CHAPTER 4

METHODOLOGIES FOR COMPETITIVE ANALYSIS

4.1 Introduction

This study attempts to establish the extent to which South Africa and Australia are able to compete in the international flower industry. It will also attempt to indicate the extent to which South Africa and Australia will be able to compete with each other in an internationally competitive environment where direct competition is destined to intensify between these two countries.

The first part of this chapter provides a literature survey of the methodologies available for describing and estimating competitiveness. However, for the purpose of this study, the South African and Australian flower industries will be analysed according to the three methods described in the latter part of this chapter. The first method used is the determinants of competitiveness as proposed by Porter (1990). The second is the application of Balassa's (1989) Revealed Comparative Advantage model and the third, the application of the Policy Analysis Matrix (Monke and Pearson, 1990).

4.2 Literature survey

Two concepts can be identified in the literature. These concepts are frequently used to explain the issue of competitiveness. The first is the concept of comparative advantage and the second, the concept of competitive advantage. Porter (1990) describes the interaction between the two concepts and suggests that businesses generally should develop a hierarchy of competitive advantage. Comparative advantage or factor costs would be the lowest level in such a hierarchy. Economies of scale might be the next level, with technology and a highly skilled work force on the following levels.

4.2.1 Comparative advantage

The concept of comparative advantage suggests that the patterns of trade and the location of production are determined by comparing the cost of production with the cost of importing. If it costs less to produce locally than to import from abroad, then the country is deemed to have a comparative advantage.

Comparative advantage is the benefits that a business obtains as a product of the physical environment in which it operates. A business may passively gain a comparative advantage simply by being located in a country that has this advantage.

The theory of comparative advantage, as proposed by Ricardo in 1817, suggests that a country will export those goods that most intensely use that country's most abundant factors of production. Two approaches were developed to calculate a comparative advantage. Firstly Heckscher and Ohlin formulated a theory in 1933, but the assumptions of perfect competition and a world with only two nations makes this model inappropriate in practice.

A method developed by Balassa (1989), known as the Revealed Comparative Advantage method, bases its results on a country's trade performance in the specific commodity. Another method to calculate comparative advantage is the Policy Analysis Matrix (PAM) developed by Monke and Pearson (1990) in which social profits (shadow prices) measure the efficiency or comparative advantage of a firm or commodity system. The previous two methods approach the issue of comparative advantage from two different viewpoints. By contrast, the Revealed Comparative Advantage method approaches the issue from a macroeconomic perspective taking trade data into consideration, whereas the PAM approach calculate comparative advantage from a micro-level perspective taking production and marketing costs into consideration. It will therefore be useful to apply both methods to achieve a balanced view of comparative advantages for both South Africa and Australia.

4.2.2 Competitive advantage

Competitive advantage involves a more active approach to business than that of comparative advantage. Competitiveness relies on two factors: productivity and responsiveness to requirements in the market place.

Freebairn (1986) argues that industries are competitive when they are able to deliver products to overseas buyers at prices as good as or better than other suppliers, and they are capable of attracting resources of capital, land, and labour from other economic activities. This implies that without assistance, firms can pay at least the market rate of return for the resources they employ. This view suggests that competition lies between individual firms within a country. It has been shown (Stoneham, 1992) that export-competitive industries are those that have the ability to export and hold resources without government assistance. It was for this reason that Monke and Pearson (1990) developed the Policy Analysis Matrix that measures the effect of government intervention and other distortions on the competitiveness and efficiency (comparative advantage) of commodity systems. Porter (1990) identifies the determinants of competitive advantage as factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry, the government and the role of chance. Day (1984) devised another popular method of conducting strategic analysis and determining competitive advantage. Using this analysis, the firm's strengths and weaknesses as well as opportunities and threats are identified. Note that the first letters in each of these words form the acronym SWOT. The SWOT analysis views the firm's strengths and weaknesses as internal factors, while threats and opportunities are regarded as specifically involving scanning the external environments.

In the present study there is a need for a broad overview of the factors influencing competitive advantage in the South African and Australian flower industries. This objective will be achieved by applying the method proposed by Porter (1990). As this method was not specifically developed as a tool for comparing the competitive advantages of different industries in different countries, the Policy Analysis Matrix is used where the measurement and comparison of competitive advantages are possible (Monke and Pearson, 1990).

4.3 Determinants of competitive advantage

When is an industry internationally competitive? To answer this question, a second question posed by Porter (1990) should first be addressed:

"Why does a nation achieve international success in a particular industry?"

Porter believes the answer lies in the six broad attributes of a nation that shape the environment in which local firms can compete, and that foster a competitive advantage (see Figure 4.1).

- Factor conditions. The nation's position in the factors of production, such as skilled labour or infrastructure, needed to compete in a given industry.
- Demand conditions. The nature of home demand for the industry's product and service.
- Related and supporting industries. The presence or absence in the nation of supplier industries and related industries that are internationally competitive.
- Company strategy, structure and rivalry. The conditions in the nation governing how companies are created, organised and managed, and the nature of domestic rivalry.
- Government. The government plays a vital role, if not the most important role in international competitiveness. Government can be influenced by and influence each of the above determinants either positively or negatively. This is why government, as a determinant of competitiveness, can be viewed separately from the four determinants mentioned above.
- The role of chance. Chance events are occurrences that have little to do with conditions in a nation and are often largely beyond the control of firms (and often the national government). Chance events may include wars, political decisions by foreign governments, large increases in demand, shifts in world financial markets and exchange rates, discontinuity of technology and input demand.

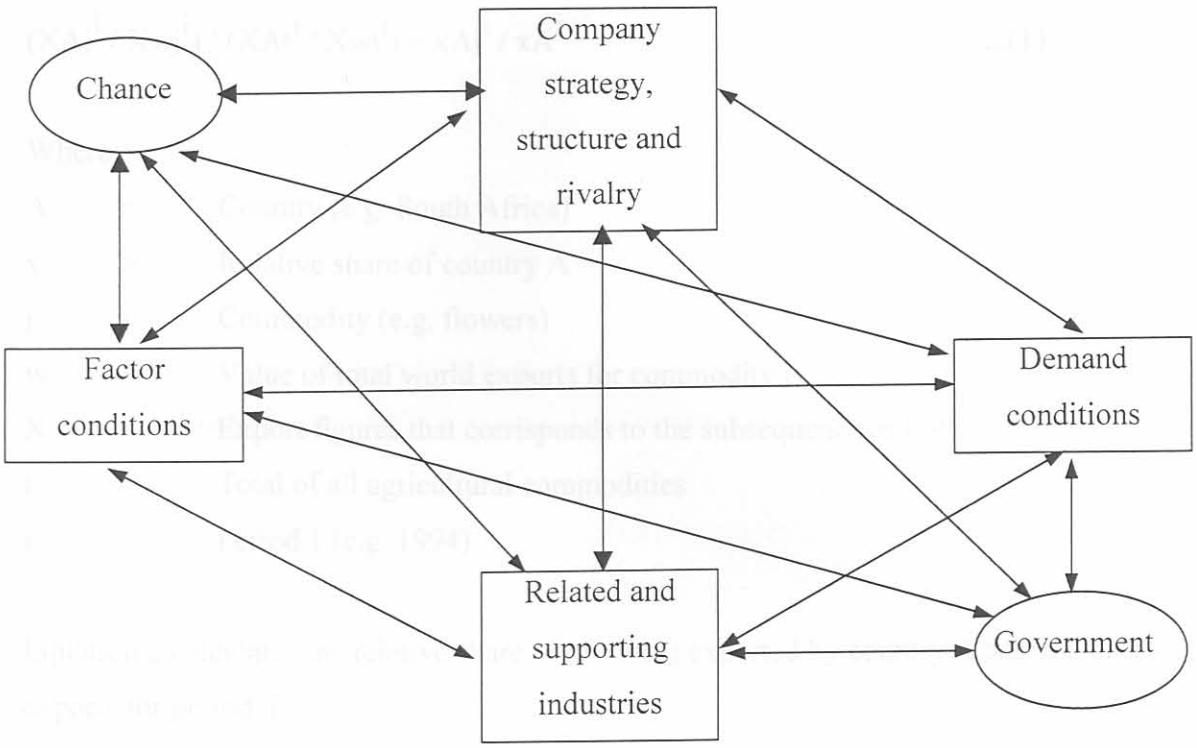

Figure 4.1: The determinants of competitive advantage

4.4 Revealed Comparative Advantage

Using the Revealed Comparative Advantage Model, the individual country's trade performances are analysed to determine the following (Balassa, 1989):

- The country's relative share in world exports of a individual commodity, and
- how the share changes over time.

According to the Revealed Comparative Advantage model, the following equations are used to calculate the comparative advantage:

Equation 1 determines an indicator of comparative advantage of country A in commodity j in period 1:

$$(XAj^{i} / Xwj^{i}) / (XAt^{i} / Xwt^{i}) = xAj^{i} / xA^{i} \quad ...(1)$$

Where:

A	=	Country (e.g. South Africa)
x	=	Relative share of country A
j	=	Commodity (e.g. flowers)
w	=	Value of total world exports for commodity j
X	=	Export figures that corrisponds to the subsequent symbol
t	=	Total of all agricultural commodities
i	=	Period 1 (e.g. 1994)

Equation 2 calculates the relative share of product j exported by country A to the world exports for period ii:

$$(XAj^{ii} / Xwj^{ii}) / (XAt^{ii} / Xwt^{ii}) = xAj^{ii} / xA^{ii} \quad ...(2)$$

Where:

ii	=	Period 2 (e.g. 1995)

The third equation compares the relationship between the relative share in period 1 and the relative share in period 2:

$$(xAj^{ii} / xA^{ii}) / (xAj^{i} / xA^{i}) \quad ...(3)$$

To determine an index for comparative advantage, equations 1 and 2 (indicators of comparative advantage in period 1 and 2) must be combined with equation 3 (indicating the change in comparative advantage between period 1 and 2). Equation 4 combines these two equations as follows:

$$(xAj^{ii} / xA^{ii}).(xAj^{ii} / xA^{ii}) / (xAj^{i} / xA^{i}) \quad ...(4)$$

In equation 4 it is assumed that the change in a country's relative share will grow geometrically. Balassa (1989) states however that the assumption can be partially avoided by compromising. The average of equation 2 and equation 4 will result in the compromise equation, equation 5.

$$1/2\ [(xAj^{ii} / xA^{ii}) + (xAj^{ii} / xA^{ii}).(xAj^{ii} / xA^{ii}) / (xAj^{i} / xA^{i})] \qquad ...(5)$$

The assumption of the compromise equation (equation 5) is that past trends will still continue, but at a decreasing rate. Equation 5 can be used to create indices of each commodity.

A commodity with an index greater than one will have a comparative advantage but an index of less than one will indicate a comparative disadvantage.

4.5 Policy analysis matrix (PAM)

4.5.1 Introduction

A policy analysis matrix is essentially the product of two accounting identities. The first identity defines "profitability" in private (market) prices as the difference between revenues and costs. The second identity measures the effects of distortions, such as government intervention and market failures, in the form of social (shadow) prices as the difference between observed parameters and parameters that would exist if the divergences were removed. Table 4.1 illustrates the differences between private and social analysis of profitability.

Table 4.1: Differences between private and social analysis

	Private	Social
Subject	Private/individual/firm	Nation, region, society, public
Objective	Private profits	National income objectives, efficiency
Composition of revenues and costs	Add taxes, deduct subsidies	Deduct taxes and subsidies
Prices	Market prices for capital, forex, etc.	Social prices (Shadow prices)
Externalities	Excluded	Included
Social impact and intangibles	Excluded	Can be examined and weighed

Source: Anandajayasekeram *et al.*, 1996

Annex 2 contains a detailed description of methods to calculate social prices.

4.5.2 Construction of a Policy Analysis Matrix (PAM)

The following data are required to construct a PAM:

- Detailed farm budgets for the specific system analysed. This budget must show fixed establishment costs[1], operating costs, marketing costs and revenues over the lifespan of the operation.

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[1] The fixed cost accrued in the establishment of the enterprise must be converted into an annual payment that will repay the cost of the fixed input over the useful life of the input and will provide an economic rate of return on the investment, also known as the capital recovery cost (CRC). CRC can be calculated by using the following formula (Monke et al, 1989)

$$CRC = Z[(1+i)^n i]/[(1+i)^n-1]$$

With: Z = Cost of the fixed input

i = Risk free interest rate
South Africa: government bonds = 12%; Australia: 5%

n = Useful life of the input

- Information about costs, allowing for disaggregation in tradable[2] and domestic[3] costs.
- Information about the distortions present in the environment so as to construct a flow of social prices where the distortions are eliminated from the private prices, as illustrated in Table 4.1 above.
- The construction of the PAM is based on the period in which the system operates at full capacity (Monke and Pearson, 1990).

By determining the elements of the PAM it will be possible to address the following issues:

- Determine a commodity system's competitive advantage.
- Compare the competitive advantage of different commodity systems.
- Determine the commodity system's comparative advantage
- Compare the comparative advantage of different commodity systems.
- Assess the impact of policy on competitiveness and farm-level profits.
- Assess the influence of investment policy on economic efficiency.
- Assess the effects of agricultural research policy on changing technologies.

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[2] Tradable products and services exported are classified as follows

Free on board price (f.o.b. price) > domestic cost of production

Goods are tradable if the f.o.b. price received at the border for a product on the world market is higher than the cost of local production. In such a case it is therefore profitable to sell the product on the international market.

Domestic cost of production > cost, insurance and freight price (c.i.f. price)

This implies that a product is imported because the cost of local production is higher than the c.i.f. price at the border for the same product on the international market (Gittinger, 1982).

[3] Non-tradable products and services can be classified as follows

Cost, insurance and freight prices (c.i.f. prices) > Domestic cost of production > free on board prices (f.o.b. prices)

In other words the import price of a product is higher than the cost of local production, but the cost of production is higher than the price on the world market. Goods can therefore not be traded at a profit in the international market. Non-tradable items also include goods and services that are not freely tradable because of government intervention (Gittinger, 1982).

Each PAM contains a revenue column and cost columns. Subtracting the cost columns from the revenue column will create a third column that represents the profits (Monke *et al.*, 1998; Gittinger, 1982).

Table 4.2: Policy Analysis Matrix

	Benefits	Costs		Profits
	Gross revenues	Tradable input items	Domestic factors	
Private (market) prices	A	B	C	D[1]
Social (shadow) prices	E	F	G	H[2]
Policy effects (Divergences)	I[3]	J[4]	K[5]	L[6]

[1] Private profits, D, equal A minus B minus C. [2] Social profits, H, equal E minus F minus G.

[3] Output transfers, I, equal A minus E.

[4] Input transfers, J, equal B minus F.

[5] Factor transfers, K, equal C minus G.

[6] Net transfers, L, equal D minus H; they also equal I minus J minus K.

4.5.3 Ratio indicators for the comparison of unlike output

Private cost ratio (PCR) = C/(A-B)

Domestic resource cost ratio (DRC) = G/(E-F)

Nominal protection coefficient (NPC)

On tradable outputs (NPCO) = A/E

On tradable inputs (NPCI) = B/F

The usefulness of these ratios is now discussed with special reference to private profitability, social profitability and policy transfers.

4.5.3.1 Competitive advantage

Systems producing an identical output can be compared where private profits, D, indicate competitiveness under existing policies. A ratio has to be determined to permit comparisons among systems producing different commodities. Direct inspection of the data for private profits is not sufficient. Profitability results are residuals and might have come from systems using very different levels of input to produce output (products) with widely varying prices. This ambiguity is inherent in comparisons of private profits of systems producing different commodities with differing capital intensities.

The problem is circumvented by constructing a private cost ratio (PCR), the ratio of domestic costs (C) to value added in private prices (A-B); that is PCR=C/(A-B). Value added is the difference between the value of output and the costs of tradable input items; it shows how much the system can afford to pay the domestic factor (including a normal return on capital) and still remain competitive, that is, breaking even after earning normal profits, where (A-B-C) = D = 0. The entrepreneurs in the system prefer to earn excess profit (D>0), and they can achieve this if their private factor costs (C) are less than their value added in private prices (A-B). Therefore they try to minimise the private cost ratio by holding down factor and tradable input costs in order to maximise excess profits (Monke and Pearson, 1989).

4.5.3.2 Comparative advantage

Social profits measure efficiency or comparative advantage. Results can be taken directly from the second row of the PAM for a comparison of identical output items. Social profits equal social revenues less social costs: H = (E – F – G). When profits are negative, a system cannot survive without assistance at social costs that exceed the costs of importing. The choice is clear for efficiency-minded economic planners: enact new policies or remove existing ones to provide private incentives for the systems that generate social profits, subject to non-efficiency objectives.

When systems producing different output items are compared for relative efficiency, the domestic resource cost ratio (DRC), defined as G/(E – F), serves as a proxy measure for social profits. No new information beyond social revenues and costs is required to calculate a DRC. The DRC was developed to compare the relative efficiency or comparative advantage of different production systems. The DRC plays the same substitute role for social profits, as does the PCR for private profits; in both instances, the ratio equals 1 if its analogous

profitability measure equals 0. Minimising the DRC is therefore equivalent to maximising social profits. In cross-commodity comparisons, DRC ratios replace social profit measures as indicators of relative degrees of efficiency (Monke *et al.*, 1989).

4.5.3.3 Policy transfers

Transfers are shown in the third row of the PAM. If market failures are unimportant, these transfers measure mainly the effects of the distorting policy. Efficient systems earn excess profits without any help from the government, and subsidising policy (L>0) increases the final level of private profits. Because a subsidising policy allows inefficient systems to survive, the consequent waste of resources has to be justified in terms of non-efficiency objectives.

Comparisons of the extent of policy transfers between two or more systems with different output items also require the formation of ratios (for reasons analogous to those offered in the discussion of private and social profits). The nominal protection coefficient (NPC) is a ratio that contrasts the observed (private commodity price) with a commodity price that has a comparable world (social) price. The ratio indicates the impact of policy (and of any market failures not corrected by efficient policy). That causes a divergence between the two prices. The NPC on tradable output (NPCO), defined as A/E, indicates the degree of output transfer, for example, an NPC of 1.10 shows that policies are increasing the market price to a level 10% higher than the world price. Similarly the NPC on tradable input (NPCI), defined as B/F, shows the degree of tradable input transfer. An NPC of 0.80 on the input shows that policies are reducing input costs; the average market prices for this input are only 80% of world prices (Monke and Pearson, 1990).

4.6 Conclusion

A more complete insight into the competitiveness of the South African and Australian flower industries will be gained by applying the three above-mentioned approaches. A qualitative analysis, using the guidelines proposed by Porter (1990), will be done to lay a broad basis for the more detailed studies that follow. The RCA method will derive the comparative advantage from the trade performance of the respective industries. Although this will not give the whole picture, the PAM derives comparative (DRC) and competitive advantage (PCR) from farm level, analysing enterprise budgets in the different industries.

The results of these approaches will be compared and consistencies and inconsistencies will both be discussed.