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Working Paper Series 2009-03

Export Market Selection Methods and the
Identification of Realistic Export Opportunities for
South Africa Using a Decision Support Model

ERMIE STEENKAMP, RIAAN ROSSOUW, WILMA VIVIERS, AND
LUDO CUYVERS

November 2009



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EXPORT MARKET SELECTION METHODS AND THE IDENTIFICATION
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ERMIE STEENKAMP, RIAAN ROSSOUW, WILMA VIVIERS, AND LUDO CUYVERS

NOVEMBER 2009

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LIST OF ABBREVIATIONS / ACRONYMS

ASEAN: Association of Southeast Asian Nations

CGIC: Credit Guarantee Insurance Corporation

D'TI: Department of Trade and Industry

DSM: Decision Support Model

EU: European Union

ITC: International Trade Centre

GDP: Gross Domestic Production

HS: Harmonised System

LPI: Logistics Performance Index

MFN: Most Favoured Nation

OECD: Organisation for Economic Co-operation and Development

ONDD: *Office National du Ducroire*

SITC: Standard International Trade Classification

TPO: Trade Promotion Organisation

TRAINS: Trade Analysis and Information System

UNCTAD: United Nations Conference on Trade and Development

WTO: World Trade Organisation

UK: United Kingdom

USA: United States of America

EXECUTIVE SUMMARY

Export promotion activities in South Africa are, to a large extent, driven by historical trends and trading partners (**the dti**, 2005). However, the limited resources of government should be allocated in such a manner that they contribute towards successful exports and increased export growth in the future. **The dti** has indicated that further research on international market selection for export promotion in South Africa would greatly assist senior management in ensuring that government resources are used with maximum return on investment by determining priority products and markets (Erero, 2004).

Market selection methods, of which a vast number exist, are a critical tool in firms' and government's policy, planning and budgeting processes. To this end, the primary aim of this paper is to determine the international market selection method best-suited to the identification of potential export opportunities for South Africa. The secondary aim is to apply the chosen method for South Africa in order to determine realistic export opportunities (country-product combinations).

The decision support model (DSM) of Cuyvers *et al.* (1995:173-186) and Cuyvers (2004:255-278) was chosen as the most appropriate international market selection method for the purposes of this study. It was henceforth applied to South Africa in order to provide **the dti** with a tool to justify export promotion activities more scientifically.

The methodology of the DSM developed is discussed. The DSM consists of a sequential filtering process using four filters to eliminate countries with lower export potential. The first filter considers the macro-economic environment of the trading partner. Indicators such as country risk ratings; GDP (GDP per capita); and GDP growth (GDP per capita growth) play a role in the selection process.

In filter two, import market growth in the short and long term, and relative market size, were considered for each country-product combination. A table has been constructed to show the categories that will be used for further analysis. In filter three, the Herfindahl-Hirschmann Index gives an indication of the market concentration of the importing countries and barriers to entry. In filter four, realistic export opportunities identified in the previous filters are classified. This classification was done by calculating South Africa's relative market importance for each country-product combination and combining this with the categorisation in filter two.

After the application and adaptation of the DSM for South Africa, 12,695 country-product combinations were identified as realistic export opportunities. After the identification of the 12,695 country-product combinations, a clustering process was undertaken to enable **the dti** to focus on specific regions, if needed, when developing their export promotion strategies. This clustering is reported and graphically represented in this paper.

It is recommended that the DSM results should form part of an overall strategy towards increasing exports through utilising government resources in order to contribute to the effectiveness of export promotion in South Africa.

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ERMIE STEENKAMP^{1,2}, RIAAN ROSSOUW¹, WILMA VIVIERS¹, AND LUDO CUYVERS³

Abstract

Market selection methods, of which a vast number exist, are a critical tool in firms' and government's policy, planning and budgeting processes. To this end, the primary aim of this paper is to determine the international market selection method best-suited to the identification of potential export opportunities for South Africa. The secondary aim is to apply the chosen method to South Africa in order to determine realistic export opportunities (country-product combinations). The decision support model chosen for application in this study consists of a screening process of four consecutive filters, through which relevant information on markets (such as country risk indicators, macroeconomic data, imports per product group, etc.) is fed, and which allows the identification realistic export opportunities. Results are reported on the application of this decision support model to the case of South Africa, adapted for an analysis of foreign trade data at the SITC four-digit level up to 2004. In this way, South Africa's export opportunities in individual countries are listed and categorised according to criteria such as import market characteristics and South Africa's market share in the various markets.

Keywords: Exports, market research, decision support model, South Africa

JEL classification: F13, F14, D81

1. INTRODUCTION

The Department of Trade and Industry (**the dti**), as the primary trade promotion organisation (TPO) in South Africa, finances or co-finances export activities on a regular basis. Several hundreds of projects submitted annually to the TPO for funds must be evaluated for their suitability for funding from the state budget. Until recently, however, export promotion activities in South Africa have been based on historical export performance trends. Very little attention has been devoted to new export opportunities in unexploited markets or opportunities for new products in existing markets. Still, the South African government wants to fulfil its obligation, not only to assist potential exporters, but also to prioritise export promotion activities in a

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manner that will yield a high return on investment of scarce resources, while increasing the success rate of South African exporters (the dti, 2005:47).

For this to be realised, the South African government must distinguish between the vast numbers of export opportunities that exist. Because of scarce resources, only a limited number of these can be explored. The challenge faced by government thus lies in the selection of specific sectors for export promotion and the allocation of its limited resources among these sectors. Market selection methods, of which a vast number exist (e.g. Papadopoulos and Denis, 1988; Green and Allaway, 1985; Russow and Okoroafo, 1996; Papadopoulos *et al.*, 2002; Freudenberg and Paulmier, 2005a;b; Shankarmahesh *et al.*, 2005; Sakarya *et al.*, 2007), are therefore a critical tool in government policy, planning and budgeting processes.

To this end, the primary aim of this paper is to determine the international market selection method best-suited to the identification of potential export opportunities for South Africa. The secondary aim is to apply the chosen method to South Africa in order to determine realistic export opportunities (country-product combinations) for the country. With the starting point as all the countries of the world and all possible products, the decision support model (DSM) of Cuyvers *et al.* (1995) and Cuyvers (2004) seemed to be the best suited to the task. The model consists of four consecutive steps or 'filters' (adapted for the circumstances of South African trade), leading to a list of realistic export opportunities in countries with sufficient macroeconomic strength and performance. This facilitates transparent identification and evaluation of realistic export opportunities. It is thus possible, in a simple and effective manner, to obtain an answer to the question: how can government prioritise export assistance for potentially successful exporters?

This paper presents a modified decision support method for the identification of realistic export opportunities for South Africa. First, various market selection methods for international expansion are presented and discussed and this is followed by a more detailed description of the decision support model selected. The paper concludes with a presentation of the results and policy implications for South Africa of the application of the model.

2. LITERATURE OVERVIEW: MARKET SELECTION METHODS FOR INTERNATIONAL EXPANSION

Governments and individual firms that want to stimulate growth through export development must distinguish between the vast number of export combinations due to the fact that, in most circumstances, a large number of export opportunities exist, and only a limited number of these can be explored because of scarce resources (Papadopoulos and Denis, 1988:38). The challenge that governments and individual firms therefore face is in choosing specific sectors for export promotion (Shankarmahesh *et al.*, 2005:204). In order to yield a higher return on investment and make sure that resources are not wasted on less attractive export markets, they should focus their efforts and resources on a limited set of dominant export markets (Shankarmahesh *et al.*, 2005:204). Furthermore, selecting the "right" market is important as a first step in expanding exports to ensure export success, determining foreign marketing strategies and determining where to establish bases to establish a favourable competitive position in those markets (Papadopoulos and Denis, 1988:38). Rahman (2003:119) stated that there exists a well-developed literature of market failures encountered by international marketers and that the biggest reason for these failures is poor market selection resulting from inappropriate evaluation of markets.

The process of evaluating worldwide export opportunities is complicated for a number of reasons. These include the difficulty of examining all possible export opportunities to all the countries of the world and the availability of data for specific consumers, businesses or governments that limits the screening process to

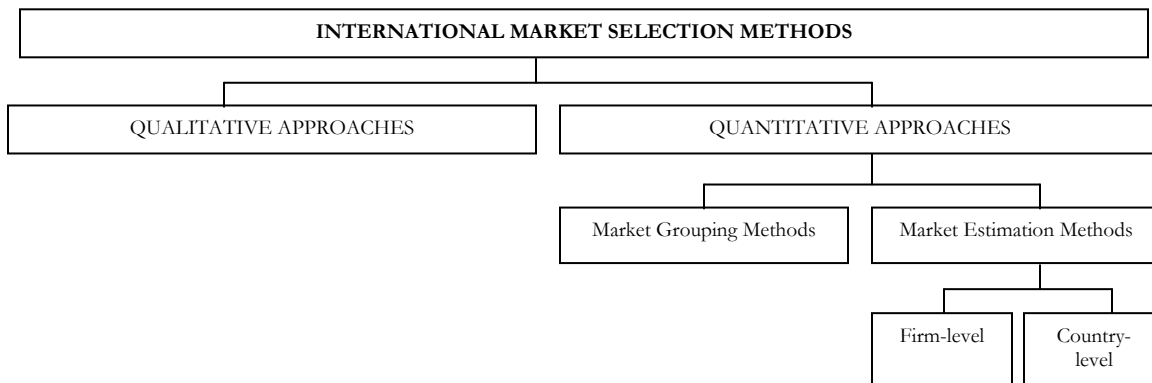
using only published data (Jeannet and Hennessey, 1988:137; Brewer, 2001:155). Numerous attempts to formulate appropriate international market selection processes have been made in the literature.

The purpose of this section is to find the international market selection method best-suited to the identification of potential export opportunities for a given exporting country (in this case, South Africa). The focus is therefore on country-level (macro-level) rather than firm-level (micro-level) market selection (see section 2.1.2.2.1 and 2.1.2.2.2). This implies that all possible country-product combinations worldwide must be screened in order to identify a list of priority export opportunities for the exporting country. Different international market selection models or processes will be discussed and evaluated subsequently.

2.1 International market selection methods

The literature on international market selection methods will be discussed in this section under different categories. In figure 1 this categorisation is illustrated.

Figure 1: Categorisation of the international market selection literature



Source: Own figure constructed from Papadopoulos and Denis (1988:38-51)

Papadopoulos and Denis (1988:38-51) summarised the literature on international market selection methods up until the late 1980s. They classified over 40 proposed international market selection models into two broad types of approaches – *qualitative approaches* (rigorous and systematic gathering and analysis of qualitative information about one or a handful of potential country markets) and *quantitative approaches* (analysing large amounts of secondary statistical data about many or all foreign markets).

2.1.1 Qualitative approaches

According to Papadopoulos and Denis (1988:39) most *qualitative approaches* typically start with identifying a short list of countries for further consideration by establishing objectives and constraints for exporting a specific product to each country under consideration. Other studies focus more on the nature, appropriateness and sources of qualitative information that could be used in the international market selection process. These sources include government agencies, chambers of commerce, banks, distributors, customers, international experts and foreign market visits (Pezeshkpur, 1979). Papadopoulos and Denis (1988:39) suggest that pure qualitative approaches to international market selection could be seen as biased as they are based on perceptions and are largely inaccurate.

Douglas *et al.* (1982:27) stated that the biggest challenge in international market selection is the large number of countries throughout the world that need to be analysed. They suggest that a screening procedure of secondary data be used to determine which countries to investigate in depth. *Quantitative approaches* to international market selection do exactly this by analysing and comparing secondary data of a large number of countries and will be discussed subsequently.

2.1.2 *Quantitative approaches*

Papadopoulos and Denis (1988:39) further divided quantitative approaches into two categories, namely *market grouping* methods and *market estimation* methods. Market grouping methods cluster countries on the basis of similarity while market estimation models evaluate market potential on firm or country level (see figure 1).

2.1.2.1 *Market grouping methods*

Studies undertaken to attempt *market grouping* have been summarised by Papadopoulos and Denis (1988: 39-41), Steenkamp and Ter Hofstede (2002:185-213) and Shankarmahesh *et al.* (2005:204-206). These methods are based on the assumption that the most attractive markets for a firm are the ones that most closely resemble the markets it has already penetrated successfully (Papadopoulos and Denis, 1988:41). By providing insight into structural similarities, these methods enable firms to standardise their offerings and marketing strategies across markets (Sakarya *et al.*, 2007:213). Countries are clustered based on similarities in social, economic and political indicators while demand levels are, for the most part, not taken into account (Sakarya *et al.*, 2007:212). Market grouping methods are mostly criticised for relying exclusively on general country indicators, rather than on product-specific market indicators, as macro indicators may not reflect market development for a product (Sakarya *et al.*, 2007:212; Kumar *et al.*, 1994:31; Papadopoulos and Denis, 1988:41). Studies that attempted to include more product-specific information faced the problem of insufficient data, and are limited to the product ranges of a particular firm. Thus, they cannot be applied to all possible product groups (Papadopoulos and Denis, 1988:41, 47). Sakarya *et al.* (2007:212) also argued that grouping methods fail to take into account similarities among groups of consumers across national boundaries. Furthermore, focusing only on countries with similar characteristics to markets already penetrated may hold the risk of overlooking lucrative opportunities in countries with other characteristics (Kumar *et al.*, 1994:32).

Referring to the abovementioned limitations, market-grouping methods will not be suitable to identify export opportunities for a country if the trade promotion organisation or researcher needs to consider all possible country-product combinations worldwide.

Market estimation methods will therefore be subsequently investigated in order to establish if the international market selection method best suited to the identification of potential export opportunities for South Africa can be found within this classification of international market selection methods.

2.1.2.2 *Market estimation methods*

Market estimation models evaluate foreign markets on the basis of several criteria that measure aggregate market potential and attractiveness (Sakarya *et al.*, 2007:212; Papadopoulos and Denis, 1988:41). The criteria vary across methods and often include wealth, size, growth, competition and access indicators (Sakarya *et al.*, 2007:212). Papadopoulos and Denis (1988:40-47) summarised the different methods of measuring market potential that were introduced up until the late 1980s and included multiple factor indices, regression analyses and multiple criteria import demand estimations. Papadopoulos and Denis (1988:40-47) found that common

shortcomings of these methods include the lack of product specificity, the assumption of a static environment and methodological problems due to data availability.

Henceforth, the more recent literature on market estimation methods will be discussed in detail. Most of these methods are based on, and address, the methodological shortcomings of earlier studies (see Papadopoulos and Denis (1988:40-47) for a discussion of these earlier studies).

For the purposes of this study, the literature on market estimation methods will be categorised into *firm-level* and *country-level* methods (see figure 1). *Firm-level* methods can be applied by firms to identify markets for their limited product ranges. These methods usually include an analysis of the firm's objectives, profitability, managerial experience and knowledge, customer standards and attitudes and product adaptation requirements when identifying potential export markets. *Country-level* methods, on the other hand, can be applied by a country's export promotion agency to identify the most promising country-product combinations to focus their export promotion efforts on. Criteria and data used in these methods should be product-specific, applicable to many country-product combinations and generally available. These criteria might include product-specific market growth, market size, level of competition and barriers to trade.

2.1.2.2.1 Firm level market estimation methods

Firm level market estimation methods include the studies of Davidson (1983)⁴, Cavusgil (1985)⁴, Ayal and Zif (1978)⁴, Kumar *et al.* (1993), Hoffman (1997), Andersen and Strandskov (1998), Brewer (2001), Andersen and Buvik (2002), Rahman (2003), Alon (2004), Ozorhon *et al.* (2006), and others.

Given that the purpose of this study is to identify the most appropriate country-level international market selection method to apply to South Africa (see section 1), firm-level market estimation methods will not be discussed in much detail. It is, however, important to note that Cavusgil (1985:30-31) and Kumar *et al.* (1994:33-34) suggest that the process of evaluating the export potential of a foreign market involves the following three stages: (1) a preliminary screening stage to select more attractive countries to investigate in detail, based on countries' demographic, political, economic and social environments; (2) an in-depth screening stage in which product potential (market size and growth), competitors, market access, and other market factors are analysed; and (3) a final selection stage that involves the analysis of company sales potential, profitability and product adaptation to the firm's existing portfolio. This process forms the basis of many firm-level market estimation models and cannot be used in this exact form when identifying export opportunities for a country due to the final selection stage that includes subjective, firm-specific variables.

With the purpose of this study being partly to find the best suited country-level international market selection method, the focus will subsequently be on studies in this category.

2.1.2.2.2 Country-level market estimation methods

On first review, the methods of Green and Allaway (1985), Russow and Okoroafo (1996) and Papadopoulos *et al.* (2002), although applied to a limited number of countries and products, seemed to be applicable for screening a wide range of country-product combinations and are therefore categorised under country-level market estimation methods. These methods are discussed in sections 2.1.2.2.1 to 2.1.12.2.2.3.

Papadopoulos and Denis (1988:43) mentioned a multiple criteria method proposed by the International Trade Centre (ITC) to assist developing countries that want to extend exports in identifying potential export

⁴ Although these three studies were conducted before 1988, it was not included in Papadopoulos and Denis' (1988:40-47) summary of the international market selection literature, and is therefore included here.

markets. On a research visit to the ITC in Geneva in September 2008, the researchers found that the ITC is still using a similar method to assist developing countries in identifying potential export markets. This method can also be classified as country-level market estimation model and is discussed in section 2.1.2.2.2.4.

Three other studies that can be classified under country-level market estimation models are the studies of Arnold and Quelsh (1998:7-20), Cavusgil (1997:87-91) and Sakarya *et al.* (2007:208-238). They all attempted to assess export opportunities in emerging markets specifically, as discussed in further detail in section 2.1.2.2.2.5.

Another method that was specifically designed to be applied on a country-level is the decision support model proposed by Cuyvers *et al.* (1995). This model was designed to screen all possible worldwide country-product combinations to identify potential export opportunities for Belgium⁵. Cuyvers (2004) adapted and applied this model to Thailand as the exporting country. This method is discussed in section 2.1.2.2.2.6.

2.1.2.2.2.1. Green and Allaway's shift-share model

Green and Allaway's (1985) shift-share approach to identify export opportunities were described by Douglas and Craig (1992) as the only new approach to international market selection that had been proposed up until the early 1990s. They used 20 OECD countries and 51 high-technology products⁶ (at the SITC four-digit level) and the period 1974 to 1979 in their analysis.

Shift-share analysis identifies growth differentials based upon the changes that have occurred in market shares over time. It requires import data of the countries under investigation for the products in question at the beginning and end of the period of analysis. An expected growth figure is calculated for each country-product combination based on the average growth of all combinations included in the analysis. The difference between each market's actual and expected growth is called the net shift and will be positive for markets that gained market share over the period of analysis and negative for those that lost market share. The net shift is therefore the difference between a market's actual performance and the performance it would have had if its growth rate had been equal to the average growth of the entire group of markets included in the analysis (Green and Allaway, 1985:84).

Furthermore, the percentage net shift is calculated by dividing the net shift of each market under investigation by the total net shift of all the markets included in the analysis and multiplying it by 100 (Green and Allaway, 1985:85). The figure thus obtained provides the total gain or loss of market share accounted for by each member of the group⁷.

Green and Allaway (1985:87) identified a few shortcomings to their analysis. These include that the timeframe of the analysis is based on only two points in time. Moreover, shift-share analyses identify only relative opportunities.

⁵ Although Shankarmahesh *et al.* (2005:205) classified Cuyvers *et al.*'s (1995) decision support model as a market segmentation / grouping method, the authors use mostly market estimation techniques in their analysis. Market estimation is used in filters 1 to 3 and, in filter four, the identified export opportunities (country-product combinations) are classified according to market size and growth, and the exporting countries' current position in the different markets. No geographical or demographical grouping based on similar country characteristics has been done. This method therefore falls under market estimation methods.

⁶ These products are defined by Green and Allaway (1985:85) as individual product categories possessing a high level of technological input. Specific products are not specified in the article.

⁷ For a step-wise mathematical description of the shift-share methodology, see Papadopoulos *et al.* (2002:186-190) and Huff and Scherr (1967).

Papadopoulos *et al.*'s (2002:168-169) specifically reviewed Green and Allaway's (1985) shift-share model as it seemed to address all the shortcomings of the international market selection models that they have reviewed in their study. According to Papadopoulos *et al.* (2002:168) the core strength of the shift-share approach is that it is simple and industry-specific. Its main weakness, on first review, is that it is limited to import-only measures. When Papadopoulos *et al.* (2002:168) investigated the theoretical foundations of the shift-share approach, they noted that other authors who applied the shift-share approach in the field of marketing found the results to be biased, depending on the base years chosen, and to fluctuate greatly due to outliers. Papadopoulos *et al.* (2002:168-169) subsequently tested the shift-share approach themselves by performing the shift-share approach for three products and 50 importing countries. They found that one country might perform very promisingly at one point in time but very poorly in subsequent years. They also found that the rankings identified by the model are volatile and that the simple growth model rankings were highly correlated to the shift-share rankings. Papadopoulos *et al.* (2002:169) concluded that the shift-share approach lacked predictive power and that it was redundant, given the high correlation between the results and those that would be obtained from the simple growth model.

Based on these findings and the fact that no other indicators except import growth are considered, the shift-share approach does not seem appropriate for application in this study.

2.1.2.2.2.2 *Russow and Okoroafo's global screening model*

Russow and Okoroafo (1996:52) used six randomly selected products and 192 countries around the world in their analysis. From the international business theory and market screening and assessment literature, Russow and Okoroafo (1996:50) identified three screening criteria, namely product-specific market size and growth, factors of production and economic development. The variables used to measure market size and growth include domestic production, imports, exports, shift-share of domestic production, shift-share of imports and shift-share of exports of a specific product. The cost and availability of factors of production was captured by gross fixed capital formation, money supply, total international reserves, total population, unemployment rate, average hourly wages in manufacturing, country area and population density. The level of economic development was measured by gross domestic product, gross domestic product per capita, agriculture as a percentage of GDP, the contribution of manufacturing industries as a percentage of GDP, construction as a percentage of GDP, wholesale and retail trade as a percentage of GDP and transportation and communication as a percentage of GDP (Russow and Okoroafo, 1996:52).

A principal components analysis⁸ was used for every product included separately in the analysis to determine whether the 21 variables mentioned above are interrelated. After performing the principal components analysis for "calculators" (as an example product), seven factors were identified to be used in the screening model. A cluster analysis was consequently conducted to group countries with similar⁹ market

⁸ Principle components analysis is a technique for identifying groups or clusters of variables. The technique is used to understand the structure of a set of variables or to reduce a data set to a more manageable size without compromising on the original information in the dataset (Field, 2005). Principle components analysis involves measuring the correlation between variables in order to transform a number of correlated variables into a smaller amount of uncorrelated variables called principle components (Fields, 2005).

⁹ For instance, in the case of "calculators" the seven factors that were defined by means of the principle components analysis include market size, economic development, market size growth, trade, population density, capital spending and infrastructure maintenance and development. Countries which are similar based on these seven factors are therefore considered to have similar market potential for "calculators".

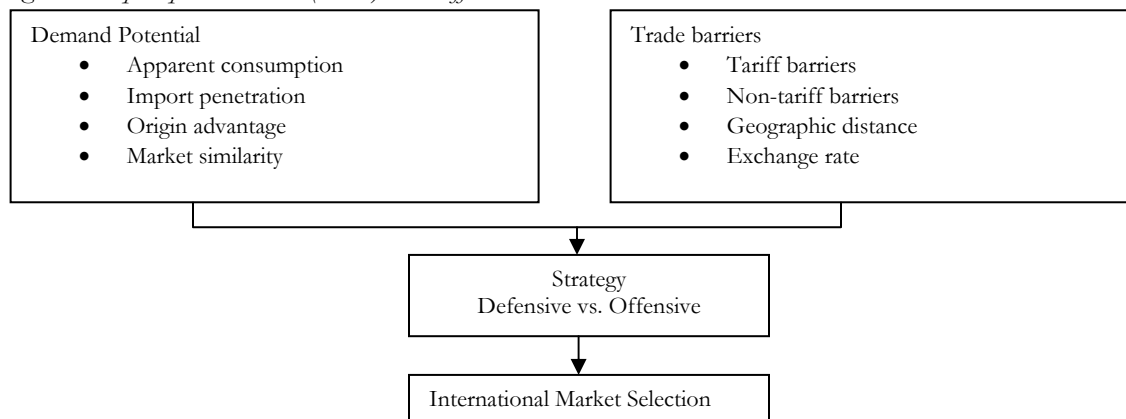
potential for a specific product. Each country group was then classified as having a high, medium or low market potential¹⁰ for the product in question (Russow and Okoroafo, 1996:55-58).

Due to the fact that, in this method, a principle components analysis is performed for each product category separately, the application thereof to over 900 four-digit level, or over 5000 HS six-digit level, product categories would be very extensive and time consuming for research purposes. The availability of data on, *inter alia*, factors of domestic production for a large array of country-product combinations would also be problematic. This method can be used more realistically when a limited number of products have been identified for further analysis. This method will therefore not be considered for application in this study, although elements of the model – such as the criteria identified to measure market potential – can be very useful.

2.1.2.2.2.3 Papadopoulos *et al.*'s trade-off model

According to Papadopoulos *et al.* (2002:169) the international market selection theory suggests that both the pluses and minuses of the countries under review must be considered in order to make effective decisions. They expressed these trade-offs as the demand potential (plus) and trade barriers (minus) in the countries under review. They state that many researchers identify trade barriers as the most important deterrent to exports, but most have not accounted for it in their international market selection models. This was probably due to the difficulty in quantifying non-tariff barriers and most authors assumed that non-tariff barriers would be dealt with in later stages of the internationalisation process where in-depth market analyses are conducted (Papadopoulos *et al.*, 2002:170). Papadopoulos *et al.* (2002:170) also accounted for the firm's strategic orientation to guide the weighting of the constructs in their model. Papadopoulos *et al.*'s (2002) model is illustrated in figure 2.

Figure 2: Papadopoulos *et al.*'s (2002) trade-off model



Source: Papadopoulos *et al.* (2002 :170, figure 1).

Four variables were used for each of the two main constructs (demand potential and trade barriers). These variables were chosen based on relevance, frequency of use in past research, evidence of satisfactory performance in various settings, data availability, reliability, comparability and ability to express qualitative

¹⁰ The determination of the thresholds for the classification of countries into high, medium or low market potential is not specified by Russow and Okoroafo (1996).

factors where necessary (Papadopoulos *et al.*, 2002:170-171). The variables and their measures are summarized in table 1.

Table 1: Papadopoulos *et al.*'s (2002) trade-off model – variables and measures*

Demand Potential	Trade barriers
<p>Variable 1: Apparent Consumption = <i>Domestic production plus imports minus exports</i> Import data do not portray the total available market. This measure for apparent consumption is considered to be the appropriate reflection of true market size in a given industry.</p>	<p>Variable 1: Tariff Barriers = <i>Weighted mean annual tariff rate over the study period.</i> Tariffs have a direct effect on the exporter's prices and pricing strategy discretion.</p>
<p>Variable 2: Import Penetration = <i>Imports as % of apparent consumption.</i> This measure is widely used in industry-specific analyses. A high ratio means import market openness and low domestic producer competitiveness, signalling an attractive market.</p>	<p>Variable 2: Non-tariff barriers = <i>Composite quantitative index of 20 barrier items</i> Non-tariff restrictions are often a more important obstacle to exporting than tariffs. Papadopoulos <i>et al.</i> (2002:172) developed an index consisting of all 20 barrier items in the World Trade Organisation's Trade Policy Review. Each item was weighted based on its frequency of occurrence in the target countries. WTO data was used.</p>
<p>Variable 3: Origin Advantage = <i>Exporting country's share in target market's total imports</i> A high overall share indicates that the exporting country has the benefits of critical mass, favourable image in the importing market and strong trade relations between the importing and exporting countries.</p>	<p>Variable 3: Geographic Distance = <i>Mileage distance between exporting and target countries</i> According to Papadopoulos <i>et al.</i> (2002:171) distance is directly related to transport costs and affects export price. Distance between countries' main ports was used (if no port, the capital or next closest major city was used).</p>
<p>Variable 4: Market Similarity = <i>Overall score of four indicators, namely health and education, personal consumption, production and transportation and trade.</i> According to Papadopoulos <i>et al.</i> (2002:171) demand tends to be higher in markets similar to the market in which a product was initially developed. Sethi (1971) proposed 29 indicators of market similarity that were grouped in the above-mentioned four categories. Papadopoulos <i>et al.</i> (2002:171) used the indicator in each group with the highest correlation to the others in the group to measure the four indicators in their market similarity score. These were:</p> <ul style="list-style-type: none"> • for health and education: life expectancy. • for personal consumption: GNP per capita • for production & transportation: electricity production and • for trade: imports-to-GDP ratio. 	<p>Variable 4: Exchange Rate = <i>Percent change in official exchange rate vs. previous year</i> According to Papadopoulos <i>et al.</i> (2002:171) volatile exchange rates between the exporting and importing countries' currencies is a major risk element in exporting and can have a big impact on pricing and strategy.</p>

Note : *) the variables used are all at one point in time

Source: Papadopoulos *et al.* (2002:170-171, Exhibit 1).

Seventeen OECD countries were chosen as the target (importing) countries due to data availability and similarities among these developed countries. Two different countries were chosen to be the exporting countries, namely Canada, which is a highly-developed country and an experienced exporter, and China, which has the world's largest population and is in its earlier stages of internationalisation. Papadopoulos *et al.* (2002:173) argued that a major weakness in earlier international market selection models was that, when screening markets, they focused on the importing countries only, without considering the identity of the exporting country. They thus chose two greatly different exporting countries in their analysis to test the effects of taking into account who the exporting country is.

Three products were chosen, namely aircraft (representing industrial goods), furniture (representing consumer durables) and beverages (representing consumer non-durables)¹¹. Two- and three-digit SITC (Standard International Trade Classification) data were used.

Papadopoulos *et al.* (2002:173) stated that there is no clear guidance in the literature as to the length of the period between when an observation is made about a country and when it is reacted upon. Papadopoulos *et al.* (2002:173) chose the six-year period 1989 to 1994 with 1988 as the base year.

¹¹ The basis for choosing aircraft, furniture and beverages to represent industrial goods, consumer durables and consumer non-durables respectively, are not specified by Papadopoulos *et al.* (2002).

The data for each variable was scaled by subtracting the lowest country value from the highest and dividing the difference by 10. Therefore 10 equal scale intervals were formed and each country could be assigned a score from 0 to 10. Each country's scores for each variable were averaged to get a total score for each of the demand potential and trade barrier dimensions. High scores represented high demand potential and low trade barriers. Countries were subsequently plotted in a two-dimensional matrix illustrated in figure 3.

Figure 3: Two-dimensional matrix for plotting countries in Papadopoulos et al.'s (2002) trade-off model

High demand potential / High trade barriers	High demand potential / Low trade barriers
Low demand potential / High trade barriers	Low demand potential / Low trade barriers

Source: Papadopoulos et al. (2002 : 174, figure 2).

Target markets in the upper right quadrant (high demand potential / low trade barriers) would offer the best export opportunities.

As many users would prefer to rank countries on a single overall score, Papadopoulos et al. (2002:174-175) assigned weights based on firm strategy to develop total score country attractiveness scales that combine the two dimensions. If a firm has a defensive strategy it will focus more on markets that are easier to penetrate and high trade barriers would carry a bigger weight. On the other hand, if a firm has an offensive strategy it will focus on markets with high demand potential, even though it may take more effort to penetrate those markets. Weighted scores for each of the two dimensions were then added to generate an overall score for each country.

Papadopoulos et al. (2002:183) identified a few limitations of their model. These include deficiencies of secondary data; the lack of direct conversion schemes between the trade coding systems¹²; unavailability, unreliability and aging of data for some countries (particularly less-developed countries) and the lack of greater product-specificity¹³.

Papadopoulos et al. (2002:184) attempted to address as many of the limitations identified in previous studies as possible. They stated that their model provided a significant improvement over earlier ones by capturing total rather than import-only demand, because it is industry-specific and was tested using three products, 17 importing countries and two very different exporting countries (Papadopoulos et al., 2002:184).

When considering the application of this model for the purposes of this study where all countries are included as possible export markets, a few possible problems can be raised. When dealing with a large array of possible country-product combinations (over 200,000¹⁴ when four-digit level product data is used and over one million¹⁵ on a six-digit level) domestic production figures for all of these products would be difficult to

¹² Papadopoulos et al. (2002:183) stated that the SITC codes alone have been revised three times since 1965 and some countries still use earlier versions to report trade data.

¹³ Papadopoulos et al. (2002) used the SITC two- and three-digit level product classification in their analysis. This is rather aggregated product classifications. For example, the three-digit level SITC code 001 represents "live animals", while the four-digit SITC codes 0011 represents "animals of the bovine species, including buffalo"; 0012 represents "live sheep and goats"; 0013 represents "live swine"; 0014 represents "live poultry"; and 0015 represents "live horses, asses, mules and hinnies". It is clear that the four-digit product classifications are more specific.

¹⁴ 240 countries in the world x 986 SITC four-digit product groups = 236 640

¹⁵ 240 countries in the world x 5407 HS six-digit product groups = 1 297 680

collect, especially in the least-developed countries. The same applies for data availability of non-tariff barriers and consumption figures per country-product combination. Papadopoulos *et al.*'s (2002) analysis is also conducted at the product level. In other words, a list of priority countries can be identified per product (as in Russow and Okoroafo (1996) (see section 2.1.2.2.2)). Again, the vast number of products dealt with poses the problem of the application of this method being a very extensive and time-consuming exercise. This method would, however, be very useful when a limited number of products have already been identified and a list of priority countries has to be identified for each of these.

Papadopoulos *et al.*'s (2002) trade-off model will therefore not be used for the purposes of this study, although the proposed criteria and rationale of their market potential analysis can be very useful.

2.1.2.2.2.4 *The ITC's multiple criteria method*

One of the aims of the International Trade Centre (UNCTAD / WTO) is to assist developing countries that want to extend and diversify their exports of products which are critical for their future growth and development, as well as to effectively focus their trade promotion efforts (Freudenberg, 2006). They do this by using a multiple criteria method to assess the export potential of these countries, thereby identifying those sectors with the highest potential for future exports (Freudenberg, 2006).

The ITC measures the export potential of a specific product group as (Freudenberg and Paulmier, 2005a: 10-11; Freudenberg and Paulmier, 2005b: 8, Freudenberg *et al.*, 2007:2; Freudenberg *et al.*, 2008:11-12):

- The current export performance of the exporting country (index 1), evaluated by indicators such as its exports of the product in value, the world market share, the growth rates of exports of the product, net exports to the world and the relative trade balance;
- The domestic supply capacity (index 2), evaluated by a survey of companies questioning the quality of products and the efficiency of supporting industries; and
- The characteristics of the international environment (index 3), evaluated by indicators such as size and growth of world demand and the exporting country's access conditions to international markets.

An export potential index is ultimately calculated for each product group under investigation, using the abovementioned variables. The different variables are first standardised (due to the fact that the different variables are in different units – dollar, value, % per year etc.) before they are aggregated into the composite index. To standardise the variables, the following formula is used:

$$100 \times (\text{Value} - \text{Lower limit}) / (\text{Upper limit} - \text{Lower limit})$$

This provides a score ranging from 0 (weak performance) to 100 (best performance) for each variable. The best performing 5% of products define the upper limit and the weakest performing 5% of products define the lower limit for each variable. For reasons of simplicity, all variables are given the same weights within the indexes (index 1 to index 3) and the three indexes are again weighted equally when deriving the overall index (Freudenberg and Paulier, 2005a: 34).

According to (Freudenberg and Paulmier, 2005a: 36) the limitations of the ITC's multiple criteria method include that composite indexes measure only that which can be quantified and for which there are data available; the selected variables give only a snapshot at one moment in time; growth variables are backward-looking; weighting of the different variables is difficult to establish; and rankings should be interpreted with caution, especially when differences between the respective indices for products are small.

To reach the objectives of this study, all possible world-wide country-product combinations must be considered and, ultimately, a limited list of the country-product combinations with the highest export

potential for the exporting country should be produced in order for an export promotion agency to use its resources optimally. The ITC's export potential assessment studies discussed in this section unfortunately concentrate only on identifying product groups/industries in which the country under investigation have potential for future exports. The focus is not on demand for the product group in different countries respectively, but rather on total world demand. Therefore only a ranking of product groups is done, rather than a ranking or list of country-product combinations that hold potential for future exports.

It does, however, seem possible to apply the ITC's method on a country-product level, but it would be a time-consuming exercise to conduct it for all possible country-product combinations around the world. As is the case with Russow and Okoroafo's (1996) and Papadopoulos *et al.*'s (2002) models, the analysis is extensive because no elimination process is in place and each of the more than 200,000 (when four-digit level product data is used) and over one million (when six-digit level data is used) possible country-product combinations should be analysed individually. When a limited list of country-product combinations is considered, the ITC's methodology would be very useful to rank these in terms of export potential.

2.1.2.2.2.5 Assessment of export opportunities in emerging markets

As mentioned earlier, Cavusgil (1997:87-91), Arnold and Quelsh (1998:7-20) and Sakarya *et al.* (2007:208-238) all attempted to assess export opportunities in emerging markets specifically. They argue that traditional market selection analyses fail to account for the dynamism and future potential of emerging markets (Sakarya *et al.*, 2007:208). Cavusgil (1997:87-91) attempted to rank the total market potential of only 25 emerging countries. Only country-level (macro) indicators were used and no product specificity was introduced.

Arnold and Quelsh (1998:7-20) proposed a foreign market assessment framework that included three elements, namely assessing long-term market potential (using population and GDP, thus country-level measures), identifying business prospects (product-level assessment, companies must identify their own indicators for assessing demand for their product) and predicting potential profits (assessing concentration of population in urban centres versus rural villages, the distribution of wealth, telecommunications infrastructure, penetration of key consumer durables such as telephones, televisions or cars, etc.). Because Arnold and Quelsh's model uses only macro-level indicators to assess market potential and then concentrates on firm-level assessments (which are mostly situation specific, qualitative and not applicable in a model that assesses a large array of country-product combinations), this method is not discussed in further detail and is not applicable for the purposes of this study.

Sakarya *et al.* (2007:209) introduces long-term market potential (from Arnold and Quelsh's model), cultural distance, competitive strength of the industry, and customer receptiveness as criteria for assessing emerging markets as candidates for international expansion. Their proposed model was applied to the United States of America as the exporting country, Turkey as the importing country and apparel as a product/industry. Because Sakarya *et al.*'s (2007) model includes an in-depth, situation-specific assessment of a particular country-product combination that requires information not readily available for a large array of country-product combinations (such as social and moral values of consumers, wages in the industry, consumer choice opportunities, product quality, appeal of sales promotions, level of customer service, etc.), this model cannot be considered for the purposes of this study either.

2.1.2.2.2.6 Cuyvers' decision support model

The basic ideas of Walvoord (1983) were used by Cuyvers *et al.* (1995:173-186) to construct a decision support model (DSM) for a Belgian government export promotion institution to provide them with a limited

list of realistic export opportunities to which they could devote their limited financial resources. This DSM was then refined and applied for Thailand in 2004 (Cuyvers, 2004:255-278).

The basic decision support model used to identify realistic export opportunities for a particular country, starts from the assumption that all world markets hold potential export opportunities for a particular country and, therefore, all possible country-product combinations enter the filtering process (Cuyvers, 2004:256). After every filter, a number of opportunities are rendered uninteresting and are not considered in subsequent filters.

In filter one, countries that hold too high a political and/or commercial risk and do not show adequate macro-economic size or growth are eliminated. The rationale for this is that, with the 240 countries of the world as a starting point, filter one enables the researchers to eliminate uninteresting markets in order to concentrate in detail on a more limited set of preliminary opportunities.

In filter two, a more specific assessment of the various product groups for the remaining countries is done to identify the market potential of each possible country-product combination (market). The main purpose of this filter is therefore to eliminate markets that do not show sufficient demand potential. The main criteria that are used in this filter are the growth rate of imports of a given product group by a given country (import growth) and the value of imports of a given product group by a given country (import market size).

Three variables are calculated for each market, namely, short-term import growth, long-term import growth and import market size. Short-term import growth is considered to be the most recent available simple annual growth rate in imports, while long-term growth is calculated as the average annual percentage growth in imports over a period of five years. Finally, the relative import market size is calculated as the ratio of imports of country i for product group j and the total imports of all countries that entered filter two of product group j (Cuyvers *et al.*, 1995:178; Cuyvers, 2004:259-260).

In filter three, trade restrictions and other barriers to entry are considered to further screen the remaining possible export opportunities. Two categories of barriers are considered in this filter, namely, the degree of market concentration (competitor analysis) and trade restrictions (market accessibility).

In the last stage of the analysis (filter four), the export opportunities (country/product combinations) identified in filters one to three, are categorised according to relative market importance and relative market size and growth (Cuyvers, 2004:267).

One of the main benefits of the DSM is that it provides a tool to assist export promotion authorities to decide how to allocate their scarce resources to export promotion activities in various markets. It also provides information on export markets and export promotion efficiency to derive appropriate actions in relevant export markets (Cuyvers *et al.*, 1995:174). The DSM further provides export promotion agencies with a limited list of export promotion priorities, based on measurable and objective economic data, and draws attention to markets that have not previously been recognised as potential export markets (Cuyvers *et al.*, 1995:174).

Despite the abovementioned benefits of using the DSM to identify realistic export opportunities in a country, Cuyvers *et al.* (1995:174) warn that it would be unwise to rest all export promotion decisions upon the model alone. Other considerations, such as feedback from foreign trade offices (on the demand side of exports) and export councils (on the supply side), should also be taken into consideration. Diplomatic and political issues would also lead to government supporting exports to a particular country, even though it might be identified by the DSM as an economically promising market (Cuyvers *et al.*, 1995:175).

Export promotion is, furthermore, an activity that is very often only effective in the long run. Since the DSM's scope is more short term and based on historical data, some export opportunities that are considered by the model as sub-optimal, might be good opportunities in the long run (Cuyvers *et al.*, 1995:174). Therefore, basing export promotion decisions only on the results of the DSM could also lead to missed

opportunities. Cuyvers *et al.* (1995:174) also state that it is important to keep in mind that the purpose of the model is not to provide a ranking of export opportunities, but rather a list of choices of interesting markets grouped into categories reflecting market size, market growth and market importance.

When considering the application of this model for the purposes of this study, it seems that the DSM conforms to the prerequisites that all possible world-wide country-product combinations must be considered and that a limited list of the country-product combinations with the highest export potential for the exporting country should be produced in order for an export promotion agency to use their resources optimally. It also seems to be capable of handling a large array of possible country-product combinations due to the filtering process used. The DSM can also provide a list of priority products in each country and, *vice versa*, a list of priority countries for each product. For an export promotion agency, these lists of priority products for each specific market would be very useful.

As it seems that the DSM is the best-suited model for identifying export opportunities for South Africa, and that most of its limitations could be overcome, the DSM will be refined and applied in this study.

2.2 Summary and method selected

The aim of this section was to evaluate the international market selection literature to find the method best-suited to the identification of potential export opportunities for a given exporting country (in this case, South Africa).

The literature was classified into various categories of studies (see figure 1) and the focus of this study was established to be on country-level market estimation models. Six country-level market estimation models could be found in the literature and are discussed in sections 2.2.1 to 2.2.6. The benefits and limitations of each of these methods or models were discussed and each method was evaluated for application in this study.

The decision support model (DSM) of Cuyvers *et al.* (1995:173-186) and Cuyvers (2004:255-278) was found to be the model best-suited to the purposes of this study. The basic methodology of the DSM and the results of the application of the DSM to South Africa are discussed in Section 3.

3. THE SOUTH AFRICAN APPROACH

This section demonstrates the ways in which a decision support model, incorporating various adaptations for the South African trade environment, can be used to more successfully identify realistic export opportunities. The following explanations are therefore an extension of the work of Cuyvers *et al.* (1995) and Cuyvers (2004) who developed and applied a decision support model for Belgium and Thailand.

3.1 A decision support model for planning export promotion activities

The decision support model adapted for South Africa also starts from the assumption that, in principle, all world markets (i.e., the markets for all products in all countries) are potential markets for the exporters of the given exporting country, and all markets should therefore enter a screening procedure. The unit of analysis is the country-product combination. The analytical framework of the model is based on the model of international market research proposed by Walvoord (1983), in which relevant information on markets is fed through a screening process of four consecutive filters, with the result that less interesting market opportunities are identified and deleted from the list (see section 2.1.2.2.2.6).

In the following sections the method used and results for each filter of the South African application and refinement of the DSM is discussed.

3.2 Filter one: Which countries show preliminary export opportunities for South African products?

As pointed out in section 2.1.2.2.2.6, the aim of the first step in our analysis is to determine which countries merit closer investigation as potential markets. The criteria used here are relatively low commercial and political risks, together with total market potential as measured by macro-economic growth and/or the size of the economy.

The commercial and political risks involved in doing business with foreign countries can be assessed using parameters such as the current-account deficit as a percentage of GDP, the external debt service as a percentage of export earnings, the stock of foreign debts of a country in proportion to its GDP, etc., as well as past and future changes in these parameters (Cuyvers, 2004:258). This information is available through the International Monetary Fund and other international organisations. In addition, some academic and private organisations publish such information, based on commercial and political risk assessments by foreign business people¹⁶. The assessment of the political risk of a country usually involves analysing *inter alia* the system of government (e.g. amount of state control over international trade and investment activities), history of political instability, evidence of corruption in political and financial circles, economic policies, rule of law and the legal system (ITRISA, 2009:16-17). Commercial risk assessments generally involve analysing the financial strength of buyers in a particular country (therefore assessing their ability and willingness to pay). It is often easier to acquire information for countries rather than individual buyers. Therefore, foreign buyers' general ability and willingness to pay are assessed by using the levels of insolvencies or bankruptcies in a country, the degree to which an economy is dependent on foreign aid, the level of unemployment and social unrest, the average per capita income, the external debt repayment record, history of balance of payments deficits and exchange controls, history of imposing sanctions and foreign exchange reserves (ITRISA, 2009:16-17).

¹⁶ See <http://www.countryrisk.com>

In the application of the DSM for both Belgium (Cuyvers *et al.*, 1995) and Thailand (Cuyvers, 2004), the country risk ratings of the Belgian public credit insurance agency, *Office National du Ductroire* (ONDD) were used in this part of filter 1. The ONDD's ratings conform to the OECD's Arrangement on Guidelines for Officially Supported Export Credits¹⁷ and are not conducted from the point of view of a specific exporting country. It can therefore be used by any exporter that wants to establish the degree of risk involved in dealing with a specific country. Therefore the country risk ratings of the ONDD were used in this study.

The ONDD provides risk assessment on export transactions in terms of political risk in the short-, medium-, and long-term, as well as the commercial risk of the country. From these country risk ratings a country risk score is calculated. The country risk score is used to determine whether or not a country should be further investigated as a potential export market.

The ONDD political risk rating rates countries on a scale of 1 to 7, where 1 indicates a low political risk in a specific category and 7 indicates a high political risk in a specific category (short-, medium-, and long-term) for the particular country. The commercial risk rating differs from that of the political risk rating. The commercial risk rating is presented either as an A, a B, or a C, where A indicates that the country is experiencing low commercial risk and C indicates that the country is experiencing a high commercial risk. The three political risk ratings are transformed from a 1 to 7 scale to a 1 to 10 scale, whereas the commercial risk country rating is transformed in such a manner that A represents 3.33, B represents 6.67 and C represents 10 (Cuyvers, 2004:256). This transformation is necessary to construct a country risk score. A compounded country risk score is calculated from the risk ratings, namely short-, medium- and long-term political as well as commercial risks. The country risk score is used to determine a critical value to eliminate less interesting export markets from the model.

To illustrate the process, consider Country X with the following political and commercial risk ratings as an example.

Table 2: Country X's risk ratings

	Political Risk: short term	Political Risk: medium term	Political Risk: long term	Commercial Risk
Country X	3	4	5	B

Source of data: excerpt from the DSM for South Africa.

In order to construct the country risk score, the country risk ratings should be transformed as discussed in the previous paragraph. The transformed country risk rating for country X is given as:

Table 3: Country X's transformed risk ratings

	Political Risk: short term	Political Risk: medium term	Political Risk: long term	Commercial Risk
Country X	4.29	5.71	7.14	6.67

Source of data: excerpt from the DSM for South Africa.

In order to obtain a country risk score for a particular country an equally weighted index is constructed from the country risk ratings in terms of political risk and commercial risk of the specific country under investigation. In terms of the example of Country X, the country risk score is 6.19.

When a particular country's risk score exceeds the critical value of 9.286, this country should not be included in the further analysis of potential export markets for South Africa. Country X considered in the example would be included in the further analysis of potential export markets because its risk score of 6.19 is below 9.286.

¹⁷ For more information see Cutts and West, 1998:12-14; Moravcsik, 1989:173-205

Twenty-one countries (out of an original 240), belonging to the two highest credit risk groups of the ONDD, were excluded from the analysis, leaving 219 countries¹⁸. These countries were excluded due to their relatively high political and commercial risk ratings that exceeded the critical value of 9.286¹⁹.

To identify potential export markets, indicators that give an indication of whether the particular markets are large enough or show relative growth should be employed. GNP and GNP per capita were chosen in the Belgian and Thailand studies as a starting point for the filtering process in terms of macro-economic indicators (Cuyvers *et al.*, 1995:177; Cuyvers, 2004:256). In this study, real GDP and GDP per capita values were used in filter 1, as well as GDP growth and GDP per capita growth to extend the model to include countries that show general potential due to economic growth and development.

Data on GDP and per capita GDP between 2002 and 2004 could be collected for 193 of the remaining 219 countries. No, or incomplete, data was available for 26, mostly small, countries such as Andorra, the Cayman Islands, the Cook Islands, the Faroe Islands, Liechtenstein, Vatican City, etc. In order to select the more interesting markets from these 193 countries, a cut-off point x is calculated for the GDP and per capita GDP values, such that:

$$x = \bar{X} - \alpha \delta_x, \quad (1)$$

where \bar{X} is the average of X (GDP or per capita GDP), δ_x is the standard deviation of X , and α is a factor which is determined in such a way that small changes in its value only marginally affect the number of countries screened out. The same α -value is chosen for both GDP and GDP per capita. When choosing an α -value, it is therefore also considered that a comparable number of countries should be selected for both GDP and GDP per capita within a small range of values for α .

Countries are selected when the following condition applies:

$$X_j \geq x \quad (2)$$

(GDP and per capita GDP, respectively, are larger than or equal to the cut-off value) for at least two consecutive years of the most recent three-year period for which data are available.

Starting from $\alpha = 0.001$, α is increased consecutively by 0.001 until the number of countries rejected stabilises. An alpha value of $\alpha = 0.056$ was chosen to calculate the cut-off value in this filter, in which case a total of 95 countries meet condition (2) for GDP and/or per capita GDP. This number is the union of the two sets of 62 and 52 countries selected on the basis of GDP and per capita GDP²⁰. Among the countries which do not fulfil condition (2) are some central and Eastern European countries (such as Belarus, Macedonia, Croatia and Serbia and Montenegro), some less-developed Asian countries (such as Papua New

¹⁸ The countries eliminated include Afghanistan, Belarus, Burundi, Cambodia, Côte d'Ivoire, the Democratic Republic of the Congo, Cuba, Eritrea, Guinea, Haiti, Iraq, North Korea, the Lao People's Democratic Republic (Laos), Lebanon, Liberia, Malawi, Myanmar, Palestine, Rwanda, São Tomé and Príncipe, the Seychelles, Sierra Leone, Somalia, Sudan, Suriname, Tajikistan, and Zimbabwe.

¹⁹ The ONDD's risk ratings for 2008 were used. 241 countries are rated yearly by the ONDD.

²⁰ The reader is reminded that countries can meet both cut-off values or either value. For example, both China and India are above the GDP cut-off value but below the per capita GDP threshold. Both are considered for further investigation in filter two because they are large markets, although their per capita income levels are low.

Guinea and Jordan), one North-African country (Tunisia), a number of Latin-American countries (Costa Rica, El Salvador, Paraguay and Uruguay) and some Caribbean islands (such as the Aruba, the Dominican Republic, Jamaica, and Grenada). Among those countries which pass the test of this first stage are the OECD countries, the ASEAN countries China, Taiwan, Hong Kong, South Korea, India, New Zealand and Australia, Argentina, Indonesia, Vietnam, etc.

3.3 Filter two: Detecting possible export opportunities for South Africa

In the next stage of the assessment of South Africa’s export opportunities, data on imports are analysed for each country selected in the previous section. The data used are at the SITC (revision 2) four-digit level over the period 2002-2004²¹. However, for Antigua and Barbuda, Aruba, Botswana, Iran, the Isle of Man, the Lao People’s Democratic Republic (Laos), Lebanon, Namibia, Puerto Rico, San Marino, St. Lucia, and Suriname, no trade data were available. Therefore, only 85 countries remain for the detection of possible export opportunities. Based on these data, 83,810 trade figures in total – henceforth called country-product combinations – will be analysed for the remaining 85 countries, using the growth of imports and the import market size as criteria, with the purpose of eliminating non-interesting country-product combinations.

As in the previous step (see section 3.2), cut-off points are calculated for each product group at the SITC four-digit level. The cut-off points used also take into account whether or not South Africa is relatively specialised in the respective products, as the so-called “revealed comparative advantage” (RCA) index indicates²². The rationale is that if South Africa is relatively specialised in a particular product i ($RCA_i > 1$), one may allow the selection of interesting markets to be less restrictive than if South Africa is not specialised in it ($RCA_i \leq 1$).

Evidently, the time period considered for the growth of imports of each product group is important. As far as short-term growth is concerned, the simple percentage growth rate of the imports of each product group j in country i is calculated for 2004. Long-term growth, however, stretches over a longer period and is calculated as the compounded annual growth rate of imports of product group j in country i between 2002 and 2004.

In order to take into account the degree of specialisation in the exports of South Africa of a product group j , we define a scaling factor s_j , following Willeme and Van Steerteghem (1993), such that:²³

$$s_j = 0.8 + \frac{1}{(RCA_j + 0.85)e^{(RCA_j - 0.01)}}, \quad (3)$$

²¹ The data are from the World Trade Analyzer. <http://data.library.ubc.ca/java/jsp/database/production/detail.jsp?id=161>

$$RCA_j = \frac{X_{SA}^j / X_{SA}^{all}}{X_{World}^j / X_{World}^{all}}$$

²² The RCA index is defined as follows: $RCA_j = \frac{X_{SA}^j / X_{SA}^{all}}{X_{World}^j / X_{World}^{all}}$, where X_{SA}^j is the exports of the country/world of product group j , and X_{World}^{all} is the total exports of the country/world of all product groups (see Balassa, 1965).

²³ The properties of the scaling factor are as follows: $s_j = 2$ for $RCA = 0$, $s_j = 1$ for $RCA = 1$, $s_j = 0.848$ for $RCA = 2$ and $s_j = 0.8$ for $RCA = \infty$.

Denoting the rate of growth of imports of product group j by country i by g_{ij} and total world imports of the same product group by $g_{world,j}$, the cut-off point for import growth of product group j is then

$$G_j = g_{World,j} \cdot S_j \text{ if } g_{world,j} > 0, \text{ and}$$

$$G_j = \frac{g_{World,j}}{S_j} \text{ if } g_{world,j} < 0 \text{ (see Willeme and Van Steerteghem, 1993:6-7).}$$

Hence, the market in a particular country i for product group j will be deemed sufficiently promising if:

$$g_{i,j} \geq G_j, \tag{4}$$

This procedure is applied to calculate both short-term and long-term cut-off growth rates. In Table 4, “1” is reflected in columns 2 and 3 if the condition in equation 4 is fulfilled for both the short and long term.

For market size of country i for product group j the import value of j in i is obviously not taken as a proxy, but rather the share of this market in the world imports of that product group. This criterion enables selection of markets that do not show growth, but that are interesting because of their size. Taking into account the degree of specialisation of South Africa in a particular product group j , the cut-off point for relative import market size S_j is determined as follows:

$$S_j = 0.02M_{World,j},$$

if $RCA_i > 1$, and:

$$S_j = \left[\frac{3 - RCA_i}{100} \right] M_{World,j},$$

if $RCA_i \leq 1$ where $M_{World,j}$ is the aggregate imports in the world of product group j . As can be seen from the above equations, the cut-off points for the relative import market size will vary between two and three percent according to the RCA_i ²⁴.

Therefore, the relative import market size of country i for product group j will be considered as sufficiently large, and consequently the country-product combination will be selected as a possible export opportunity for South Africa, if:

$$M_{i,j} \geq S_j, \tag{5}$$

Each country-product combination is now assigned a 1 or a 0 in column 4 of Table 4, according to whether condition (5) is fulfilled or not.

²⁴ The criterion of a 2 % share in the world imports, with South Africa being relatively specialised in a given product j , is for the sake of comparability with the previous applications of the DSM in Belgium and Thailand, when the same criterion was applied. When South Africa is relatively less specialised ($RCA_i \leq 1$), the market size criterion becomes more binding.

Table 4: *Categorising of country-product combinations*

Category	Short-term market growth	Long-term market growth	Relative market size
0	0	0	0
1	1	0	0
2	0	1	0
3	0	0	1
4	1	1	0
5	1	0	1
6	0	1	1
7	1	1	1

Source of data: *excerpt from the DSM for South Africa.*

Table 4 represents the basis for the selection procedure within filter two. The number 1 is assigned to either column 2, 3, or 4, if condition 4 in the short and long term and condition 5 are fulfilled respectively, otherwise a 0 applies. Category 0 in Table 4 thus indicates those markets that do not show growth in the short or long term, and that also have a relatively small import market size for a specific product group. The result in Table 4 is indicated as a 0 in column 2, 3, and 4. The markets in category 7 show growth in the short and long term and have a relatively large market size. Categories 3 to 7 will be considered as interesting markets and will be chosen for further analyses. These categories will be further grouped into 3 groups. Group 1 will consist of category 3, group 2 will consist of categories 4, 5, and 6 and, lastly, group 3 will contain category 7. In filter three, trade restrictions play a part in further eliminating the number of country-product combinations for analysis.

The distribution of the 83,810 country-product combinations according to the various combinations of fulfilment or non-fulfilment of condition (4) for short-term and long-term market growth, and of condition (5), is shown in Table 5.

Table 5: *Distribution of country-product combinations according to short-term import market growth, long term import market growth and relative import market size, 2004*

Category	Short-term market growth	Long-term market growth	Relative market size	Number of country-product combinations, 2004
0	0	0	0	59,323
1	1	0	0	2,296
2	0	1	0	7,441
3	0	0	1	1,084
4	1	1	0	10,331
5	1	0	1	136
6	0	1	1	1,674
7	1	1	1	1,525
				14,750

Source of data: *authors' own calculations based on DSM results.*

Following Cuyvers *et al.* (1995:179), we will consider further only the country-product combinations which show either sufficient relative import market size or sufficiently high import market growth in the short and long terms. This implies that the country-product combinations in categories 0, 1 and 2 of Table 4 are not selected. This stage of the selection process ends up with 14,750 possible export opportunities for South Africa.

3.4 Filter three: *The selection of realistic export opportunities for South Africa*

The purpose of the third stage of the decision support model used is to analyse further the 14,750 country-product combinations selected in the previous stage according to their “accessibility” for South African exporters. This “accessibility” depends on trade restrictions and other barriers to entry, which can prevent

South African exporters of product group j acquiring a significant market position in country i . The decision support model considers two such barriers: the degree of market concentration, and import restrictions.

Market concentration is measured using the well-known Herfindahl-Hirschmann index (Hirschmann, 1964):

$$HHI_{i,j} = \sum_k \left(\frac{X_{k,i,j}}{M_{tot,i,j}} \right)^2,$$

where $X_{k,i,j}$ is country k 's exports of product group j to country i , and $M_{tot,i,j}$ is country i 's total imports of product group j .

It is assumed that, if an import market is relatively highly concentrated (i.e. supplied by a few countries), it will be more difficult for South African exporters of the product group in question to penetrate that market than if an import market shows a relatively low HHI.

In order to determine whether $HHI_{i,j}$ is sufficiently low, cut-off points are calculated analogously to the procedure outlined in section 3.1, using an average standard deviation σ and a parameter α to be determined. Therefore, the cut-off point for HHI is defined as:

$$h_k = \bar{x}_h - 0.1\alpha\sigma_h,$$

for country-product combinations of category 3 (see Table 5),

$$h_k = \bar{x}_h + 0.1\alpha\sigma_h,$$

for country-product combinations of category 4, 5 or 6 (see Table 5), and

$$h_k = \bar{x}_h + 0.3\alpha\sigma_h,$$

for country-product combinations of category 7 (see Table 5):

$$h_k \geq HHI_{ij}, \tag{6}$$

Subsequently an alpha value of $\alpha = 16.6$ was chosen to calculate the cut-off value in this part of filter three. Using condition (6) we then calculated the cut-off points, which are $h_k = -0.083$ ($k =$ category 3), 0.928 ($k =$ category 4, 5 or 6), and 1.939 ($k =$ category 7). Hence, in relatively large markets, a cut-off point below zero (i.e. negative cut-off point) implies that none of the markets are selected based on concentration. In relatively large and growing markets the degree of concentration is allowed to be higher, and in the most interesting markets (relatively large and growing in both the short and long terms) the cut-off point of larger than 1 implies that all markets in that category are selected. In earlier applications of the DSM to Belgium a more subjective approach was taken in the choice of an appropriate alpha value (Cuyvers et al., 1995:180). However, in Cuyvers (2004:277) a more scientific method, as suggested by Glenn Rayp, was applied to calculate an alpha value that would result in the smallest possible impact on the number of country-product combinations selected. For this reason the same method was applied in this study²⁵.

At this stage of the DSM, the current paper does not include the second part of filter three's methodology followed by Cuyvers, *et al.* (1995) and Cuyvers (1996; 2004) in terms of import restrictions. An alternative methodology was applied. The first reason for not including this specific filter stems from the proxy used within Cuyvers *et al.* (1995) and Cuyvers (1996) to account for import restrictions. The concept of "revealed absence of barriers to trade" was used as an indicator of the ability for a country to export to another market. In the Thailand DSM (Cuyvers, 2004) four ASEAN countries were used as a proxy for "revealed absence of barriers to trade". The four ASEAN countries were Indonesia, Malaysia, the Philippines and Singapore. The

²⁵ For more detail on the method applied to calculate the alpha value, please refer to Cuyvers (2004:277).

notion is that, if at least one of the four ASEAN countries is able to penetrate an export market, Thailand would also be able to penetrate that specific market because of four ASEAN countries' geographic proximity and similar economic structures and level of development (Cuyvers, 2004)²⁶.

These criteria however cannot be used for the South African DSM because such proxy countries with similar characteristics as those surrounding Belgium (OECD countries) and in the Thailand case, ASEAN countries, could not be found for South Africa. As an alternative, an index for market accessibility was constructed using the following five variables: distance, transport cost, the World Bank Logistics Performance Index (LPI), average applied tariffs, and the frequency coverage ratio of non-tariff barriers.

3.4.1 Variable 1: Distance

Countries were divided into coastal countries and landlocked countries. All distances were calculated from Durban harbour to the main port of the coastal countries or the nearest port to the landlocked countries. For coastal countries, data on the nautical miles from Durban harbour to a port in each of the countries was collected from SeaRates.com and Netpas Distance. Nautical miles were converted into kilometres (1 nautical mile = 1.852 kilometres).

For landlocked countries, the distance was calculated based on data on the nautical miles from Durban harbour to the port nearest to the landlocked country (this port is situated in another country) was obtained from the same sources as for the coastal countries. Nautical miles were also converted into kilometres. As-the-crow-flies distances (in kilometres) were then obtained from the port closest to the capital city in the landlocked country by using MapCrow Travel Distance Calculator. Distances to landlocked countries were then calculated as the sum of the kilometres from Durban harbour to the closest port and from the closest port to the capital of the particular landlocked country.

3.4.2 Variable 2: Transport Cost

Quotes for the shipment of a 20-foot container from Durban harbour to as many countries around the world as possible were obtained from three main shipping lines. Based on these quotes, the average shipping cost for each country was calculated. In the case of landlocked countries, the cost of shipment to the nearest port for which a quote was available was used. Only sea transport fees were considered due to time and cost limitations of obtaining road and rail transportation cost per country. Sea transport cost will, however, still be a good indicator of transport cost. Furthermore, domestic logistics cost is also considered in the construction of the logistics performance index of each country (see section 3.4.3).

3.4.3 Variable 3: Logistics Performance Index (World Bank)

The Logistics Performance Index (LPI) that was constructed by the World Bank and built on information from a web-based questionnaire completed by more than 800 logistics professionals worldwide was used. The logistics professionals included the operators or agents of the world's largest logistics service providers. Each respondent was asked to rate the performance in seven logistics areas for eight countries with which they conducted business. For each respondent, the eight countries were automatically generated by the survey engine based on trade flows, income level, geographical position of respondent countries (coastal or

²⁶ In this respect, these four ASEAN countries differ from the other ASEAN members like Laos, Cambodia, Myanmar, etc.

landlocked) and random selection. The performance was evaluated using a 5-point scale (1 being the lowest score and 5 being the highest score).

The seven areas of performance are:

- Efficiency of the clearance process by customs and other border agencies;
- Quality of transport and information technology infrastructure for logistics;
- Ease and affordability of arranging international shipments;
- Competence of the local logistics industry;
- Ability to track and trace international shipments;
- Domestic logistics costs;
- Timeliness of shipments in reaching their destinations;

More than 5000 individual country evaluations (which cover 150 countries) were used to prepare the Logistics Performance Index (LPI). The LPI was aggregated as a weighted average of the seven areas of logistics performance, and constructed using the principal component analysis method in order to improve the confidence intervals. The questionnaire and more information are available at www.worldbank.org/lpi.

3.4.4 Variable 4: Average Applied Tariffs

The latest available simple average of each country's Most Favoured Nation (MFN) applied tariffs for all product categories available in the latest year (mostly 2007) was used. Sources include the UNCTAD TRAINS database and the WTO. Only the average tariff for the Netherlands Antilles was not available. This value was left as a missing value in the dataset and was not taken in consideration in the calculation of the average index of the Netherlands Antilles.

3.4.5 Variable 5: Frequency Coverage Ratio of Non-Tariff Barriers

The unweighted average percentages of non-tariff barriers by country were used in this category. The latest data available varied between countries. The data are based on core non-tariff barriers which are defined as including quantity and price restrictions as well as monopolistic trading channels. The main source for this data is UNCTAD TRAINS. For 19 of the countries that entered filter three, non-tariff barrier percentages were not available. These were also left as missing values in the dataset and were not taken into consideration in the calculation of the average index of those 19 countries.

3.4.6 Construction of an index for market accessibility

Incorporating these five variables, an index for market accessibility was subsequently constructed. Given the fact that all these variables are in different units of measurement (distance – km, price – US\$, LPI – score out of 5, tariffs – percentage and non-tariff barriers – percentage), z-scores for each variable were calculated to standardise the data. The z-score for each variable from each country was calculated as follows:

$$z - score = \frac{\text{actual value} - \text{world average}}{\text{standard deviation for the world}}$$

In this manner, one can easily see if a country scores above or below the world average for the variable.

The z-scores for the different variables from each country were used to arrive at a final index. Because of the fact that the further away from South Africa a country is, the more difficult it would be to export to, the distance z-scores were subtracted when calculating the index. Also, higher cost to export to a particular country would adversely affect its attractiveness. Z-scores for cost were also therefore also subtracted when calculating the index. The higher a country's LPI score, the better. LPI z-scores were therefore added when calculating the index. Also, the higher the tariff/non-tariff barrier the less attractive a country would be, the tariff and non-tariff barrier z-scores were therefore also subtracted when calculating the index. Therefore distance, cost and tariff and non-tariff barriers are negative factors and LPI a positive factor in the calculation of the index.

The researchers first set out to determine how to assign weights to the different variables. There is however no clear indication in the literature hereof. It was therefore decided that no elimination of countries would be done in this part of filter 3. The countries were ranked as most accessible (green), lesser accessible (orange) and least accessible (red) in order for **the dti** to take market accessibility to the different countries under investigation into account in their export promotion activities. Four options of weighing the different variables, together with its results, were provided to **the dti** (Rossouw, Steenkamp and Viviers, 2009). For 60 per cent of the countries under review there was no difference in the classification between the different options. It was argued that **the dti's** practical experience and encounters with the different countries in question might shed light on which weighting to choose.

After reviewing the different options, Mr. R. le Roux (2009), Chief director of **the dti's** Export promotion and development, indicated in a meeting that the best option for weighing the different variables would be as follows: tariff and non-tariff barriers (converted into one variable): 40%, transport cost: 30%, LPI: 20%, distance: 10%. The dti indicated that these weights cannot be considered perfect, but the ranking would at least give some indication of the market accessibility of the different countries included in the DSM. It needs to be stressed again that no elimination of country-product combinations was done in this part of filter 3 and that future studies should be conducted to improve on this part of filter 3 for the application of the DSM for South Africa. In tables 6, 7 and 8 the accessibility ranking, green, orange and red, respectively, are indicated.

Table 6: Most accessible countries based on degree of restriction – “green countries”

Country	Distance (km)	Z-score Distance	Shipping Cost (US\$)	Z-score Cost	LPI	Z-score LPI	Average z-score Tariffs & NTB	Weighted Index
Singapore	9052.576	-0.30917	298.00	-1.67520	4.19	2.274869	-0.86829	1.33577
Hong Kong (China)	11558.33	0.38030	285.00	-1.69938	4.00	1.975583	-1.11987	1.31485
Macau	11526.85	0.37163	614.37	-1.08681	3.32	0.904455	-1.73703	1.16458
United Arab Emirates	7502.452	-0.73569	743.33	-0.84697	3.73	1.550282	-0.98461	1.03156
Brunei	9867.456	-0.08495	577.60	-1.15520	3.48	1.156485	-0.7277	0.87743
Iceland	14001.12	1.05244	1072.50	-0.23478	3.99	1.959831	-1.28916	0.87282
Malaysia	8715.512	-0.40192	577.60	-1.15520	3.48	1.156485	-0.46131	0.80257
Israel	8765.516	-0.38816	908.00	-0.54072	3.21	0.731185	-0.99797	0.74646
Bahrain	7906.188	-0.62460	960.00	-0.44401	3.15	0.636674	-0.938	0.69820
Indonesia	8450.676	-0.47479	504.00	-1.29208	3.01	0.416147	-0.44593	0.69670
Georgia	11010.14	0.22946	1335.00	0.25342	3.15	0.636674	-1.64745	0.68735
Bulgaria	10204.52	0.00779	1335.00	0.25342	2.87	0.195621	-1.73703	0.65713
Kuwait	8248.808	-0.53033	960.00	-0.44401	2.99	0.384643	-0.93087	0.63551
Japan	13973.34	1.04479	715.86	-0.89807	4.02	2.007087	-0.1408	0.62268
Australia	10815.68	0.17595	853.33	-0.64239	3.79	1.644794	-0.24011	0.60012
Switzerland	11379.36	0.33105	997.50	-0.37427	4.02	2.007087	-0.2736	0.59003
Mauritius	2909.492	-1.99946	510.00	-1.28092	2.13	-0.97002	-0.43678	0.56493
Austria	11305.3	0.31067	997.50	-0.37427	4.06	2.070094	-0.16884	0.56277
Philippines	11189.78	0.27889	703.00	-0.92198	2.69	-0.08791	-0.79079	0.54744
Netherlands	12991.78	0.77472	1072.50	-0.23478	4.18	2.259117	-0.16884	0.51232
Oman	5793.056	-1.20604	1060.00	-0.25803	2.92	0.27438	-0.64708	0.51172
Qatar	7833.96	-0.64448	1310.00	0.20692	2.98	0.368892	-1.05627	0.49866
Germany	13178.83	0.82618	1072.50	-0.23478	4.10	2.133102	-0.16884	0.48197
Saudi Arabia	7152.424	-0.83200	1060.00	-0.25803	3.02	0.431899	-0.58282	0.48012
Thailand	10563.81	0.10665	665.00	-0.99265	3.31	0.888704	-0.02552	0.47508
United Kingdom	12671.38	0.68656	1072.50	-0.23478	3.99	1.959831	-0.16884	0.46128
China	12845.47	0.73446	614.37	-1.08681	3.32	0.904455	-0.03934	0.44923
Taiwan	12199.12	0.55661	467.00	-1.36090	3.64	1.408515	0.463823	0.44878
Norway	13736.28	0.97957	1472.50	0.50914	3.81	1.676297	-0.90392	0.44613

Table 7: Lesser accessible countries based on degree of restriction – “orange countries”

Country	Distance (km)	Z-score Distance	Shipping Cost (US\$)	Z-score Cost	LPI	Z-score LPI	Average z-score Tariffs & NTB	Weighted Index
Italy	10219.34	0.01187	997.50	-0.37427	3.58	1.314004	-0.16884	0.44143
Malta	10278.6	0.02817	997.50	-0.37427	3.58	1.314004	-0.16884	0.43980
Belgium	12806.58	0.72376	1072.50	-0.23478	3.89	1.802312	-0.16884	0.42606
France	12447.29	0.62490	1032.50	-0.30917	3.76	1.597538	-0.16884	0.41731
Sri Lanka	6728.316	-0.94870	810.00	-0.72298	2.40	-0.54472	-0.45936	0.38657
New Zealand	12273.2	0.57700	876.67	-0.59899	3.75	1.581786	0.171542	0.36974
Mozambique	2044.608	-2.23744	926.67	-0.50600	2.29	-0.71799	-0.31799	0.35915
Spain	10837.9	0.18207	1122.50	-0.14179	3.52	1.219493	-0.16884	0.33576
Turkey	9928.572	-0.06814	1335.00	0.25342	3.15	0.636674	-0.68486	0.33207
Mongolia	15071.52	1.34696	614.37	-1.08682	2.08	-1.04878	-0.85921	0.32528
Tanzania	3313.228	-1.88837	685.00	-0.95546	2.08	-1.04878	-0.14586	0.32406
Slovenia	10845.31	0.18411	997.50	-0.37427	3.14	0.620922	-0.16884	0.28559
Hungary	11024.13	0.23331	997.50	-0.37427	3.15	0.636674	-0.16884	0.28382
Zambia	2139.592	-2.21130	926.67	-0.50600	2.37	-0.59197	-0.04032	0.27066
Portugal	11169.41	0.27328	1147.50	-0.09530	3.38	0.998967	-0.16884	0.26859
Czech Republic	11411.46	0.33988	997.50	-0.37427	3.13	0.60517	-0.16884	0.26686
Ireland	12580.64	0.66159	1397.50	0.36966	3.91	1.833816	-0.16884	0.25724
Albania	10178.59	0.00066	997.50	-0.37427	2.08	-1.04878	-0.86751	0.24946
The Republic of Korea	14627.1	1.22468	614.37	-1.08681	3.52	1.219493	0.514063	0.24185
Sweden	13619.61	0.94746	1472.50	0.50914	4.08	2.101598	-0.16884	0.24037
Denmark	13551.08	0.92861	1372.50	0.32316	3.86	1.755057	-0.16884	0.22874
Slovakia	11080.34	0.24878	997.50	-0.37427	2.92	0.27438	-0.16884	0.20981
Greece	9850.788	-0.08954	1335.00	0.25342	3.36	0.967463	-0.16884	0.19396
Armenia	11241.92	0.29324	1335.00	0.25342	2.14	-0.95427	-1.2175	0.19080
Bosnia and Herzegovina	11725.01	0.42616	997.50	-0.37427	2.46	-0.45021	-0.51883	0.18715
Moldova	10593.86	0.11492	1335.00	0.25342	2.31	-0.68648	-0.89126	0.13169
Poland	13912.22	1.02798	1072.50	-0.23478	3.04	0.463403	-0.16884	0.12785
Finland	14912.3	1.30315	1472.50	0.50914	3.82	1.692049	-0.16884	0.12289

Table 8: Least accessible countries based on degree of restriction – “red countries”

Country	Distance (km)	Z-score Distance	Shipping Cost (US\$)	Z-score Cost	LPI	Z-score LPI	Average z-score Tariffs & NTB	Weighted Index
Azerbaijan	8985.166	-0.32772	960.00	-0.44401	2.29	-0.71799	-0.23219	0.11525
Viet Nam	11460.18	0.35329	757.50	-0.82062	2.89	0.227125	0.358991	0.11269
Cyprus	8880.34	-0.35656	1335.00	0.25342	2.92	0.27438	-0.16884	0.08204
Romania	10297.12	0.03327	1335.00	0.25342	2.91	0.258628	-0.16884	0.03991
Ukraine	10565.66	0.10716	1335.00	0.25342	2.55	-0.30844	-0.4582	0.03485
Trinidad and Tobago	11758.35	0.43533	1410.00	0.39290	2.75	0.006598	-0.40952	0.00372
Latvia	14312.26	1.13805	1472.50	0.50914	3.02	0.431899	-0.16884	-0.11263
Uzbekistan	9089.67	-0.29896	998.00	-0.37334	2.16	-0.92276	0.197759	-0.12176
Estonia	14397.45	1.16149	1472.50	0.50914	2.95	0.321636	-0.16884	-0.13703
Bangladesh	8730.328	-0.39784	1210.00	0.02094	2.47	-0.43445	0.221003	-0.14179
Netherlands Antilles	12099.12	0.52910	1410.00	0.39290	2.75	0.006598		-0.16946
Lithuania	14023.34	1.05855	1472.50	0.50914	2.78	0.053854	-0.16884	-0.18029
Canada	14641.91	1.22875	2429.25	2.28851	3.92	1.849568	-0.63189	-0.18676
Bhutan	9130.488	-0.28773	1210	0.02094	2.16	-0.92276	0.111374	-0.20661
India	7233.912	-0.80958	1138.25	-0.11250	3.07	0.510659	1.226561	-0.27378
United States	15364.19	1.42749	2393.90	2.22277	3.84	1.723553	-0.31527	-0.33876
Chad	7049.846	-0.86023	1560.00	0.67187	1.98	-1.2063	0.095991	-0.39519
Ecuador	14453.01	1.17678	1410.00	0.39290	2.60	-0.22968	0.420011	-0.44949
Brazil	7543.196	-0.72448	1410.00	0.39290	2.75	0.006598	1.158991	-0.50770
Barbados	11412.02	0.34004	1410.00	0.39290	2.75	0.006598	0.914347	-0.51629
Maldives	5980.108	-1.15457	810.00	-0.72298	2.4	-0.54472	1.88174	-0.52929
St.Kitts and Nevis	12065.78	0.51992	2393.90	2.22277	3.84	1.723553	0.412735	-0.53921
Peru	12404.7	0.61318	2210.00	1.88075	2.77	0.038102	0.13805	-0.67314
Russia	16645.78	1.78013	1472.50	0.50914	2.37	-0.59197	0.58358	-0.68258
Kazakhstan	10198.24	0.00606	2177.06	1.81949	2.12	-0.98577	0.055486	-0.76580
Mexico	15253.07	1.39692	2393.90	2.22277	2.87	0.195621	1.251874	-1.26815
Equatorial Guinea	5615.264	-1.25496	3010.00	3.36860	2.49	-0.40295	1.415958	-1.53206
Bahamas	13877.04	1.01830	2393.90	2.22277	3.84	1.723553	3.619465	-1.87174

In filter four a country-product combination will be considered for further investigation if condition (6) is satisfied. This is the case for 12,695 country-product combinations.

3.5 Filter four and results: An analysis of South Africa’s realistic export opportunities

In this section we analyse the 12,695 realistic export opportunities detected according to their product group, the geographical markets involved, and some major characteristics of these markets.

The process up to this stage of the model is summarised in table 9.

Table 9: Selection of realistic export opportunities for South Africa, 2004

Filter one: Country risk rating and macroeconomic analysis	Filter two: Detecting possible export opportunities	Filter three: Realistic export opportunities	Filter four: Final analysis of export opportunities
<ul style="list-style-type: none"> Country risk rating (critical value 9.29, 193 countries selected). Selection on the basis of macroeconomic indicators. GDP and GDP per capita – 95 countries selected. GDP growth and GDP per capita growth – 98 countries selected. 85 countries selected to enter filter two. 	<ul style="list-style-type: none"> 83,810 country-product combinations. Category 3 – 0 Category 4, 5, 6 – 11,272 Category 7 – 1,483. 14,750 country-product combinations selected. 	<ul style="list-style-type: none"> Herfindahl-Hirschmann Index (Degree of Market Concentration). 12,695 country-product combinations selected. Market accessibility index: ranking of 85 countries. 	<ul style="list-style-type: none"> Criteria of filters 2, 3 & 4. 12,695 country-product combinations analysed and classified.

Source: Decision support model analyses conducted by the authors.

When analysing the 12,695 country-product combinations identified in filters one to three, the following product groups were identified as having the highest export potential for South Africa (shows potential in the highest number of countries):

- Wine of fresh grapes (including fortified wine); grape must in fermentation or with fermentation arrested (SITC 1121): 60 country-product combinations.
- Non-alcoholic beverages, n.e.s. (SITC 1110): 57 country-product combinations.
- Paper and paperboard, uncoated, n.e.s., in rolls or sheets (SITC 6415): 57 country-product combinations.
- Aluminium and aluminium alloys, worked (SITC 6842): 56 country-product combinations.
- Iron or non-alloy steel flat-rolled products, not clad, plated or coated, hot-rolled only, specified yield points based on thickness (SITC 6731): 55 country-product combinations.
- Iron and non-alloy steel flat-rolled products, not clad, plated, etc., cold-rolled (cold-reduced) only, specified yield points based on thickness (SITC 6733): 55 country-product combinations.
- Iron and steel railway and tramway track construction material (SITC 6770): 55 country-product combinations.
- Overcoats, car coats, capes, anoraks (including ski-jackets), etc. (except suit-type jackets), of woven textile fabrics, women's or girls' (SITC 8421): 52 country-product combinations.
- Juices; fruit and vegetable (including grape must) unfermented (SITC 0585): 50 country-product combinations.
- Fertilisers, n.e.s. (imports only) (SITC 5629): 50 country-product combinations.
- Millstones, grinding wheels and the like, without frameworks, for grinding, sharpening, trueing, etc., of natural or artificial abrasives or ceramics (SITC 6631): 50 country-product combinations.
- Crustaceans and molluscs, fresh, chilled, frozen etc. (SITC 0360): 49 country-product combinations.
- Colouring matter n.e.s.; preparations based on colouring matter, n.e.s.; inorganic products used as luminophores (SITC 5331): 49 country-product combinations.
- Passenger motorcars, for transport of passengers and goods (SITC 7810): 49 country-product combinations.
- Minerals, crude, n.e.s. (SITC 2789): 47 country-product combinations.
- Bulbs, tubers, and rhizomes of flowering or of foliage plants; cuttings, slips, live trees and other plants (SITC 2926): 47 country-product combinations.
- Aldehyde-, ketone- and quinone-function compounds (SITC 5162): 47 country-product combinations.
- Inorganic acids and oxygen compounds of non-metals (SITC 5222): 47 country-product combinations.
- Metallic oxides of zinc, chromium, manganese, iron, etc. (SITC 5224): 47 country-product combinations.
- Organic surface-active agents other than soap; surface-active, washing and cleaning preparations, whether or not containing soap, n.e.s. (SITC 5542): 47 country-product combinations.
- Sacks and bags of textile materials used for packing goods (SITC 6581): 47 country-product combinations.
- Monumental or building stone and articles thereof (SITC 6613): 47 country-product combinations.
- Statuettes and other ornaments, and articles of adornment (SITC 6666): 47 country-product combinations.
- Trousers, breeches etc. of textile fabrics (SITC 8423): 47 country-product combinations.
- Fluorides; fluorosilicates, fluoroaluminates and other complex fluorine salts (SITC 5231): 46 country-product combinations.

The 85 countries under investigation were also ranked in table 10 according to export potential for South African products. As can be seen in table 10, these export opportunities are geographically diverse, with some European countries showing the largest numbers (e.g. Germany, France, Italy, the UK and the Netherlands), with countries of the Pacific Rim (the US, Japan, Hong Kong, Korea, China and the other ASEAN-5 countries) coming close.

Table 10: Realistic export opportunities per country, 2004

Rank in 2004	Country	Number of opportunities in 2004	Rank in 2004 (continued)	Country (continued)	Number of opportunities in 2004 (continued)
1	Germany	354	44	Albania	136
2	France	315	45	Iceland	136
3	Italy	288	46	Sweden	136
4	China	274	47	Thailand	136
5	Belgium-Luxembourg	273	48	Oman	135
6	UK	273	49	Singapore	135
7	Turkey	261	50	Switzerland	128
8	Netherlands	250	51	Sri Lanka	127
9	Spain	249	52	Azerbaijan	125
10	Poland	243	53	Finland	125
11	Russia	234	54	Estonia	122
12	Ukraine	232	55	Philippines	118
13	Romania	231	56	Mongolia	113
14	USA	230	57	Bangladesh	109
15	India	213	58	Norway	109
16	Japan	213	59	Peru	108
17	Kazakhstan	209	60	Tanzania	106
18	Czech Republic	207	61	Ireland	105
19	Bulgaria	200	62	Saudi Arabia	103
20	Indonesia	198	63	Ecuador	101
21	Malaysia	192	64	Malta	100
22	Bosnia Herzegovina	191	65	Portugal	98
23	Lithuania	189	66	Mauritius	96
24	Austria	186	67	Kuwait	95
25	Slovakia	180	68	Mozambique	94
26	Moldova	178	69	Vietnam	93
27	Georgia	176	70	Qatar	92
28	Republic of Korea	175	71	Israel	88
29	Hungary	172	72	Uzbekistan	87
30	Latvia	159	73	Armenia	81
31	Australia	155	74	Equatorial Guinea	78
32	Canada	153	75	Trinidad Tobago	78
33	Greece	151	76	Netherlands Antilles	77
34	Hong Kong	150	77	St. Kitts Nevis	70
35	Maldives	149	78	Barbados	69
36	Slovenia	149	79	Zambia	69
37	Brazil	148	80	Bahrain	68
38	Denmark	146	81	Bahamas	60
39	Macau	145	82	Brunei	48
40	New Zealand	143	83	Chad	32
41	Cyprus	142	84	Mexico	32
42	United Arab Emirates	142	85	Bhutan	21
43	Taiwan	138			

Source of data: authors' own calculations based on DSM results.

The distribution of realistic export opportunities according to the 12 identified regional clusters is shown in Table 11. From Table 11, it can be seen that the EU and Asia have the highest shares in the number of realistic export opportunities found.

Table 11: South Africa: distribution of realistic export opportunities according to regional clusters, 2004

Regional cluster	Number of opportunities 2004	Percentage
Africa	475	3.74
Asia	2,872	22.62
Western Europe	2,961	23.32
Middle Europe	1,660	13.08
Eastern Europe	1,110	8.74
Scandinavia	652	5.14
Baltic States	470	3.70
Middle East	1,071	8.44
Australasia	298	2.35
North America	415	3.27
South America	357	2.81
Caribbean	354	2.79
Other	0	0.00
	12,695	100.00

Source of data: authors' own calculations based on DSM results.

Realistic export opportunities can further be grouped according to their relative market importance for South Africa and according to their relative size and growth rate. Table 12 shows this tentative grouping.

Table 12: South Africa's realistic export opportunities according to relative market position and market characteristics, 2004

	Market share of South Africa relatively small	Market share of South Africa intermediately small	Market share of South Africa intermediately high	Market share of South Africa relatively high	Total
Large product/market	(Cell 1) 0	(Cell 6) 0	(Cell 11) 0	(Cell 16) 0	0
Growing (long- and short term) product/market	(Cell 2) 7277	(Cell 7) 290	(Cell 12) 107	(Cell 17) 1804	9478
Large product/market short term growth	(Cell 3) 106	(Cell 8) 5	(Cell 13) 1	(Cell 18) 6	118
Large product/market long term growth	(Cell 4) 1267	(Cell 9) 288	(Cell 14) 33	(Cell 19) 21	1609
Large product/market short- and long term growth	(Cell 5) 1307	(Cell 10) 129	(Cell 15) 21	(Cell 20) 33	1490
Total	9957	712	162	1864	12695

Source of data: authors' own calculations based on DSM results

The categorisation in table 12 was done by calculating a relative market importance for South Africa's exports in the different country-product combinations (vertical classification – small market share to high market share) and using the categories identified in filter two (horizontal classification - category 3: large product market to category 7: large market with short- and long-term growth).

The calculation of South Africa's relative market share for each country-product combination is subsequently discussed. For each chosen exporting country n (South Africa in this case), the degree of market importance of country n 's exports of product group j to country i is defined as:

$$M_{n,i,j} = \frac{\frac{X_{n,i,j}}{X_{World,i,j}}}{\frac{X_{n,j}}{X_{World,j}}},$$

where $X_{n,i,j}$ is country n 's exports of product group j to country i , $X_{World,i,j}$ is the world's exports of product group j to country i , $X_{n,j}$ is country n 's total exports of product group j , and $X_{World,j}$ is the world's total exports of product group j .

A comparison can now be made for any particular country-product combination selected in the previous section of South Africa's $\mu_{SA,ij}$ with $\mu_{Six,ij}$, the combined degree of market importance of the six exporting countries with the largest exports of the product category to the country in question. By calculating the difference between South Africa's degree of market importance and that of the six dominant exporting countries of product group j to country i , we can now determine whether South Africa's relative market share is large or small. We are therefore using the following rules as suggested by Cuyvers (2004:267):

- $\mu_{SA,ij} - \mu_{Six,ij} > 3$: the relative market share of South Africa is relatively small;
- $1.5 \leq \mu_{SA,ij} - \mu_{Six,ij} \leq 3$: the relative market share of South Africa is intermediately small;
- $0 \leq \mu_{SA,ij} - \mu_{Six,ij} \leq 1.5$: the relative market share of South Africa is intermediately high; and
- $\mu_{SA,ij} - \mu_{Six,ij} \leq 0$: the relative market share of South Africa is relatively high.

Table 12 shows the distribution of realistic export opportunities for 2004 according to the characteristics of the foreign markets and South Africa's relative market share.

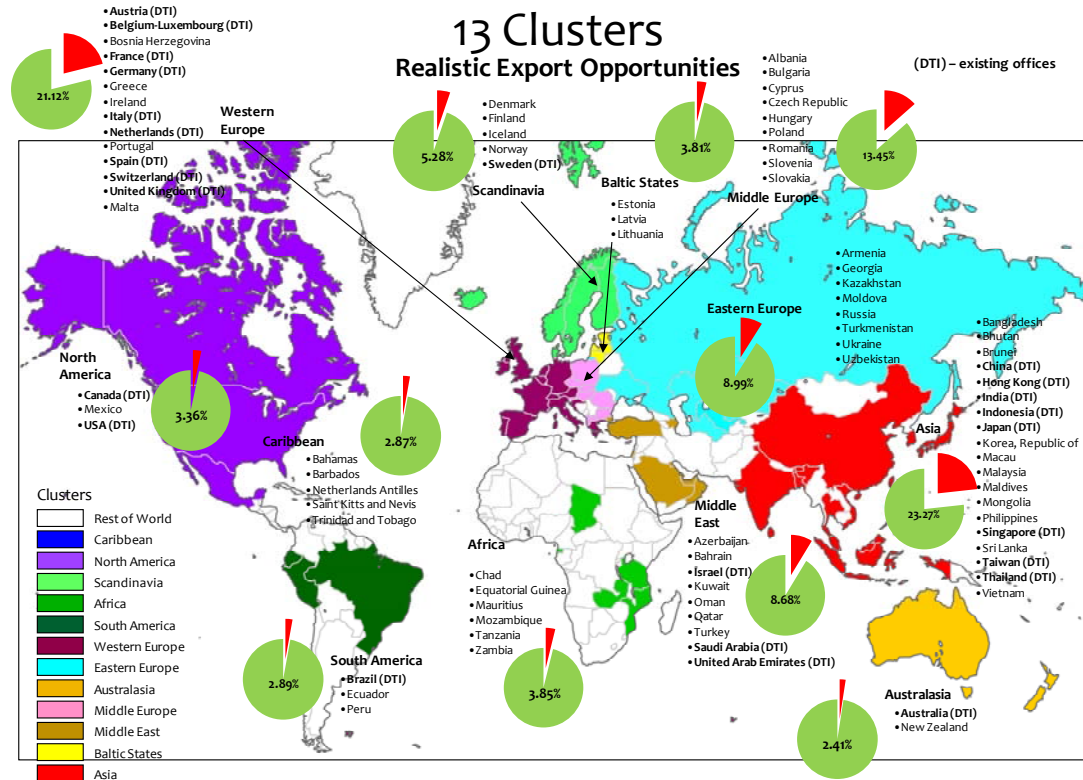
As stated in section 2.1.2.2.2.6, these results could be used to derive appropriate export promotion strategies in relevant export markets (Cuyvers *et al.*, 1995:174). From Table 12, it can be seen that about 78 percent of the realistic export opportunities found for 2004 correspond to country-product combinations with a relatively small market share for South Africa (cells 1 to 5). Cuyvers (2004:270) recommended that, in the case of Thailand, country-product combinations in cells 1 to 5 should not be actively promoted due to the relatively limited resources of Thailand's Department for Export Promotion. It can be argued that the same applies for South Africa and that a policy option could be not to promote actively the export opportunities in these cells of Table 12, but rather to gather and disseminate market information regarding these opportunities to South African exporters. It could also be argued, as in the Thai case, that export opportunities in cells 6 to 10 (representing some 6 per cent of all realistic export opportunities in 2004) should also not be actively promoted, although these opportunities could be explored in greater depth using the official trade counsellors at South African embassies abroad and the services of **the dti**.

As recommended by Cuyvers (2004:270) in the Thai case, an active and offensive export promotion strategy of "market expansion" can be implemented by South Africa's TPO for the country-product combinations in cells 11 to 15. This strategy is recommended because South African exporters have already gained some market share in these markets and this experience can be utilised for future expansion of South Africa's market share.

For the country-product combinations in cells 16 to 20 (which account for 15 per cent of all realistic export opportunities in 2004) in which South Africa already has a relatively large market share, a defensive export promotion strategy of "market maintenance" would be appropriate.

Another presentation of the results was done after consultation with **the dti**'s Chief Director of Export Promotion and Development. The 12,695 realistic export opportunities were clustered according to regions in the world as deemed important by **the dti**. The 13 regional clusters identified in collaboration with **the dti** include: Africa, Asia, Western Europe, Middle Europe, Eastern Europe, Scandinavia, the Baltic States, the Middle East, Australasia, North America, South America, and the Caribbean. The 13 clusters are illustrated in Figure 4.

Figure 4: Global clusters according to overall share of realistic export opportunities in 2004



Source: Compiled by the authors.

From figure 4 it is clear that 23.27% of the realistic export opportunities identified for South Africa are in Asia and 21.12% in Western Europe. Clusters with the least opportunities are Australia (2.41%), the Caribbean (2.87%), South America (2.89%), North America (3.36%) and Africa (3.85%). This is a more visual presentation of the results in table 11.

Although one of the main benefits of the DSM is that it provides a tool to assist export promotion authorities to decide how to allocate their scarce resources to export promotion activities in various markets, the list of realistic export opportunities should not be considered as guaranteeing future success. It would therefore be unwise to rest all export promotion decisions upon the model alone. Other considerations, such as feedback from foreign trade offices (on the demand side of exports) and export councils (on the supply side), should also be taken into consideration.

4. POLICY IMPLICATIONS AND CONCLUSION

Export promotion activities by governments are, to a large extent, driven by historical trends and trading partners (DTI, 2005). However, the limited resources of government should be allocated in such a manner that they contribute towards successful exports and increase export growth in the future. The dti indicated that further research on export promotion in South Africa would greatly assist senior management in ensuring that government resources are used with maximum return on investment by determining priority products and markets (Erero, 2004). In order to determine these priority country-product combinations, a decision support model (DSM) was applied to the South African export market and will provide the dti with a tool to justify export promotion activities more scientifically.

The methodology of the DSM developed by Cuyvers *et al.* (1995:173-186), Cuyvers (1996:71-96) and Cuyvers (2004:255-278) was discussed. The DSM consists of a sequential filtering process eliminating countries with lower export potential with the use of four filters. The first filter considers the macro-economic environment of the trading partner. Indicators such as country risk ratings; GDP (GDP per capita) and GDP growth (GDP per capita growth) play a role in the selection process.

In filter two, import market growth in the short and long term, and relative market size were considered for each country-product combination. Table 4 is constructed to show the categories that will be used for further analysis. In filter three, the Herfindahl-Hirschmann Index gives an indication of the market concentration of the importing countries and barriers to entry. In filter four, realistic export opportunities identified in the previous filters were classified. This classification was done by calculating South Africa's relative market importance for each country-product combination and combining this with the categorisation in filter two (see Table 12).

After the application and adaptation of the DSM, 12,695 country-product combinations were identified as realistic export opportunities. After the identification of the 12,695 country-product combinations, **the dti** indicated that a clustering process would enable them to deploy their limited resources better. The clustering process will enable **the dti** to focus on specific regions and products when developing their export promotion strategies.

In conclusion, future research should aim to develop a more robust index to account for import restrictions. Furthermore, an attempt could be made to increase the product-specificity of the DSM by using a less aggregated product classification (e.g. six-digit instead of four-digit trade data). Future studies may also include specific country-product studies to account for the qualitative issues that cannot be captured in a model. In-depth analyses of the results of specific continents could also be conducted. The robustness of the model could also be tested by varying cut-off values and comparing the results. Furthermore, it is recommended that the DSM results should form part of an overall strategy towards increasing exports through utilising government resources; and **the dti's** current export promotion programmes should be correlated with the realistic export opportunities identified with the DSM. The DSM results can also be used to evaluate the appropriateness of current export promotion offerings. Ultimately the results of this study can contribute to more efficient export assistance in South Africa.

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