracting

Source: Field research data.

When asked about the negotiations with fruit suppliers the Independent Importers turned out to be concerned about the following issues:

- Quality management strategy adopted by the fruit exporters – In this case the Independent Importers expected from their suppliers the capacity to deliver a product which embodies all the specifications established during negotiations. It was said that if a shipment of fruit arrives in the UK and it proves to be of inadequate quality, the fruit exporters will be responsible for bearing the losses.
- Fruit prices – Since the Independent Fruit Importers do not maintain strong partnerships with institutional buyers in the UK, they need in most cases to offer more competitive prices.

- Fruit trade volume – Independent importers revealed a preference for having only one fruit supplier in each fruit production region. Every supplier is required to provide a volume of fruit capable of satisfying the importer’s need during a specific period of the year.
- Regularity of supply and period of supply – Independent Importers want to trade throughout the whole year. In order to do so they have a list of suppliers (distributed around the globe) capable of delivering fruit during each specific period of the annual cycle. If a fruit exporter fails to supply a shipment of fruit in a specific season the Independent Importers will then suffer a reduction in their volume of trade.

The Independent Importers visited revealed a preference for using Obligational Contracting as the predominant type of contract.

### Distribution Transaction

Distribution transactions organised by Independent Importers are of a market type since the imported produce is sold to a client in the United Kingdom. Table 6.18 shows the main characteristics of the distribution transactions organised by Independent Importers.

**Table 6.18 –Distribution Transactions Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise fruit in the British market.
Transaction type	Market transaction
Negotiation concerns	Regularity of supply, Quality management strategy; Price; Volume of fruit traded; Period of supply.
Predominant Type of Contract	Arm’s Length Contracting

Source: Field research data.

The objective of Independent Importers is to commercialise their imported fruit on the British market. In most cases the clients are supermarket chains, fresh produce wholesalers, catering companies, independent supermarkets and green-grocers. The executives interviewed affirmed that sales activities start very early while the fruit is still in the fields. Possible clients are contacted and informed about the characteristics of the fruit to be harvested. Sellers and buyers also start to discuss possible prices, and it is common during this period for both sides to arrive at price guidelines for the shipments of fruit from specific suppliers.

After the negotiations most of the resulting information is sent back to the fruit exporters, who are asked to deliver the fruit according to the agreed specifications. When the produce arrives at the British ports or airports the Independent Importers receive the shipment and sent it to storage facilities. The shipment is kept there until it can be delivered to the organisational buyers.

## Quality Management Strategies

The interviews with the Independent Importers support the idea that these fruit traders tend to use a limited number of quality management strategies. Two of these strategies are: Detailed Product Specifications and Strategic Alliances with fruit suppliers.

All the executives interviewed confirmed that it is important to have clear and detailed product specifications in their trade activities. These specifications serve to guide the negotiations with both suppliers abroad and fruit organisational buyers in the UK. One of the executives interviewed spontaneously mentioned that the specifications are used to evaluate the fruit that arrives in the UK. If a shipment prove to be of low quality the price will reflect this fact.

None of the Independent Importers claimed to directly control quality during the fruit production or post-harvest processing stages. The interviewees did however affirm

that occasional visits are paid to the fruit suppliers. During these visits the fruit production environment is monitored, to check aspects such as: adequacy of production facilities; adequacy of the machinery; work conditions; and the control measures adopted by the exporters.

The Independent Importers visited turned out to be responsible for only a few logistics related activities. In most cases they expect that the fruit exporters will assume responsibility for managing logistics. Only after the fruit shipment arrives in the UK do the Independent Importers start to assume direct responsibility for logistics. It is important to observe that the fruit importers are responsible for determining when a specific fruit shipment should arrive in the UK.

The alliances with fruit suppliers abroad seems to be the strategy most commonly used by Independent Importers to guarantee quality in the fresh produce they trade. Two interviewees observed that by maintaining long-term partnerships with competitive suppliers abroad, their organisations have a better chance of trading in quality fruit on the British market. Another executive interviewed revealed that strategic alliances with fruit exporters generate the possibility of continuous improvement of the trade, mainly because both sides have the time to improve their performance in several aspects of the fruit trade.

#### **6.5.4 Regional Wholesalers**

Regional Wholesalers are a traditional category of fruit traders in the UK. This type of organisation aims to import fruit and trade it in the UK. Regional Wholesalers also trade fruit produced in the UK and fruit imported by other organisations.

Table 6.19 presents the main characteristics of the Regional Wholesalers operating in the UK. These results are based on interviews conducted at three wholesale markets in the UK (New Covent Garden, Western International Market and Spitalfields Market)

**Table 6.19 – Regional Wholesalers Characteristics**

TRANSACTION TOPIC	CHARACTERISTICS
Objective	Import fruit and trade it in the UK.
Specialized Assets	Cooled storage facilities;
Integrated Activities	Port operations; Storage;
Transaction counterpart	Fruit exporters abroad; Wholesalers, Retailers, and Catering companies.
Quality Management Strategies	Product specification; Quality control on arrival of the fruit.

Source: Field research data.

Regional Wholesalers maintain few specialised assets, one such being are cooled storage facilities. In most of the cases these facilities have limited storage capacity and are located in the same place as the trade operations (fruit buying and selling) take place. Only fruit that will be traded in the next few days is kept in these stores.

A very limited number of technical activities in the international fruit trade are integrated by Regional Wholesalers. They do not maintain any assets abroad, and these fruit traders showed a preference for receiving the imported produce at their own site. This technical limitation dramatically reduces the number of fruit exporters that can trade with the Regional Wholesalers. These fruit exporters need to have the capacity to export the fruit and to carry out all the port operations in the UK. In most cases these fruit exporters are based in Europe (mainly the Netherlands, Belgium, France, Spain and Italy).

Most of the produce traded by Regional Wholesalers is obtained from specialized importers like Integrated Multinationals, Import Agents and Independent Importers.

The main customers of the regional wholesalers are independent retailers, catering companies, secondary wholesalers, hotels, restaurants and clubs. These types of clients have a volume of consumption big enough to buy from wholesalers but not

big enough to buy directly from specialised fruit importers. An important advantage for this type of customers of buying from Regional Wholesalers comes from the fact that wholesalers trade a great diversity of fresh produce at the same site ( the wholesale market), In other words, when an organisational fruit buyer goes to the Wholesale Market, the chances are high that they will find the fresh produce they want. Box 6.11 illustrates the case of a Regional Wholesale company.

### **Box 6.11 – Regional Wholesale Company<sup>21</sup>**

The company visited is Importer I1 (I11)<sup>22</sup> an organisation based at Spitalfields Wholesale Market. The interview was given by the General Manager on 17 August 1999.

I11 has one of the biggest volume of trade among the firms operating in the Spitalfields Market . The organisation traditionally trades a wide diversity of fresh fruit and vegetables. Recently I11 has started to trade organics.

The produce traded is obtained from British growers, fruit exporters based on the continent (mainly The Netherlands) or from British fruit importers. The General Manager affirmed that his firm regularly trades more than 100 types of fruits and vegetables.

Samples of the fruit are displayed (inside their boxes) in front of the firm’s stand. Part of the produce is kept in the area behind the stand and the rest of the produce is kept in a cold store, also in the stand area.

Most trading activities take place in the area in front of the stand where professional traders meet potential buyers. This is the place where the produce is shown to the consumers and where the produce price is discussed. When both sides reach a deal the fruit boxes are taken from stock, loaded in a fork-lift truck and delivered to the buyer’s transport.

This following text found in one of the company’s brochures helps to clarify the market niche occupied by I11: “*Are you worried about getting here early in case you miss anything! Let us do your worrying.*”

*We have a large range of produce. And our experienced buyers are on the market by midnight hunting for short items and bargains.*

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<sup>21</sup> This case is here described because the company presented the highest total score amongst all Regional Wholesalers.

<sup>22</sup> Fictitious name.

*Pre-ordering from us is possible by fax at anytime or by phone up to 12 am the day before, with the final selection made by you upon your arrival.*

*Your quick turn-round is important to us, which is why we are the only stand with five forklifts and seven porters/loaders for your service.”*

It can be concluded from this text that I11 aims mainly spot transactions with their clients. In this case the main issues negotiated are product specific attributes and the price for a shipment of fruit. According to the interviewee the price of the product negotiated in a wholesale market is influenced by a great number of variables, which are difficult to predict. He also observed that the traders working for the company need to have a great dose of experience to perform satisfactory.

It was said during the interview that in general fruit supply is not a cause of problems, since it is not difficult to buy or to import fruit. The problem is on the demand side. The interviewee pointed out that it is becoming increasingly difficult to sell fresh produce since some clients prefer to source outside the wholesale market. He observed that the main consumers of fruit (supermarkets) buy directly from importers.

When asked about the quality management strategy the executive interviewed observed that a shipment of fruit is evaluated by experienced traders when it arrives at the company's stand. A price will be proposed to the suppliers based on the quality of the shipment of fruit and on the predominant prices at the wholesale market. The General Manager of I11 mentioned that the company does not trade only top quality fruit. Products with appearance problems are also traded if the price shows to be adequate.

Source: Field research data.

## Import Transaction

The objective of the import transactions organised by Regional Wholesalers is to bring fruit from abroad and trade it in the UK. It is a market type transaction. The main characteristics of these transactions are presented in Table 6.20.

**Table 6.20 – Import Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Import fruit and trade it on the UK market.
Transaction type	Market transaction
Negotiation concerns	Price; Fruit trade volume; Period of supply.
Predominant Type of Contract	Arm's Length Contracting

Source: Field research data.

The interviews conducted among regional wholesalers support the idea that price is the main concern during negotiation with suppliers. One interviewee mentioned that his organisation tries to beat the competition by trading fruit at lower prices, which is possible when the suppliers' prices are competitive and when the company keep its operational costs low. The other interviewees observed that when necessary fruit suppliers are replaced in order to guarantee competitiveness.

The predominant type of contract used by Regional Wholesalers to import their fruit are Arm's Length Contracting. It means that they aim to maintain low dependency on a specific supplier by trading with a large number of fruit exporters. It also means that Regional Wholesalers want open bidding for their orders. Orders are won by suppliers who are most competitive. There is no long-term commitment between buyers and sellers. Volume of fruit traded and the period of supply were also recognised as important issues during negotiations.

The communication between Regional Wholesalers and their suppliers was indicated as focusing on negotiations for each transaction separately. None of the interviewees suggested that they paid regular visits to their suppliers or developed long term strategies with them.

## Distribution Transactions

The distribution transactions organised by Regional Wholesalers are of the market type. Their aim is to commercialise fresh produce on the UK internal market. Table 6.21 shows the main characteristics of these transactions.

**Table 6.21 –Distribution Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise fruit on the UK internal market.
Transaction type	Market transaction
Negotiation concerns	Price; Fruit trade volume; Period of supply.
Predominant Type of Contract	Arm's Length Contracting.

Source: Field research data.

During negotiations between Regional Wholesalers and their clients the price of the products being traded is the main point of reference. The final price is influenced by the specific characteristics of the fruit being traded and also by the prices prevailing on the wholesale market at the time. It was stated that fruit buyers receive a discount according to the volume of produce that they buy.

Arm's Length Contracting was indicated as being the predominant type of contract used by Regional Wholesalers to distribute fruit. In this case the wholesalers seek to maintain commercial relations with as high a number of clients as possible. By adopting this strategy they aim to have low dependence of specific clients. Communication with these clients was said to be infrequent and focused on the commercial negotiations only.

## Quality Management Strategies

The interviews conducted among Regional Wholesalers support the idea that only two main types of quality management strategies are used by them: Product Specification and Fruit quality control on arrival.

All the executives interviewed working for Regional Wholesalers affirmed that it is important to use clear fruit specifications during the negotiations with fruit suppliers. This is a guarantee that the suppliers will deliver a product capable of satisfying all the pertinent legislation and also the final consumers needs.

When the fruit shipment arrives at the Regional Wholesalers site, it is evaluated by experienced traders. The interviewees affirmed that the result of this evaluation directly affects the price paid to the suppliers. If a fruit shipment proves to be of poor quality (below the acceptable standards established by the wholesaler) the suppliers are required to take the fruit lot back.

None of the Regional Wholesalers visited said that they adopt strategies such as: quality control during the production and post-harvest processing stages; production environment monitoring; integrated logistics management; and strategic alliances with trade partners.

### **6.5.5 Supermarket Chains**

Supermarket Chains rarely import fruit directly, preferring to source from specialised importers (Import Agents, Independent Importers, Integrated Multinationals or Regional Wholesalers). However all the interviews conducted during this study (both in Brazil and UK) support the idea that Supermarket Chains are the most influential organisations in the international fruit trade between Brazil and the UK. Table 6.22 presents the main characteristics of this type of organisation regarding the fruit trade. The table was produced based on the results of interviews conducted among 19

Brazilian fruit exporters and 15 British fruit importers. An interview conducted with the fresh produce head buyer of a supermarket chain was also of fundamental importance.

**Table 6.22 – Supermarket Chains Characteristics**

TRANSACTION TOPIC	CHARACTERISTICS
Objective	Trade fruit on the British internal markets.
Specialized Assets	Distribution centres, transport fleet, Supermarket stores.
Integrated Activities	Fruit Distribution; Fruit display on supermarket shelves.
Transaction counterpart	Dedicated fruit importers and fruit consumers.
Quality Management Strategies	Detailed product specification; Quality control during production and post-harvest processing; Production environment monitoring; Integrated logistics management; and Strategic alliances with trade partners.

Source: Field research data.

One of the objectives of supermarket chains is to sell fresh produce (fruit and vegetables) to British final consumers. In order to do so, these retailers maintain assets like distribution centres, a transport fleet and supermarket stores. The supermarket chains integrate few technical activities related to the fruit trade. Such activities are fruit distribution and the display of fruit on the supermarket shelves.

In most cases, after the final agreement with the fruit suppliers, the Supermarket Chains transport the negotiated fruit lot to regional distribution centres. At these centres the fruit shipment is divided up. Each portion of the original fruit lot is sent to the different retail stores along with other merchandise, in a composite shipment. At the retail stores the shipment is unloaded. Some of the fruit will go to the supermarket shelves and the rest is kept under controlled conditions. The stored fruit is used as a guarantee that supermarket shelves will always be filled with fresh

produce. When the fruit stock level is low the retail store will contact the regional distribution centre and request a new shipment.

The main fruit suppliers to the Supermarket Chains are Integrated Multinationals and Import Agents. Occasionally these retailers also source from Independent Importers. The customers of the supermarket are the British final consumers.

Box 6.12 illustrates the case of a major Supermarket Chain trading in the United Kingdom.

### **Box 6.12 – Supermarket Chain<sup>23</sup>**

Importer 16 (I16)<sup>24</sup> is one of the six main food retailers operating in the British market. The headquarters of the company is located at west of London. It was there where the interview took place on 20 September 2000. The head buyer of the fruit and vegetables gave the interview.

The interviewee spontaneously stated that one ambition of I16 is to trade fairly. He observed that I16 receives pressure from the shareholders to be responsible towards the global community involved in the trade activities of the company. This community includes customers, suppliers and employees. It was said that suppliers are expected to offer favourable employment conditions to their workers and outworkers, which means adequate wages and benefits, working hours, working conditions, health and safety conditions, equality of treatment and employee representation. The employment of children or the use of forced labour is not acceptable.

The suppliers are also required to be responsible for environmental protection.

The interviewee affirmed that I16 aims to be the best fresh food retailer in the UK. At this stage of the interview, the executive showed me a document with the strategies adopted by the company in order to trade quality produce. Consolidation of the supply base is one of these strategies. It was mentioned that in the past I16 had more than 120 fresh produce suppliers. The company currently has about 60 suppliers and aims to have less than 40 suppliers of fresh produce in the near future.

Some of the suppliers are required to assume the role of category managers, which means that they will be responsible for supplying a determined category of fresh

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<sup>23</sup> It was possible to interview only one Supermarket Chain.

<sup>24</sup> Fictitious name.

produce. Each category manager is asked to report to a specific buyer working for I16. It was said that category managers receive data about fruit sales. The objective of this measure is to help them in their analysis of their commercial performance.

According to the executive interviewed the category managers are encouraged to:

- Guarantee the continuity and security of the supply;
- Supply the best possible quality produce from the best possible sources at all times of the year;
- Provide a category data analyst;
- Conduct market research with the customer base;
- Have an product innovation programme;
- Have a programme of tracking and reporting on all lines of fresh produce;
- Organise a joint wastage management and control programme;
- Provide marketing support for promotions and tasting;
- Identify and disseminate best practice in crop production and post-harvest processing;
- Provide electronic data interchange and digital images;

It was said that all I16's suppliers are regularly evaluated. The head buyer showed me a form with 55 different items that are part of the evaluation process. Each of these items is marked according to the following criteria: 1 - Unacceptable; 2 – Room for improvement; 3 – Acceptable; 4 – Good; 5 – Excellent. The 55 items mentioned are divided into the following six groups: Category performance; Accounting; Category management; Technical; Distribution; and Corporate sales.

Finally, with regard to evaluation, the interviewee observed that the suppliers are asked to evaluate the behaviour of the buyers working for the I16. Here a form is used which is very similar to the one previously mentioned.

At the end of the interview the Head Buyer observed that I16 has a modernisation and expansion plan. In the year 2000 alone, the retail chain opened five new supermarkets and acquired eleven stores from another British retail chain.

According to the executive interviewed the modernisation of I16 involves: larger stores; new assortment; second generation scanning; new distribution systems; new ordering systems; new buying systems; new merchandising systems; and intensive use of information technology.

Regarding information technology the interviewee emphasised that in the near future computers and Internet resources will be used much more intensively during all stages of the fresh produce trade. He gave the example of digital images sent by e-mail. These pictures are turning out to be an efficient instrument in the management of relations with fruit growers, exporters and importers.

Source: Field research data.

## Fruit Buying Transaction

In order to win and sustain market share in the UK, the supermarket chains look for suppliers capable of delivering fruit with all the attributes preferred by the British consumers. Table 6.23 presents the main characteristics of the fruit buying transactions organised by supermarket chains. The interviews conducted in the UK and in Brazil among fruit traders (Table 6.1) support the results presented in Table 6.22.

**Table 6.23 –Import Transaction Characteristics.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Buy fruit capable of satisfying the British consumers expectations.
Transaction type	Market transaction
Negotiation concerns	Regularity of supply; Quality management strategy; Price; Fruit trade volume; and Period of supply.
Predominant Type of Contract	Obligational Contracting

Source: Field research data.

The fruit buying transactions are of the market type. None of the interviews conducted suggested that the supermarkets are growing fruit or executing post-harvest processing activities directly. Actually the supermarket chains act as the head of a chain in the fruit trade. They use their substantial buying power to guide the actions of the fruit growers, exporters and importers. It is important to remember that in the UK the food sector is highly concentrated, the retailers carry out most of the distribution activities, having easy access to the final consumer. The Supermarket Chains also control an extensive range of own label products. These factors combined help to concentrate the negotiation power in the hands of the supermarket chains.

In most cases, supermarket chains employ sophisticated buying teams to build up alliances with fruit suppliers. These highly professional buyers were said to focus on several factors during buying negotiations; among these factors we can count:

- Quality Management strategy – The suppliers are required to adopt a proactive posture regarding quality. It is not enough to deliver fruit capable of satisfying all the pertinent legislation, the fruit suppliers need to adopt a comprehensive quality management system capable of generating a reliable flow of top quality fresh produce;
- Price – Since supermarket chains buy high quantities of fresh produce, they use their buying power to obtain discounts from the suppliers. The fruit prices are also affected by the fact that the transactions with supermarkets are less risky, in other words the costs of insurance tend to be lower;
- Fruit trade volume – Supermarkets want to rationalise their supply base by narrowing the number of suppliers. It is preferable to make use of a group of only a few suppliers capable of delivering high volumes of produce. This strategy helps to economise on logistics and negotiation costs;
- Regularity of supply – Retailers want their shelves filled with fresh produce throughout the whole year. It is recognised that fruits and vegetable are products capable of generating store loyalty;
- Period of supply – It is incumbent on the suppliers to grow fruit or to find growers capable of supplying quality fruit throughout the whole annual cycle. It is of relatively little importance whether the growers are dispersed around the globe. In most cases each fruit grower knows in advance when the fruit shipment should be dispatched to the UK.

The predominant type of contract used by supermarket chains to regulate the relationship with their fruit suppliers is Obligational Contracting<sup>25</sup>.

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<sup>25</sup> The main characteristics of the Obligational Contracting are presented on Table 1.3

## Sale To The Final Consumer

One of the objectives of the supermarket chains is to commercialise fresh produce and other food products in the UK internal market. This market type transaction is a daily (or at least weekly) routine for most of the British population. Some important characteristics of these transactions are presented on Table 6.24.

**Table 6.24 –Sale To The Final Consumer.**

<b>TRANSACTION TOPIC</b>	<b>CHARACTERISTICS</b>
Objective	Commercialise fresh produce and other products in the UK internal market.
Transaction type	Market transaction
Predominant Type of Contract	Spot transactions.

Source: Field research data.

There is no negotiation between buyers and sellers when consumers purchase fruit in a supermarket. It is a spot transaction where buyers go to the supermarket shelves, choose the fruit they want (along with other products) and pay for them at the checkout. Very few words are exchanged between buyers and sellers. Despite this impersonal transaction the supermarket chains have developed ways to assess the consumer needs and preferences on a collective base.

An extensive range of quantitative research techniques are used by the supermarket chains for monitoring consumption. For instance computerised check-outs and labels with bar codes allow supermarkets to built detailed time-series about consumption patterns of a considerable number of products. It is possible for a supermarket chain to forecast how intensively each category of product will be consumed during specific periods of the year.

Supermarket loyalty cards are important instruments used by retailers to investigate consumers' needs and preferences. These cards make possible a clear categorisation of consumers (by age, income, gender, and so on) and their buying habits (when they

buy, what they buy, where they buy and how they pay for the products). This strategic information makes it possible for the marketing specialists of the supermarkets to devise measures capable of better focusing marketing strategies.

It is also possible for supermarkets to organise marketing experiments in which the potential products are offered with diverse formats and prices. These experiments have the potential capacity to indicate consumers' preference in terms of product characteristics.

In addition to quantitative research techniques, supermarket chains can also make use of qualitative research like focus groups, depth interviews and projective techniques. These qualitative methods are used as fine-tuning in the process of assessment of the consumers' needs and preferences.

## Quality Management Strategies

Supermarket chains commonly use quality management strategies to regulate their fruit trade operations. This belief is sustained by the interviews conducted among Brazilian fruit exporters and British fruit traders. These interviews confirmed that detailed product specifications, quality control during the production processes, production environment monitoring, integrated logistics management and strategic alliances with trade partners are some of the strategies employed by supermarket chains for dealing with fruit quality issues.

### Detailed Product Specification

The fruit suppliers of supermarket chains are expressly required to observe all the legislation that regulates the fruit trade in the UK. They are also required to deliver a product that is in accordance with the consumers' preference (the fruit size, colour, weight and shape). It should be noted that supermarkets have developed the capacity to transform the consumers' preferences and beliefs into concrete specifications. For

instance in the last few years some British retailers have started to offer organic food and non-genetically modified products. It is important to observe that the supermarkets started to offer these categories of products before any legislative body could regulate the trade of the mentioned categories of products.

The results of the interview analysis are in line with the findings of Fearne and Hughes (2000), White (2000) and Swinbank (2000). Specifically Fearne and Hughes (2000, p. 762) observed that retailers adopted strategies “to ensure the safety of products reaching them from their suppliers. If their desire to develop own label products had encouraged them to take a greater interest in what was happening upstream, the 1990 Food Safety Act compelled them to effectively take control, by instituting stringent quality assurance programmes with their suppliers, with a particular emphasis on traceability. In effect, risk management became a key driver for co-ordination in the fresh produce supply chain.”

#### Quality Control During The Production Processes

In most cases, supermarket chains do not control quality during the fruit production and post-harvest processing stages. The suppliers to the supermarkets (fruit growers, exporters and importers) are required to perform this task. However the multiples do supervise their suppliers job by organising periodical visits to them and by evaluating the fresh fruit quality at specialised laboratories.

Supermarket chains also make use of voluntary labelling schemes and accreditation systems for controlling quality during the production and post-harvest stages. After receiving the fruit at their platform they take full control over quality management.

Hughes and Merton (1996), Harvey (2000) and also Fearne and Hughes (2000) found similar results when they analysed the British retail system.

## Production Environment Monitoring

Besides controlling specific characteristics of the fruit that arrives in the UK, the supermarket chains also demonstrated an ability to influence production environment conditions.

Fruit traders in Brazil and in the UK confirmed that supermarket chains monitor the following production environment factors:

- Fruit production conditions;
- Environment protection;
- Post-harvest processing conditions;
- Appropriate conditions for human work;
- Hygienic conditions.

A review of the literature confirms the importance of production environment monitoring for the supermarket chains (Swinbank, 2000; Wilson, 1996; Cotterhill, 1997; White, 2000; Hughes and Merton, 1996; Fearne and Hughes, 2000; and Wrigley, 1997).

## Integrated Logistics Management

Supermarket Chains have a very important role in fruit logistics. These organisations are in a position to determine when the fruit should arrive in the UK and where the shipment should be delivered.

After receiving the fruit cargo from suppliers the Supermarket Chains assume full responsibility for fruit logistics in the UK. In most cases the multiples use their own lorry fleet to take the fruit shipment to the suppliers' site in the UK. The fruit is then transported to regional composite storehouses. The storehouses are called composite because they can keep an extensive range of products at diverse storing conditions (frozen foods, fresh produce and dry merchandise). From the regional storehouses the fruit are dispatched to retail stores.

The routine described above is repeated on a daily basis so it becomes possible to guarantee that the retail stores will always receive fresh produce in a satisfactory state. It is important to mention that most retail stores have the necessary facilities to keep fresh fruits for a short period of time.

Fearnie (1997), Ogbonna and Wilkinson (1996); Cotterill (1997), Hughs and Merton (1996) also found that supermarket chains have a central role in the logistics of fresh produce in the UK. These authors described the logistics systems of the main supermarket chains operating in the United Kingdom.

#### Strategic Alliances With Trade Partners

Supermarket Chains have direct access to the British fruit consumers. They use this privileged position to organise alliances with fruit suppliers.

To be preferred are those suppliers who have already demonstrated the capacity to deliver quality fruit (using the Supermarket Chain specifications as a reference) at competitive prices, during the whole annual cycle. As a reward for efficiency the preferred suppliers will receive more generous orders. A few fruit and vegetable suppliers will even receive the status of category managers, which means that they will be responsible for managing the supply of a whole category of products.

Since the Supermarket Chains have such strong ascendancy over their suppliers, they can also influence those organisations who sell fruit or agricultural products to the primary suppliers. One can say that Supermarket Chains have a leadership role among a considerable number of organisations that establish commercial alliances to make international fruit trading viable.

The above conclusions regarding the strategic alliances organised by Supermarket Chains with their suppliers of fresh produce, bear out the previous research by White (2000). Fearnie and Hughes (2000) and also Hughes and Merton (1996) studied the

trade of fresh produce in the UK, and their findings are also in accordance with the results obtained in this research.

## 6.6 Quality Management Strategies: Comparisons

The analysis of the survey conducted in Brazil and UK revealed that the majority of the fruit traders do not perceive the management of quality as an impediment for their trade operations. However the survey was not capable of revealing how fruit traders deal with quality issues in their commercial activities. Further research was necessary to answer the research question: “Which are the measures adopted by exporters in order to guarantee product quality in the international fruit trade?”

Aiming to disclose the quality management strategies adopted by prominent British and Brazilian fruit traders 34 interviews were conducted among them. The interviews had as foundation the Quality Management Analysis Framework. The analysis of these interviews suggests that Brazilian and British fruit traders tend to adopt similar strategies in the management of quality.

### 6.6.1 The Brazilian Fruit Exporters

Brazilian fruit exporters evidenced to use empirically the following concepts in their quality management strategies:

- Observance of product specification;
- Production processes quality control;
- Production environment quality management;
- Integrated logistics management; and
- Alliances with trade partners.

Regarding ‘Observance of product specification’ the results found are in line with the findings of Wilson (1996); Wilson and Clerck (1997); Pandey (1997); and Onchan

(1997). All the mentioned authors agree that the strict adherence to specifications posed by importers is commonly utilised as a strategy capable of guaranteeing quality of the fruit and vegetables traded in the international market.

The examination of the commercial operations of the companies trading food products demonstrated that 'Production processes quality control' is normally employed in the international trade as a way to show to importers that the transacted products embody all the required attributes (as described by Ziggers and Trienekens, 1999; Weaver and Kim, 2000; Mowat and Collings, 2000; and Leat, Marr and Ritchie, 1998). Specifically Mowat and Collins, which analysed the fruit business in Australia and New Zealand, concluded that a thorough quality control in the fruit chain is capable of increasing the consumer acceptance to a fruit.

In relation to the issue of 'production environment quality management', review of literature confirms that it is important the constant monitoring of the production environment (Malik, 1997; Bridge, 1996; Berming and MacDonald, 2000; Nainggolan, 1997). By controlling the fruit production environment (fields of production, packing-houses and storage facilities) it become easier to trade a quality guarantee product and consequently to find markets for the merchandise.

With respect to 'Integrated logistics management' the results obtained with the 19 interviews confirm the previous research by Grimsdell (1996); Mowat and Collins, 2000; Stainer (1997); and Bridge (1996). These authors argue that the integrated management of logistics is capable of avoiding quality problems by reducing transport time, by eliminating unnecessary delays and improving the cargo environment conditions (adequate temperature and atmosphere).

Zinn and Parasuraman (1997); Corbett, Blackburn and Wassenhove (1999); Hughes and Merton (1996); Palmer (1996); Piercy, Katsinkeas and Cravens (1997); Rao and Seshadri (1996); Radamakers and McKnight (1998); and Rickard (2000) studied strategic alliances. According to them quality management problems can be better

confronted when buyers and sellers has the ability to establish alliances. In an amicable environment the focus of the transacting counterparts is the detection and elimination of causes of quality problems. Particularly Hughes and Merton (1996, p.6) mentioned that strategic alliances “are the sharing of information from one season to the next. Not only can the immediate needs of the marketplace be met, often when seasonal factors require an imaginative response to specific availabilities, but also new directions and opportunities can be mapped out for the future”.

### **6.6.2 The British Fruit Importers**

After analysing the quality management strategies of the fruit importers present in the British market it is possible to conclude that Integrated Multinationals and Import Agents are the categories of importers who adopt the most advanced and comprehensive strategies for handling fruit quality issues.

Since Integrated Multinationals execute an extensive range of technical activities in the international fruit trade (from fruit production abroad to logistics activities in the UK) these organisations have a better chance to harmonise all the technical activities that have influence in the fruit trade. Integrated Multinationals also have more favourable conditions to obtain scale and scope gains as this category of organisations have sizeable fruit trade operations.

Import Agents indicated to have the capacity of organising strategic alliances with suppliers abroad and with organisational buyers in the UK (supermarket chains, catering companies and wholesalers). These alliances create a business environment favourable to the full employment of advanced quality management strategies in the fruit trade.

Independent Importers and Regional Wholesalers have shown a limited technical capacity for dealing with quality management issues. Since these categories of organisations do not maintain fresh processing units in the UK, they can offer in

terms of quality management only restricted support to their fruit suppliers and also to their clients in Britain.

Supermarket Chains despite not importing fruit directly were shown to be at the head of the fruit import trade. These organisations were shown to promote the adoption of advanced quality management strategies among their suppliers.

## 6.7 Answering The Second Research Question

Since fruit quality management is not perceived as a cause of problems to the fruit trade it is important to verify which strategies are used by British fruit importers and Brazilian fruit exporters in order to make the international fruit commerce viable, or in other words “*which strategies are adopted by exporters and importers in order to guarantee product quality in the international fruit trade*”. According to the results of this study, the above-formulated research question has the following answer.

The interviews conducted with 19 fruit exporters in Brazil and 15 fruit importers in the UK confirmed that the following quality management strategies are used in the international fruit trade: Detailed product specifications; Quality control during the production processes; Production environment monitoring; Integrated logistics management; and Strategic alliances with trade partners. However these strategies are not uniformly used by the different categories of organisations trading fruit. The main differences are described in the following paragraphs.

**Detailed product specification** – All the different categories of fruit trade organisations revealed that they make use of detailed product specifications in their commercial operations (see Tables: 6.2, 6.4, 6.6, 6.8, 6.10, 6.12, 6.15, and 6.21; see Boxes: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11 and 6.12).

Comprehensive specifications are used by fruit exporters as guides for their production, post-harvest and export operations. Importers on the other hand use the

specifications as the main reference for quality control and negotiations. When the fruit specifications are clear both sides of the international fruit trade have better chances to minimise the consequences of technical and order errors.

**Quality control during the production processes** – Specialized Fruit Growers, Export Agents, Integrated Exporters, Integrated Multinationals, Independent Importers, Import Agents and Supermarket Chains are the types of organisations that showed that they adopt quality control strategies to regulate their technical and commercial activities (see Tables: 6.2, 6.4, 6.8, 6.10, 6.12, 6.15 and 6.21; see Boxes: 6.5, 6.6, 6.7, 6.8, 6.9, 6.10 and 6.12).

In most cases the quality control processes are used as a routine activity that is capable of detecting and avoiding inefficient production processes and low quality fruit. In more advanced stage quality management control is used as a tool capable of helping in the selection of commercial partners. In this case only those organisations capable of making use of advanced quality control techniques will be considered to be suitable partners.

**Production environment monitoring** – The organisations that deal with fruit production or fresh produce processing issues were those who reported monitoring the production environment regularly. These organisations are: Specialised Fruit Growers, Export Agents, Integrated Exporters, Integrated Multinationals, Import Agents and Supermarket Chains (see Tables: 6.2, 6.4, 6.6, 6.8, 6.10, 6.12 and 6.21; see Boxes: 6.5, 6.6, 6.7, 6.8, 6.9 and 6.12).

Monitoring practices are employed primarily to maintain under satisfactory conditions resources such as: fruit production fields, packinghouses, fruit processing machinery and quality control laboratories. However the most sophisticated use of the monitoring practices is related to the work supervision of human resources, in this case the final aim is to guarantee that the production routines (fruit production, post-harvest processing and distribution activities) are executed thoroughly.

**Integrated logistics** – Since transport and storage are very sensitive aspects of the international fruit trade, most of the different types of organisations assessed during this study reported adopting strategies for dealing with logistics. Only Fruit Growers, Independent Importers and Regional Wholesalers were revealed to be conducting a limited number of logistics functions (see Tables: 6.2, 6.6, 6.8, 6.12, 6.12 and 6.21; see Boxes: 6.5, 6.6, 6.7, 6.9, 6.8, and 6.12).

Efficient logistics is intrinsically linked to successful fruit commercial operations. It is capable of reducing costs considerably, of extending the shelf-life of fresh products and of making access to distant markets. It should also be emphasised that that logistics management is connected not only to the physical movement of fresh products but also to the process of information exchange about shipments of products.

**Strategic alliances** - All the categories of fruit trade organisations investigated in this research with the exception of Regional Wholesalers, reported that strategic alliances are crucial for their commercial operations. It is a guarantee that quality standards will be respected throughout the whole fruit chain (see Tables: 6.2, 6.4, 6.6, 6.8, 6.12, 6.15, 6.10 and 6.21; see Boxes: 6.5, 6.6, 6.7, 6.8, 6.9, 6.10 and 6.12).

Spot transactions (regulated by Arm's Length Contractual Relations) were found not to be commonly used in the fruit trade. In a spot commercial transaction buyers and sellers want to maintain independence from each other. It is common for buyers to use open bidding for their orders. The suppliers on the other hand will sell their produce to the best offer. Another important characteristic of spot transactions is related to the fact that buyers and sellers are likely to exchange very little information about their business, communication tends to be focused on each commercial transaction only. The interviews conducted in Brazil and the UK revealed that spot transactions are not common.

Long-term relationships (regulated by Obligation Contractual Relations) were shown to be the most commonly employed relationships in the international fruit trade. In this case, buyers and sellers are committed to each other in a relation of mutual dependence. Orders are placed in advance and bidding is unlikely to take place. It is common for commercial partners to exchange information about production technologies, managerial procedures and market tendencies. In order to do so, both sides maintain frequent and regular communication. In some cases it is even possible to find the situation where fruit exporters and importers have a willingness for risk sharing.

Apart from the above cited quality management strategies other aspects of the international fruit trade were mentioned as important. Among these aspects we can find: negotiation prices, regularity of supply, fruit trade volume and period of supply.

It was suggested by the interviews conducted in Brazil and the UK that quality management is a regular practice among the more prominent players in the British-Brazilian fruit trade. The interview results support the idea that those organisations that have a limited capacity for adopting quality management strategies have little place in the international fruit trade. On the other hand those fruit traders that adopt advanced quality management strategies have conquered a more extensive market share.

## 6.8 Summary

- i. In general the 34 interviews conducted in Brazil and the UK support the idea that the perceived technical problems related to fruit quality management are associated with each type of fruit. The interviews also lead to the conclusion that each type of fruit has problems in a specific stage of the production and trade cycles.
- ii. Interviews conducted with 19 fruit exporters revealed that they use three distinct transaction arrangements to export fruit.

- iii. The Integrated Production-Export Transaction Arrangement was shown to be the most common scheme used by fruit exporters in Brazil. The arrangement is composed of an Integrated Production-Export Company (hierarchical type of transaction) followed by an export negotiation (market type transaction).
- iv. Export Agent Transaction Arrangement was shown to be the second most common scheme used by fruit exporters. The arrangement is composed of a hierarchy (specialized fruit producers) followed by a market transaction (fruit gathering activities) followed by a hierarchy (Export Agent) followed by a market transaction (export activities).
- v. The Integrated Multinational Transaction Arrangement was shown to be the scheme used by one organisation exporting fruit from Brazil. In this arrangement fruit production, export and import operations are all integrated by one multinational organisation.
- vi. Each transaction arrangement presented a particularity. The organisations using the Integrated Production-Export Transaction Arrangement demonstrated the capacity to trade fruit both in the internal and external markets. The Export Agent Transaction Arrangement makes possible for one company to commercialise a more diversified group of fruit. The Integrated Multinational Transaction Arrangement helps to avoid the risks and costs of market type transactions.
- vii. Interviews conducted with 15 fruit importers in the UK revealed that they can be categorised into five main groups: Integrated Multinationals, Import Agents, Independent Importers, Regional Wholesalers and Supermarket Chains.
- viii. Similarities were found among the fruit trade organisations. Some of the most significant are those related to the Quality Management Strategies adopted by Brazilian and British fruit traders. They indicate to use the following concepts in their trade activities: Observance of product specification; Production processes quality control; Production environment quality management; Integrated logistics management; and Alliances with trade partners.

## *Chapter 7*

# British-Brazilian Fruit Trade: Conclusions and Suggestions

## 7.1 Introduction

The discussions and the results of this study into the British-Brazilian fruit trade has been presented in the previous chapters. A survey conducted in Brazil and the UK revealed that quality management is not perceived as a commercial barrier by the majority of the fruit traders. The interviews conducted in both countries were more revealing since they disclosed the transaction arrangements and the quality management strategies used by fruit exporters and importers.

The aim of this chapter is to present the main conclusions and suggestions of the study. The chapter is divided into four main sections: Theoretical Considerations, Evaluation of the Research Methods, Commercial Practices and Public Policies.

## 7.2 Theoretical Considerations

This study has analysed the fresh fruit trade between the United Kingdom and Brazil using Transaction Cost Economics as the main theoretical framework. Particular attention was given to the technical aspects that affect fruit quality and to the quality management strategies employed by fruit traders. The study has disclosed the transaction arrangements employed by Brazilian fruit exporters and British fruit importers in order to make viable their commercial activities.

### **7.2.1 Technical Aspects Of The Fruit Trade**

Empirical and also secondary data confirmed that the fruit trade is greatly affected by morphological and physiological characteristics of fruit. Technical aspects of fruit commerce such as production and harvest factors, fruit attributes, post-harvest factors and transport factors were also shown to be of crucial importance for the international trade in fruit. The use of these technical concepts as the foundation for empirical and theoretical discussion was shown to be appropriate.

The specific technical aspects that affect fruit quality (Field production techniques; Use of chemicals in field production; Grade of maturity; Harvesting; Appearance; Texture; Nutritive value; Flavour; Safety requirements; Use of chemicals in post-harvest processing; Packing; Pallet construction; Transport from the fields of production to the main carrier; Loading the main carrier; Transport in the main carrier; Unloading the main carrier; and Transport from the main carrier to the importer's facilities) were employed in the development of more precise research instruments (questionnaires and interviews). These research instruments made it possible to localize the exact position of each specific hierarchical and market type transaction in the sequence of interactions used in the international fruit trade. Without this resource all the analytical and theoretical discussions would probably be less precise.

As a suggestion for future discussions it would be appropriate to verify how each particular technical issue affects the predominant type of transaction in a specific stage of the fruit trade chain.

### **7.2.2 Fruit Quality Management Strategies**

It was clear from the examination of the empirical data (interviews and direct observations) that the fruit traders do not adopt a single quality management construct to regulate their commercial operations. None of the constructs such as ISO

9000 Series, Total Quality Management (TQM), Good Manufacturing Practices (GMP), Good Hygiene Practice (GHP) and Hazard Analysis of Critical Control Point (HACCP) were shown to be fully adopted by the fruit traders.

Fruit exporters and importers do adopt quality management strategies, but none of the adopted strategies are universally employed. In fact each fruit trader tends to adapt the different quality management strategies to their specific needs. As a result the development of a broad-scope perspective for the analysis of quality management strategies was found to be appropriate. The proposed framework is based on concepts like: Product Specification; Production Process Quality Management; Production Environment Quality Management; Logistics Quality Management; and Alliances Between Trade Partners to Support Quality.

These five elements and their constituent parts were of great value as reference for the presentation and the analysis of the empirical data. It became possible to describe, categorize and compare the quality management strategies of the main actors of the British-Brazilian international trade in fruit.

On examining the completed analysis, it turns out that quality management strategies are practised regularly among exporters and importers, although each category of fruit traders gives emphasis to a particular aspect of the different strategies.

The analysis of the quality management strategies also supports the view that quality consciousness is a *sine qua non* for exporters and importers the fresh produce. Organisations with a narrow capacity for dealing with quality management issues have only minimal chances in the international fruit trade.

It is also important to recognise that fruit quality management is not the only aspect that affects the British-Brazilian fruit trade. The analysis of the quality management strategies revealed that aspects such a negotiation prices, regularity of supply, fruit

trade volume and period of supply are also capable of influencing the shape of the fruit trade.

The analysis of quality management strategies offers rich opportunities for future research in the international trade of agricultural products. It would be interesting to describe, categorize and compare the quality management strategies employed by the Brazilian exporters of soybean, sugar, coffee, orange juice, cattle meat, poultry meat. This type of analysis has the potential of revealing the most successful initiatives regarding quality management.

### **7.2.3 Transaction Cost Economics and Fruit International Trade**

The complexity and the diversity that can be found in the international fruit trade poses difficulties to any analytical effort. Eight distinct theoretical frameworks (Marketing, Strategic Management, Game Theory, Behavioural Theory of the Firm, Agency Theory, Evolutionary Theory, Agricultural Marketing and Transaction Cost Economics) were considered as candidates for the main framework of reference for the discussion of this study. In the end Transaction Cost Economics was chosen.

Transaction Cost Economics was selected mainly because it is a theoretical framework that allows the analysis of internal processes of both organisations and interorganisational relationships. In addition TCE is a multidisciplinary approach that allows both qualitative and quantitative research techniques.

On examination of the completed data collection, analysis and discussion it was possible to conclude that the choice was opportune. Most of the discussions were centred on the Organisational Failure Framework, a theoretical construct developed by Williamson (1975).

The qualitative data, after analysis according to TCE concepts, allowed the categorization of all transactions into two basic groups: market type transactions and hierarchical type transactions.

In the next phase of the analytical effort all the hierarchical type transactions were decomposed into five distinct elements: Objective, Specialized Assets, Integrated Activities, Transactions Counterparts, and Quality Management Strategies.

This initiative made it possible to refine better the analytical effort. It should be noticed that the element “Integrated Activities” provided the information necessary for categorizing the distinct group of fruit exporters and fruit importers.

All the market type transactions were also decomposed into five distinct parts (Objective, Transaction Type, Negotiation Concerns, Contract, and Predominant Type of Contract). It is important to notice that the description of the “Predominant Type of Contract” allowed the explanation of the different transaction specificities.

The main limitation of TCE as a theoretical framework came from the fact that transaction cost economics consists of subjective concepts that are difficult to quantify. It was necessary then to base most of the analysis on qualitative empirical data.

As a suggestion for future research it would be appropriate to analyse more in depth the internal processes of the fruit trading organisations. For this task Agency Theory can provide the necessary support for the examination of the internal network of contracts.

For the investigations about the interorganisational relationships among fruit traders, the employment of Evolutionary Approaches could bring considerable advantages. It would become possible to describe the basic evolution mechanism among the fruit trading organisations. In other words, it would be possible to describe how fruit

exporters and importers interact among themselves and how they interact with their general environment.

### 7.3 Evaluation Of The Research Methods

This research started by conducting a comprehensive literature review into the technical factors that affect the production and trade sequences of the six most exported Brazilian fruit types (mangoes, apples, melons, papayas, oranges and grapes). On completion of the literature review, it became apparent that there is a production and processing technical sequence that is common to the six fruit analysed. The sequence is composed by 19 different procedures (Pre-harvest activities; Harvesting; Short distance transport; Receiving operations; Selection and grading; Treatments; Packing and labelling; Pallet consolidation; Cooling; Storage; Loading the ship or the airplane; Long distance transport; Unloading the ship or aeroplane; Transport to distribution point; Processing; Packing; Distribution; Retailers' shelves; Final consumer).

The secondary data analysis was revealed to be decisive for the success of this research. It disclosed a progression of technical events in the fruit chain that formed the backbone of all empirical and theoretical discussions. In the future it is important to verify if the same technical sequence is applicable to the trade of the other fruit.

Besides the secondary data analysis it was also possible to conduct a survey among fruit exporters and importers. This survey was shown to be quite revealing about the main characteristic of the fruit traders (number of employees, degree of specialization, value of fruit exported, types of fruit exported, destination markets and supply markets). The data obtained with the questionnaires were also employed to organise multiple item scales about fruit quality management. These scales revealed that the majority of the respondents do not perceive fruit quality management as a barrier to their trade operations.

It was possible to organise crosstabulations between firms' characteristics and the quality management scales. For all crosstabulations performed no association or fairly weak association were found. This result is an indication that all the different categories of fruit importers and exporters have similar perceptions about fruit quality management. In addition, by using the survey data it was possible to find association between the different types of price negotiation contracts and fruit quality management issues. In this case the method employed was the Ordered Probit analysis, which signalled that choice between the distinct price negotiation contracts (Fixed Price, Cost-type and Incentive contracts) is influenced by fruit quality management issues.

The survey was shown to be an instrument capable of providing a general picture across the universe of the Brazilian-British fruit traders. However more incisive research techniques were necessary in order to disclose the main characteristics of the fruit trading organisations and their commercial transactions. The chosen research techniques were semi-structured interviews and direct observations.

After a literature review about TCE, international fruit trade and quality management, five main topics were chosen to be the backbone of the interviews:

- The technical activities performed by the organisations operating in the fruit commerce;
- The main types of commercial clients (partners) of the firms;
- The nature of the market type relations maintained by the firm;
- The level of quality problems perceived by the firm; and
- The quality management strategies adopted by the firm.

These five distinct topics were employed to generate the main questions, the probe questions and the follow-up questions of the interviews. The data obtained during the interviews allowed the characterisation of the transaction arrangements and the graphical representation of these transactions.

**It should be noted that the qualitative research aimed to go further than simple descriptions.** It was possible to categorize the fruit trading organisations and the commercial transactions conducted by them. Eight different categories of fruit trading organisations were created and seven different categories of commercial transactions were explained.

In the next step of the analytical effort, the different categories were grouped into three distinct transaction arrangements and finally these transaction arrangements were contrasted to each other. This sequence of analysis proved to be a valuable resource since it created favourable conditions for data comparisons and exposure.

It is important to observe that the adopted sequence of analysis is not an exhaustive method, or in other words it is not possible to affirm that the disclosed transactions arrangements are all that can be found in the British-Brazilian fruit trade.

The information obtained with the survey and with the interviews was shown to be in a relation of synergy or in other words to complement each other. For instance the survey made it visible that a minority of fruit traders do perceive problems with the management of some specific fruit quality aspect. The interviews conducted in Brazil and the UK offered a rich opportunity to explain this finding.

The explanation was found when the organisations with the highest level of perceived management problems were examined more closely, using the results of the interviews. By employing this strategy it was possible to conclude that there is an association between the categories of fruit traded and the extent to which the fruit trading organisations perceive difficulties.

The same analytical technique revealed that fruit importers and exporters have almost identical views regarding the majority of the components items on the scale of perceived quality management problems. Significant differences of perceptions were

found only for three items related to transport activities. No statistically significant differences were found for all the remaining 14 items of the scale.

Again when the data obtained with the interviews were examined an explanation emerged. It became clear that the Brazilian fruit exporters are responsible for managing the majority of the transport activities. They receive this task from the British fruit importers. It should be also noted that Brazilian fruit exporters trade lower volumes of fruit when compared with British and Brazilian importers. As a direct consequence, it is more difficult for the exporters to negotiate with the international companies.

### **7.3.1 Limitations of the Study**

It is important to point out the limitations of this study since the readers will then have a better chance to frame the findings in a dimension more close to reality.

The process of data gathering for this dissertation was impaired at several stages. It is important to make these constraints clear.

At the initial stages of the research it was especially difficult to obtain reliable and up-to-date lists of fruit exporters (in Brazil) and importers (in the UK). This specific difficulty was partially overcome when the lists obtained were compiled together into databases. Even in this case the surveys carried in Brazil and the UK demonstrated that the original lists were inaccurate since the mail service in both countries returned a relatively high number of letters that were not delivered (with the message of unknown addressee). Several addressees also sent messages that they are no longer trading fruit.

At the end of the survey research it was possible to obtain only 49 valid questionnaires in Brazil and 32 valid questionnaires in the UK. These modest figures certainly reduce the generalisability of the results.

During the qualitative research phase it was especially difficult to obtain interviews with Export Agents in Brazil and Regional Wholesalers in the UK. In fact most of the potential interviewees that declined to participate to this study probably were in one of these two categories. It was also extremely difficult to obtain interviews with representatives of Supermarket Chains. Attempts were made with the five main chains in the UK; only one valid interview was obtained.

### **7.3.2 Limitations Of Transaction Cost Analysis**

The initial idea of this research involved the quantification of transaction costs. At the very beginning of the literature review and the initial pilots it became clear that the main concepts of Transaction Cost Analysis are highly subjective and immensely difficult to quantify. The idea of mathematical modelling was then put aside. It should be also be noticed that despite this constraint, Transaction Cost Analysis was shown to be a theoretical construct highly appropriate for investigating commercial transactions influenced or organised by supermarket chains.

It should be emphasised that the **Diversity of Transaction Arrangements**, a research sequence especially developed for this study (see Section 4.5.1) is not an exhaustive method. This implies that the transaction arrangements described are probably not the only ones in fruit trading.

The high cost of this research, especially the travels in Brazil, contributed to a reduction in the number of cases described. It was possible to achieve only 34 cases (19 in Brazil and 15 in the UK). If the resources had been less restricted the study could have reached a more comprehensive dimension.

### **7.3.3 Research Implications**

Transaction cost analysis was revealed to be a valuable framework in the investigation of the international fruit trade. However further development of

research instruments is necessary in order to make the investigation more precise. The following topics need particular attention:

- Questionnaires – The questionnaires used for mail research should be more focused on only a few investigation topics. Lengthy questionnaires are likely to present a low response ratio and also to be inconclusive.
- Structure of interviews – It is important to take into account in the structure of the interviews, the technical factors that are important to the fruit trade. The interviewer needs to know in depth the “trade language” used in the international fruit commerce.
- Graphical representation of transaction arrangements – It is important to have a visual representation of the main transaction arrangements used in fruit trading. When these graphical representations are formulated it is possible to better focus the analysis of the fruit trade.

During this research it was possible to develop a model intended to help in the process of graphical representation of transaction arrangements. When this graphical representation model was applied to a specific sector (the British-Brazilian fruit trade business) it was shown to have five main positive attributes. It gives a clear notion of how transaction arrangements are organised around a product or a group of products since it is possible to clearly represent organisations, market type transactions and their relative position in the cycle (manufacture/trade) of a product. It also makes easier to compare transaction arrangements. After the description of the distinct transaction arrangements it is possible to verify how frequently a transaction arrangement is used (the number of organisations that adopt it) and how intensively (the number of transactions) the transaction arrangement is employed.

The graphical model makes more precise the process of categorising organisations according to their behaviour: By clearly describing the technical activities performed by an organisation it will be possible to assess its role in a specific sector. Finally the model helps to analyse market type transactions. This is probably the most important

use of the graphical model since it opens the opportunity to specify the nature of the market transactions (spot or long-terms transactions) and their appropriateness.

The next stage in the improvement of this graphical model is the development of mathematical modelling based on it. It is especially important to identify and quantify the forces that are determinant of the market type transactions and devise quantitative models capable of describing them. These mathematical models have the potential capacity to allow speculation about the implications of organisational strategies and modifications in the business environment.

It should be noted that the research instruments (questionnaires and structures for semi-structured interviews) developed for this specific piece of research can be adopted and applied to analysing the trade in fruit between Brazil and other countries. The utility of the scale destined to measure the level of difficulty of fruit quality management issues should be emphasized. Similar research instruments can also be employed for analysing the trade in products other than fruit.

Apart from Transaction Cost Analysis other frameworks can be employed in the investigation of the fruit trade. Three of these frameworks are:

- Cost analysis – Can be employed in all stages of the fruit trade (production, post-harvest processing, and logistics).
- Price analysis – The analysis of the prices practised in the fruit chain together with cost analysis have the power to reveal market distortions in a specific fruit chain.
- Marketing research – It is essential to assess consumers preferences in the fruit trade, those organisations that have this capacity have a chance to be ahead of the competition.

## 7.4 Commercial Practices

As a general conclusion, it is possible to affirm that the Integrated Production-Export organisations are capable of presenting the lowest transaction costs. Consequently this type of organisation has managed to conquer the largest share of the British-Brazilian fruit trade. The operations organized by the Export Agents occupy an intermediary position in terms of transaction costs. These organisations were able to capture the second most expressive share of the fruit trade between Brazil and the UK.

Among the different categories of organisations investigated in this research, the Integrated Multinationals seems to present the highest transaction costs. Only a marginal part of the British-Brazilian fruit trade is organised by the Integrated Multinationals.

### 7.4.1 The Organisation Of The Trade Activities

The survey and the interviews conducted in Brazil indicated that there are three main types of transaction arrangements used in Brazil with the aim of exporting fruit to the UK. These arrangements are: Integrated Production-Export Transaction Arrangement, Export Agents Transaction Arrangement and the Integrated Multinational Transaction Arrangement.

The survey and the interviews conducted in the UK have shown that there are five main types of organisations importing fruit in the UK. These types of organisations are: Integrated Multinationals, Import Agents, Independent Importers, Regional Wholesalers and Supermarket Chains.

The transactions organised by the Integrated Multinationals are predominantly of hierarchical type. In this case there is intensive use of capital and technologies in all stages of the fruit production and trade cycles. The Integrated Multinationals have

shown the capacity to use advanced quality management strategies. Those organisations operating in both fruit production regions and fruit consumption markets have conquered an expressive share of the fruit international commerce. Since fruit international trading corporations have branches in the UK they do not need to negotiate with British fruit import firms.

It should be noted that the transactions organised by the Integrated Multinationals in Brazil are mainly export oriented, and little attention is given to the Brazilian internal fruit market. As a consequence the Integrated Multinationals have a limited capacity to use the Brazilian potential for fruit consumption to complement export operations.

The commercial operations organised by the Integrated Production-Export firms combine both hierarchical and market type transactions. The preferred trade partners of Production-Export firms are Import Agents or Independent Importers. These two types of fruit traders demonstrate a capacity to adopt advanced quality management strategies.

Since fruit Import Agents maintain firm commercial relations with supermarket chains (the main institutional buyers in the UK) the Integrated Production-Export transaction arrangement tend to have a low risk level. As a consequence both the exporters and importers are able to maintain all the specialized assets necessary to produce, process, transport and store fresh fruit.

When the Integrated Production-Export transaction arrangement is compared with the Integrated Multinational transaction arrangement it is possible to distinguish a major advantage of the former. This transaction arrangement allows the Integrated Production-Export firms to sell fruit to the Brazilian internal market and also to export fruit.

The Integrated Production-Export Transaction Arrangement brings a considerable advantage to the Fruit Import Agents operating in the UK. These traders do not need

to organise commercial operations abroad (fruit production or packinghouses) an activity that can prove to be costly and complex since it is necessary to deal with foreign legislation and culture. The Integrated Production-Export Transaction Arrangement also offers a more flexible trading alternative, mainly because exporters and importers can still negotiate with new trade partners at their convenience.

The Export Agent Transaction Arrangement is the most flexible commercial arrangement investigated in this study. It makes it possible for Fruit Growers, Export Agents and Import Agents to find the exact volumes of trade that are appropriate to their needs. It is also a business system capable of creating opportunities for fruit growers to sell their produce both to the internal and external markets.

The Export Agent Transaction Arrangement has however three disadvantages when compared with the previously mentioned transaction arrangements. First it is more difficult for the trade partners to harmonise their independent administrative systems (quality management, logistics and marketing). Second, it is a more risky commercial system since any member of the trade chain may fail to perform accordingly, or they may adopt opportunistic strategies. Third, it is possible that as soon as fruit growers reach an appropriate volume of trade they will start to negotiate directly with fruit importers, neglecting the relationship with the Export Agent in consequence.

#### **7.4.2 Quality Management Strategies**

It is possible to affirm, as a general conclusion, that a proactive posture in relation to quality management is an essential requirement for the fruit trading organisations. The data obtained with the surveys and interviews made it clear that the majority of the fruit trading organisations do not perceive as a problem, the management of the issues related to fruit quality.

Another important general conclusion is related to the fact that quality management is not only employed as an internal administrative instrument by the fruit trading organisations. In fact, quality management concepts were shown to be extensively employed to regulate market type transactions between fruit exporters and importers.

The management of quality is a strategic aspect of the fruit international trade business. Fruit traders have higher chances to commercialise a shipment of fruit satisfactorily if the merchandise embodies all the attributes desired by the end consumer. If an importer purchases a cargo of fruit that does not have all the desirable qualities, the negative consequences can be considerable for both fruit importers and exporters. The importers will lose the chance to profit with the commercial intermediation and will have their credibility negatively affected. The losses however tend to be higher for the fruit exporters. It is important to remember that when a fruit shipment arrives at its destination market a substantial investment has already taken place (fruit production, post-harvest processing, storage and transport). If a shipment proves to be of no use, there will be some additional costs to dispose of the fruit.

Importers have the chance to guide the actions of fruit producers and exporters, and by doing it thoroughly they are able to avoid unnecessary efforts and fruit losses.

The research results obtained in Brazil and in the UK have exposed that it is possible to find both hierarchical and market type transactions in the British-Brazilian commerce of fruit. The hierarchical type of transaction is embraced mainly by Integrated Multinationals, which revealed that they adopt advanced quality management strategies.

Market type transactions are adopted by the other different categories of fruit traders. In order to decrease transaction costs these organisations revealed that they make active use of quality management strategies. It is important to show how quality

management strategies are employed by them in order to reduce transaction costs in the international fruit trade.

Information impactedness is an unfavourable condition that acts as an obstacle to market type transactions. It emerges in unbalanced market transactions when one of the sides makes use of privileged information to obtain gains from the other side. According to Williamson (1975) information impactedness is a serious obstacle to commercial exchange when the following predominate in a given sector: bounded rationality, uncertainty/complexity, opportunism and the small-number condition.

Quality management strategies can be used as a tool capable of reducing information impactedness in a specific sector. In the British-Brazilian fruit trade it was found that those organisations that make use of market type transactions also made use of quality management strategies in order to reduce information impactedness.

**Quality management strategies are used to reduce uncertainty/ complexity in the British-Brazilian fruit trade.** The interviews conducted with Brazilian fruit exporters and British fruit importers revealed that the following quality management strategies are used to reduce uncertainty/ complexity in the fruit trade:

- Detailed product specifications – British fruit importers have the capacity to precisely define the characteristics they want in their imported fruit. This helps to decrease uncertainty in of fruit trading since Brazilian exporters will have the time to develop production systems capable of delivering the specified product.
- Quality control during the production stages – Brazilian and British fruit traders actively make use of quality control techniques at different stages of the fruit trade cycle. This proactive attitude helps to decrease the complexity of the trade operations since buyers and sellers do not need to handle unnecessary quality related problems.
- Production environment monitoring – By checking the production environment, fruit exporters and importers are able to avoid possible damage

resulting from mismanagement of production resources. For instance if grading machinery is uncalibrated it can cause injuries to the whole shipment of fruit.

- Integrated logistics management – By jointly managing logistics, exporters and importers are able to dramatically reduce uncertainty in the fruit trade. Both categories of traders will know in advance which transport or storage resources can be used in fruit trading.
- Strategic Alliances – Long-term associations between fruit traders create an environment favourable to a continuous process of information exchange. Both sides in the fruit trade then have the chance to detect and remove obstacles.

**Quality management strategies are used to extend the bounds of rationality in the trade of fruit.** British and Brazilian fruit traders demonstrated a capacity to use quality management strategies as a tool for organising a considerable part of their commercial operations. One can say that they are using concepts of quality to bring more rationality and efficiency to the international trade in fresh produce.

In order to develop clear specifications for fruit, exporters and importers need to know about consumers needs in depth and also about the technicalities of fruit production and logistics. In other words, fruit traders base a significant number of their business decisions on technical and scientific concepts.

In addition British importers and Brazilian exporters showed that they were capable of using sophisticated expertise in order to properly manage quality control, production environment monitoring and integrated logistics. It should be noted that the full development of this expertise can be better achieved when exporters and importers are able to maintain long term strategic alliances.

**Quality management strategies are used to curb opportunistic behaviour.** Fruit traders in the UK and in Brazil revealed that they adopt the following strategies to overcome opportunistic behaviour:

- Detailed product specifications – Since product and process specifications are clear after the negotiations; it becomes difficult for fruit exporters and importers to adopt opportunistic behaviour. For example if an importer rejects a particular shipment of fruit alleging poor quality, the allegation needs to be based on technical grounds or in other words, on the results of detailed inspections or on the results of laboratory analysis. There is no space for subjective evaluation when quality management strategies are adopted.
- Quality control during the production stages – A fruit that embodies all the attributes desired by the final consumer is an aim for all those producers who adopt quality management strategies. In order to achieve this aim, fruit quality is controlled in most stages of the fruit trade cycle. If a chain member fails to perform according his responsibilities, it will be simple for the other chain partners to know who is responsible for the failure. It becomes difficult for them to hide opportunistic behaviour.
- Production environment monitoring – A fruit trader needs to obey different legislation (Brazilian, British, European) in order to trade. Such legislation regulates not only products but also production processes. In most cases traders are required to adopt measures of environmental protection and to provide adequate work conditions for their employees. When a firm embraces strategies for monitoring the production environment (both the internal and also the suppliers environment) it is better able to verify if the commercial partners are behaving opportunistically regarding fruit trade legislation.
- Integrated logistics – The responsibility for each stage of the fruit logistics is clear when integrated logistics strategies are adopted. It becomes easy to identify opportunism in the fruit transport and storage stages.
- Strategic Alliances – When trade partners organise long-term alliances, they are assuming a posture unfavourable to opportunism. In most cases long-term alliances have as an objective the creation of a safe business environment

where both sides have the opportunity to improve production and trade operations.

**Quality management strategies help to overcome the small number condition.**

The small-number condition obtains when one firm makes use of its prominent position to achieve continuous and systematic commercial gains from trade partners. It is not a sustainable type of relationship since one side of the commercial transaction does not receive enough economic resources to proceed to all the investments necessary to improve its trade operations.

Fruit traders in the United Kingdom and Brazil have shown an ability to overcome the small-number condition by clearly defining the responsibilities of each firm in the fruit trading chain. When responsibilities are unambiguous the trade partners can make use of complete quality management strategies like: Detailed product specification, Quality control of production processes, Production environment monitoring, Integrated logistics and Strategic alliances. Strategic Alliances in particular create a business environment propitious to the conjoint development of technical operations. The long-term partnership gives confidence that investments in the improvement of production and trade resources will be recovered.

**British fruit importers and Brazilian fruit exporters show a capacity to create a favourable business atmosphere.** In this case both sides perceive the commercial interaction not as neutral but as a valuable asset developed over time. In other words fruit buyers and sellers have developed transaction specific abilities that make their interactions more productive.

### **7.4.3 Managerial Implications**

The results of this study support the conviction that the majority of the organisations trading at different stages in the fruit trade chain are making use of relatively advanced quality management strategies. It is possible to suggest that those

organisations that aim to further develop their fruit import/export business need to adopt a proactive position in relation to quality management.

It is also important to recognise that there are three transaction arrangements which are more frequently used in the British-Brazilian fruit trade. It is an indication that fruit traders need to adopt strategies in order to be prepared for one of these transaction arrangements.

## 7.5 Public Policies

During this investigation it was possible to identify the main actors and forces operating in the British-Brazilian fresh fruit trade. It was also possible to show how they interact in order to make the trade operations economically and technically viable. Based on the collected information and on the performed analysis it is now possible to pose some suggestions which aim at the development of the trade activities.

Four of the suggestions are related to both Brazilian and British importers. They are:

- Incentives for the introduction of management techniques capable of promoting a better flow of information between fruit traders. Some of these techniques are: bar-coding, labelling and Electronic Data Interchange (EDI);
- The organisation of training sessions for the small players among the international fruit traders. The training activities would be about quality management, fruit production techniques, post-harvest processing techniques and commercial practices. This initiative has the potential of reversing the tendency of marginalization of the small volume traders;
- The development of a database with information about fruit traders. It would be possible for a British fruit importer to have access to information about Brazilian exports (types of fruit produced, volume of production, period of production). Similarly, a Brazilian exporter would be capable of accessing the

main characteristics of each fruit importer (volume of trade, main types of fruit traded, periods of imports and fruit specifications).

### **7.5.1 Public Policies In Brazil**

This study indicated that in the international fruit trade, few transaction arrangements predominate. Policy makers in Brazil need to be conscious of this fact in order to organise incentive policies for those organisations that adopt a strategic position favourable to these predominant transaction arrangements. For instance, the Integrated Multinationals are responsible for a significant part of the international fruit trade, mainly because they have direct links with the main import markets. This category of companies also has the advantage of using advanced logistics systems, a crucial advantage in the fiercely competitive international fruit market.

This study demonstrated that there are few of these types of companies operating in Brazil. It is important to investigate the reasons behind the present scenario, and then adopt the necessary measures for the establishment and development of these organisations in Brazil. Integrated Multinationals have the potential to rapidly increase the exports of fruits like bananas, melons and pineapples.

Specialised Fruit Growers, Integrated Production-Export companies and Export Agents are the other categories of organisation that have a significant share in Brazilian fruit exports. These three categories of organisations should also receive help if the objective is to increase Brazilian exports.

It is important to highlight that public incentives for the fruit export sector in Brazil should always be related to improvements in fruit production and logistics. Policies centred on governmental subsidies are to be avoided, since they tend to be unsustainable under the new directives of the World Trade Organisation.

This research has shown that quality management is of pivotal importance in the international fruit trade. Public policies should then be adopted in order to disseminate concepts of quality among fruit growers and exporters in Brazil.

Brazilian traders need to adopt quality management strategies (such as detailed product specifications, quality control of production processes, production environment monitoring, integrated logistics and strategic alliances) in order to be more competitive in the world scenario.

Another important factor that can contribute significantly for the competitiveness of the fruit sector in Brazil is the expansion of scientific research supporting fruit production and business. It is crucial to develop production and post-harvest techniques that are economically and environmentally viable.

In terms of infrastructure, the Brazilian authorities responsible need to improve the transport system from the fruit production fields to the ports or airports. The poor state of the motorways was systematically mentioned as causing serious damage to fruit and fruit pallets.

The ports and airports in Brazil also require improvements if they are going to be used for a more intensive trade in quality fruit. Cold storage facilities are necessary at ports and airports in order to keep fruit pallets under controlled temperatures.

Disincentive policies should be focused on those traders that do not adopt strategies for quality management or adopt opportunistic behaviour in the fruit export business. These types of organisation can seriously damage Brazilian exports. A significant positive movement would be the development of agencies capable of certifying the trading organisations that are really capable of exporting quality fruit.

### **7.5.2 Public Policies In The UK**

It is important to recognise that the majority of the British fruit traders showed that they make use of advanced trade practices in the international trade in fresh produce. These traders are worried not only about fruit quality and safety issues but also about environmental and social issues. Despite this predominant and positive position it is still possible to find traders who are unprofessional or adopt opportunistic positions. These traders can cause health and environmental problems in the UK and also social and commercial problems in Brazil.

It is possible to improve the fruit import business in the UK if these unprofessional and opportunistic traders are curbed in their actions by the British public authorities or accreditation agencies.

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