

**The identification of export opportunities for South African products with
special reference to Africa**

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SUMMARY

This thesis identifies realistic export opportunities for South African products in the rest of the world and specifically in the rest of the *African* continent. The method chosen to achieve this goal is the Decision Support Model (DSM) developed by Cuyvers *et al* (1995) and Cuyvers (1997) that was specifically designed to assist export promotion institutions in planning and assessing their export promotion activities. This model is positioned into the international market selection literature and four main refinements to the DSM methodology are introduced to address the limitations of the model and to make it more applicable for the South African international trade conditions. The refined model is then applied to identify product-country combinations with the largest export potential for South Africa in the rest of the world and in the rest of the African continent specifically.

The refinements to the DSM filtering process introduced in this study contribute to the effective use and application of the DSM results by South African exporters and more focused export promotion activities by South African export promotion organisations. The four refinements include (i) running the DSM on a HS 6-digit level, (ii) introducing a method to calculate the potential export value of each identified export opportunity in order to prioritise between the product-country combinations identified as realistic export opportunities, (iii) taking the production capacity of South Africa into consideration in order to identify export opportunities that can be pursued immediately due to the country's existing revealed comparative advantage in the production and exportation of these products and (iv) developing a market accessibility index per product-country combination from a South African point of view on a HS 6-digit level in order to make filter 3.2 (barriers to trade) of the DSM applicable for South African conditions.

The results of the application of the refined DSM to identify export opportunities for South Africa in the rest of the world include the top 50 worldwide export opportunities. There are 17 countries in which the top 50 worldwide product-country combinations identified as export opportunities for South Africa are located. These include the United States, Japan, India, the United Kingdom, Canada, China, Germany, Israel, Hong Kong, the Netherlands, Australia, Belgium, Singapore, Indonesia, Saudi Arabia, Italy and Brazil. Mineral products (coal, copper and aviation spirit); transportation products (1500 – 3000 cc automobile engines and diesel powered trucks); stone/glass (diamonds, platinum and rhodium) and metals (aluminium,

iron/steel structures, nickel) are the product classifications within the top 50 worldwide product-country combinations that hold the largest worldwide export potential for South Africa.

In terms of the product-country combinations with the highest export potential for South Africa in the rest of the African continent, there are 18 countries in which the top 50 product-country combinations for South Africa in the rest of the African continent are located. These include Nigeria, Namibia, Ghana, Morocco, Egypt, Zambia, Tunisia, Kenya, Uganda, Zimbabwe, Botswana, Mauritius, Tanzania, Senegal, Mozambique, Algeria, Malawi and Cote d'Ivoire. The products with the highest potential export values in the top 50 product-country combinations for South Africa in Africa include mineral products (aviation spirit, iron ore, sulphur and coal) and transportation products (1500 – 3000 cc automobile engines and diesel powered trucks weighing less than 5 tons).

Key words: International market selection, export opportunities, product-country combinations, export promotion, South Africa, Africa.

OPSOMMING

Hierdie proefskrif identifiseer realistiese uitvoergeleenthede vir Suid-Afrika in die res van die wêreld en spesifiek in die res van die Afrika-kontinent. Die metode wat gekies is om hierdie doel te bereik is die besluitnemingsondersteuningsmodel wat ontwikkel is deur Cuyvers *et al* (1995) en Cuyvers (1997) om uitvoerbevorderingsinstansies te ondersteun in die beplanning en evaluering van hulle uitvoerbevorderingsaktiwiteite. Hierdie model is in die literatuur aangaande die identifisering van internasionale uitvoermarkte geposisioneer en vier aanpassings is aan die metode van die model aangebring om die tekortkominge van die model aan te spreek en om die resultate meer toepaslik vir die Suid-Afrikaanse internasionale handelsomstandighede te maak. Die aangepaste model is toegepas om realistiese produk-landkombinasies met die grootste uitvoerpotensiaal vir Suid-Afrika in die res van die wêreld en spesifiek in die res van die Afrika-kontinent te identifiseer.

Die aanpassings wat in hierdie studie aan die model aangebring is, dra by tot die effektiewe gebruik en toepassing van die resultate deur Suid-Afrikaanse uitvoerders en meer gefokusde uitvoerbevorderingsaktiwiteite deur Suid-Afrikaanse uitvoerbevorderingsorganisasies. Die vier aanpassings sluit in (i) die gebruik van HS 6-syfer produkklasifikasies (wat meestal gedurende die uitvoerproses deur uitvoerders gebruik word om hul produkte te identifiseer), (ii) die bekendstelling van 'n nuwe metode om die uitvoerpotensiaal van elke uitvoergeleentheid in waarde (VSA dollarwaarde) uit te druk om sodoende tussen geleenthede te kan prioritiseer, (iii) die inagneming van Suid-Afrika se produksiekapasiteit om sodoende die uitvoergeleenthede te identifiseer wat onmiddellik bevorder kan word, aangesien Suid-Afrika reeds 'n mededingende voordeel in die produksie en uitvoer daarvan het en (iv) die ontwikkeling van 'n marktoeganklikheidsindeks per produk-landkombinasie vanuit 'n Suid-Afrikaanse oogpunt op 'n HS 6-syfervlak om sodoende filter 3.2 (handelsbeperkings) van die model toepaslik vir Suid-Afrikaanse omstandighede te maak.

Die resultate van die toepassing van die aangepaste model om uitvoergeleenthede vir Suid-Afrika in die res van die wêreld te identifiseer sluit die top 50 wêreldwye uitvoergeleenthede in. Daar is 17 lande waarin hierdie top 50 geleentheid geleë is. Hierdie lande is die Verenigde State van Amerika, Japan, Indië, die Verenigde Koninkryk, Kanada, Sjina, Duitsland, Israel, Hongkong, Nederland, Australië, België, Singapoer, Indonesië, Saoedi-Arabië, Italië en Brasilië. Minerale (steenkool, koper, vliegtuigbrandstof); vervoerprodukte (1500 – 3000 cc motorenjins

en dieseltrokke), steen en glas (diamante, platinum en rodium) asook metale (aluminium, yster/staalstrukture en nikkel) is produkklassifikasies binne die top 50 produk-landkombinasies met die hoogste wêreldwye uitvoerpotensiaal vir Suid-Afrika.

Daar is 18 lande waarin die top 50 produk-landkombinasies vir Suid-Afrika in die res van die Afrika kontinent, geleë is. Hierdie lande sluit in Nigerië, Namibië, Ghana, Marokko, Egipte, Zambië, Tunisië, Kenia, Uganda, Zimbabwe, Botswana, Mauritius, Tanzanië, Senegal, Mosambiek, Algerië, Malawi en die Ivoorkus. Die produkklassifikasies met die hoogste uitvoerpotensiaal binne die top 50 produk-landkombinasies sluit in minerale (vliegtuigbrandstof, ystererts, sulfaat en steenkool) en vervoerprodukte (1500 – 3000 cc motorenjins en dieseltrokke wat minder as 5 ton weeg).

Sleutelwoorde: identifisering van internasionale uitvoermarkte, uitvoergeleenthede, produk-land kombinasies, uitvoerbevordering, Suid-Afrika, Afrika.

ABBREVIATIONS

AU	African Union
BRIC	Brazil, Russia, India and China
CIF	Carraige, Insurance and Freight
DSM	Decision Support Model
DTI	Department of Trade and Industry
EU	European Union
FOB	Free on Board
GDP	Gross Domestic Product
GNP	Gross National Product
HHI	Herfindahl-Hirshmann Index
HS	Harmonised System
ITC	International Trade Centre
ITPC	Investment and Trade Policy Centre
LPI	Logistics Performance Index
NEPAD	The New Partnership for Africa's Development
NTB	Non-tariff Barrier
NTL	National Tariff Line
OECD	Organisation for Economic Co-operation and Development
ONDD	<i>Office National du Ducroire</i>
OTRI	Overall trade restrictiveness index
RCA	Revealed Comparative Advantage
SACU	Southern African Customs Union
SADC	Southern African Development Community
SI	Specialisation Index
SITC	Standard International Trade Classification
TISA	Trade and Investment South Africa
TOM	Trade Opportunity Matrix
TPO	Trade Promotion Organisation
TRAINS	Trade Analysis and Information System
TTRI	Tariff trade restrictiveness index
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development

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CHAPTER 1: INTRODUCTION

1.1 Background

Public policy makers regard export development as an economic tool that enables a nation to employ citizens, build overseas exchange reserves and ultimately create a higher standard of living (Shankarmahesh, Olsen and Honeycutt, 2005:203; Edwards and Stern, 2007:1-22).

However, governments and individual firms that want to stimulate growth through export development must distinguish between a vast number of export combinations due to the fact that in most circumstances a large number of export opportunities exists, and only a limited number of these can be explored because of scarce resources (Papadopoulos and Denis, 1988:38).

Therefore, the challenge that governments and individual firms face is in choosing specific markets for export promotion (Shankarmahesh *et al*, 2005:204). In order to yield a higher return on investment and to make sure that resources are not wasted on less attractive export markets, they should focus their efforts and resources on a limited set of export markets that holds the highest export potential (Shankarmahesh *et al*, 2005:204). Furthermore, selecting the “right” market is important as a first step to ensure export success (Papadopoulos and Denis, 1988:38).

Rahman (2003:119) stated that the biggest reason for export failures is poor market selection, resulting from inappropriate evaluation of the markets. He also stated that such market failures are almost always more expensive than the cost associated with the systematic evaluation of markets. He recommended that computer-based decision support systems be developed to support governments and exporters in the international market selection processes in order to overcome a significant research gap in this area.

Cuyvers, De Pelsmacker, Rayp and Roozen (1995:173-186) and Cuyvers (1997:3-21)¹ developed a Decision Support Model (DSM) specifically to assist export promotion institutions in planning and assessing their export promotion activities. This DSM uses a sequential filtering

¹ The DSM was first developed by Cuyvers, De Pelsmacker, Rayp and Roozen in 1995 and applied for Belgium in order to assist the Belgian export promotion institution, Export Vlaanderen in planning and assessing export promotion activities. The model was further developed and applied by Cuyvers in 1997 for Thailand. Due to the additional developments in 1997, this study refers to the DSM developed by Cuyvers *et al* (1995) and Cuyvers (1997). The DSM was again applied by Cuyvers for Thailand in 2004.

process to identify realistic export opportunities² for a particular exporting country. A limited list of product-country combinations on which the export promotion agency can focus its export promotion efforts is therefore provided.

The DSM's filtering process includes four filters. In short, *filter 1* examines the risk and macro-economic size and growth of all worldwide countries. Countries that hold too high a political and/or commercial risk (filter 1.1) or show too low macroeconomic size and growth (filter 1.2) are eliminated in filter 1. In *filter 2*, a more specific assessment of the demand in the remaining countries for each of the products under investigation is done to identify the market potential of each possible product-country combination (market). The main criteria that are used in this filter are the growth rate of imports of a given product group by a given country (short and long-term import growth) and the value of imports of a given product group by a given country (import market size). In *filter 3*, 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) (filter 3.1) and trade restrictions (market accessibility) (filter 3.2). Markets that are highly concentrated or difficult to access by the exporting country are eliminated in filter 3. In *filter 4*, the export opportunities (product-country combinations) that were identified in filters 1 to 3 are categorised according to import market size and growth on the one hand, and the exporting country's current market share on the other (Cuyvers, 2004:267) (see sections 3.2.1 to 3.2.4 for a detailed discussion of each of the four filters).

The Department of Trade and Industry (DTI), as the export promotion authority in South Africa, also faces the market selection challenge described above as expressed in the National Export Strategy (DTI, 2006): *"...government is faced with an array of existing and potential markets offering commercial export opportunities. The challenge lies in how to select and prioritise markets from a global list of prospects..."* In light hereof, the DTI commissioned a study by Viviers and Pearson in 2007 to also apply the Decision Support Model (DSM) for the South African conditions.

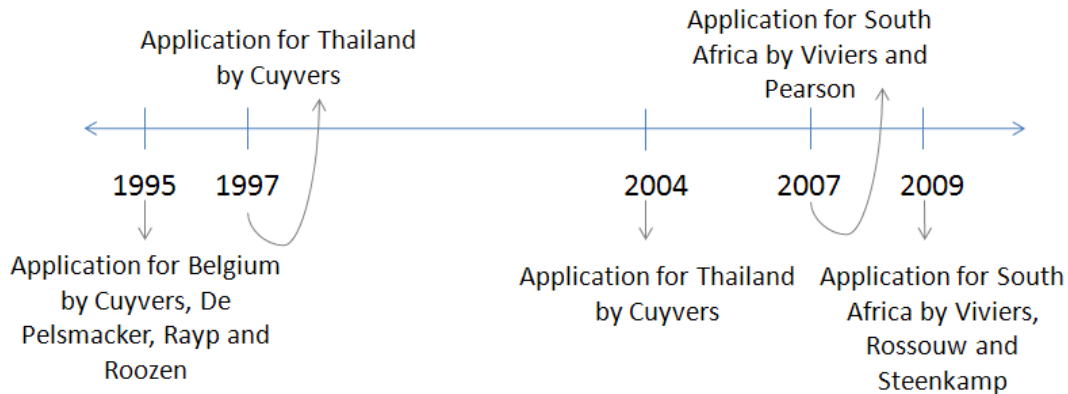
Due to the fact that the trade data used in the 2007 application of the DSM for South Africa were for 2000 to 2002 (Viviers and Pearson, 2007), the DTI commissioned the researchers to rerun

² An export opportunity refers to a specific product, produced by the exporting country, that shows export potential in a specific importing country (product-country combination). The term "market" also refers to a product-country combination.

the model in 2009 with the most recent (2002 to 2004) available trade data³ (Viviers, Rossouw and Steenkamp, 2009).

To illustrate the sequence of the different applications of the DSM, see Figure 1.1.

Figure 1.1: Time line for the previous applications of the DSM⁴



1.2 Problem statement

The main limitations of the previous applications of the DSM (see Figure 1.1) are the following:

- The methodology of the DSM has never been analysed and positioned within the context of the international market selection literature.
- SITC 2-digit (Belgian application) and 4-digit level (Thai and South African applications) trade data were used. These product categorisations are rather aggregated⁵. Exporters use the Harmonised System (HS) six-digit level product classification to specify their goods in export ventures and in their export documentation (Tempier, 2010). The HS 6-digit level product classification is also the most disaggregated level of product specifications that is standardised throughout the world⁶ (Tempier, 2010). The

³ World Trade Analyzer data, Statistics Canada on an SITC 4-digit level. The lag in available data is due to the time it takes to audit the trade data. In other words, reported and mirror data are matched by Statistics Canada, causing the lag in data availability.

⁴ The DSM was again refined and applied for South Africa in 2010 (Viviers, Steenkamp and Rossouw, 2010). However, this PhD study forms part of the 2010 refinement and rerun of the DSM for the DTI and therefore only the 1995 to 2009 applications of the DSM are considered “previous applications of the DSM”.

⁵ For example, the SITC 4-digit level code 0571 includes oranges, mandarins, clementines and other citrus fruits. If this product group should be selected by the DSM, there is no clear indication whether the export opportunity is for oranges or mandarins or clementines or lemons or limes or grapefruit or any other citrus fruit.

⁶ Standard product codes are used all over the world on a HS 6-digit level. For any higher level of product specification (8-digit, 10-digit or 12-digit level) the codes used are not standardised over the world and the code for a particular product, namely the national tariff line (NTL), in one country could differ from the NTL code used in another country.

introduction of HS 6-digit level trade data would therefore contribute to the effective use and application of the results of the DSM by export promotion organisations and exporters.

- Although the DSM provides lists of export opportunities, it is still difficult to prioritise between these opportunities. The only way one could prioritise between countries (or products) is to compare the total number of opportunities identified for each country (or product). For example, in the 2009 application of the DSM for South Africa, Turkey ranked in the seventh place with 261 products identified as export opportunities and the United States only ranked 14th with 230 products. It might, however, be that the potential export value of the 230 products in the United States exceeds the potential export value of the 261 products in Turkey. Therefore, the number of opportunities of a country is not necessarily an indication of the potential export value. Another example is small wares and toilet articles, which have export opportunities in 41 countries and rank second when compared with other products, while motor vehicles for the transportation of goods or materials ranked 20th with opportunities in 35 countries. Again, the size of the export opportunities was not considered and a ranking based on the number of opportunities is not accurate. A ranking method to prioritise the export opportunities based on the size of the export potential of every export opportunity will therefore greatly contribute to the practical implementation of the DSM results.
- The DSM mostly focuses on the demand potential (size, growth, competitors, market access) for products in different countries and does not take into consideration the production capacity of the exporting country. It may therefore be that there are export opportunities identified for a specific product in many countries, but the exporting country does not have the excess capacity to produce more of this product. If the national export promotion agency for which the DSM is applied therefore prefers to only consider the export opportunities that present an immediate opportunity, a way of taking the production capacity of the exporting country into consideration should be introduced in the DSM filtering process.
- An index for “revealed absence of barriers to trade” was used as a proxy for trade barriers in the second part of filter 3 in the Belgian and Thai studies. It was argued that if Belgium’s (or Thailand’s) neighbours could successfully export a particular product to a country, it would not be too difficult for Belgium (or Thailand) to also be able to overcome the trade barriers in that market (Cuyvers *et al*, 1995:181; Cuyvers, 1997:3-21; Cuyvers, 2004:262). In the application of the DSM to identify realistic export opportunities for South Africa, this second part of filter 3 could not be applied in the same way. The reason for this is that South Africa’s neighbouring countries do not have many similar characteristics

to South Africa and the proxy for revealed absence of trade barriers could not be used (Viviers and Pearson, 2007). Therefore a different approach needed to be followed. In the first application of the DSM for South Africa, Viviers and Pearson (2007) used crow-fly distances between Pretoria, South Africa and the capital cities of the countries that entered filter 3 as a measure of trade barriers. This proxy can, on its own, not be considered an accurate estimation of market accessibility and another proxy for market accessibility had to be found (Viviers *et al*, 2009:68). In the second application of the DSM for South Africa (Viviers *et al*, 2009; Steenkamp *et al*, 2009:22-26), an index for market accessibility was constructed by using distance, transport cost, the World Bank Logistics Performance Index (LPI), average applied tariffs per country and the frequency coverage ratio of non-tariff barriers per country (Steenkamp *et al*, 2009:22). The main limitation of this measure of market accessibility (or barriers to trade) is that the index was only calculated on a country level and not a product-country level. A country can therefore perform well overall in terms of this measure/index, but specific products can still be highly protected or restricted in that country. With the purpose of the DSM to identify product-country combinations with the largest export potential, this country-level measure of market accessibility is not ideal. A way of measuring South Africa's market accessibility on a product-country level should therefore be devised.

- A geographical limitation of the 2009 South African DSM is the fact that 45 of the 52 African countries (excluding South Africa) were already eliminated in filter 1. This left only seven African countries that were analysed in filters 2 to 4 (see section 1.3.2 for the motivation why this is considered a limitation).

In this study, these limitations will be addressed by further refining the DSM, and rerunning it separately for Africa.

1.3 Motivation for the refinement and specific rerun of the DSM for Africa

1.3.1 Refining the DSM

In section 1.1 the importance of export development and the need for export promotion and export market selection have been highlighted. The usefulness of the DSM developed by Cuyvers *et al* (1995) and Cuyvers (1997), since it was specifically developed to assist export promotion institutions in the planning and assessment of export promotion activities, has also been discussed in section 1.1. A summary of the previous applications of the DSM has been provided in Figure 1.1, and in section 1.2 the limitations of the previous applications of the DSM have been explained.

In addition to providing a background and explanation of the problem that needs to be addressed in this study, sections 1.1 and 1.2 therefore also provide a motivation for the need for systematic, scientific ways of selecting priority markets for export promotion and the usefulness of the DSM in this regard. The need to further refine the DSM in this study was also highlighted by explaining the limitations of the previous applications of the DSM.

A more detailed motivation for the specific application of the DSM to identify export opportunities for South Africa in the rest of the African continent follows in section 1.3.2.

1.3.2 DSM for Africa

As the strengthening of trade and economic links with countries in Africa is regarded a priority in trade policies of the South African government (DTI, 2006), the relatively small number of African countries selected in the 2009 DSM (see section 1.2) is not ideal. The DTI therefore indicated that a study in which all African countries are considered in filter 2, regardless of their risk ratings or GDP performance, would assist them in formulating their export strategy for the rest of the African continent.

To further motivate the specific application of the DSM of Africa, the following aspects need to be taken into account:

- i) The South African government regards trade with other African economies as very important. According to the DTI (2010) the African continent is amongst the most important and fastest growing destinations for South African exports. Furthermore, South Africa's exports to the rest of the African continent include more higher-value-added products compared to other continents. This contributes to the achievement of South Africa's industrial and employment objectives (DTI, 2010).
- ii) Furthermore, the South African government's strategic objectives include support to economic development in Africa through regional integration, increased intra-African trade and capacity building and strengthened SADC, SACU, NEPAD and AU institutions (DTI, 2006). The reasons for prioritising the strengthening of trade and economic links with countries in Africa include the following (DTI, 2006):
 - South Africa's economic development is linked to the economic development of the rest of the African continent.
 - South Africa is the leading economy in Africa. This presents unique trade and investment opportunities for South Africa, but also presents a responsibility to contribute to the continent's economic development.

- Other countries around the world are seeking increased presence in the African continent through various trade initiatives. South Africa needs to compete with this growing competition for markets in Africa.
- iii) Akinboade and Makina (2005:45-62) examined the prospects of South Africa playing a leading role in Africa's economic development, similar to the role Japan played in the development of Eastern Asia. The flying geese theory was used in Akinboade and Makina's (2005) study to explain economic development. Japan was seen as the Asian leading goose in a "V" shaped pattern in which latecomers replicate the development experience of the countries ahead of them in the formation. The flying geese theory was derived from empirical studies proving the efficiency of the "import – domestic production – export" pattern in stimulating sequential growth. This involves an import-substitution-cum-export-promotion policy in which imports are replaced with domestic output and later these outputs are promoted for exports. Akinboade and Makina (2005:55) have drawn some parallels between the leading role of Japan in Asia and South Africa in Africa. They found that based on the size of South Africa's GDP as well as the country's well-developed infrastructure relative to other African countries, South Africa is in the position to act as the "leading goose" in Africa in a similar manner as Japan did in Asia. Arora and Vamvakidis (2005) characterised South Africa as Africa's growth engine and found that an increase of 1% in South Africa's GDP correlates with an increase of 0.5% to 0.7% in the GDP growth rate of the rest of the African continent. Furthermore, Akinboade and Makina (2005:63) found anecdotal evidence that South Africa's involvement in Africa contributes to other African countries catching up in terms of development.

Based on these findings, this study could contribute to the practical implementation of this theory by firstly identifying the product-country combinations in the rest of the African continent with a large and/or growing import demand (determined in filter 2 of the DSM), secondly, determining the market concentration and accessibility of South Africa in each market (filter 3), and finally determining whether South Africa has the appropriate capacity in producing and exporting the different products (introduction of the additional criteria, $RCA > 1$, see section 4.2.3). Subsequently, South Africa could start exporting to these product-country combinations and, after getting to know the market conditions and African importers, possibly invest in the production of the different products in the African countries concerned. Over time, if production is sufficient, these African countries can start promoting the exports of these products. This whole process could benefit South Africa as the initial exporter and investor as well as the African importers who start producing, substituting imports and eventually exporting. Through this process, higher economic growth and development can be achieved in the continent as a whole.

The South African government has also recognised South Africa's important role in the development of the continent by stating in the National Trade Policy and Strategy Framework (DTI, 2010) that trade with Africa is more than just an opportunity for South Africa to benefit commercially, but must advance to contribute to development across the continent.

This study therefore sets out to address the limitations of the DSM as stipulated in section 1.2 in order to more accurately identify export opportunities for South Africa in the world and specifically in the rest of the African continent.

1.4 Research questions

The research questions include the following:

- Where does the DSM fit into the international market selection literature, and how does the DSM compare to models with similar objectives?
- What refinements should be made to address the limitations of the DSM? More specifically:
 - Is it possible to rerun the DSM by using HS 6-digit level trade data? Are the data available and does the DSM have the capacity to easily analyse the exponentially larger amount of data?
 - How can the potential export value of each export opportunity be determined in order to prioritise between the product-country combinations identified as realistic export opportunities?
 - How can the production capacity of South Africa be taken into account in the process of identifying export opportunities?
 - How can the market accessibility of different product-country combinations be measured more accurately from a South African point of view?
- By running the refined DSM for South Africa, what are the realistic export opportunities for South Africa in the rest of the world?
- By starting with filter 2 (see section 1.3.2), what are the export opportunities for South Africa in the rest of the African continent?

1.5 Research objectives and contribution

The main objectives of this study are to⁷:

⁷ See Table 7.1 for a summary of where each of these objectives was met in this study.

- position the DSM within the international market selection literature;
- introduce the following refinements to the DSM to address the limitations mentioned in section 1.2:
 - use HS 6-digit level trade data;
 - calculate a potential export value of each export opportunity in order to prioritise between the product-country combinations identified as realistic export opportunities;
 - take into account the production capacity of South Africa in the process of identifying export opportunities;
 - measure the market accessibility of different product-country combinations from a South African point of view and incorporate this measure in the second part of filter 3 of the DSM;
- run the refined DSM to identify export opportunities for South Africa in the rest of the world; and
- run the refined DSM from filter 2 to identify export opportunities for South Africa in the rest of the African continent.

By achieving these objectives, this study will contribute to the current literature on international market selection and to the effective promotion of exports from South Africa to the rest of the world and specifically to the rest of the African continent.

1.6 Research method and design

The research method includes a literature and empirical study.

The literature study will provide an overview of the current literature on international market selection. The focus will be on international market selection on a macro (country) level as opposed to a micro (firm) level. The main aim of the literature study is to position the DSM in the body of literature that it contributes to.

The empirical study will involve the implementation of the refined DSM to identify export opportunities for South Africa in the rest of the world and specifically in the rest of the African continent.

1.7 Division and summary of chapters

In Chapter 1 an introduction to this study is provided by stating the background, problem statement, motivation, objectives, research method and design of the study as well as the division of chapters.

Chapter 2 contains an overview of the current literature on international market selection, with a specific focus on country-level international market selection methods.

In Chapter 3 the methodology of the previous applications of the DSM will be discussed in detail.

In Chapter 4 the refinements proposed in this study to address the main limitations of the previous applications of the DSM (see section 1.2 and Figure 1.1) will be further motivated and explained.

Chapter 5 will present the results of the refined DSM to identify export opportunities for South Africa in the rest of the world.

In Chapter 6, special attention will be given to the export opportunities identified for South Africa in the rest of the African continent.

Chapter 7 includes a summary, conclusions and recommendations.

CHAPTER 2: LITERATURE OVERVIEW: MARKET SELECTION METHODS FOR INTERNATIONAL EXPANSION⁸

2.1 Introduction

As mentioned in section 1.1, governments and individual firms that want to stimulate growth through export development must distinguish between vast numbers 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 process of evaluating worldwide export opportunities is, however, complicated for a number of reasons. These reasons include the difficulty to examine all possible export opportunities to all the countries of the world and the availability and reliability of data on specific consumers, businesses or governments (Jeannet and Hennessey, 1988:137; Brewer, 2001:155). Numerous attempts to formulate appropriate international market selection processes have been made in the literature (see section 2.2).

One of these international market selection processes is the Decision Support Model (DSM) developed by Cuyvers *et al* (1994) and Cuyvers (1997) (see section 1.1). This method was chosen to be used in this study in order to identify export opportunities for South Africa in the rest of the world and specifically in the rest of the African continent (see sections 1.2 and 1.3.2). One of the objectives of this study is to determine where the DSM fits into the international market selection literature (see section 1.5).

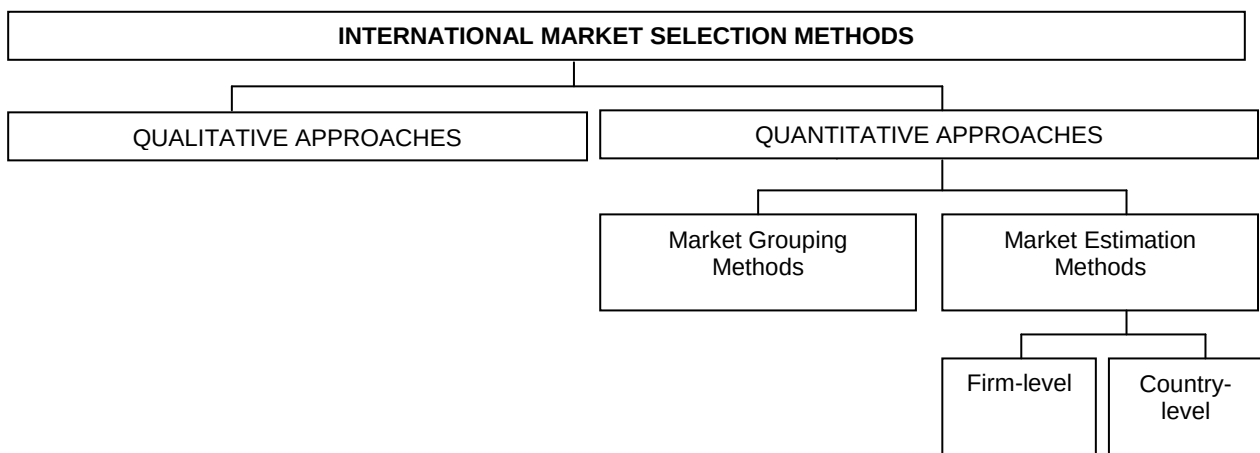
In section 2.2 a categorisation of the literature on international market selection is provided and the DSM is classified into one of these. In section 2.3 other studies in the same category as the DSM are discussed in more detail.

⁸ Part of this chapter was published as a working paper (Steenkamp, Rossouw and Viviers, 2009) and the financial assistance received from TIPS and AusAid is hereby acknowledged.

2.2 Categorisation of international market selection methods

Papadopoulos and Denis (1988:38-51) summarised and categorised the literature on international market selection methods up until the late 1980s. They firstly identified two broad types of approaches, namely qualitative and quantitative approaches and then divided quantitative approaches into market grouping and market estimation methods. After considering the more recent literature on international market selection (1989 to 2010), the market estimation methods were divided into firm-level and country-level methods for the purposes of this study. The above-mentioned categorisation is illustrated in Figure 2.1 and discussed in more detail in the rest of this section.

Figure 2.1: Categorisation of the international market selection literature



Source: Own figure based on Papadopoulos and Denis (1988:38-51)

Most *qualitative approaches* typically start with identifying a short list of countries for further consideration. Secondly, objectives and constraints for exporting a specific product to each country under consideration are established (Papadopoulos and Denis, 1988:39). Typical sources of qualitative information used in these studies include government agencies, chambers of commerce, banks, distributors, customers, international experts and foreign market visits (Pezeshkpur, 1979). Due to the fact that most qualitative information is based on perceptions, Papadopoulos and Denis (1988:39) consider qualitative approaches to international market selection biased and largely inaccurate⁹.

⁹ Although qualitative approaches are criticised for being based on perceptions, this information still has a place in the market selection process. After selecting markets on a quantitative basis, qualitative information into specific markets can be very valuable to provide market-specific information that is not always quantifiable. Qualitative and quantitative approaches should therefore be used together to complement one another and it is not necessary to choose the one or the other (see section 7.4).

Quantitative approaches to international market selection, on the other hand, involve analysing and comparing secondary trade data of a large number of countries. Papadopoulos and Denis (1988:39) 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 2.1).

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, Eckman and Hyllegard, 2007:213). Countries are clustered based on similarities in social, economic and political indicators. The demand levels of countries are mostly not taken into account (Sakarya *et al*, 2007:212). Market grouping methods are mostly criticised for relying exclusively on general country indicators rather than product-specific market indicators, as macro or country indicators may not reflect market demand for a product (Sakarya *et al*, 2007:212; Kumar, Stam and Joachimsthaler, 1994:31; Papadopoulos and Denis, 1988:41). Studies that attempted to include more product-specific information face the problem of insufficient data, are limited to the product ranges of a particular firm and cannot be applied for 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, only focusing 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).

Market estimation models evaluate foreign markets on the basis of several criteria that measure market potential and attractiveness (Sakarya *et al*, 2007:212; Papadopoulos and Denis, 1988:41). The criteria vary across methods and often include market wealth, size, growth, competition and access indicators (Sakarya *et al*, 2007:212). For the purpose of this study, the literature on market estimation methods is categorised into *firm-level* and *country-level* methods (see Figure 2.1).

Firm-level market estimation methods are applied by firms to identify markets for their limited product ranges. These methods usually include an analysis of the firm's objectives, profitability, managers' experience and knowledge, customer standards and attitudes and product

adaptation requirements when identifying potential export markets. Apart from the older studies summarised by Papadopoulos and Denis (1988:40-47), firm-level market estimation methods include the studies of Ayal and Zif (1978), Davidson (1983), Cavusgil (1985)¹⁰, Kumar *et al* (1993), Hoffman (1997), Andersen and Strandskov (1998), Brewer (2000), Andersen and Buvik (2002), Rahman (2003), Alon (2004), Ozorhon, Dikmen and Birgonul (2006) and more. Most of these studies are based on the following three-stage process of evaluating the export potential of foreign markets: i) a preliminary screening to select more attractive countries to investigate in detail, based on countries' demographic, political, economic and social environment; ii) an in-depth screening in which these products' potential (market size and growth), competitors, market access and other market factors for the countries selected in stage one are analysed; and iii) a final selection that involves the analysis of company sales potential, profitability and possible product adaptation.

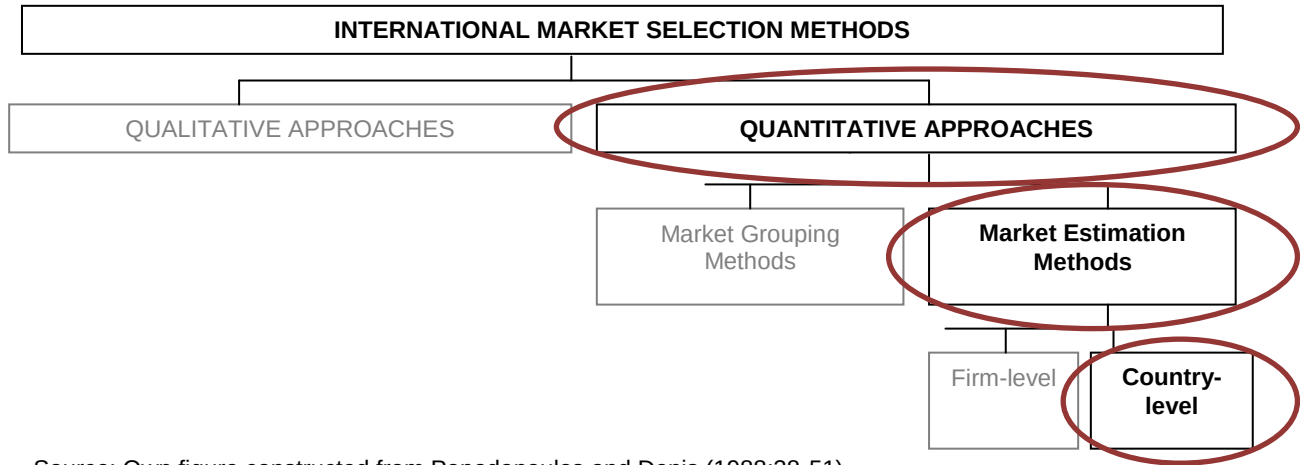
Although country-level market selection methods might include similar variables and screening stages, the main difference between firm-level and country-level market selection methods is that firm-level methods focus on only a limited range of products and consider firm-specific issues like firm objectives, profitability, managers' experience and knowledge, customer standards and attitudes and product adaptation requirements. *Country-level* market estimation methods, on the other hand, can be more generally applied and focus on selecting export opportunities for a specific exporting country and not only a firm. These methods are therefore applicable to evaluate a wider range of product-country combinations than only the products a specific firm would offer. The country-level approaches could also be used by export promotion organisations of different countries to plan and assess their export promotion activities. Variables typically used in country-level market selection models may include market size and growth, indicators of economic development, domestic consumption, factors of production, tariff and non-tariff barriers, exchange rates, distances between countries and current international trade data.

The DSM can be classified as a country-level, quantitative, market estimation international market selection method. This is due to the fact that the DSM starts off by considering all world-wide product-country combinations as possible export opportunities for a specific exporting country. A filtering process is then followed to eliminate markets that do not show adequate demand potential or would be difficult for the exporting country to enter due to fierce competition or barriers to entry. The DSM arrives at a limited list of export opportunities on which an export

¹⁰ Although these are older references, they were not included in Papadopoulos *et al*'s (1988) summary of the international market selection literature and are therefore included here.

promotion agency of the exporting country can focus its limited resources. The classification of the DSM in the international market selection literature is illustrated in Figure 2.2.

Figure 2.2: The DSM's position in international market selection literature



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

In section 2.3, other methods that can be classified as country-level, quantitative, market estimation methods will be discussed.

2.3 Country-level market estimation methods

Apart from the DSM, nine other studies can be found that can be classified as country-level market selection methods. The main criterion for a market selection method to be classified into this category is that it should be capable of screening a wide range of product-country combinations to select export markets with realistic potential for a specific exporting country.

The methods that, on first review, seemed to comply with this criterion include the shift-share model of Green and Allaway (1985), the global screening model of Russow and Okoroafo (1996), the trade-off model of Papadopoulos, Chen and Thomans (2002), the multiple criteria method of the International Trade Centre (ITC) (Freudenberg and Paulmier, 2005a, 2005b, Freudenberg, Paulmier, Ikezuki and Conte, 2007, 2008), the assessments of export opportunities in emerging markets by Cavusgil (1997:87-91), Arnold and Quelsh (1998:7-20) and Sakarya *et al* (2007:208-238), the gravity model (see section 2.3.7) and the trade opportunity matrix (TOM) of Export Development Canada (Verno, 2008).

The above-mentioned methods will be summarised in sections 2.3.2 to 2.3.8. Although the methodology of the DSM is discussed in detail in Chapter 3 and 4, for the sake of

completeness, a short description of the origin, method, benefits and limitations of the DSM will be provided in section 2.3.1.

2.3.1 Decision support model¹¹

The basic ideas of Walvoord (see section 3.2) were used by Cuyvers *et al* (1995:173-186) to construct a decision support model for a Belgian government export promotion institution, namely Export Vlaanderen, to provide a limited list of realistic export opportunities to which they could devote their limited financial resources. The DSM was then refined and applied for Thailand in 1997 and 2004 (Cuyvers, 1997:1-19; Cuyvers, 2004: 255-278) and, as mentioned in section 1.1, refined and applied for South Africa by Viviers and Pearson (2007) and Viviers, *et al* (2009).

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

In filter 1, countries that hold too high a political and/or commercial risk are firstly eliminated. A second elimination of countries is done based on macroeconomic size and growth. The rationale for this is that, with all the countries of the world as a starting point, filter 1 enables the researchers to quickly eliminate countries with relatively low general market potential in order to concentrate in detail on a more limited set of possible export opportunities.

In filter 2, a more specific assessment of the various product groups for the remaining countries is done to identify the market potential of each possible product-country combination (market). The main purpose of this filter is therefore to eliminate markets that do not show sufficient size and growth in demand. 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 year's 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

¹¹ A detailed discussion of the DSM methodology follows in section 3.2.

of country i for product group j and the total imports of all countries that entered filter 2 of product group j (Cuyvers *et al*, 1995:178; Cuyvers, 2004:259-260).

In filter 3, 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 4), the export opportunities (product-country combinations) that were identified in filter 1 to 3 are categorised according to two criteria, namely their relative market importance and their 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 that are useful to derive appropriate export promotion actions in the different 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 the attention to markets that have not previously been recognised as potential export markets (Cuyvers *et al*, 1995:174).

Despite of the above-mentioned 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 not 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, and since the DSM's scope is more short term and based on historical data, some export opportunities that are considered by the model as suboptimal, 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 to provide a list of choices of interesting markets, grouped into categories reflecting market size, market growth and market importance.

The nine other country-level market estimation methods will subsequently be summarised.

2.3.2 Green and Allaway's shift-share model¹²

Green and Allaway's (1985) shift-share approach to identify export opportunities was described by Douglas and Craig (1992) as the only new approach to international market selection that had been proposed up until the early 1990s.

Shift-share analysis identifies growth differentials based on 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 product-country combination (market) 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 who 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). This figure provides the total gain or loss of market share accounted for by each market under investigation¹³.

Green and Allaway (1985:85) applied the shift-share analysis to identify export opportunities for the United States for 51 high-technology products (SITC 4-digit level) in 20 OECD countries during the period 1974 to 1979.

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

Papadopoulos *et al* (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

¹² Green and Allaway's shift-share approach was intended for firms to identify export opportunities. However, no firm-specific indicators are used in this approach and are therefore considered to be applicable to identify export opportunities for a country as well.

¹³ For a step-wise mathematical description of the shift-share methodology, see Papadopoulos *et al* (2002:186-190) and Huff and Scherr (1967).

core strength of the shift-share approach is that it is simple and industry-specific while the 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 found that other authors that applied the shift-share approach in the field of marketing found the results to be biased depending on the base years chosen, and fluctuating 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 promising at one time and very poorly in subsequent years. They also found that the rankings identified by the model are volatile and that 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 is redundant due to the high correlation with the simple growth model.

In response to Russow and Okoroafo's (1996) (see section 2.3.3) comment that global screening models should be subjected to inferential statistical analyses to establish the importance of the independent variables used in these models, Williamson, Kshetri, Heijwegen and Schiopu (2006:72) examined the significance of three variables typically used in the export market selection process. These variables are i) a measure of import market potential (such as the net shift in import growth as used by Green and Allaway), ii) a measure of import market competitiveness and iii) a measure of barriers-to-imports. To test the role of each variable's influence on the outcomes of the export market identification process, the relationship between the above-mentioned three explanatory variables and the dependent variable was evaluated (Williamson *et al*, 2006:80-81). The dependent variable was defined as the change in an importing country's share in the exporting country's exports for a particular product. Williamson *et al* (2006:80-81) argued that if this is a positive change, exporters of the product would have shortlisted this market as a potential export opportunity. The dependent variable therefore determines the real-world outcome of the export identification process to which the explanatory variables can be related. Williamson *et al* (2006:88) found a negative relationship between import market potential and the dependent variable for the two exporting countries and products they used in their analysis. They also found that the import market competitiveness and barriers-to-imports variables have no independent effect on the dependent variable. Only when all three variables are used together, the dependent variable is better explained. This indicates that the variables should be used together rather than separately. According to Williamson *et al* (2006:72), the import market potential, import market competitiveness and barriers-to-imports variables can be incorporated together into a shift-share model to identify export markets for a specific exporting country and product. Williamson (2006), however, did not implement these changes to the shift-share model, but only tested the importance of these variables in export

market selection. They discredited a shift-share framework that only uses one explanatory variable (such as Green and Allaway's shift-share model).

2.3.3 Russow and Okoroafo's global screening model

From the international business theory and market screening and assessment literature, Russow and Okoroafo (1996:50) identified three criteria to screen markets and identify export opportunities for a particular exporting country. These criteria are (i) product-specific *market size and growth*, (ii) *factors of production* and (iii) *economic development* of the importing country. The variables used to measure *market size and growth* include domestic production, imports, exports, the shift-share of domestic production, the shift-share of imports and the shift-share of exports of a specific product. The cost and availability of *factors of production* are measured by gross fixed capital formation, money supply, total international reserves, population, percentage unemployment, average hourly wages in manufacturing and surface and density. The level of *economic development* is measured by gross domestic product, gross domestic product per capita, agriculture as a percentage of GDP, 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).

Russow and Okoroafo (1996:52) used six randomly selected products and 192 possible importing countries around the world in their analysis to identify possible export markets for the United States. A principal components analysis was used for every product separately to determine whether the 21 variables mentioned above are interrelated. After performing the principal components analysis for the product *calculators* (as an example), seven factors were identified to use in the screening model. A cluster analysis was consequently conducted to group countries with similar market potential for a specific product. Each country group was then classified as having a high, medium or low market potential for the product in question (Russow and Okoroafo, 1996:55-58).

Russow and Okoroafo (1996:62) state that their method can assist managers to select potential markets objectively and efficiently, and distinguish markets with high export potential from those that hold little or no potential. This decreases the risk involved when venturing into new markets.

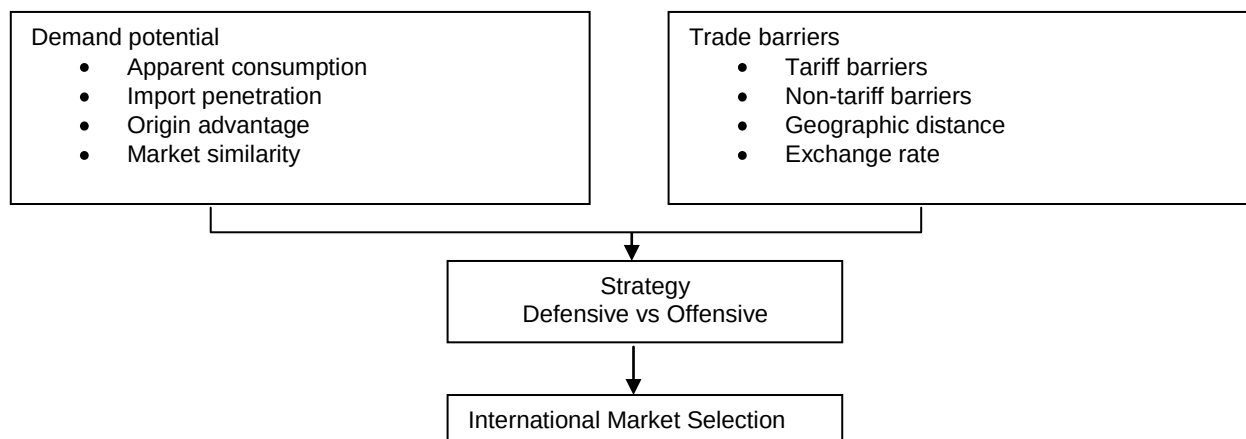
According to Russow and Okoroafo (1996:60), limitations to their study include that no sub-national opportunities are identified and, on the other hand, no export potential to country

groupings (eg, North American Free Trade Area or the European Union) are identified. Also, this screening technique is considered a starting point to identify the location of potential demand, and a full assessment of the identified markets should follow. This assessment would include a customer profile as well as determining the specific sub-national location of the opportunity and a possible grouping of the results into trade blocs.

2.3.4 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 market selection decisions. They identified these trade-offs as the *demand potential* (plus/positive) and *trade barriers* (minus/negative) in the countries under review. They state that many researchers identify trade barriers as the most important deterrent of exports, but most have not accounted for it in their international market selection models. This is probably due to the difficulty in quantifying non-tariff barriers, and most authors assume 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*'s trade-off model is illustrated in Figure 2.3.

Figure 2.3: Papadopoulos *et al*'s (2002) trade-off model



Source: Papadopoulos *et al* (2002:170)

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 and data availability, reliability and comparability (Papadopoulos *et al*, 2002:170-171). The variables and their measures are summarised in Table 2.1.

Table 2.1: Papadopoulos *et al*'s (2002) trade-off model

Demand potential	Trade barriers
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.	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.
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.	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 are. 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.
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.	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).
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 where 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: • for health and education: life expectancy; • for personal consumption: GNP per capita; • for production and transportation: electricity production; and • for trade: imports-to-GDP ratio.	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 are a major risk element in exporting and can have a big impact on pricing and strategy.

Source: Summary of Papadopoulos *et al* (2002:170-171)

The data for each variable indicated in Table 2.1 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. Averages were calculated for the variables measuring the plusses (demand potential) and minuses (trade barriers) of each country. A score could therefore be assigned to each of the demand potential and trade barriers dimensions. High scores represented high demand potential and low trade barriers. Countries were subsequently plotted in a two-dimensional matrix illustrated in Figure 2.4.

Figure 2.4: 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)

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 strategy¹⁴, it would 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 strategy¹⁵, it would focus on markets with high demand potential, even if 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 (also see sections 3.2.4, 5.4 and 6.7 for more information on export promotion strategies).

Papadopoulos *et al* (2002:184) stated that their model provides a significant improvement on earlier market selection models due to the fact that it captures total rather than import-only demand; it is industry-specific and was tested using three products (namely aircraft (representing industrial goods), furniture (representing consumer durables) and beverages (representing consumer non-durables)), 17 importing countries (OECD countries) and two very different exporting countries (namely Canada (highly developed country and an experienced exporter) and China (world's largest population and in its earlier stages of internationalisation) (Papadopoulos *et al*, 2002:184)).

¹⁴ According to Papadopoulos *et al* (2002:171,175), a firm with a defensive export promotion strategy will focus on preventing competitors from threatening their market share.

¹⁵ A firm with an offensive export promotion strategy will seek growth at their competitors' expense and value demand potential more than being concerned about trade barriers (Papadopoulos *et al* 2002:171,175).

Papadopoulos *et al* (2002:183) identified a few limitations to their model. These include deficiencies of secondary data, unavailability, unreliability and ageing of data for some countries (particularly less developed countries) and the lack of greater product-specificity.

2.3.5 The International Trade Centre's multiple criteria method

One of the aims of the International Trade Centre (ITC) is to assist developing countries that want to effectively focus their trade promotion efforts and extend/diversify their exports (Freudenberg, 2006). The ITC does this by using a multiple criteria method to assess the export potential of a specific exporting country (Freudenberg, 2006).

The ITC identifies priority sectors and markets for export promotion by using both quantitative and qualitative analyses. The *quantitative analysis* involves the calculation of composite indicators¹⁶ to measure the export potential of different sectors and markets. The quantitative information required to calculate these indices includes trade statistics and market access data obtained from the ITC's *Market Access Map* and *Trade Map* databases respectively. These are online databases of global trade flows and market access barriers providing detailed and up-to-date export and import profiles and trends for over 5300 products in 200 countries on HS two-, four-, six-, eight- and 10-digit levels (Freudenberg *et al*, 2008:12). The databases include official data reported by countries to the United Nations Statistics Department (UN Comtrade Database).

The *qualitative analysis* includes an assessment of relevant literature and information collected from surveys and interviews with enterprises and business associations in the exporting country (Freudenberg and Paulmier, 2005a:11). Quantitative analyses usually include assessments of *domestic supply conditions* such as product quality, unit labour costs, production cost, process technology, infrastructure cost, up-/down-stream linkages between industries and competitiveness prospects in their export potential assessment. The projected *socio-economic impact* resulting from an increase in exports of the different sectors or markets is also often added to the qualitative analysis. These include projected full-time employment equivalents, poverty reduction, foreign currency generation and contribution to industrialisation and environmental sustainability (ITC, 2011).

Due to the focus of this section on quantitative market selection methods, the ITC's *quantitative assessment* of export potential will be discussed in more detail.

¹⁶ A composite index is formed when individual indicators are compiled into a single index (ITC, 2011).

The following indicators are used to quantitatively evaluate the export potential of different sectors and markets (Freudenberg and Paulmier, 2005a: 10-11; Freudenberg and Paulmier, 2005b: 8, Freudenberg *et al*, 2007:2; Freudenberg *et al*, 2008:11-12, ITC, 2011):

- the current export performance of the exporting country (*export performance index*), evaluated by current export *size* (exported value and world market share), export *dynamism* (export growth and relative growth¹⁷) and the *trade balance* (the absolute trade balance (exports minus imports) and the relative trade balance (absolute trade balance divided by total trade)); and
- the characteristics of the international environment (*world demand index/market attractiveness index*¹⁸), evaluated by market *size* (imported value), market *dynamism* (import growth and relative growth¹⁹), and *ease of market access conditions* (average *ad valorem* tariff applied to the exporting country and the average *ad valorem* tariff applied to the top five competitors minus the tariff applied to the exporting country).

A composite export potential index is ultimately calculated for each sector and/or market under investigation, using the above-mentioned indices and sub-indices. The different variables are first standardised (due to the fact that it is measured in different units) before they are aggregated into the respective indices. To standardise the variables, the following formula is used (Freudenberg and Paulmier, 2005a: 34; ITC, 2011):

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

This will provide an index value ranging from 0 (weak performance) to 100 (best performance) for each variable. The 5% best performing products define the upper limit and the 5% weakest performing products define the lower limit for each variable. The weighting of the different sub-indices to arrive at the composite index is determined on a theoretical basis or in consultation with an advisory council of knowledgeable people in the field.

Depending on the requirements of the client (exporting country/exporter), the export potential of sectors/products/specific markets (product-country combinations) can be assessed by following the ITC method described above. For a particular country, the sectors with the highest export potential can be identified. Also, after identifying the sectors with the highest export potential for

¹⁷ Difference of the country's export growth and world export growth.

¹⁸ The world demand index is used when the overall potential of sectors or products needs to be assessed and is calculated by using the world import value, world import growth, share of attractive markets in world imports, average tariff advantage and world market prospects. The market attractiveness index is used when prioritising between importing countries for a specific export product. Here indicators such as *country i*'s import value, import growth and applied tariff to product *j* are used (ITC, 2011)

¹⁹ Difference between market growth and world import growth.

a specific country, the export potential for the products within a selected sector (eg, fruits) can be assessed by also calculating a composite export potential index per product. If required, a product with high export potential (eg, fresh grapes) can be selected and the countries with the highest export potential can be identified by calculating the market attractiveness index²⁰ for all possible importing countries (ITC, 2011).

The limitations of the ITC's quantitative analysis of export potential include that composite indices only measure what can be quantified and for which there are data available and the selected variables only give a snapshot at one moment in time. Furthermore, growth variables are backwards 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 (Freudenberg and Paulmier, 2005a: 36; ITC, 2011).

2.3.6 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 specifically in emerging markets. They argue that traditional market selection analyses fail to account for emerging markets' dynamism and future potential (Sakarya *et al*, 2007:208)²¹. Cavusgil (1997:87-91) attempted to rank the total market potential of 25 emerging countries. Cavusgil only used country-level indicators and no product specificity was introduced.

Arnold and Quelsh (1998:7-20) proposed a foreign market assessment framework that includes 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). Arnold and Quelsh's model uses only macro-level indicators to assess market potential and then concentrates on a firm-level assessment (which is mostly situation specific and qualitative) of export opportunities.

²⁰ In the case of identifying the sectors and products in a specific exporting country with the highest export potential, the export performance index and world demand indices are used. When the export potential for a specific product within different importing countries is assessed, only the market attractiveness index is used.

²¹ Although these studies only focus on identifying export opportunities in emerging markets, it can still be classified as country-level market estimation methods.

Sakarya *et al* (2007:209) introduced 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 for the United States as the exporting country, Turkey as the importing country and *apparel* as product/industry. Sakarya *et al*'s (2007) model includes an in-depth, situation-specific assessment of each particular product-country combination under consideration that requires information that is not readily available for a large array of product-country combinations. This information includes social and moral values of consumers, wages in the industry, consumer choice opportunities, product quality, appeal of sales promotions and level of customer service.

2.3.7 The gravity model

The gravity model has been widely used over the last four decades to explain international trade flows (Kepaptsoglou, Karlaftis and Tsamboulas, 2010:1-3). Since the gravity model was first introduced by Tinbergen (1962) and Linneman (1966), it has been applied and refined by many authors attempting to analyse trade flows between regions, analyse bilateral trade flows of specific products, examine the effects of regional trade agreements, examine the factors affecting trade and estimate trade potential (see Kepaptsoglou *et al*, 2010:1-13 for a summary of 55 empirical studies published on the gravity model in the last decade). The main idea behind the gravity model originates from Newton's gravity theory in physics (Kepaptsoglou *et al*, 2010:2). Trade flows are regarded a result of two countries being attracted based on the 'masses' (sizes) of their economies. Therefore, the larger the countries, the larger the trade among them will be. Restrictions/resistance to trade such as distance, tariffs, border controls and quantity restrictions are, however, also considered (DTI, 2004).

In its most general formulation, the gravity model explains a flow of goods between two areas *i* and *j* (F_{ij}) as a function of the characteristics of the origin (O_i) and the destination (D_j) and some measure of restrictions on this flow of goods (R_{ij}) (Kepaptsoglou *et al*, 2010:1-3):

$$F_{ij} = O_i \cdot D_j \cdot R_{ij} \dots \dots \dots (1)$$

Equation (1) can be translated into a linear function:

$$\text{Log } F_{ij} = \beta X + \varepsilon \dots \dots \dots (2)$$

where:

- X: vector containing the logs of the explanatory variables;
 β : vector of parameters to be estimated; and
 ε : Error term.

Equation (2) indicates that trade flows (bilateral trade flows, imports or exports) can be explained by a number of explanatory variables. These explanatory variables normally include factors affecting demand and supply of the countries trading with one another and factors restricting the trade flows between countries. Variables often used to proxy demand and supply include measures of a country's size such as GDP, GDP per capita, population and area size. Variables used to measure restrictions on trade include distance, transportation costs, tariffs, quality of infrastructure and common language (Kepaptsoglou *et al*, 2010: 3, 9, 11).

As mentioned earlier, the gravity model is often used to estimate trade flows. A specific application of the gravity model to estimate potential exports for South Africa was undertaken by the Investment and Trade Policy Centre (ITPC) of the Department of Economics at the University of Pretoria together with the Department of Trade and Industry in 2004 (henceforth referred to as the South African trade potential gravity model). The main aim of this application of the gravity model was to analyse the trade potential of South Africa by predicting what trade flows ought to be, and to determine priority export markets for South Africa (DTI, 2004). Potential export values were estimated and compared with actual exports to identify priority markets in which South Africa is not utilising its export potential to a satisfactory level. Due to the similarity of the objectives of this study (see section 1.5) and the South African trade potential gravity model, the remainder of this section will focus on this application of the gravity model.

In the South African trade potential gravity model, a sample of the 50 countries to which South Africa has exported the most in US dollars since 2000, was used. These countries are considered the countries to which trade is supposed to have reached its potential (DTI, 2004). A gravity equation was henceforth estimated explaining bilateral exports within the sample. This equation was used to simulate bilateral exports from South Africa to any other country (given the availability of data on distance, GDP and population figures) and the simulated (potential) exports were compared with actual exports to identify export potential for South Africa (DTI, 2004). This methodology was applied to both total exports²² as well as the five priority sectors of the DTI²³, namely textiles, transport, chemicals, minerals and agriculture (DTI, 2004). Total potential exports from South Africa as well as potential exports of South African textiles,

²² Total export data for the period 1980 to 2000 was used.

²³ Sectoral export data for the period 1988 to 2000 were used.

transportation products, chemicals, minerals and agricultural products (as a whole) to different countries around the world could therefore be simulated and compared with actual exports (DTI, 2004).

By following a panel estimation approach²⁴, South Africa's exports can be explained by the following equation (DTI, 2004):

$$\text{Log } X_{ijt} = C_0 + \beta_1 \log EX_{jt} + \beta_2 \text{Dist}_{jt} + \beta_3 \text{PCY}_{jt} + \beta_4 \text{Prod}_{jt} + \beta_5 \text{Infra}_{jt} + \beta_6 \text{ERP}_i + \varepsilon_i + \eta_t$$

where:

- X_{jt} : exports from South Africa to country j . The subscript i refers to the specific sector where applicable;
- C_0 : common intercept;
- EX_{jt} : exchange rate between South Africa and country j ;
- Dist_{jt} : the distance in miles between South Africa and country j ;
- PCY_{jt} : GDP per capita of country j ;
- Prod_{jt} : GDP of country j divided by the area of country j ;
- Infra_{jt} : an index containing a comprehensive rating of the infrastructure of country j ;
- ERP_i : the effective rate of protection for exports in sector i (measured mainly by tariffs);
- ε_i : the country specific random effect; and
- η_t : the white noise residual.

Separate estimations were performed for total exports and each of the priority sectors. The model was found to be well specified and robust in all cases. The factors used in the estimation are also considered as the core factors determining trade (DTI, 2004).

To summarise, the South African trade potential gravity model simulates the determinants of exports based on historical export data and uses this estimated model to calculate export potentials for different countries and industries. Markets in which the export potential is not adequately utilised in actual exports are then identified as priority markets.

2.3.8 Export Development Canada's Trade Opportunity Matrix

Based on the overload of contradicting information available to exporters and the fact that exporters mainly use generic economic information such as GDP, GDP growth and population

²⁴ South Africa's total or sectoral exports to 50 countries over 21 years for total exports and 13 years for sectoral exports.

size, which provides very little industry-specific information to make market selection decisions, Export Development Canada has developed a Trade Opportunity Matrix (TOM) (Verno, 2008).

The TOM is a forward-looking analysis in which 69 countries are ranked for business in 44 industries (ISIC 2-digit level) based on the greatest potential for new business (Verno, 2008). It ranks the countries and industries in which Canadian exporters are most likely to increase export sales.

The TOM uses historical and forecasted data to estimate models of the drivers of Canadian exports. Hereby, the size and significance of each of these drivers of Canadian exports are determined and the latest available data are fed into the estimated models in order to rank the best countries per industry or the best industries per country (Verno, 2008).

Firstly, to rank the *best countries per industry*, a fixed-effects and random-effects model was estimated for each one of the 44 manufacturing industries included in the panel of data. The unrestricted models for the determinants of Canadian exports by industry are as follows (Verno, 2008):

Fixed-effects model:

$$CX_{i,t+1} = \alpha + \alpha_i + \beta_1gdp_{i,t+1} + \beta_2gdp_{i,t} + \beta_3cdia_{i,t} + \beta_4ca_{i,t} + \beta_5mkt_{i,t+1} + \beta_6mkt_{i,t} + \beta_7er_{i,t+1} + \beta_8er_{i,t} + \beta_9CR_{i,t+1} + \beta_{10}CR_{i,t} + \varepsilon_{i,t} \dots \dots \dots (1)$$

Random-effects model:

$$CX_{i,t+1} = \alpha + \beta_1gdp_{i,t+1} + \beta_2gdp_{i,t} + \beta_3cdia_{i,t} + \beta_4ca_{i,t} + \beta_5mkt_{i,t+1} + \beta_6mkt_{i,t} + \beta_7er_{i,t+1} + \beta_8er_{i,t} + \beta_9CR_{i,t+1} + \beta_{10}CR_{i,t} + \omega_{i,t} + \lambda_t + \mu_i \dots \dots \dots (2)$$

where:

$\alpha, \alpha_i, \varepsilon_{i,t}, \omega_{i,t}, \lambda_t, \mu_i$:

α is the common intercept, α_i is the individual country intercept, $\varepsilon_{i,t}$ and $\omega_{i,t}$ are the error terms, λ_t is the time error term and μ_i is the individual error term;

$CX_{i,t+1}$: future Canadian exports of goods produced in sector j to country i. $CX_{i,t+1} = CX_{i,t+1} / \sum_i CX_{i,t+1}$;

$gdp_{i,t}$: country i's percentage change in real GDP;

$CDIA_{i,t}$: current level of Canadian Direct Investment Abroad. $cdia_i = CDIA_{i,t} / \sum_i CDIA_{i,t}$;

$ca_{i,t}$: proxy measuring Canada's current comparative advantage in producing sector j goods relative to country i and foreign competitors with presence in country i. $ca_{i,t} = CX_j / MKT_{i,t}^2$;

- MKT_i: market size of sector j in country i given by domestic production of product j plus net imports. $mkt_{i,t+1} = MKT_{i,t+1} / \sum_i MKT_{i,t+1}$;
- er_{i,t}: percentage change in the cross-exchange rate between the Canadian dollar and country i's currency; and
- CR_{i,t}: proxy for country risk computed by using Export Development Canada's economic and political ratings as well as the political ratings of International Country Risk Guide.

Verno (2008) estimated models (1) and (2) for each of the 44 industries in the data panel. They determined which model best fitted each industry by running various statistical tests. Therefore, for every industry the variables retained and the coefficients for each variable differ. In order to rank the 69 countries for each industry, a score is calculated for each country by multiplying all the estimated coefficients with the actual explanatory variables corresponding to them, and adding all these multiplied terms. The higher the score, the better the country's ranking.

In order to rank the *best industries per country*, a different model needed to be estimated. This model includes only industry data and does not include any macroeconomic data due to the fact that the country is assumed to be already regarded a priority. The model also had to be adapted to include dynamic effects and compensate for statistical problems (see Verno, 2008). The final model for determining the best industries per country is the following (Verno, 2008):

$$\Delta cx_{j,t+1} = \delta \Delta cx_{j,t} + \beta_1 \Delta mkt_{j,t+1} + \beta_2 \Delta mkt_{j,t} + \beta_3 \Delta ca_{j,t+1} + \beta_4 \Delta ca_{j,t} + \epsilon_{j,t} \dots\dots\dots(3)$$

where:

- j: Agriculture, ..., Jewellery (44 industries);
- t: 1994, ..., 2003.

Equation (3) was estimated by using aggregated data for Canada and the world (Verno, 2008) across all 44 industries. In other words, Canada's share in world exports for industry j ($cx_{j,t}$); world spending on goods of industry j ($mkt_{j,t}$) and Canada's world comparative advantage in industry j ($ca_{j,t}$) are used as the explanatory variables. Only one model needed to be estimated across all industries. A ranking of industries per country was again established by calculating a score for each industry per country. This was done by multiplying the coefficient estimates of each of the explanatory variables with the actual industry data corresponding to it and adding the multiplied terms.

Verno (2008) regards the TOM as a tool for Canadian exporters and trade commissioners to quickly find the best country and industry export opportunities. Verno also notes that the TOM is relatively easy to update and therefore recent developments in a country or industry will quickly reflect in the TOM rankings.

The limitations of the TOM include that, like all statistical models, it uses some assumptions and generalisations and is limited by data availability and reliability (Verno, 2008). Also, industry data are broadly aggregated and one industry includes a wide variety of products. Verno (2008) therefore recommends that the TOM results be complemented with more in-depth analyses and sector-specific knowledge.

In section 2.3.9 a summary of the country-level market selection methods follows.

2.3.9 Summary of the country-level market selection methods

In Table 2.2 the main aim and focus as well as the criteria used in each of the country-level market selection methods identified in the literature (see sections 2.3.1 to 2.3.8) are summarised.

Table 2.2: Summary of the country-level market selection methods

Country-level market selection method	Focus/Main aim	Criteria used in identifying export opportunities
Decision support model (Cuyvers <i>et al</i> , 1995; Cuyvers, 1997; 2004)	The DSM's main aim is to provide a national export promotion agency with limited financial resources a list of realistic export opportunities on which they can focus their export promotion activities. It starts from the assumption that all world markets hold potential export opportunities. All possible worldwide product-country combinations therefore enter the filtering process. Previous applications were on a SITC 4-digit level. This amounts to 237,626²⁵ possible product-country combinations analysed by Viviers, Rossouw and Steenkamp (2007).	Political risk. Country risk. GDP and GDP growth. GDP per capita and GDP per capita growth. Import size. Import growth. Market concentration. Market accessibility / trade restrictions.
Green and Allaway's shift-share model (Green and Allaway, 1985)	The shift-share method was designed to serve as an initial screening process of a large number of product-country combinations in order to reduce the number of more in-depth analyses in later stages of the international market selection process. Markets are identified that grows faster in relation to others. The model was applied to identify export opportunities for the United States for 51 high-technology products (SITC 4-digit level) in 20 OECD countries during the period 1974 to 1979.	Net shift = actual import growth MINUS expected growth (based on average growth of all product-country combinations in the analysis).

²⁵ 241 countries (for which risk ratings were available) x 986 SITC 4-digit product groups = 237,626 product-country combinations.

Table 2.2: Summary of the country-level market selection methods (continues)

Country-level market selection method	Focus / Main aim	Criteria used in identifying export opportunities
Russow and Okoroafo's global screening model (Russow and Okoroafo, 1996)	The global screening model includes the analysis of 21 different variables (grouped into three main criteria) to measure, cluster and classify countries' market potential per product. A principle components analysis is performed for each product individually and countries with similar market potential for the specific product are grouped by means of a cluster analysis. Countries are classified as having a high, medium or low market potential per product. The analysis includes no elimination of product-country combinations. The model was applied to identify possible export markets for six randomly selected United States products. 192 possible importing countries were considered.	(i) Product-specific market size and growth (variables include domestic production, imports, exports and the shift-shares of these variables). (ii) Cost and availability of factors of production (variables include gross fixed capital formation, money supply, total international reserves, population, unemployment, average hourly wages, surface and density). (iii) The level of economic development of the importing country (variables include GDP, manufacturing, construction, wholesale, transportation and communication as percentages of GDP).
Papadopoulos <i>et al</i>'s trade-off model (Papadopoulos, <i>et al</i>, 2002)	The trade-off model involves considering both the “plusses” and the “minuses” of product-country combinations when making market selection decisions. “Plusses” are considered to be demand potential and “minuses”, trade barriers. Papadopoulos attempted to improve on earlier market selection models by capturing total demand, being industry-specific (applied the model for three products) and using two very different exporting countries to test the model with. 17 OECD countries were used as importing countries. For each product under investigation, countries were classified into a two-dimensional matrix containing combinations of high/low demand potential and high/low trade barriers. Countries with high demand potential and low trade barriers are considered those with the most potential. The analysis is repeated for each product separately and no elimination is done.	(i) Demand potential - Domestic consumption - Import penetration - Origin advantage - Market similarity (ii) Trade barriers - Tariff barriers - Non-tariff barriers - Geographic distance - Exchange rate See Table 2.1

Table 2.2: Summary of the country-level market selection methods (continued)

Country-level market selection method	Focus/Main aim	Criteria used in identifying export opportunities
The ITC's multiple criteria method (Freudenberg and Paulmier, 2005a; Freudenberg and Paulmier, 2005b; Freudenberg <i>et al</i>, 2007; Freudenberg <i>et al</i>, 2008; ITC, 2011).	The ITC aims to assist developing countries to focus their trade promotion efforts. A multiple criteria method is used to measure and prioritise the export potential of different sectors and markets for a given exporting country. The quantitative analysis of export potential involves an evaluation of (i) current export performance and (ii) the international environment/world demand/market attractiveness. Sub-indices are assigned to each variable used to estimate (i) and then (ii) weighted to arrive at an overall export potential index. This index is then used to rank sectors or products. If a certain product is identified as having high export potential for the exporting country, the above-mentioned method can be repeated to identify the countries around the world with the most export potential for the specific product.	Quantitative analysis: Export potential index (i) Current export performance - Export size - Export dynamism - Trade balance (ii) International environment/world demand/market attractiveness - Import size - Import dynamism - Market access conditions
Assessments of export opportunities in emerging markets: Cavusgil (1997), Arnold and Quelsh (1998), Sakarya (2007).	Cavusgil (1997), Arnold and Quelsh (1998) and Sakarya (2007) attempted to assess export opportunities specifically in emerging markets. Cavusgil ranked the total market potential of 25 emerging countries, but did not introduce any product specificity. Arnold and Quelsh used country-level growth and development indicators to assess market potential and stipulated that companies must identify their own indicators for assessing demand for their products. Sakarya's model was applied for the United States as the exporting country, Turkey as the importing country and <i>apparel</i> as product/industry. Their model includes an in-depth, situation-specific assessment of each particular product-country combination under consideration that requires information such as social and moral values of consumers, wages in the industry and consumer choice that is not readily available for a large array of product-country combinations.	- GDP - Concentration of population in urban centres vs rural villages - Distribution of wealth - Telecommunications infrastructure - Penetration of telephones, televisions or cars - Cultural distance - Competitive strength of the industry - Customer receptiveness and choice opportunities - Wages per industry/Product quality - Appeal of sales promotions/Level of customer service - Social and moral values of consumers

Table 2.2: Summary of the country-level market selection methods (continued)

Country-level market selection method	Focus / Main aim	Criteria used in identifying export opportunities
Export Development Canada's Trade Opportunity Matrix (Verno, 2008).	Export Development Canada developed the TOM to assist Canadian exporters to make better market selection decisions. The TOM identifies the best countries per industry (ISIC 2-digit) and the best industries per country. The export potential of 44 manufacturing industries was investigated in 69 countries. Estimation models are used to establish the determinants of Canadian exports. A model is fitted for each industry individually and the coefficients and actual industry data of the statistically significant determinants of Canadian exports per industry are used to arrive at a score per country. Countries are then ranked accordingly.	- GDP growth - Current level of Canadian direct investment in country <i>i</i> - Canada's current comparative advantage in producing industry <i>j</i> goods compared to foreign competitors with presence in country <i>i</i> - Market size of industry <i>j</i> in country <i>i</i> (domestic production + imports – exports) - Percentage change in the cross-exchange rate - Country risk – economic and political
The gravity model (Kepaptsoglou, <i>et al</i> , 2010), (DTI, 2004).	The gravity model has been widely used over the last four decades to explain international trade flows (Kepaptsoglou, Karlaftis and Tsamboulas, 2010:1-3). In its most general formulation, the gravity model explains a flow of goods between two areas <i>i</i> and <i>j</i> (F_{ij}), as a function of 'attracting' characteristics between the origin (O_i) and the destination (D_j) country and some measure of restrictions on this flow of goods (R_{ij}) (Kepaptsoglou <i>et al.</i> , 2010:1-3). A specific application of the gravity model to estimate potential exports for South Africa was undertaken by the Investment and Trade Policy Centre (ITPC) of the Department of Economics at the University of Pretoria together with the Department of Trade and Industry. Estimated potential values were compared with the actual levels of exports, and priority markets in which South Africa is not sufficiently utilising its export potential were identified. This methodology was applied to total exports and the five priority sectors of the DTI, namely textiles, transport, chemical, minerals and agriculture.	- Exchange rate between South Africa and importing country <i>j</i> - Distance between South Africa and importing country <i>j</i> - GDP per capita of importing country <i>j</i> - GDP / area of land of importing country <i>j</i> - Infrastructure of importing country <i>j</i> - Effective rate of protection of country <i>j</i> in sector <i>i</i> (mainly measured by tariffs)

2.4 Summary and conclusion

In this study the decision support model (DSM) is used to identify export opportunities for South Africa in the rest of the world and specifically to identify export opportunities for South Africa in the rest of the African continent (see sections 1.1, 1.2 and 1.3). One of the objectives of this study is to position the DSM in the international market selection literature (see section 1.5).

In this chapter, the international market selection literature was classified into various categories of methodologies (see Figure 2.1) and the DSM was categorised as a country-level market estimation model (see Figure 2.2). Nine other country-level market estimation models were identified in the literature and have been discussed in sections 2.3.2 to 2.3.8. The focus of and criteria used in the different country-level market estimation models were summarised in section 2.3.9.

It can be concluded that the DSM is the only methodology that includes all possible product-country combinations (markets) in the world as a starting point of the market selection process. In this sense, the DSM methodology is unique and specifically useful to guide trade promotion organisations in more effective country-level export promotion activities. The DSM was also specifically designed for the planning and assessment of export promotion activities by government and export promotion institutions. For these reasons, the DSM was selected to be refined and applied for the purposes of this study.

A detailed description of the methodology of the DSM as well as other studies that support the use of the different variables used in the filters of the DSM, follow in Chapter 3.

CHAPTER 3: METHODOLOGY OF THE PREVIOUS APPLICATIONS OF THE DSM

3.1 Introduction

The decision support model (DSM) developed by Cuyvers *et al* (1995) and Cuyvers (1997), as one of the market selection methods on country level (see sections 1.1 and 2.3.1), was selected for the purposes of this study to identify export opportunities for South Africa in the rest of the world, and specifically in the rest of the African continent (see sections 1.1 and 2.4).

In this chapter a detailed discussion of the methodology of the previous applications of the DSM (see Figure 1.1) will be provided in section 3.2. Section 3.3 contains a summary of support from the international market selection literature for the use of the different variables in the DSM used to identify export opportunities for a specific exporting country.

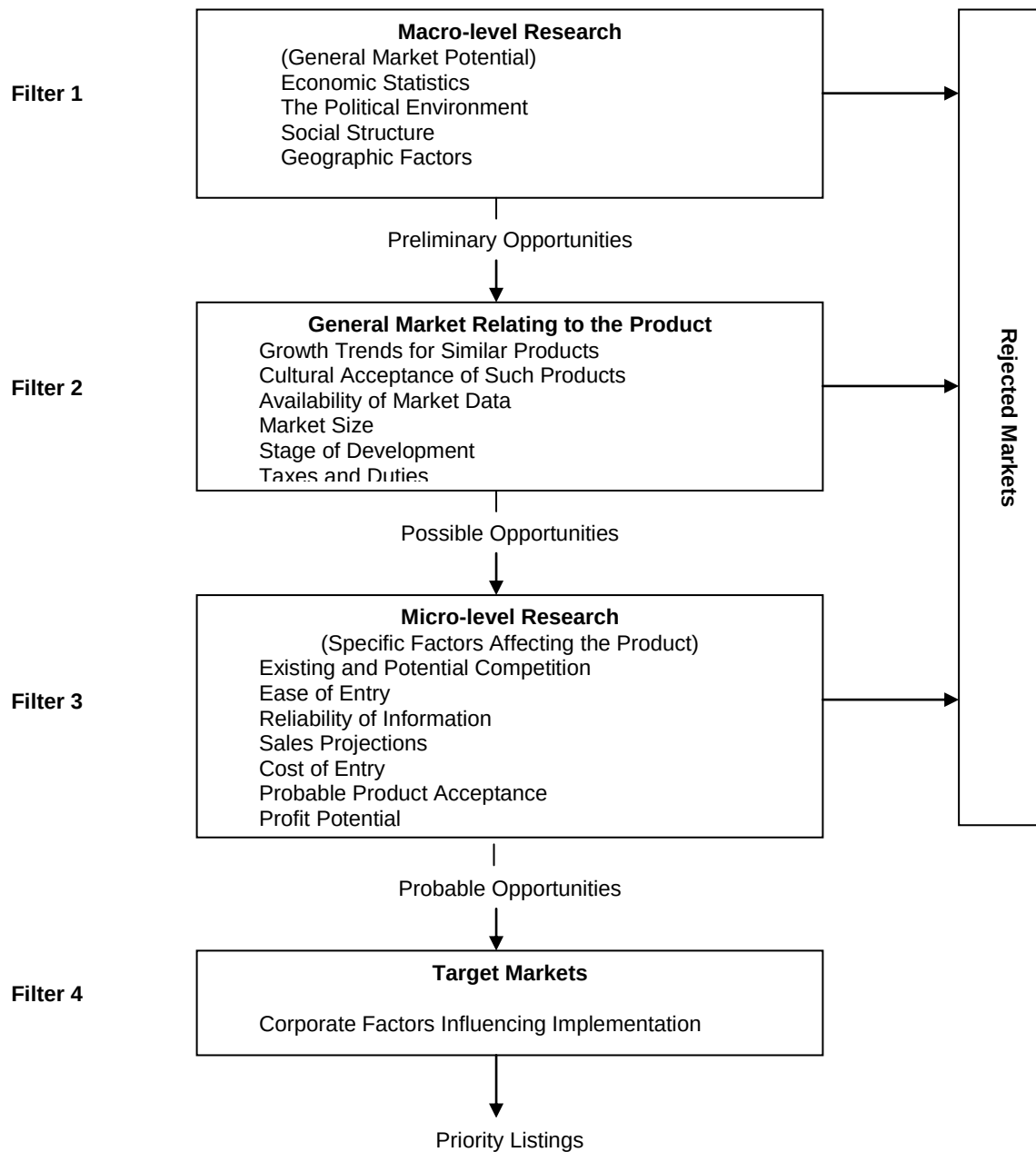
3.2 The methodology of the previous applications of the DSM²⁶

The fundamental framework of the DSM was based on Walvoord's 1980 model for selecting foreign markets (Walvoord as in Jeannet and Hennessy, 1998:137-140)²⁷. The basic idea of Walvoord's model was that a screening/filtering process be used to assess international market opportunities. This would involve gathering relevant information on each market under investigation and filtering out less desirable markets. The screening process includes four filters in which uninteresting countries are quickly eliminated on the basis of general macro-indicators in the first filter in order to concentrate in detail on a more limited set of export opportunities in subsequent filters. Walvoord's model is illustrated graphically in Figure 3.1:

²⁶ The DSM was first developed and applied for Belgium (Cuyvers *et al*, 1995) and then further developed and applied for Thailand in 1997 (Cuyvers, 1997) and reapplied in 2004. In 2007 and 2009 the model was adapted to best suit South African conditions (Viviers and Pearson, 2007 and Viviers *et al*, 2009) (see Figure 1.1). In this section, the methodology of each filter of the DSM is discussed in detail. The method developed in the Belgian (Cuyvers *et al*, 1995) and Thailand (Cuyvers, 1997; 2004 (reapplied)) studies is outlined as the basic/normative DSM methodology and it is specifically indicated where the South African application differs from this methodology. The 2007 and 2009 South African applications of the DSM therefore followed the same methodology as described in this section, unless deviations from this methodology are specifically indicated.

²⁷ The primary source by Walvoord (1980) could not be found. Therefore the secondary source of Jeannet and Hennessy (1998) was used as source for the description of the Walvoord model.

Figure 3.1: Walvoord's model for selecting foreign markets



Source: Jeannet and Hennessey, 1988:139

Filter 1 of the Walvoord model entails macro-level research to assess the general market potential of each of the countries under investigation in order to identify a set of preliminary opportunities. Macroeconomic statistics such as GDP and GDP per capita are used in this filter to be able to assess the size of the different markets. The political environment, social structure

and geographic factors of the different countries under investigation are also assessed in this first filter (Jeannet and Hennessey, 1998:137-140).

In *filter 2* of Walvoord's proposed model, product-related criteria are assessed in order to eliminate markets (product-country combinations) that do not show adequate size and growth. Cultural acceptance of products, the stage of development of the product and taxes and duties applied to the product in the various importing countries are also considered in this filter (Jeannet and Hennessey, 1998:137-140).

In *filter 3* of the Walvoord model, micro-level research is conducted to investigate specific factors that might affect the marketing and sales of a product. Existing and potential competition, cost and ease of entry, reliability of information, sales projections, probable product acceptance and profit potential for each product-country combination under consideration are taken into consideration in this filter. It is argued that micro-level factors will influence the export success or failure of a specific product in a country and that marketers should assess only a small number of product-country combinations in this filter to make it feasible to get more detailed, up-to-date information (Jeannet and Hennessey, 1998:137-140).

In *filter 4* of Walvoord's proposed model, the factors that may affect market entry into the selected countries, for the specific company for which the model is applied, are taken into consideration. An evaluation and ranking of the potential markets are therefore based on the specific company's resources, objectives and strategies (Jeannet and Hennessey, 1988:137-140).

No example of an application of Walvoord's model could be found in the literature. It is therefore assumed that the model serves as a theoretical framework to be used as a guideline for the selection of foreign markets.

Although Walvoord's model focuses on selecting foreign markets for a *firm*, Cuyvers *et al* (1995:173-186) used this framework to construct a country-level market selection model specifically designed to support the planning and assessment of export promotion activities by government export promotion institutions. They called this framework a decision support model (DSM) to identify realistic export opportunities for a specific exporting *country*. As mentioned in sections 1.1 and 2.3.1, the DSM was applied for Belgium (Cuyvers *et al*, 1995:173-186),

Thailand (Cuyvers, 1997:1 -19; 2004:255-278) and South Africa (Viviers and Pearson, 2007 and Viviers *et al*, 2009) (see Figure 1.1). Many of the variables proposed in the Walvoord model could not be used in DSM because of its firm-specific nature and the non-availability of data for the large number of product-country combinations assessed in the DSM. Examples of such variables include the stage of development of the product, sales projections, probable product acceptance and profit potential.

The decision support model (DSM) starts with the assumption that all world markets hold potential export opportunities for a particular exporting country and therefore all possible product-country combinations enter the filtering process (Cuyvers, 2004:256). After every filter, a number of opportunities is rendered uninteresting and is not considered in subsequent filters. The goal, rationale and methodology of each filter will be discussed in sections 3.2.1 to 3.2.4.

3.2.1 Filter 1: Identifying preliminary market opportunities

In filter 1 of the DSM, countries are eliminated that hold too high a political and/or commercial risk to the exporting country (filter 1.1) and do not show adequate macroeconomic size or growth (filter 1.2). The rationale for this is that, with all the countries of the world as a starting point, filter 1 enables the researchers to eliminate uninteresting countries in order to concentrate in detail on a more limited set of product-country combinations in the consecutive filters. Countries that lack general potential are therefore eliminated in this filter.

3.2.1.1 Filter 1.1: Political and commercial risk assessment

The first criterion that is considered in filter 1 is the *political and commercial risks* that exporters would face in doing business with the foreign countries under investigation.

Commercial risk can be defined as the risk resulting from the deterioration of the importer's financial situation, leading to the impossibility to pay for a consignment (ONDD, 2011). Indicators that are used to measure the overall commercial risk of a country include (i) *economic and financial indicators* that affect all companies' corporate results and balance sheets (eg, devaluation of the currency, real interest rates, GDP growth and inflation), (ii) indicators reflecting the country's *payment experience* (the ONDD and other credit providers' past

experience with the country) and (iii) indicators characterising the *institutional context* in which local companies operate (eg, corruption index, transition economy) (ONDD, 2011).

Political risk is defined as any event occurring in the importing country assuming the nature of *force majeure* for the importer, such as wars, revolutions, natural disasters, currency shortages and government action (ONDD, 2011). Indicators that are used to measure the political risk of a country include (i) an assessment of the *economic and financial situation*, (ii) an assessment of the *political situation* and (iii) a *payment experience* analysis. The assessment of the *financial situation* is based on external debt ratios and liquidity indicators such as the level of foreign exchange reserves. A country's *economic situation* is evaluated by using three sets of indicators, namely indicators of economic policy performance (eg, fiscal policy, monetary policy, external balance, structural reforms), indicators of the country's growth potential (eg, income level, savings, investments) and indicators of external vulnerability (eg, export diversification and aid dependency). The assessment of the political situation in a country is based on a quantitative analysis of the *political risks* associated with doing business in the country (not specified by the ONDD) and the *payment experience* analysis is based on data of the ONDD and other credit insurers' past encounters with the country (ONDD, 2011).

Many academic, private and government institutions around the world rate countries on the basis of the political and commercial risks that an exporter in these countries would face²⁸.

In the previous applications of the DSM, the country risk ratings of the Belgian public credit insurance agency, *Office National du Ducroire* (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 Credits²⁹ 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.

The ONDD rates countries on a scale of 1 to 7 for political risk, where 1 indicates a low political risk and 7 indicates a high political risk. Political risk ratings are provided for the short, medium, and long term. The commercial risk rating is presented as either an "A", "B", or "C", where an "A" indicates low commercial risk and a "C" indicates high commercial risk (ONDD, 2011). The three political risk ratings for each country under investigation are transformed from a 1 to 7

²⁸ See <http://www.countryrisk.com>

²⁹ For more information see Cutts and West, 1998:12-14; Moravcsik, 1989:173-205.

scale to a 1 to 10 scale, whereas the commercial risk country rating is transformed in such a manner that a score of 3.33 is assigned to an “A” rating, a score of 6.67 is assigned to a “B” rating and a score of 10 is assigned to a “C” rating. This transformation is necessary to construct an overall country risk score. Firstly, an average political risk score (simple average of the three political risk scores) is calculated for each country under investigation. Secondly, the average political risk score and the commercial risk score are weighted equally to calculate an overall country risk score for each country under investigation. This country risk score is used to determine a critical value to eliminate less interesting countries from the analysis. Countries are eliminated if they belong to the two highest credit risk groups of the ONDD, namely 6 C and 7 C.

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

Table 3.1: Country X's risk ratings

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

Source: Viviers and Pearson (2007)

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

Table 3.2: Country X's transformed risk ratings

	Political Risk: short term	Political Risk: medium term	Political Risk: long term	Commercial Risk
Country X	5.71	7.14	4.29	10

Source: Viviers and Pearson (2007)

By following the method described above, country X's average risk score is 7.86³⁰.

When a particular country's risk score exceeds the critical value of 9.286 (short, medium and long-term political risk score equals 6 and commercial risk is rated as C), this country is

³⁰ The average political risk score is calculated by $[(5.71 + 7.14 + 4.29) / 3]$ and equal to 5.71. The average of the average political risk score and the commercial risk score is then calculated by $(5.71 + 10)/2$ and equal to 7.86.

excluded from further analysis of potential export opportunities. Country X in Table 3.2 would therefore be included in the further analysis of potential export markets, because its average risk score of 7.86 is below 9.286.

3.2.1.2 Filter 1.2: Macroeconomic size and growth

The second criterion that is used to screen the remaining countries in filter 1 of the DSM is a *county's macroeconomic size* measured by GNP and GNP per capita (Cuyvers, 1997:4; 2004:256). Data on GNP and GNP per capita for a specified period are gathered and a cut-off point is identified in order to eliminate countries that do not show large enough overall potential (Cuyvers, 1997:4; 2004:258). Cuyvers *et al* (1995:177) warned that a cut-off point should be determined in a conservative way to avoid eliminating too many countries. The cut-off point or critical value (CV) for the GNP and GNP per capita values is identified as:

$$CV = \bar{X} - \alpha \sigma_X$$

where $\bar{X}$ is the average of X (GNP or GNP per capita) and σ_X is the standard deviation of X (Cuyvers, 1997:4; 2004:258). α is a factor which is determined in such a way that small changes in its value only marginally affect the number of countries eliminated, or when a comparable number of countries is eliminated for both GNP and GNP per capita within a small range of α -values. A sensitivity analysis is therefore carried out, starting from $\alpha = 0.1$ and increasing it consecutively by 0.001, where the number of countries eliminated for each value of α is monitored (Cuyvers, 2004:258). It is clear that if $\alpha = 0$, the cut-off point would be the average, in which case half of the countries included in filter 1 would be eliminated (if the data are distributed normally) (Cuyvers, 2004:256). When the α -value is increased, the number of countries eliminated will decrease smoothly and the α -value that is selected would be the last one before there is a clear break in the number of countries eliminated (Cuyvers, 2004:256).

Countries are selected if:

$$X_j \geq CV$$

for at least two consecutive years of the most recent three-year period for which data are available, where X_j is the GNP or GNP per capita for country j (Cuyvers, 1997:4; 2004:258). If a country, for instance, had sufficient GNP or GNP per capita values for two subsequent years,

but not for a third year, the country will still pass the first filter. This ensures that countries that do not meet the requirements for only one year would not be eliminated for subsequent analysis (Cuyvers *et al*, 1995:178).

In the previous applications of the DSM for South Africa (Viviers and Pearson, 2007 and Viviers *et al*, 2009), GDP and GDP per capita values were used instead of GNP and GNP per capita values. Viviers and Pearson (2007) and Viviers *et al* (2009) also added GDP growth and GDP per capita growth rates as part of filter 1.2. This was done to include countries that showed above average GDP and GDP per capita growth for three years in a row, even if the size of the market (GDP or GDP per capita) is not sufficient. Countries were therefore selected based on GDP growth and GDP per capita growth if the growth values were above the world average growth rates for the most recent three years for both growth measures. A country was selected to enter filter 2 if it either qualified in terms of GDP or GDP per capita values *or* GDP growth and GDP growth values (Viviers and Pearson, 2007, Viviers *et al*, 2009).

3.2.2 Filter 2: Identifying possible opportunities

In filter 2 an assessment of the various product categories for the remaining countries is done to identify product-country combinations (markets) that show adequate import size and growth.

Two criteria are used in this filter, namely *import growth* and *import market size*. The short and long-term growth rate and the size of imports of the different product-country combinations that entered filter 2 are assessed (Cuyvers *et al*, 1995:178; Cuyvers, 1997:5; 2004:257).

Cuyvers *et al* (1995:178) stated that ideally, for the purpose of identifying new export opportunities, predicted imports per product category would be a better criterion for measuring import market size. They, however, stated that this extension of the model was to a large extent impossible because of the lack of data and the absence of a valid prediction model.

Three variables are therefore calculated for each product-country combination, 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. *Long-term growth* is calculated as the compounded 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 category j and the total world imports of product category j (Cuyvers *et al*, 1995:178; Cuyvers, 2004:259-260).

Subsequently, a cut-off value for filter 2 needed to be calculated. Cuyvers *et al* (1995:179) argued that if the exporting country under consideration was already specialised in exporting a particular product category, the cut-off point for these markets had to be less stringent. Therefore the Specialisation Index (SI) or Revealed Comparative Advantage (RCA) Index (Balassa, 1965) is used to define cut-off points for each of the above-mentioned sub-criteria.

$$RCA = \left(\frac{X_{i,j}}{X_{W,j}} \right) / \left(\frac{X_{i,tot}}{X_{W,tot}} \right)$$

where:

$X_{i,j}$: exports of country i (which is the exporting country for which realistic export opportunities are identified) of product j ;

$X_{W,j}$: worldwide exports of product j ;

$X_{i,tot}$: total exports of country i ; and

$X_{W,tot}$: worldwide exports of all product categories.

An RCA index of 0 means that country i either does not export, or exports very little of the product category. An RCA index bigger than or equal to 1 means that country i is relatively specialised in exporting the product category under consideration (Cuyvers *et al*, 1995:179).

Cut-off values for the variables of filter 2 are defined as follows (Cuyvers, 1997:5; 2004:260):

For *short and long-term import growth* a scaling factor, s_j , is firstly defined (Willeme and Van Steerteghem, 1993, as quoted by Cuyvers, 1997:5; 2004:260) in order to take the exporting country's degree of specialisation in the exports of product category j into account when defining cut-off values:

$$s_j = 0.8 + \frac{1}{(RCA_j + 0.85) \exp^{(RCA_j - 0.01)}}$$

The cut-off values were then defined as (Willeme and Van Steerteghem, 1993:6-7, as quoted by Cuyvers, 1997:5; 2004:260):

$$g_{ij} \geq G_j ;$$

with $g_{i,j}$ being the import growth rate of product category j by country i ; and

$$G_j = g_{w,j} s_j, \text{ if } g_{w,j} > 0 ; \text{ or}$$

$$G_j = g_{w,j} / s_j, \text{ if } g_{w,j} < 0$$

with $g_{w,j}$ being the total world imports of product category j . Table 3.3 illustrates these cut-off points.

Table 3.3: Illustration of cut-off points for short and long-term growth

	$0 \leq RCA < 1$ (The exporting country for which the model is applied is not specialised in exporting product j)	$RCA \geq 1$ (The exporting country for which the model is applied is specialised in exporting product j)
$g_{w,j} > 0$ (World short or long-term growth rate in product j is positive)	Country i 's short or long-term import growth rate of product j (g_{ij}) must be between one and two times the world growth rate for product j . For example: If $RCA = 0$ and $g_{w,j} = 5\%$, then $s_j = 1.988$ and G_j (cut-off point) = 9.94% If $RCA = 0.5$ and $g_{w,j} = 5\%$, then $s_j = 1.25$ and $G_j = 6.25\%$	Country i 's short or long-term import growth rate of product j (g_{ij}) is allowed to be a bit lower than, or equal to, the world growth rate for product j . For example: If $RCA = 1$ and $g_{w,j} = 5\%$, then $s_j = 1$ and $G_j = 5\%$ If $RCA = 1.5$ and $g_{w,j} = 5\%$, then $s_j = 0.895$ and $G_j = 4.475\%$
$g_{w,j} < 0$ (World short or long term growth rate in product j is negative)	Country i 's short or long-term import growth rate of product j (g_{ij}) must be higher than the world growth rate for product j . For example: If $RCA = 0$ and $g_{w,j} = -5\%$, then $s_j = 1.988$ and $G_j = -2.5\%$ If $RCA = 0.5$ and $g_{w,j} = -5\%$, then $s_j = 1.25$ and $G_j = -4\%$	Country i 's short or long term import growth rate of product j (g_{ij}) is allowed to be a bit lower than, or equal to, the world growth rate for product j . For example: If $RCA = 1$ and $g_{w,j} = -5\%$, then $s_j = 1$ and $G_j = -5\%$ If $RCA = 1.5$ and $g_{w,j} = -5\%$, then $s_j = 0.895$ and $G_j = -5.59\%$

Source: Own table based on Cuyvers (1997:5; 2004:260)

This procedure is carried out for both *short-term* and *long-term growth* rates (Cuyvers, 1997:6; 2004:260). If the above-mentioned criteria are met by a particular country for a specific product, a “1” is assigned in the *short-term* and/or *long-term import growth* columns in Table 3.5. A “0” is assigned in the case where the criteria are not met.

Furthermore, *the relative import market size* of country *i* for product category *j* was considered sufficiently large if (Cuyvers, 1997:6; 2004:260):

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

where $M_{i,j}$ is the import market size of country *i* for product category *j*; and

$$S_j = 0.02 M_{w,j}, \text{ if } RCA_j \geq 1; \text{ or}$$

$$S_j = [(3 - RCA_j)/100] M_{w,j}, \text{ if } RCA_j < 1.$$

Table 3.4 illustrates the implication of the above-mentioned cut-off points.

Table 3.4: Illustration of cut-off points for import market size

$0 \leq RCA < 1$ (The exporting country for which the model is applied is not specialised in exporting product <i>j</i>)	$RCA \geq 1$ (The exporting country for which the model is applied is specialised in exporting product <i>j</i>)
Country <i>i</i> 's imports of product <i>j</i> (M_{ij}) must be between 2% and 3% of total world imports of product <i>j</i> . For example: If $RCA = 0$, then S_j (cut-off point) = $0.03 M_{w,j}$ (3% of total world imports of product <i>j</i>) If $RCA = 0.5$, then $S_j = 0.025 M_{w,j}$ (2.5% of total world imports of product <i>j</i>)	Country <i>i</i> 's imports of product <i>j</i> (M_{ij}) must be greater or equal to 2% of total world imports of product <i>j</i> .

Source: Own table based on Cuyvers (1997:6; 2004:260)

Again, each product-country combination is assigned a “0” or a “1” in the *relative import market size* column of Table 3.5, based on whether the above conditions as illustrated in Table 3.4 are fulfilled or not.

The selection of markets in filter 2 is based on the categorisation illustrated in Table 3.5.

Table 3.5: Categorisation of product-country combinations in filter 2

Category	Short-term import market growth	Long-term import market growth	Relative import 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: Cuyvers (1997:7; 2004:261)

A product-country combination is selected to enter filter 3 if it falls in category 3, 4, 5, 6 or 7 (Cuyvers, 1997:6; 2004:261). A market should therefore at least be growing adequately in the short or long term (see Table 3.3) and/or be of adequate size (see Table 3.4) to be considered for further analysis. The remaining product-country combinations subsequently enter filter 3.

3.2.3 Filter 3: Identifying probable and realistic export opportunities

According to Cuyvers *et al* (1995:180), it holds true that being selected on the basis of size and growth does not necessarily mean that markets can be easily penetrated. In filter 3, 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 concentration* (filter 3.1) and *trade restrictions* (filter 3.2) (Cuyvers *et al*, 1995:180; Cuyvers, 1997:7; 2004:261).

3.2.3.1 Filter 3.1: Degree of market concentration

According to Cuyvers *et al* (1995:180), a market that is very *concentrated* is difficult to enter. A particular import market is considered to be concentrated if only a few exporting countries hold a relatively large market share and therefore have a lot of market knowledge and are well known by local customers. To confirm their argument, Cuyvers *et al* (1995:180) carried out a partial analysis that revealed a negative correlation between export performance and market concentration. Cuyvers *et al* (1995:180) concluded that it would be inefficient for government export promotion agencies with limited resources to focus on heavily concentrated markets for which the chances of successful exporting are relatively small.

In the DSM the Herfindahl-Hirshmann-index (HHI) of Hirshmann (1964) is used to measure the degree of concentration in a market. The index is calculated as follows:

$$HHI_{ij} = \sum \left(\frac{X_{k,ij}}{M_{tot,ij}} \right)^2$$

where:

$X_{k,ij}$: the exports of country k to country i for product category j ; and

$M_{tot,ij}$: country i 's total imports of product category j .

A HHI of 1 indicates that the importing market is only supplied by one exporting country and a HHI closer to 0 indicates a lower market concentration (importing market supplied by many exporting countries). It would therefore be more difficult for an exporting country to penetrate a particular market if the HHI for that market is relatively high (closer to 1) (Cuyvers *et al* 1995:180; Cuyvers, 1997:7; 2004:261).

A cut-off point for market concentration had to be derived. Cuyvers *et al* (1995:180) stated that it had to be kept in mind that concentration can be considered a bigger problem in a non-growing market (in which a market share will have to be won from often firmly established competitors) than in a large, growing market. Therefore, the cut-off point for market concentration was designed to be dependent on the category to which the various markets were assigned to in filter 2 (see Table 3.5).

The cut-off points were defined as follows (Cuyvers, 1997:8; 2004:262):

$$h_k \geq HHI_{ij}$$

with:

$$h_k = \bar{x}_h - 0.05\alpha\sigma_h, \text{ for category 3}$$

$$h_k = \bar{x}_h + 0.05\alpha\sigma_h, \text{ for category 4, 5, and 6}$$

$$h_k = \bar{x}_h + 0.15\alpha\sigma_h, \text{ for category 7}$$

where:

$\bar{x}_h$: average of the HHI-values of all product-country combinations under investigation; and
 σ_h : standard deviation of the HHI-values of all product-country combinations under investigation.

It is clear that a larger degree of concentration is tolerated for larger, growing markets. An α -value is selected where there is a “jump” in the number of product-country combinations selected (Cuyvers, 1997:8; 2004:262).

3.2.3.2 Filter 3.2: Trade barriers

The second set of accessibility criteria used in filter 3 is *trade barriers*. An index for “revealed absence of barriers to trade” was used in the Belgian and Thai studies as a proxy for trade barriers. The reason for this was that, at the time, for a large number of product-country combinations, no data were available on tariff and non-tariff barriers. Furthermore, the information that could be gathered was not available on the same product classification level (eg, SITC 2-digit or SITC 4-digit level) as the trade data used in the rest of the DSM and it was very difficult to aggregate the information to the appropriate level (Cuyvers *et al*, 1995:180). There was therefore a need to follow a different approach, and the hypothesis was formulated that if the neighbours of Belgium or Thailand could establish a relatively strong market position in a particular market, it means that trade barriers in this market would not be too difficult for Belgium or Thailand to overcome (Cuyvers *et al*, 1995:181; Cuyvers, 1997:7; 2004:262). The revealed absence of barriers to trade (M_{ij}) is calculated as follows:

$$M_{ij} = \frac{\frac{X_{Neighbour1,i,j}}{X_{Neighbour1,j}} + \frac{X_{Neighbour2,i,j}}{X_{Neighbour2,j}} + \frac{X_{Neighbour3,i,j}}{X_{Neighbour3,j}} + \dots}{\frac{X_{World,i,j}}{X_{World,j}}}$$

with:

M_{ij} : the corrected market share of the neighbours of the country for which the model is applied in country i 's imports of product category j ;

$X_{Neighbour,i,j}$: the exports of each of the neighbouring countries of the country for which the model is applied, of product category j to country i ;

$X_{World,i,j}$: total world exports of product category j to country i .

Again, a cut-off point for this criterion of filter 3 had to be identified. The cut-off point was defined with the assumption in mind that a higher relative share $M_{i,j}$ reflects a relative lack or a revealed absence of barriers to trade (Cuyvers *et al*, 1995:181). Therefore, the higher the $M_{i,j}$ -value, the easier it would be for the country for which the model is applied to access the market in question (Cuyvers *et al*, 1995:181). Cuyvers (1997:8; 2004:263) stated that no α could be determined unambiguously and that he was therefore compelled to apply the following rule of thumb to define a cut-off point for this criterion:

$$M_{i,j} \geq 0.95$$

This implies that, with a margin of error of 5%, if at least one of the neighbouring countries of the exporting country for which the model is applied, has a “revealed comparative advantage” in exporting to a particular market, it is assumed that there is no “revealed barriers to trade” for the exporting country for which the model is applied in that market (Cuyvers, 1997:8; 2004:263).

In the applications of the DSM to identify realistic export opportunities for South Africa, this second part of filter 3 could not be applied in the same way because of the fact that South Africa’s neighbouring countries do not have many similar characteristics to South Africa (Viviers and Pearson, 2007). Therefore a different approach was followed by Viviers and Pearson (2007) and Viviers, *et al* (2009). A detailed explanation of the approaches followed in the South African application of the DSM follows in section 4.2.4.

To enter filter 4, product-country combinations need to have adequately low market concentration *and* barriers to trade. Both the conditions in filter 3 have to be met in order for a market to enter filter 4.

3.2.4. Filter 4: Final analyses of opportunities

In the last stage of the analysis the realistic export opportunities identified in filters 1 to 3 are categorised and prioritised and no markets are eliminated.

According to Cuyvers *et al* (1995:181), the strength of an exporting country’s position in a foreign market can be derived from criteria that determine its competitive advantage. For each of the markets that entered filter 4, the relative market share of the exporting country (country n) of product category j in country i is calculated as follows:

$$\mu_{n,ij} = \left(\frac{X_{n,ij}}{X_{W,ij}} \right) / \left(\frac{X_{n,j}}{X_{W,j}} \right)$$

where:

$X_{n,ij}$: country n 's exports of product category j to country i ;

$X_{W,ij}$: world exports of product category j to country i ;

$X_{n,j}$: country n 's total exports of product category j ; and

$X_{W,j}$: world exports of product category j .

This is the same specialisation index/Revealed Comparative Advantage (RCA) that was used in filter 2. It is now only calculated on a per market basis. The hypothesis of Cuyvers *et al* (1995:182) was that a country has a comparative strength in doing business in a market if it has succeeded in obtaining a strong position in that market.

Subsequently, the relative market share of the exporting country ($\mu_{n,ij}$) is calculated for all markets that entered filter 4. Also, the relative market share of the six countries with the largest exports in each product-country combination ($\mu_{Six,ij}$) is calculated. A comparison can then be made between the relative market share of country n in each market that entered filter 4 and the relative market share of the six largest exporting countries in these markets. By calculating the difference between country n 's relative market share and that of the six dominant exporting countries of product j to country i , it is possible to determine country n 's market importance in each market under consideration (Cuyvers, 1997:14; 2004:267).

The following categories of market importance are identified (Cuyvers, 1997:14; 2004:267):

$\mu_{Six,ij} - \mu_{n,ij} > 3$:	Country n 's relative market share is relatively small.
$1.5 < \mu_{Six,ij} - \mu_{n,ij} \leq 3$:	Country n 's relative market share is intermediately small.
$0 < \mu_{Six,ij} - \mu_{n,ij} \leq 1.5$:	Country n 's relative market share is intermediately high.
$\mu_{Six,ij} - \mu_{n,ij} \leq 0$:	Country n 's relative market share is relatively high.

The entire filtering process leads to the following matrix (Table 3.6) to categorise the realistic export opportunities that were identified in filters 1 to 3 in terms of size and growth in demand and the exporting country's current market share in these markets.

Table 3.6: Final categorisation of realistic export opportunities

Size and growth of importing market	Market share of country <i>n</i> (filter 4)			
	Relatively small	Intermediately small	Intermediately high	Relatively high
Large product market	Cell 1	Cell 6	Cell 11	Cell 16
Growing (short and long-term) product market	Cell 2	Cell 7	Cell 12	Cell 17
Large product market with short-term growth	Cell 3	Cell 8	Cell 13	Cell 18
Large product market with long-term growth	Cell 4	Cell 9	Cell 14	Cell 19
Large product market with short and long-term growth	Cell 5	Cell 10	Cell 15	Cell 20

Source: Cuyvers, 2004:269

It can be seen that the classification in the rows of Table 3.6 is obtained from filter 2 (see Table 3.5), which indicates the size and growth of imports of the different markets, while the columns are based on the relative market share of the exporting country calculated in filter 4.

From Table 3.6 it is evident that a total of 20 different kinds of markets are distinguished and the markets that entered filter 4 are each assigned to one of these markets (Cuyvers *et al*, 1995:182; Cuyvers, 1997:15; 2004:269). Each product-country combination that is identified by the DSM as an export opportunity is assigned a cell. The exporting country for which the model is applied will therefore know what the potential (demand) in the market is (import size and growth) and whether the exporting country has already utilised this opportunity or not (based on the relative market share already established). If a product-country combination is classified in cell 5, for instance, it means that the demand in that market is large and growing in the short and long term, but the exporting country for which the model is applied has a relatively small market share in that market. This is therefore a market opportunity that is not exploited to its full potential by the exporting country.

Export promotion agencies can also use these cells to formulate export promotion strategies for the markets (product-country combinations) identified in the DSM as realistic export opportunities. Cuyvers *et al* (1995:183) suggest that an offensive market exploration export promotion strategy be used for export opportunities in cells 1 to 10, based on the exporting countries relatively small market share in these markets. An offensive market expansion strategy is suggested for export opportunities in cells 11 to 15. Due to the fact that the exporting

country already has an intermediately large market share in these markets and the demand in these markets is large and/or growing, market expansion is recommended. For export opportunities in cells 16 to 20, a defensive export promotion strategy of market maintenance is recommended by Cuyvers *et al* (1995:183).

It is, however, important to take the number of resources available by the export promotion agency into consideration when choosing different export promotion strategies. When resources are rather limited (as in the case of Thailand, Cuyvers, 2004:270), export promotion agencies are advised by Cuyvers (1997:14–15; 2004:270) not to actively promote export opportunities in cells 1 to 10, but rather to gather market information on these opportunities and distribute this information to the relevant exporters. Such export promotion agencies can then rather focus on expanding markets in cells 11 to 15 and maintaining markets in cells 16 to 20.

In section 3.3 the support from the international market selection literature for the variables used in the different filters of the DSM is summarised.

3.3 Support from the international market selection literature for the different filters of the DSM

Table 3.7 refers to other studies (firm-level and country-level, see sections 2.2 and 2.3) from the international market selection literature that support the use of the different variables included in the DSM.

Table 3.7: Other literature supporting the use of the DSM variables

Filter/procedure used in the DSM:	Studies supporting:
Screening process (elimination of uninteresting opportunities)	Cavusgil (1985:29) Kumar <i>et al</i> (1993:29) Jeanet and Hennessey (1998:138-142) Rahman (2003:120)
<u>Filter 1:</u> Country risk GDP / GNP / GDP per capita / GNP per capita / GDP / GNP growth	Verno (2008) (see section 2.3.8) Cavusgil (1985:29) Russow and Okoroafo (1996:50) (see section 2.3.3) Hoffman (1997:70) Arnold and Quelsh (1998:7-20) (see section 2.3.6) Papadopoulos <i>et al</i> (2002:170-171) (see section 2.3.4) Rahman (2003:121-122) DTI (2004) (see section 2.3.7) Sakarya <i>et al</i> (2007:209) (see section 2.3.6) Verno (2008) (see section 2.3.8)
<u>Filter 2:</u> Import market size and growth	Cavusgil (1985:29) Green and Allaway (1985:85-86) (see section 2.3.2) Kumar <i>et al</i> (1993:33, 37) Russow and Okoroafo (1996:50) (see section 2.3.3) Rahman (2003:121-122) Williamson <i>et al</i> (2006:74) (see section 2.3.2) Freudenberg <i>et al</i> (2008:11-12) (see section 2.3.5) Verno (2008) (see section 2.3.8)
<u>Filter 3</u> Market concentration (competitor analysis) Market accessibility/trade barriers	Cavusgil (1985:30) Kumar <i>et al</i> (1993:33, 38) Jeanet and Hennessey (1998:144) Papadopoulos <i>et al</i> (2002) (see section 2.3.4) Rahman (2003:121-122) Williamson <i>et al</i> (2006:78-79) (see section 2.3.2) Sakarya <i>et al</i> (2007:218-219) (see section 2.3.6) Verno (2008) (see section 2.3.8) Cavusgil (1985:30) Kumar <i>et al</i> (1993:33,38) Papadopoulos <i>et al</i> (2002:170-171) (see section 2.3.4) Rahman (2003:121-122) DTI (2004) (see section 2.3.7) Williamson <i>et al</i> (2006:79) Freudenberg <i>et al</i> (2008:11-12) (see section 2.3.5) Verno (2008) (see section 2.3.8)

It is important to note that these are not the only studies using the same variables as the DSM in their proposed international market selection methods. The use of the different variables used in these studies is mostly based on yet another set of studies using these variables. Furthermore, most of the studies mentioned in Table 3.7 are firm-level market selection

methods (see section 2.2 and Figure 2.1) and are therefore not discussed in much detail in this study. These studies might include the same variables as used in the DSM, but their focus is mainly on firm-specific (often qualitative) indicators as part of their final international market selection analysis.

3.4 Summary

In this chapter a detailed discussion of the methodology of the DSM has been provided (section 3.2). The different variables used in each filter and the determination of cut-off values for each filter were specified. A summary of support from the international market selection literature for the use of the different variables in the DSM has also been provided (see Table 3.7).

In Chapter 4, refinements are proposed to address the main limitations of the previous applications of the DSM (see section 1.2).

CHAPTER 4: REFINEMENTS TO THE PREVIOUS APPLICATIONS OF THE DSM

4.1 Introduction

In Chapter 3 the methodology of the previous applications of the Decision Support Model (DSM) was explained. In this chapter, refinements to the previous applications of the DSM (see sections 1.1 and 3.2) are proposed to address the main limitations of the model (see section 1.2) and to make it more applicable and useful for South African conditions.

4.2 Refinements to the DSM

Four main refinements to the methodology of the previous applications of the DSM (see Figure 1.1 and section 3.2) are proposed. These include: (i) using the Harmonised System (HS) six-digit level trade data instead of the SITC 2-digit or 4-digit data; (ii) calculating a potential export value for each selected product-country combination in order to prioritise between export opportunities; (iii) taking South Africa's production capacity into account and (iv) determining a new method of measuring the market accessibility of South Africa in the different product-country combinations (filter 3.2).

In sections 4.2.1 to 4.2.4 a discussion of each of these refinements will follow.

4.2.1 Introducing the Harmonised System (HS) six-digit level trade data

As mentioned in section 1.2, SITC 2-digit and 4-digit level trade data were used in the previous applications of the DSM. These approximately 67 SITC 2-digit level and 986 SITC 4-digit level product categorisations are rather aggregated (see section 1.2) and exporters mostly use the Harmonised System (HS) product classification to specify their goods in export ventures and documentation (Tempier, 2010). The HS 6-digit level product classification is also the most disaggregated level of product specifications that is standardised throughout the world (Tempier, 2010) (see also section 1.2). The introduction of HS 6-digit level trade data will therefore greatly contribute to the effective use and application of the DSM results by exporters and export promotion organisations.

However, the use of HS 6-digit level trade data in this study posed new challenges. There are 5,403 HS 6-digit level product classifications as opposed to 67 SITC 2-digit and 986 SITC 4-digit level product classifications. The introduction of HS 6-digit level product classifications therefore increased the total number of product-country combinations that needed to be analysed from around 16,147 (SITC 2-digit) or 237,626 (SITC 4-digit) to more than 1 million possible worldwide product-country combinations³¹. Also, HS 6-digit intra-country trade data are not readily available in open sources³².

HS 6-digit level data could, however, be used in this study. Intra-country trade data (UN Comtrade Database) on a HS 6-digit level were supplied to the authors by the officials of the International Trade Centre³³. It remains a limitation that these data are not audited (mirror and reported data are not always the same). However, the benefit of the HS 6-digit product classifications, which are more user-friendly for the end-users of the results, is of great significance. Reported trade data (and not mirror data) were used as far as possible.

4.2.2 Calculating a potential export value for each export opportunity identified

Although lists of realistic export opportunities were provided in the previous applications of the DSM, it was still difficult to prioritise between these opportunities, as no value was attached to every product-country combination (see section 1.2). Therefore, in this study, a potential export value was calculated for each product-country combination that was selected as a realistic export opportunity.

³¹ ONDD risk ratings are available for 241 countries around the world. 67 SITC 2-digit product classifications amount to $241 \times 67 = 16,147$ product-country combinations. 986 SITC 4-digit product classifications amount to $241 \times 986 = 237,626$ product-country combinations. 5403 HS 6-digit product classifications amount to $241 \times 5403 = 1,302,123$ product-country combinations.

³² In order to calculate the Herfindahl-Hirshmann index in filter 3.1 (see section 3.2.3) and identify the six largest competitors in each market in filter 4 (see section 3.2.4), data on every country's imports of every product under investigation from every other country around the world are needed. Intra-country trade data of this magnitude and level of detail are not readily available in open sources.

³³ A special word of gratitude is expressed to the International Trade Centre (ITC) in Geneva who has provided the UN Comtrade Database.

The total imports by country i of product j divided by the number of countries that contributes 80% of these imports, plus one³⁴, are used as a proxy for the potential export value that each export opportunity holds^{35,36}.

This formula to estimate the export potential therefore gives an indication of the relative size of the import demand for each product-country combination and takes into consideration the possibility of South Africa being added to the group of countries that collectively supplies 80% of the imports of product j to country i .

Since the European Union (EU) countries might re-export to other EU countries, which will exaggerate the potential export values (demand) in these markets, the calculation of the potential export values was adapted for these countries. The total non-EU import values in these markets were used as the numerator and the number of non-EU countries that supplies 80% of these imports (plus one), the denominator.

4.2.3 South Africa's revealed comparative advantage

As mentioned in section 1.2, the DSM mostly focuses on the demand potential (size, growth, competitors, market access) for products in different countries and does not take the production capacity of the exporting country into consideration. It may therefore be that there are export opportunities identified for a specific product that the exporting country does not have the capacity to produce.

South African production data on a disaggregated level could not be found for all HS 6-digit product classifications that were used in the DSM. Therefore another measure/proxy for production capacity had to be found.

The production capacity of South Africa was therefore taken into account by introducing the following additional criterion after categorising the export opportunities in filter 4³⁷:

³⁴ Adding one to the number of countries that supplies 80% of the total imports of product j in country i , takes into consideration the possibility of South Africa being added to the group of countries that collectively supplies 80% of the imports.

³⁵ A word of gratitude is expressed to Prof L Cuyvers for his inputs in formulating this equation.

³⁶ A word of thanks to Dr R Rossouw who incorporated the calculation of these values into the MS Excel program in which the DSM was run.

$$RCA_j > 1;$$

with:

$$RCA_j = \left(\frac{X_{SA,j}}{X_{World,j}} \right) / \left(\frac{X_{SA,tot}}{X_{World,tot}} \right);$$

where $X_{SA,j}$ is South Africa's exports of product j , $X_{SA,tot}$ is South Africa's total exports of all products, $X_{World,j}$ is the world's exports of product j and $X_{World,tot}$ is total world exports of all products (Balassa, 1965; Krugell and Matthee, 2009:461; see also section 3.2.2)³⁷.

As a RCA larger than one indicates that South Africa is relatively specialised in the production of a particular product (Krugell and Matthee, 2009:461), the introduction of this criterion ensures that only products in which South Africa is relatively specialised in producing and exporting, are selected as export opportunities.

4.2.4 A new method of measuring market accessibility (filter 3.2)

A more extensive refinement to the DSM was needed in the second part of filter 3. In the Belgian and Thai studies, an index for "revealed absence of barriers to trade" was used as a proxy for trade barriers in filter 3.2 due to the non-availability of data on tariff and non-tariff barriers on a SITC 2-digit and 4-digit level at the time (Cuyvers *et al*, 1995:180). As explained in section 3.2.3, it was argued that if Belgium's (or Thailand's) neighbours could successfully export a particular product to a country, it means that it would not be too difficult for Belgium (or Thailand) to also be able to overcome the trade barriers in that market (Cuyvers *et al*, 1995:181; Cuyvers, 2004:262).

In the application of the DSM to identify realistic export opportunities for South Africa, this second part of filter 3 could not be applied in the same way because of the fact that South

³⁷ The reason for adding this additional criterion after categorising the export opportunities identified in filters 1 to 3 is to still be able to access the full list of results prior to adding this criterion. This will enable the trade promotion organisation to assist exporters of a product which the exporting country is not yet specialised in producing and exporting in selecting appropriate markets.

³⁸ Although the RCA is considered in determining the cut-off values in filter 2, a product that South Africa is not exporting at all ($RCA = 0$) can still be selected if it complies with the more stringent cut-off points (see section 3.2.2 as well as Tables 3.3 and 3.4).

Africa's neighbouring countries do not have many similar characteristics to South Africa (Viviers and Pearson, 2007). Therefore a different approach needed to be developed.

In the first application of the DSM for South Africa, Viviers and Pearson, 2007 used crow-fly distances between Pretoria, South Africa, and the capital cities of the countries that entered filter 3 as a measure of trade barriers. This proxy, on its own, cannot be considered a very good estimation of market accessibility, and another proxy for market accessibility had to be found (Viviers *et al*, 2009:68).

In the second application of the DSM for South Africa (Viviers *et al*, 2009; Steenkamp *et al*, 2009:22-26³⁹), an index for market accessibility was calculated by using distance, international transport cost, the World Bank Logistics Performance Index (LPI), average applied tariffs per country and the frequency coverage ratio of non-tariff barriers per country (Steenkamp *et al*, 2009:22). To calculate a single index value per country, a z-score for each variable from each country was calculated. The z-scores for the five variables per country were then weighed and added (or subtracted where appropriate) to arrive at a market accessibility index per country. The main limitations of this measure of market accessibility (or barriers to trade) are the following:

- The index was only calculated on a country level and not a product level. A country can therefore perform very well overall, but specific products can still be highly protected or restricted in that country. Product-specific trade barriers are therefore not measured. With the purpose of the DSM to identify product-country combinations with the largest export potential, this country-level measure of market accessibility is not ideal.
- There is no clear indication in the literature how to weigh these variables relative to one another. In the 2009 South African study, the Chief Operations Officer of TISA (Trade and Investment South Africa) of the South African Department of Trade and Industry (DTI) was consulted to advise the authors. He advised that distance be given a 10% weighting, transport cost, 30%, the World Bank Logistics Performance Index (LPI), 20% and tariff and non-tariff barriers (converted into one z-score), 40%. He indicated that this weighting is not perfect, but the ranking of countries based on this weighting gives some indication of the relative market accessibility of the different countries included in the DSM (Steenkamp, *et al*, 2009:24).

³⁹ Working paper published and funded by TIPS and AusAid on the results of the 2009 rerun of the DSM for South Africa.

Due to the above-mentioned limitations, no elimination was done based on these indices. Countries were therefore only ranked and classified as most accessible (green), lesser accessible (orange) and least accessible (red) (Steenkamp, *et al*, 2009:25-26).

A new market accessibility index on a product-country level therefore needed to be developed in this study in order to eliminate product-country combinations in which South Africa would face high barriers to trade. Although other market accessibility/trade restrictiveness indices exist (for an overview of the literature on measures of trade openness/protection, see Cipollina and Salvatici, 2006:53-57⁴⁰), the market accessibility index developed in this study is unique in two ways. Firstly, it measures the market accessibility of all worldwide product-country combinations for which data⁴¹ are available. Other studies mostly measured market accessibility/ trade restrictiveness on a country level or only for a limited number of sectors (see Cipollina and Salvatici, 2006:53-57). Secondly, it measures market accessibility from a South African point of view. The development of this index is therefore an important contribution to the DSM and the field of market selection.

The variables used to develop the market accessibility index for South Africa, together with support from the relevant literature for including each variable in the measurement of market accessibility, are provided in Table 4.1.

⁴⁰ The literature review of Cipollina and Salvatici (2006) covers all literature on protection and openness measures from 1965 to 2005. A more recent study on measuring market accessibility is Josling's, (2009) Composite Index of Market Accessibility. Josling measures the market accessibility for selected subtropical products in developed countries by mainly using the costs faced by exporters to these markets. These often firm-specific costs of exporting include tariffs, costs of compliance with government mandated measures, costs associated with meeting private standards, excise duties in the domestic market, subsidies granted to the domestic producer that give an incentive to production, marketing costs and private label costs. A similar way of measuring market accessibility could not be introduced in this study due to the difficulty of acquiring this data on a HS 6-digit product level for all countries that entered filter 3.

⁴¹ See sections 4.2.2.1 to 4.2.2.7 for more detail.

Table 4.1: Literature overview of the variables included in the market accessibility index

Market accessibility measure/variable	Examples of support from the literature	Main findings regarding the impact of this variable on trade ⁴²
International shipping time per country and Domestic time to import per country	Djankov, Freund and Pham (2006:1)	Trade is reduced by more than 1% for each additional day that a consignment is delayed.
	Hummels (2001:2,4,21)	Each additional day in transit (ocean transport) will decrease trade between countries by 1% for all types of products, and by 1.5% for manufacturing products. Furthermore, each day in transit is worth 0.8% of the value of manufactured products. Shipping time of 20 days is therefore equal to a 16% tariff.
	Martínez-Zarzoso and Nowak-Lehmann (2007:424)	Transit times, especially road transport time have a significant and negative impact on trade flows.
International shipping cost per country and Domestic cost to import per country	Anderson and Van Wincoop (2003:4)	The tariff equivalent for transportation costs in industrialised countries is 21% (12% freight cost plus 9% for the time value of goods in transit).
	Baier and Berstrand (2001:1,23)	8% of the average post World War II world trade growth rate can be attributed to decreases in transport cost.
	Egger (2005:599)	A 1% decrease in transportation costs would cause a 0.6% increase in trade openness. The effect of reductions in transport costs on trade openness has significantly increased in the three decades since 1970. The reduction of transport costs is therefore becoming more effective over time.
	Hoffmann (2002)	Transport costs have a similar impact on trade as tariffs have due to the fact that they can impact on the competitiveness of an exporter. Compared to tariffs, transport costs have risen in the relative importance in export competitiveness.
	Hoekman and Nicita (2008:17-18)	A 10% reduction in the World Bank Doing Business report's domestic cost to import (as used in this study, see section 4.2.4.4) would increase imports by 4.8%. Furthermore, if the Doing Business cost of trading of low income countries increases to the middle income average, imports of these countries will increase by 7.4%.
	Hummels (1999:27)	The minimisation of transportation costs is a key determinant in importer's decision making.
	Jansen van Rensburg (2000:177)	International transport costs pose a threat to South African export competitiveness. An increase in transport costs will have a significant impact on South Africa's exports.
	Limão and Venables (2001:453,471)	Trade volume will decrease by 20% if transport costs increase by 10%. Doubling transport cost will result in a 45% decline in trade volumes (imports and exports).
	Martínez-Zarzoso and Nowak-Lehmann (2007:424)	Transport costs have a significant negative effect on trade volumes.
	Martínez-Zarzoso and Nowak-Lehmann (2008:3145)	Higher transportation costs have a significant negative effect on trade, especially in high value-added sectors.
	Limão and Venables (2001:471)	Compared to coastal countries, landlocked countries have 50% higher transport costs and 60% lower trade volumes. However, if landlocked countries improve their infrastructure, the transport costs will be lower.

⁴² These findings are based on data of different samples of countries. One should therefore take caution in interpreting these results. The detailed findings are not provided in Table 4.1, as the purpose of this table is only to illustrate the importance of including each variable in developing a more suitable market accessibility index in the DSM for South Africa.

Table 4.1: Literature overview of the variables included in the market accessibility index
(continued)

Market accessibility measure/variable	Examples of support from the literature	Main findings regarding the impact of this variable on trade
Logistics Performance Index per country	Bougheas, Demetriades and Morgenroth (1999:169)	A positive relationship exists between the level of infrastructure and the volume of trade.
	Clark, Dollar and Micco (2004:417,434)	When port efficiency is improved from the 25 th to the 75 th percentile, maritime transport costs are reduced by around 12%.
	Hoekman and Nicita (2008:18)	A higher LPI score is strongly associated with increased bilateral trade. If the LPI of low income countries increases to the middle income average, imports of these countries will increase by 15.2%.
	Limão and Venables (2001:464)	Improvements in a landlocked country's infrastructure from the median to the 25 th percentile will increase trade volumes by 13%.
	Wilson, Mann and Otsuki (2004:12,17)	Improvements in port efficiency lead to an increase in trade flows in manufactured goods.
<i>Ad valorem</i> equivalent tariffs per product	Baier and Berstrand (2001:1,23)	25% of the average post World War II world trade growth rate can be attributed to tariff rate reductions.
	Haveman, Nair-Reichert and Thursby (2003:485)	Tariffs reduce trade flows by an average of 5.5% in the 15 countries included in the study.
	Hoekman and Nicita (2008:17-18)	If an exporter has a 1% tariff advantage over competitors, it will increase exports by 3.5%. Furthermore, if the average tariff trade restrictiveness index for low income countries decreases to 5%, imports of these countries will increase by 5.7%.
	Hummels (1999:21)	A 10% increase in tariffs will decrease trade by 56%.
	Wilson, Mann and Otsuki (2004:12)	Trade is significantly negatively affected by higher tariffs. A decrease of 1% in the world average <i>ad valorem</i> tariff (8.5% to 7.5%) will increase trade by 1.1%.
	Most of the studies included in the summary of Cipollina and Salvatici (2006:53-57) make use of some form of either tariff or non-tariff barriers.	
Ad valorem equivalent non-tariff barriers (NTBs) per product	Haveman, Nair-Reichert and Thursby (2003:485)	Non-tariff barriers can either increase or decrease trade, but the net effect was found to be a trade reduction of 0.4% (in the sample of 15 countries for which the analysis was done).
	Hoekman and Nicita (2008)	If the average overall trade restrictiveness index (including tariffs and non-tariff measures) for low income countries is reduced to 10%, imports in these countries will increase by 8.4%.
	Kee, Nicita and Olarreaga (2008:31)	Non-tariff barriers play a big role in the trade restrictiveness of countries. On average, non-tariff barriers add 87% extra restrictiveness to the tariffs already imposed. For almost half of the countries included in this analysis, the restrictiveness of non-tariff barriers was found to be larger than that of tariffs.
	Most of the studies included in the summary of Cipollina and Salvatici (2006:53-57) make use of some form of either tariff or non-tariff barriers.	

Transportation costs and shipping arrangements, documentation requirements, tariff barriers and non-tariff barriers were also identified as barriers to exports by Arteaga-Ortiz and Fernández-Ortiz (2010:397-406). They summarised the literature (1978 to 2007) that proved

these variables as barriers to exports. Arteage-Ortiz and Fernáindex-Ortiz (2010:397-406) grouped barriers to exports into *knowledge barriers* (including lack of knowledge of potential markets, export assistance programmes, the benefits of exporting, how to export, opportunities for the exporter's specific product abroad), *resource barriers* (including lack of financial resources to pay for the high cost of international payments, recovery from export-related investments and increasing production capacity as well as inadequate local bank expertise and a foreign network of the banks that you work with), *procedure barriers* (including transportation costs and shipping arrangements, documentation requirements, language differences, cultural differences, tariff barriers, non-tariff barriers, differences in product usages in foreign markets, cost of adapting your product for the foreign market, logistical difficulties, difficulties locating suitable distribution channels) and *exogenous barriers* (including competition, exchange rate variation, risk of losing money and political instability). All South African exporters will face some of these barriers and they were therefore not included in the DSM, while others are very exporter specific and will therefore be difficult to measure quantitatively to be included in the DSM. Most of the *resource barriers* were, however, considered in the measurement of market accessibility and the *exogenous barriers* were also mostly captured in filter 1 (political and commercial risk) and in filter 3.1 (competitor/concentration analysis).

In sections 4.2.4.1 to 4.2.4.7 more detail about each of the variables that was used in this study to measure market accessibility will be given. In section 4.2.4.8, a description of the method used to develop the market accessibility index for South Africa in each of the product-country combinations under investigation, will follow.

4.2.4.1 International shipping time per country

This information was gathered from www.linescape.com. Information regarding routes and schedules from 125 container lines, 8 million voyages through 3000 ports is available on this website. If no direct route is available between two countries, information on transshipment is also available. Transshipment time was therefore also taken into consideration. For this study, the international shipping time from Durban, South Africa, to the nearest port in all the countries that entered filter 3, was gathered. If a country is landlocked, the shipping time to the nearest or

most likely port was used based on the ports used by the World Bank in their Doing Business 2009 report (Djonkov, Freund and Pham, 2006⁴³).

4.2.4.2 Domestic time to import per country

The World Bank's Doing Business report includes a section on *Trading Across Borders* in which information on the documents (number) to export and import, time (days) to export and import and cost (US dollar per container) to export and import for most countries around the world is provided. This information was gathered from freight forwarders, shipping lines, customs brokers, port officials and banks⁴⁴.

The *time to import* for each country under investigation was used to measure the domestic time to import per country. This measure includes the time required for obtaining all necessary documents, inland transport and handling, customs clearance and inspections and port and terminal handling (World Bank, 2009:92)⁴⁵. In calculating the time to import for each country, time is recorded in calendar days. The assumption is made that no time is wasted and the completion of procedures is without delay, procedures that can be completed in parallel are measured simultaneously and the waiting time between procedures is included.

4.2.4.3 International shipping cost per country

Matthee (2007) conducted a literature overview on the role of transport costs in the international trade arena. This overview includes, *inter alia*, the significance of transport costs, the measurement of international and domestic transport costs and factors influencing transport cost. On the measurement of international transport costs, it appears that there are two main sources for obtaining international transports costs. The first source is direct quotes from the shipping industry or transport operators (as used by, for example, Hummels, 1999:31; Limão and Venables, 2001:453 and Martínez-Zarzoso, Pérez-García and Suárez-Burguet, 2008:3146). The second source is the national customs data in the form of CIF import values and FOB export values. To get an indication of bilateral transport costs between countries, the CIF import

⁴³ A word of gratitude is expressed to the authors of the article *Trading on Time* for providing information on the ports in each country that was used in their analysis.

⁴⁴ For more detail on the method, see Djankov, Freund and Pham (2006:4-6).

⁴⁵ The World Bank adopted the methodology of Djankov, Freund and Pham (2006) to calculate the domestic time to import per country.

value is divided by the FOB export value (as used by, for example, Anderson and Van Wincoop, 2003; Baier and Berstrand, 2001:15; Jansen van Rensburg, 2000 and Limão and Venables, 2001:453). However, Chasomeris (2007:159) found this measure to be inaccurate for South Africa and he concluded that it should not be used as an indicator of South Africa's direct shipping costs.

Therefore, to overcome this problem, in this study quotes for the shipment of a 20-foot container from Durban harbour to the nearest or most likely port in 66 coastal countries were obtained from three main shipping lines⁴⁶. Based on these quotes, the average shipping cost for each country was calculated. In the case of landlocked countries or coastal countries for which a quote could not be obtained, the cost of shipment to the nearest or most likely port, for which a quote is available, was used.

Distance was not used as one of the variables to measure market accessibility in this study for two main reasons. Firstly, shipping time and cost are considered to encapsulate distance and are considered better measures due to the fact that it takes routing (eg, lower transport cost and times associated with main routes, Hoffmann, 2002), transshipment, dwell costs (eg, time and cost of loading, unloading, waiting in the port, Coughlin, 2004:2) as well as time and costs associated with distance into account. Secondly, domestic time and cost incurred by the exporter in the importing country are also considered in this study which, as opposed to distance, takes the time and cost of infrastructure, documentation, inland transport and handling, customs clearance and inspections as well as port and terminal handling into consideration.

4.2.4.4 Domestic cost to import per country

The World Bank's Doing Business report was also used for this variable. *Cost to import* information in the *Trading Across Borders* section of the report for all the countries under investigation was used (The World Bank, 2009:92).

The cost to import for each country includes the cost associated with all documentation, inland transport and handling, customs clearance and inspections, port and terminal handling and official costs (no bribes) (The World Bank, 2009:92). In calculating the cost to import for each

⁴⁶ A word of gratitude to Me S Grater who supplied this information.

country, the fees levied on a 20-foot container in US dollars were used. The cost does not include tariffs or costs related to ocean transport.

4.2.4.5 Logistics Performance Index per country

The World Bank also issued a report compiled by Arvis, Mustra, Ojala, Shepherd and Saslavsky (2010) in which a Logistics Performance Index (LPI) was constructed for 155 countries around the world. The LPI measures the performance of these countries in six important aspects of the current logistics environment. These are the efficiency of the customs clearance process, quality of trade and transport-related infrastructure, ease of arranging competitively priced shipments, competence and quality of logistics services, ability to track and trace consignments, and the frequency with which shipments reach the consignee within the scheduled or expected time. Online questionnaires were used to survey nearly 1,000 logistics professionals from international logistics companies in 130 countries (Arvis *et al*, 2010:4).

According to Arvis *et al* (2010:46), the LPI is specifically focused on the “friendliness” of countries’ trade and transport facilitation and is considered the first international benchmarking tool that specifically measures the critical factors of trade logistics performance.

Furthermore, Hoekman and Nicita (2008:17) found that both the LPI score and the Doing Business cost to import measures are significant measures of market access. They also found that the two measures do not overlap and it therefore captures the different factors affecting market access.

4.2.4.6 Ad valorem equivalent tariffs per product

The International Trade Centre’s *MacMap* was used to gather tariff information on HS 6-digit product level for all the product-country combinations that entered filter 3 (ITC, 2010a). *Ad valorem* equivalent tariffs were used due to the difficulty of comparing specific duties (eg, two Euros per kilogram of sugar) with *ad valorem* tariffs (eg, 5% of the total value of the imports) across countries. An *ad valorem* equivalent tariff is defined as a tariff presented as a percentage of the value of goods cleared through customs. It is the equivalent of a corresponding specific tariff measure based on unit quantities such as weight, number or volume (ITC, 2010b).

According to the IMF (2005:14), the *MacMap* database is unique and extremely accurate to measure the tariff levels faced by individual country exports due to the fact that it accounts for bilateral, regional and preferential tariff systems.

The *MacMap* database is specifically suitable for this study due to the fact that the data are available on a HS 6-digit level. Also, the tariffs applied by the different importing countries to products originating from South Africa are available. The tariffs applied by all the different importing countries to all HS 6-digit products originating from South Africa were therefore used for the purposes of developing a market accessibility index for South Africa. Another benefit of using the *MacMap* database is that it provides the most recent available tariff data (up until 2009).

If there are no tariff data available for a particular country, the world average tariff per product was used. This replacement of missing values is not perfect, but a zero tariff could not be used, as it can be argued that countries that did not report their tariffs most likely impose tariffs higher than zero. As the factor scores determined by the principle components analysis, used to develop the market accessibility index (see section 4.2.4.8), revolve around zero (zero being equal to the world average), countries with missing values were not extensively penalised or treated favourably by assigning them the world average values.

4.2.4.7 Ad valorem equivalent non-tariff barriers (NTBs) per product

Kee, Nicita and Olarreaga (2008:18) estimate *ad valorem* equivalents for non-tariff barriers per product-country combination on a HS 6-digit level, based on the UNCTAD TRAINS database.

They include *core non-tariff barriers*, namely price control measures, quantity restrictions, monopolistic measures and technical requirements as well as *agricultural domestic support* measured in US dollars. 4,575 non-linear regressions (one for each HS 6-digit category for which at least one country imposes non-tariff barriers) were run to estimate the impact of the above-mentioned non-tariff barriers on imports. Country and product-specific import demand elasticities were estimated and used to transform the above-mentioned non-tariff barrier impact estimates into price equivalents of non-tariff barriers (see Kee, Nicita and Olarreaga, 2008:6-17 for more detail on the method).

For clarity, it is important to note that Kee *et al* (2008) constructed different trade restrictiveness indices. One only accounted for tariff barriers, called tariff trade restrictiveness index (TTRI), and another one adding tariff and non-tariff barriers, called the overall trade restrictiveness index OTRI. The TTRI was not used in this study due to the fact that it is not measured from a South Africa point of view, and the *MacMap* database provides more recent *ad valorem* equivalent tariffs applied by different importing countries on products originating from South Africa (see section 4.2.4.6). The OTRI (sum of tariff and non-tariff barriers) was not used either, as it would double count for tariff barriers if used together with the *MacMap* tariff data. Therefore, only the sum of Kee *et al*'s (2008) estimated *ad valorem* equivalent core non-tariff barriers and the *ad valorem* equivalent of domestic support were used in this study to measure non-tariff barriers on a HS 6-digit level per product-country combination.

The benefits of using these *ad valorem* non-tariff barrier equivalents include the comparability of non-tariff barriers for a wide range of products over different countries and the fact that it is available on a HS 6-digit level. However, this is not measured from a South African point of view, and due to data limitations, *ad valorem* non-tariff barrier equivalents are only available for 78 countries (counting European Union members as one country) (Kee *et al*, 2008:28).

If there were no *ad valorem* equivalent non-tariff barrier data available for a particular country, the world average per product was used. As mentioned in section 4.2.2.6, this replacement of missing values is not perfect, but can be considered better than to substitute missing values with non-tariff equivalents of 0%. The same argument as in section 4.2.2.6 regarding the use of the world average in the principle components analysis applies here.

4.2.4.8 The construction of a market accessibility index

The information for the seven variables described in sections 4.2.4.1 to 4.2.4.7 was gathered for all product-country combinations that entered filter 3. As mentioned in section 4.2.4, no clear guidelines on weighing the different variables relative to one another could be found in the literature. Another way of constructing a single market accessibility measure per product-country combination therefore needed to be found. A principle components analysis was considered due to the fact that different variables can be reduced/condensed to measure a single construct (market accessibility in this case).

Although it was determined from the literature (see Table 4.1) that the seven variables discussed in sections 4.2.4.1 to 4.2.4.7 all impact market accessibility, the first step was to statistically determine whether the variables are indeed measuring the same construct (market accessibility). To determine this, a correlation matrix (R-matrix) was used. The analysis requires that variables correlate well, but not perfectly ($R > 0.9$) (Field, 2005). The variables included in the measurement of market accessibility in this study were found to be appropriately correlated and therefore all variables were found to be suitable to measure market accessibility.

Henceforth it needed to be determined whether a principle components analysis was suitable for the data. The Kaiser-Meyer-Olkin measure and Bartlett's test were used to measure this. The Kaiser-Meyer-Olkin measure for sampling adequacy ranges between zero and one, with values closer to zero indicating that unreliable factors were extracted from the data, and values closer to one indicating reliable and distinctive factors. Table 4.2 presents the statistics for the Kaiser-Meyer-Olkin measure and Bartlett's test for this analysis.

Table 4.2: Kaiser-Meyer-Olkin measure and Bartlett's test

Measure	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.527
Bartlett's Test of Sphericity	
Approximate Chi-Square	1031731.935
Degrees of freedom	21
Significance	0.000

From Table 4.2 it is clear that the Kaiser-Meyer-Olkin value for this analysis is 0.527. Although values above 0.7 are more desirable, a value between 0.5 and 0.7 is acceptable (Field, 2005). Bartlett's test measures whether there are suitable relationships between the variables included in the analysis. This test was highly significant in this analysis (significance < 0.05). Based on the results of these tests, it can be concluded that a principle components analysis was appropriate for the market accessibility data.

Three factors (components) were extracted in the principle components analysis that measures the market accessibility of a market (see Table 4.3), namely an *international factor* that includes international shipping time and cost, a *domestic factor* that incorporates domestic time to import, domestic cost to import and the LPI, and a *barrier factor* that includes *ad valorem* equivalent tariff- and non-tariff barriers. Since the higher the LPI score, the more accessible the market

and the higher all of the other variables (time, cost, tariffs and non-tariff barriers) the lesser accessible the market, the LPI has the opposite effect (negative sign) on market accessibility to the other variables.

Table 4.3 Component matrix

	Component		
	Factor 1 (International factor)	Factor 2 (Domestic factor)	Factor 3 (Barrier factor)
International shipment time		0.875	
International shipment cost		0.863	
Domestic time to import	0.882		
Domestic cost to import	0.829		
LPI	-0.753		
<i>Ad valorem</i> equivalent tariffs			0.614
<i>Ad valorem</i> equivalent non-tariff barriers			0.802

The three factors together explained 69.64% of the variance of the construct (market accessibility). The amount of variance retained in the three factors for each variable was around 80% for international time and cost, 87% and 73% for domestic time and cost respectively, 57% for the logistic performance indicator, 44% for tariffs and 65% for non-tariff barriers.

The three factor scores were added⁴⁷ to calculate a market accessibility index⁴⁸ for each product-country combination included in filter 3. A cut-off value was defined by using a similar procedure as used in filter 1 (see section 3.2.1).

The market accessibility index developed in this study provides a score for each product-country combination relative to all other product-country combinations included in the analysis. Each index value is therefore not very meaningful on its own. It places each product-country combination in position relative to all other product-country combinations. For the purposes of this study, where the product-country combinations with the least accessibility for South Africa needed to be identified and possibly eliminated, this is a useful index.

⁴⁷ As longer times to import, higher cost to import, higher tariffs and non-tariff barriers affect market accessibility negatively and a higher logistics performance index affects market accessibility positively, the signs of these variables were taken into consideration in the addition of the factor scores to calculate a market accessibility index value.

⁴⁸ A word of thanks is expressed to Prof WF Krugell who provided valuable help and inputs in constructing this index.

Some limitations of the market accessibility index constructed in this study include the following:

- Due to the difficulty of obtaining transportation quotes and time in transit for all modes of transport, only ocean freight was used in the measurement of international shipping time and cost.
- Due to the magnitude of data required in the DSM and the data limitations, missing values had to be dealt with in different ways. Although this was done as responsibly as possible, the use of substitute values is not optimal. The use of alternative sources or variables can be investigated in future studies (see section 7.4.2).
- In the principle components analysis it is difficult to determine what weight is assigned to each variable for each product-country combination. One could consider consulting a panel of experts to give advice on the variables used to measure market accessibility and the weighting between these variables (see section 7.4.2).

4.3 Summary and conclusion

For the purposes of identifying export opportunities for South Africa, four main refinements to the DSM methodology discussed in Chapter 3 have been introduced in this chapter.

Firstly, the use of Harmonised System (HS) six-digit level trade data instead of the SITC 2-digit and 4-digit data has been introduced due to its benefits for the effective use and application of the DSM results by trade promotion organisations and exporters.

A second refinement that has been discussed in this chapter involves the calculation of a potential export value for each selected product-country combination in order to prioritise between export opportunities. Even though the lists of export opportunities provided in the previous applications of the DSM provided reduced sets of priority realistic export opportunities (starting with all possible worldwide export opportunities and selecting those with the most export potential), it did not discriminate between high value and low value opportunities. The addition of information on potential export values therefore contributes to even more focused export promotion activities by the trade promotion organisations (see sections 5.4 and 6.7).

Due to the fact that the DSM mostly focuses on determining the demand potential (size, growth, competitors, market access) for products in different countries, export opportunities may be identified for which the exporting country does not have the necessary production capacity. In

the third refinement, South Africa's production capacity, measured by RCA, was therefore taken into account in the final selection of realistic export opportunities.

Finally, a new method of measuring the market accessibility of South Africa in the different product-country combinations (second part of filter 3) has been developed. The market accessibility index developed in this study takes the international shipping time and cost per country, domestic time and cost to import per country, logistics performance per country and *ad valorem* equivalent tariffs and non-tariff barriers per product-country combination into account. Support from the literature for using these variables to measure market accessibility has been provided in Table 4.1.

In Chapter 5 and 6 the results of the application of the refined DSM methodology to identify export opportunities for South Africa in the rest of the world (Chapter 5) and specifically in the rest of the African continent (Chapter 6) will be described and analysed.

CHAPTER 5: SOUTH AFRICA'S EXPORT OPPORTUNITIES IN THE REST OF THE WORLD

5.1 Introduction

In Chapter 2 the decision support model (DSM) was positioned in the international market selection literature (see Figure 2.2 and sections 2.2 and 2.3) and in Chapter 3 the methodology of the previous applications of the DSM was described (see section 3.2). In Chapter 4, four refinements to this method were proposed (see section 4.2).

In this chapter the results of the refined DSM, applied to identify export opportunities for South Africa in the rest of the world, will be discussed. In section 5.2 the results of each filter of the refined DSM will be discussed. Section 5.3 includes the general results such as the overall highest ranked regions, countries and products. Section 5.4 provides a summary of the main findings of this chapter.

5.2. Results of each filter of the DSM

In sections 5.2.1 to 5.2.4 the results of each filter of the refined DSM, applied for the South African circumstances, will be discussed.

5.2.1 Filter 1: The determination of preliminary export opportunities

As mentioned in section 3.2.1, in the first filter of the DSM, information related to the commercial and political risk of doing business in (filter 1.1) as well as general macroeconomic indicators of every possible importing country (filter 1.2) are used in order to assess which markets have sufficient general import potential.

5.2.1.1 Filter 1.1: Political and commercial risk assessment

Regarding the political and commercial risk, 32 countries (of an original 241 for which ONDD risk ratings are available) belonging to the two highest export credit risk groups of the ONDD were eliminated, leaving 209 countries to be considered in filter 1.2 (see section 3.2.1.1). The countries that were eliminated are Afghanistan, Burundi, Cambodia, the Democratic Republic of Congo (formerly Zaire), Côte d'Ivoire, Cuba, Djibouti, Eritrea, Ethiopia, Gambia, Guinea,

Guyana, Haiti, Iraq, North Korea, Kosovo, Lao, Lebanon, Liberia, Malawi, Marshall Islands, Myanmar, Pakistan, Palestine, Rwanda, Sao Tome and Principe, Seychelles, Somalia, Sudan, Tajikistan, Timor-Leste, and Zimbabwe. These countries were excluded due to their relatively high political and commercial risk ratings that exceeded the cut-off value of 9.286. Unfortunately, due to the non-availability of GDP and GDP per capita data, only 167 of the 209 countries selected could be introduced into filter 1.2.

5.2.1.2 Filter 1.2: Macroeconomic size and growth

Regarding the macroeconomic size and growth (see section 3.2.1.2) of the remaining 167 countries, 67 countries were selected based on their GDP and GDP per capita levels, and 65 were selected based on their GDP growth and GDP per capita growth. In total, 107⁴⁹ countries were selected to enter filter 2. See Appendix A for the list of countries and details on the selection criteria in filter 1.

5.2.2 Filter 2: The detection of possible export opportunities for South Africa

In the second filter, the import demand of the various product groups in the remaining 106 countries was assessed. As mentioned in section 3.2.2, growth of imports and import market size are used as criteria to assess product-country combinations. The data used are at the HS 6-digit level over the period 2003 to 2007 (see section 4.2.1). However, for Antigua and Barbuda, Bermuda, Channel Islands, Puerto Rico, San Marino and Taiwan, no trade data were available. Therefore only 101 countries remained for the detection of possible export opportunities.

In total, 545,703⁵⁰ product-country combinations were analysed in filter 2 to identify markets in which the demand is sizeable and growing sufficiently.

The results of filter 2 are presented in Table 5.1. As mentioned in section 3.2.2, only markets in categories 3 to 7 are selected to enter filter 3. At this stage of the selection process, 136,581

⁴⁹ 67 countries were selected based on GDP and GDP per capita levels, and 65 were selected based on GDP growth and GDP per capita growth. Countries are selected to enter filter 2 if they are selected either based on GDP and GDP per capita levels or on GDP and GDP per capita growth. 65 and 67 do not add up to 107, but there are countries that were selected for both macroeconomic size and growth and therefore not counted twice.

⁵⁰ 5,403 HS 6-digit product categories multiplied by 101 countries.

possible export opportunities show adequate size and growth in demand and enter filter 3 to be analysed in terms of its accessibility.

Table 5.1: Distribution of the product-country combinations according to import market type

Category	Short-term market growth	Long-term market growth	Relative market size	Number of product/country groupings
0	0	0	0	287,987
1	1	0	0	74,877
2	0	1	0	46,258
3	0	0	1	17,516
4	1	1	0	90,523
5	1	0	1	8,077
6	0	1	1	5,910
7	1	1	1	14,55
	189,971 [†]	161,515 [†]	46,089 [†]	136,581 [*]

Notes: ^{*}) value comprises the sum of categories 3-7; [†]) number of products in each import market type.

5.2.3 Filter 3: The selection of realistic export opportunities for South Africa

The third filter aims to analyse the remaining 136,581 possible export opportunities in more detail by eliminating markets that show a high market concentration due to a likelihood of dominant bilateral trade patterns that make it difficult for newcomers to enter (filter 3.1), and markets that are difficult to access due to various barriers to entry (filter 3.2).

5.2.3.1 Filter 3.1: Degree of market concentration

In the first part of filter 3, the concentration of the remaining product-country combinations was assessed (for the detail on the methodology, see section 3.2.3.1). The α -value was selected such that $h_k = 0.481$ for category 3; $h_k = 0.499$ for categories 4, 5 and 6; and $h_k = 0.517$ for category 7 (see section 3.2.3.1). Therefore, in relatively large markets, a Herfindahl-Hirshmann-index (HHI) of no more than 48.1% was allowed, in relatively large and growing markets, a degree of concentration of no more than 49.9% and finally in the most interesting markets that are relatively large and grow in the short and long term, 51.7% concentration was allowed⁵¹.

⁵¹ These cut-off values are not as differentiated for the three categories of markets as in the DSM applied for Thailand (Cuyvers, 1997:8; 2004:262). This is due to the exponentially larger number of product-country combinations that was assessed in this study on a HS 6-digit level (see section 4.2.1). Only one

Out of the 136,581 possible export opportunities that entered filter 3, a total of 89,229 product-country combinations showed adequately low levels of concentration.

5.2.3.2 Filter 3.2: Trade barriers

As mentioned in section 4.2.4, the second part of filter 3 of the original DSM could not be applied in the same way for South Africa. Therefore a market accessibility index, as described in section 4.2.4, was developed for each market under investigation. The cut-off index-value was identified as -1.506885⁵² (for the detail on the methodology, see section 4.2.4).

Of the 136,581 possible export opportunities that entered filter 3, a total of 115,360 showed adequate levels of market accessibility. In Table 5.2 and 5.3 the 20 most accessible and least accessible countries (on average) for all products in each country that were selected in filter 2, are provided.

It is important to take note of the limitations of Table 5.2. The market accessibility indicators in Table 5.2 are average values per country. Within a country there can still be products that are highly protected or restricted, even though the country as a whole is in the top 20 most accessible worldwide countries to South Africa.

definite “jump” in the number of product-country combinations selected could be detected at an alpha value of 0.64.

⁵² The world average market accessibility index is 0. Values above 0 indicate above average market accessibility, and values below 0 indicate below average market accessibility. The bigger positive value index, the more accessible the market; the bigger negative value index, the lesser accessible the market.

Table 5.2: The 20 most accessible countries to South Africa

Country	Inter-national shipment time (days)	Domestic time to import (days)	International shipment cost (US\$ per 20-ft container)	Domestic shipment costs (US\$ per 20 ft container)	LPI ⁵³	Average <i>ad valorem</i> Tariff %	Average NTB %	Average market accessibility index ^{54,55}
Singapore	2	3	298.00	439.00	4.09	0.03%	31.50%	3.382703
Hong Kong (China)	15	5	285.00	583.00	3.88	0.00%	2.46%	3.206013
Brunei	6	19	577.60	708.00	3.44	3.46%	4.69%	2.340244
Thailand	5	13	665.00	795.00	3.29	11.98%	5.42%	1.936700
South Korea	25	8	555.00	742.00	3.64	8.21%	0.20%	1.929957
Germany	20	7	1,072.50	937.00	4.11	0.82%	11.53%	1.910210
Netherlands	20	6	1,072.50	942.00	4.07	0.82%	12.03%	1.883541
Japan	22	11	715.86	1,047.00	3.97	4.49%	9.53%	1.882089
United Arab Emirates	22	9	743.33	579.00	3.63	4.54%	9.92%	1.804233
New Zealand	18	9	876.67	850.00	3.65	1.98%	12.47%	1.741811
Australia	22	8	853.33	1,119.00	3.84	3.15%	7.76%	1.731093
Malaysia	11	14	577.60	450.00	3.44	8.20%	27.80%	1.707938
Macao	32	5	614.37	583.00	3.49	0.00%	9.92%	1.657897
United Kingdom	21	8	1,072.50	1,160.00	3.95	0.82%	10.58%	1.625600
Indonesia	6	27	504.00	660.00	2.76	6.04%	4.53%	1.594002
Spain	12	10	1,122.50	1,221.00	3.63	0.82%	11.52%	1.561577
China	20	24	614.37	545.00	3.49	8.76%	5.56%	1.551419
Switzerland	20	9	1,072.50	1,540.00	3.97	4.30%	3.66%	1.516902
Luxembourg	22	6	1,072.50	1,420.00	3.98	0.82%	12.95%	1.482298
Austria	20	8	1,072.50	1,195.00	3.76	0.82%	12.68%	1.437921
WORLD AVERAGE	26	20	1,259.90	1,292.11	3.11	6.32%	9.92%	0

It is interesting to note from Table 5.2 that some countries might outperform the others in one or more market accessibility indicators, but perform worse in others. The market accessibility index encapsulates all the different market accessibility indicators into one score and is therefore useful in comparing the overall market accessibility of the different product-country combinations. It is, however, important to provide exporters with all the available information in order for them to know in which aspects they might face more difficulty than others. For example, if one considers Singapore, the cost and time to export from South Africa are much lower than the world average, and their logistic performance index is the best in the world.

⁵³ Note that the LPI has an opposite effect on market accessibility than the other variables have. The higher the LPI, the more accessible the market.

⁵⁴ A market accessibility index of 0 represents the world average. Values above 0 indicate above average market accessibility. Values lower than 0 indicate below average market accessibility.

⁵⁵ See sections 4.2.4.1 to 4.2.4.8 for the details on calculating this index.

Average tariffs are also very low, but the average non-tariff barriers are much higher than the world average. These non-tariff barriers do not apply to all products and therefore it is important to look at product-specific information. The market accessibility index for South Africa developed in this study is on a HS 6-digit product level. Therefore, although the average market accessibility index in Singapore is the highest in the world, the market accessibility indices for the products in Singapore range from -2.68 to 4.06, and there are products that were eliminated for this country in the detailed product-country analysis (see Table 5.4). Table 5.3 reports on the 20 least accessible countries to South Africa.

Table 5.3: The 20 least accessible countries to South Africa

Country	Inter-national shipment time (days)	Domestic time to import (days)	Inter-national shipment cost (US\$ per 20 ft container)	Domestic shipment costs (US\$ per 20 ft container)	LPI	<i>Ad valorem</i> Tariff %	NTB %	Average market accessibility index
Uzbekistan	26.5	92	1,043.44	4,600.00	2.79	27.20%	9.92%	-3.84412
Venezuela	40	71	1,930.00	2,868.00	2.68	12.88%	9.60%	-3.71574
Mexico	57	17	2,393.90	2,050.00	3.05	10.25%	16.78%	-3.12163
Angola	25	59	1,517.67	3,240.00	2.25	6.38%	9.92%	-2.73917
St Kitts and Nevis	38	13	2,393.90	2,138.00	2.68	8.69%	9.92%	-2.43615
Sierra Leone	23	31	2,110.00	1,639.00	1.97	12.91%	9.92%	-2.43611
Bahamas	29	13	2,393.90	1,380.00	2.75	29.23%	9.92%	-2.35507
Colombia	43	14	1,970.00	1,750.00	2.77	11.05%	15.63%	-2.13618
Aruba	47	26	2,050.00	1,100.00	2.68	6.32%	9.92%	-2.13457
Peru	51	24	2,130.00	895.00	2.8	4.82%	8.16%	-2.0521
Dominican Republic	45	10	2,393.90	1,150.00	2.82	7.58%	9.92%	-2.035
Barbados	41	26	1,946.00	1,100.00	2.68	13.51%	9.92%	-2.022
Chile	56	21	2,210.00	795.00	3.09	5.32%	7.35%	-1.97658
Netherlands Antilles	44	26	1,994.00	1,100.00	2.68	6.32%	9.92%	-1.95225
Azerbaijan	28	50	960.00	3,480.00	2.64	7.95%	9.92%	-1.87832
Suriname	45	25	1,930.00	885.00	2.68	6.96%	9.92%	-1.82268
Costa Rica	51	15	2,130.00	1,190.00	2.91	4.82%	0.50%	-1.73652
Russia	33	36	1,472.50	1,850.00	2.61	9.04%	13.58%	-1.72974
Trinidad and Tobago	37	26	1,890.00	1,100.00	2.68	6.84%	2.85%	-1.42209
Kazakhstan	20	76	614.37	3,055.00	2.83	5.64%	9.34%	-1.275572
WORLD AVERAGE	26	20	1,259.90	1,292.11	3.11	6.32%	9.92%	0⁵⁶

⁵⁶ A market accessibility index of 0 represents the world average. Values above 0 indicate above average market accessibility. Values lower than 0 indicate below average market accessibility.

Most of the countries indicated in Table 5.3 have above average time, cost, tariffs and non-tariff barriers applied to South African exports destined for these countries. The logistics performance indicators are also mostly below average.

Uzbekistan, Venezuela and Angola performed particularly poor in terms of domestic time and cost to import. Therefore, the time and cost associated with obtaining all necessary documents, inland transport and handling, customs clearance and inspections and port and terminal handling in these countries are very high compared to other countries. In the case of the countries in the Western part of South America and in the island countries of the Caribbean, the high international shipment time and cost played a big role in their low market accessibility scores.

In Table 5.4 the 20 specific product-country combinations that are least accessible to South Africa are listed. These combinations were all eliminated in filter 3.2.

It is interesting to note from Table 5.4 that the markets that are the most restricted or protected in the world are liquor in Egypt (probably due to their religious background) and agricultural products in European Union countries. Unfortunately the results for the market accessibility index for South Africa developed in this study are too vast in number to report on in detail in this study⁵⁷.

To enter filter 4, markets needed to show adequately low levels of concentration (filter 3.1) as well as adequately high levels of market accessibility (low barriers to entry) (filter 3.2). The number of product-country combinations that showed acceptable levels of market concentration *and* market access was 78,098 in total and these realistic export opportunities entered filter 4.

⁵⁷ More detail on the market accessibility indices for any specific product-country combination is available from the author.

Table 5.4: The 20 least accessible worldwide product-country combinations

Country	HS 6-digit product code and description	Inter-national shipment time (days)	Domestic time to import (days)	International shipment cost (US\$ per 20 ft container)	Domestic shipment costs (US\$ per 20 ft container)	LPI	Ad valorem Tariff %	NTB %	Market accessibility index
Egypt	220840 - Rum and tafia	28	15	1,385.00	823.00	2.61	3000.00%	131.77%	-104.21429
Egypt	220600 - Fermented beverages n.e.s. (eg, cider, perry, mead, etc)	28	15	1,385.00	823.00	2.61	3000.00%	94.78%	-103.41867
Egypt	220820 - Spirits obtained by distilling grape wine	28	15	1,385.00	823.00	2.61	3000.00%	79.38%	-103.0873
Egypt	220830 - Whiskies	28	15	1,385.00	823.00	2.61	3000.00%	56.23%	-102.58954
Egypt	220850 - Gin and Geneva	28	15	1,385.00	823.00	2.61	3000.00%	49.44%	-102.44339
Egypt	220410 - Grape wines, sparkling	28	15	1,385.00	823.00	2.61	3000.00%	0.00%	-101.38008
Egypt	220510 - Vermouth and other flavoured grape wines - pack < 2l	28	15	1,385.00	823.00	2.61	3000.00%	0.00%	-101.38008
Egypt	220590 - Vermouth and other flavoured grape wines - pack > 2l	28	15	1,385.00	823.00	2.61	3000.00%	0.00%	-101.38008
Egypt	220860 - Vodka	28	15	1,385.00	823.00	2.61	3000.00%	0.00%	-101.38008
Egypt	220870 - Liqueurs and cordials	28	15	1,385.00	823.00	2.61	3000.00%	0.00%	-101.38008
Egypt	220421 - Grape wines n.e.s., fortified wine or must, pack < 2l	28	15	1,385.00	823.00	2.61	1800.00%	0.00%	-60.79207
Egypt	220429 - Grape wines, alcoholic grape must n.e.s.	28	15	1,385.00	823.00	2.61	1800.00%	0.00%	-60.79207
Egypt	330210 - Mixed odoriferous substances - food and drink industry	28	15	1,385.00	823.00	2.61	1502.50%	126.28%	-53.44576
Egypt	220890 - Alcoholic liqueurs n.e.s.	28	15	1,385.00	823.00	2.61	1515.00%	0.00%	-51.15241
Egypt	220300 - Beer made from malt	28	15	1,385.00	823.00	2.61	1200.00%	121.44%	-43.11
Portugal	080530 - Lemons and limes, fresh or dried	29	15	1,147.50	999.00	3.34	0.00%	1998.53%	-42.11628
Greece	080530 - Lemons and limes, fresh or dried	11	25	997.50	1,265.00	2.96	0.00%	2000.29%	-41.93393
Denmark	080530 - Lemons and limes, fresh or dried	30	5	1,372.50	744.00	3.85	0.00%	2010.14%	-41.87571
Finland	080530 - Lemons and limes, fresh or dried	33	8	1,472.50	620.00	3.89	0.00%	1986.49%	-41.56906
Germany	120911 - Seed, sugar beet, for sowing	20	7	1,072.50	937.00	4.11	0.00%	1999.00%	-40.80839
WORLD AVERAGE		26	20	1,259.90	1,292.11	3.11	6.32%	9.92%	0

5.2.4 Filter 4: Analysis of South Africa's realistic export opportunities

Filter 4 assessed the market share of South Africa in the markets identified as realistic export opportunities for South Africa. The selected 78,098 product-country combinations were categorised in the different cells as discussed in section 3.2.4 and tabulated in Table 3.6.

As discussed in section 4.2.3, an additional criterion was introduced at this stage to limit the number of opportunities selected. The reasons for this are twofold. Firstly, the motivation for this study is to identify export opportunities for a trade promotion organisation (TPO) with limited resources (see section 1.1). Even though the number of opportunities was substantially reduced from 1,302,123 possible worldwide product-country combinations to 78,098 realistic export opportunities, it is most probably still too costly to actively promote. Secondly, the production capacity of South Africa was not taken into consideration until this stage of the filtering process. By introducing the additional criterion of Revealed Comparative Advantage $RCA_j > 1$;

with:

$$RCA_j = \left(\frac{X_{SA,j}}{X_{World,j}} \right) / \left(\frac{X_{SA,tot}}{X_{World,tot}} \right); \text{ (see section 4.2.3),}$$

it is assured that South Africa is relatively specialised in producing product j (Balassa, 1965). Therefore, by including the RCA criterion, South Africa's production capacity and ability to successfully export product j are taken into consideration⁵⁸.

After implementing the above-mentioned criterion, 15,389 of the 78,098 realistic export opportunities remained.

It is possible to provide the export promotion agency, for which the DSM is applied, with two sets of results. One set of results for products in which South Africa has an export opportunity, but which South Africa is not specialised in producing and exporting, and another list for products with an export opportunity which South Africa is specialised in producing and exporting. The first set of results will enable South African export promotion agencies to select

⁵⁸ Although the RCA is considered in determining the cut-off values in filter 2, a product that South Africa is not exporting at all ($RCA = 0$) can still be selected if it complies with the more stringent cut-off points (see section 3.2.2 as well as Table 3.3 and 3.4).

appropriate markets for exporters of products that South Africa has not exported or exported relatively small values or quantities in the past. The second set of results will serve as a list of immediate export opportunities and can be regarded as first priority for export promotion. It is important to note that although the second set of results includes *products* that have been exported before, the result might indicate *countries* to which South Africa has not exported these products. The introduction of the criteria for production capacity therefore does not eliminate new markets. It only considers South Africa's current ability to produce the different products. New countries for products that South Africa is specialised enough in producing, are therefore included in this set of results.

The results reported from here onwards are for the 15,389 product-country combinations that South Africa is specialised in producing and exporting. These product-country combinations serve as the immediate export opportunities for which export success is expected.

The results of filter 4 are categorised into the 20 cells of filter 4 (see Table 3.6 and section 3.2.4) in Table 5.5 and 5.6.

Table 5.5: *Number* of realistic export opportunities according to South Africa's relative market share and the importers' market characteristics

	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) 812 (5.28%)	(Cell 6) 197 (1.288%)	(Cell 11) 157 (1.028%)	(Cell 16) 132 (0.86%)	1298 (8.43%)
Growing (long- and short-term) product/market	(Cell 2) 8198 (53.27%)	(Cell 7) 228 (1.48%)	(Cell 12) 177 (1.15%)	(Cell 17) 417 (2.71%)	9020 (58.61%)
Large product/market short-term growth	(Cell 3) 585 (3.80%)	(Cell 8) 137 (0.89%)	(Cell 13) 123 (0.80%)	(Cell 18) 80 (0.52%)	925 (6.01%)
Large product/market long-term growth	(Cell 4) 682 (4.43%)	(Cell 9) 133 (0.86%)	(Cell 14) 145 (0.94%)	(Cell 19) 90 (0.58%)	1050 (6.82%)
Large product/market short- and long-term growth	(Cell 5) 2094 (13.61%)	(Cell 10) 385 (2.50%)	(Cell 15) 376 (2.44%)	(Cell 20) 241 (1.566%)	3096 (20.12%)
Total	12371 (80.39%)	1080 (7.02%)	978 (6.36%)	960 (6.24%)	15389 (100%)

Table 5.6: *Potential export values* of realistic export opportunities according to South Africa's relative market share and the importers' market characteristics (thousands of US\$)

	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) 10,049,293 (4.32%)	(Cell 6) 5,249,280 (2.26%)	(Cell 11) 26,908,198 (11.58%)	(Cell 16) 8,266,403 (3.56%)	50,473,174 (21.72%)
Growing (long- and short-term) product/market	(Cell 2) 23,616,518 (10.16%)	(Cell 7) 1,767,418 (0.76%)	(Cell 12) 1,204,519 (0.52%)	(Cell 17) 1,636,871 (0.70%)	28,225,326 (12.14%)
Large product/market short-term growth	(Cell 3) 10,451,825 (4.50%)	(Cell 8) 3,627,297 (1.56%)	(Cell 13) 7,328,055 (3.15%)	(Cell 18) 4,219,816 (1.82%)	25,626,993 (11.03%)
Large product/market long-term growth	(Cell 4) 8,256,001 (3.55%)	(Cell 9) 7,968,837 (3.43%)	(Cell 14) 7,400,184 (3.18%)	(Cell 19) 4,514,201 (1.94%)	28,139,223 (12.11%)
Large product/market short- and long-term growth	(Cell 5) 39,297,198 (16.91%)	(Cell 10) 12,530,033 (5.39%)	(Cell 15) 34,340,532 (14.78%)	(Cell 20) 13,774,503 (5.93%)	99,942,266 (43.00%)
Total	91,670,835 (39.44%)	31,142,865 (13.40%)	77,181,488 (33.21%)	32,411,794 (13.95%)	232,406,982 (100%)

From Table 5.5 and 5.6 it is clear in both that, in terms of number of export opportunities and potential export values, most of the export opportunities identified for South Africa are classified into cells 1 to 5, in which South Africa has a relatively small market share. This implies that South Africa is not adequately tapping into the markets where political and commercial risk is not too high (determined in filter 1), demand is sizable and/or growing (determined in filters 1 and 2), competition is not too fierce (determined in filter 3.1), barriers to trade are not too high (determined in filter 3.2) and South Africa is specialised in producing and exporting the product.

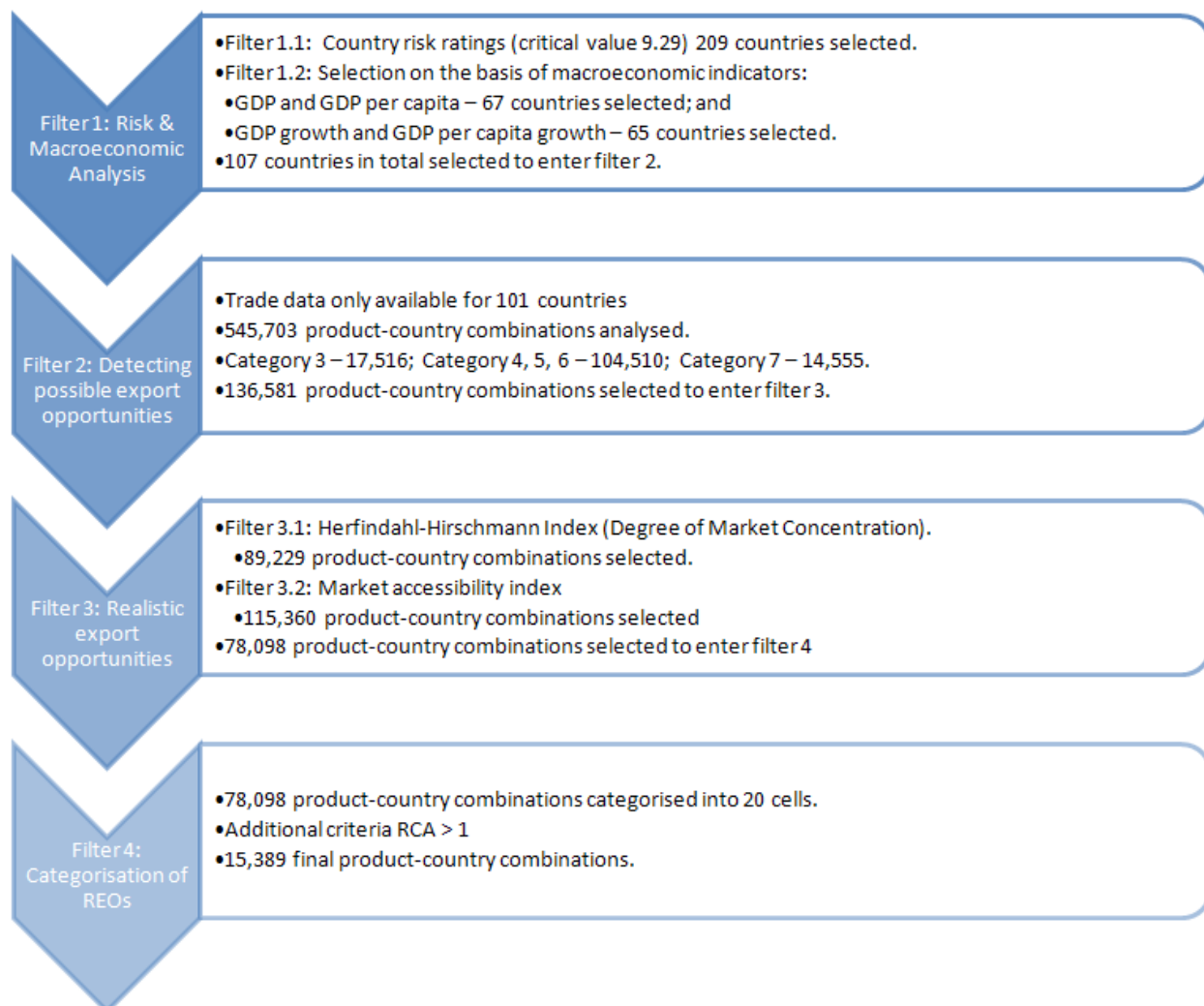
It is, however, interesting to note that the percentage of opportunities that falls into cells 1 to 5 decreases from 80.39%, when considering the number of opportunities selected, to 39.44% when the potential export value is considered. This indicates that the average potential export value of the product-country combinations in cells 1 to 5 is relatively small.

Furthermore, the contribution of markets that are only growing in the short and long term, but are not of adequate size (cells 2, 7, 12 and 17), adds up to 58.61% of the total *number* of opportunities. When the *potential export values* are considered, this percentage falls to 12.14%. It is therefore clear that the potential export values calculated in this study (see section 4.2.2)

give a better indication of the size of the export opportunities relative to one another than merely looking at the number of opportunities.

In order to give a brief overview of the results, a summary of the results of each filter of the DSM is illustrated in Figure 5.1 below.

Figure 5.1: Selection of realistic export opportunities for South Africa in the rest of the world



In section 5.3 the general results of the DSM applied to identify export opportunities for South Africa in the rest of the world are presented. These results include the regions, countries, products and product-country combinations with the highest overall export potential for South Africa.

5.3. General results of the DSM applied to identify realistic export opportunities for South Africa in the rest of the world

The DSM results provide such a wealth of information that it is impossible to report on all the detail, eg, the export opportunities of every country and every product. In this section the regions, countries, products and product-country combinations with the highest export potential for South Africa will be identified. Figures 5.2 and 5.3⁵⁹ represent the share of each region⁶⁰ in the total *number* and *potential value* of export opportunities identified.

From Figure 5.2 and 5.3 it is clear that the regional percentages in total export opportunities change dramatically when the number of opportunities is compared with the potential export values of these opportunities. Northern America holds the eighth place in terms of the *number* of opportunities identified (4.70% of the total number of opportunities identified), but in terms of the total *export potential value* of the export opportunities identified, Northern America is in the first place (24.77%). Similarly, Eastern Asia holds the seventh highest share of realistic export opportunities identified for South Africa in the world in terms of *number* of opportunities (6.77%), but in terms of the *potential export value* of these opportunities, they rank second (20.16%). Although they hold a small share in the total export opportunities selected, South-Central Asia is also one of the regions that performed better in terms of *potential value* compared with the *number* of opportunities selected (3.91% to 4.33%).

Western Europe ranks the highest in terms of *number* of opportunities, but drops to third place when the *potential export value* of these opportunities is considered. Northern, Southern and Eastern Europe perform much worse in terms of *potential export value* compared with the *number* of opportunities selected, falling from second (14.97%) to fourth (8.94%) place, third (13.17%) to fifth (6.84%) place and forth (12.15%) to ninth (3.34%) place respectively. Western Asia also performs worse in terms of *potential export value* compared with the *number* of opportunities selected, falling from fifth (9.27%) place in terms of number of opportunities and to seventh place in terms of potential export value (4.51%). South-East Asia, South America and Oceania also perform worse in terms of *potential export value* than in terms of the *number* of opportunities, and the overall percentages in these regions are also relatively low.

⁵⁹ A word of gratitude is expressed to Dr R Rossouw for his assistance in drawing these maps.

⁶⁰ Regions as defined by the United Nations (2010).

Figure 5.2: Regional distribution of worldwide export opportunities: share in total *number of opportunities*

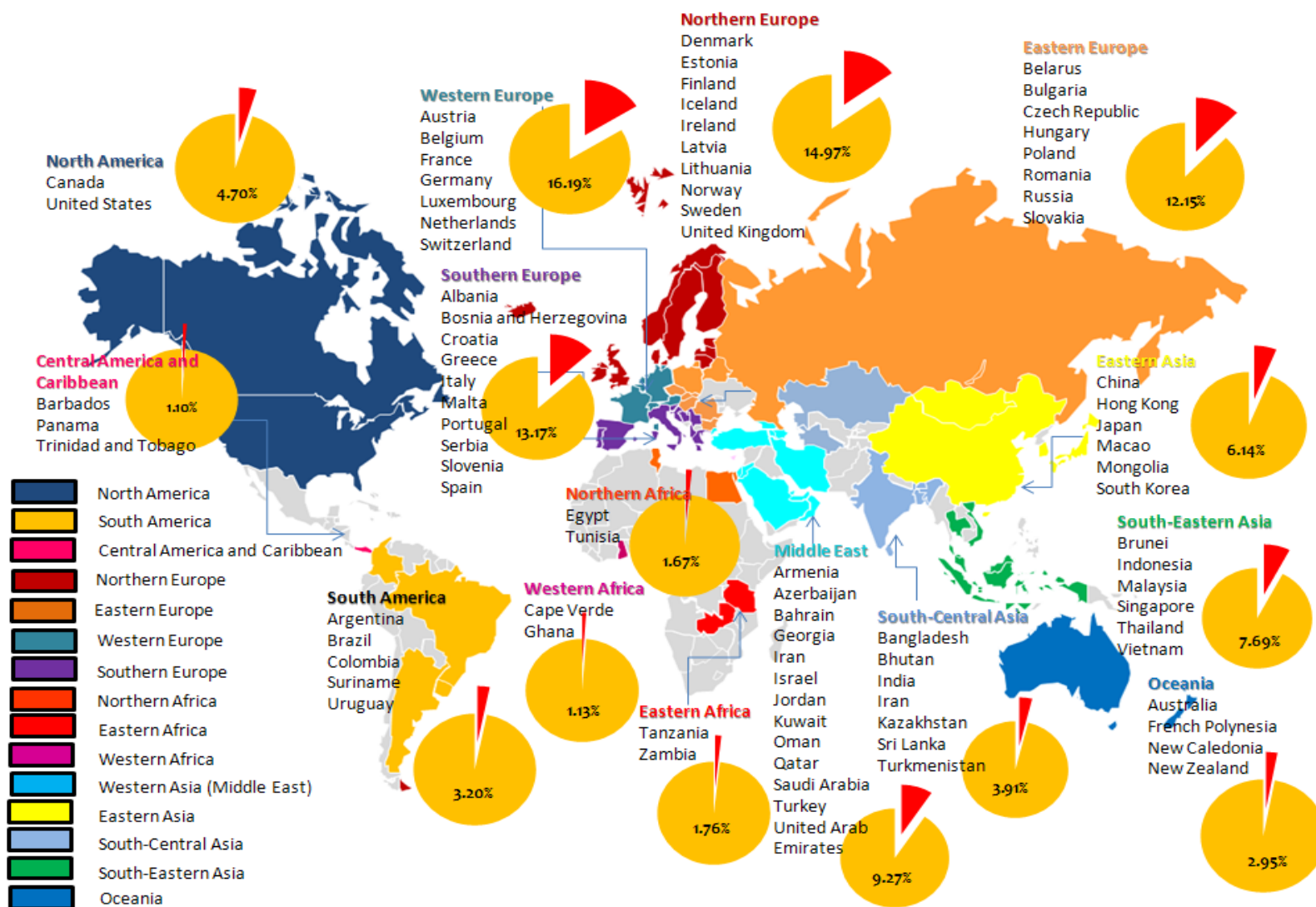
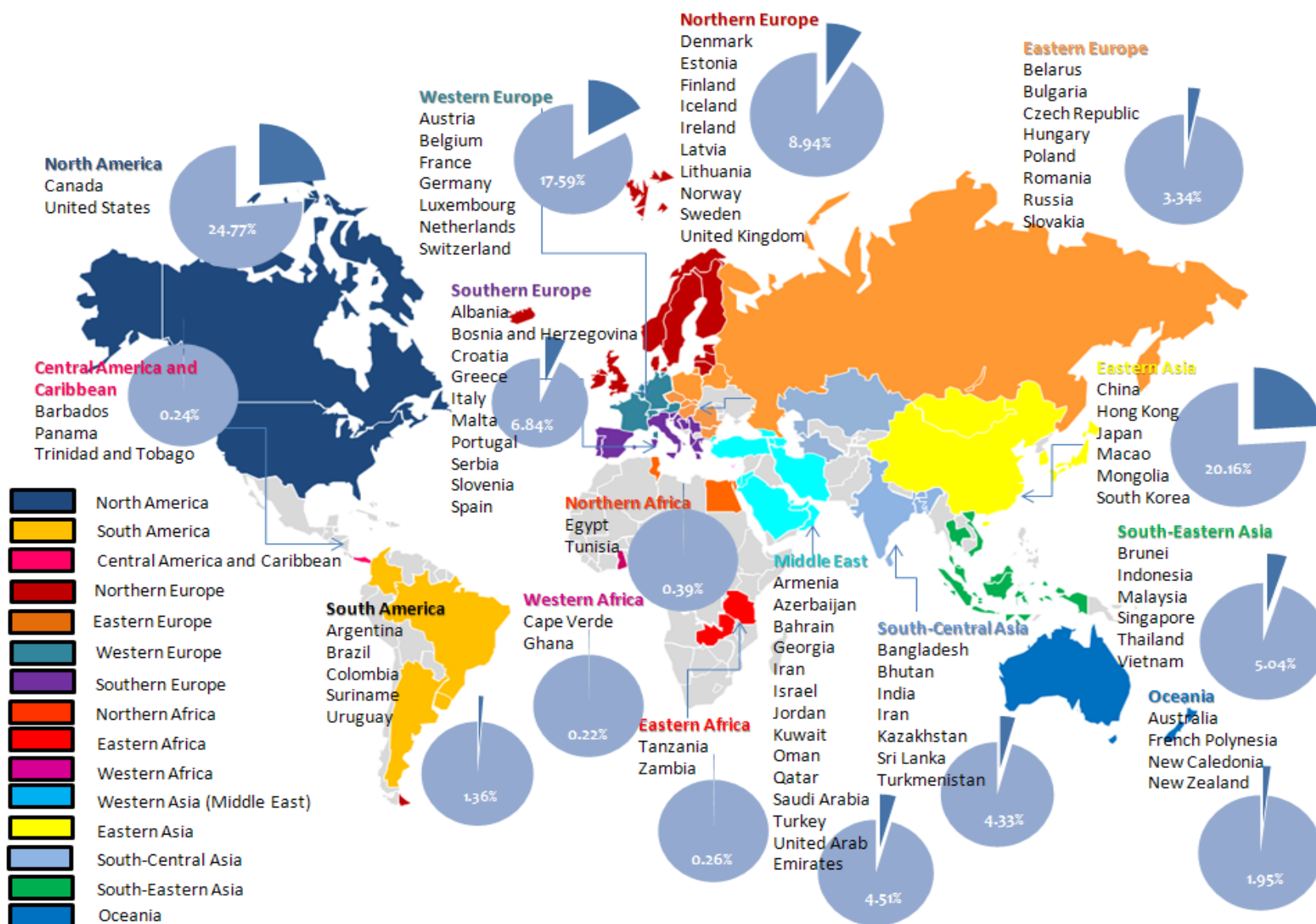


Figure 5.3: Regional distribution of worldwide export opportunities: share in total *potential* export value



In Northern, Eastern and Western Africa as well as Central America and the Caribbean the share in the number of export opportunities as well as the total potential export values are dismally low. This might be due to many African countries being eliminated based on political and commercial risk and macroeconomic size and growth (see sections 1.3.2 and 6.1) and many of the Central American and Caribbean countries performing very poorly in terms of market accessibility (see Table 5.3)

The top 20 countries in terms of the total potential export value of the export opportunities selected for each country are provided in Table 5.7.

Table 5.7: Top 20 countries with the highest worldwide export potential for South Africa

Ranking	Country	Potential export value (2007) ⁶¹ (US\$ thousand)	Current export value (2007) (US \$ thousand)	% of the total potential export value realised in actual exports
1	United States	48,847,268	6,486,919	13.28%
2	Japan ⁶²	22,786,981	5,913,485	25.95%
3	China	18,896,970	2,694,355	14.26%
4	Germany	16,552,297	4,364,043	26.37%
5	United Kingdom	14,423,764	4,020,651	27.88%
6	India	9,079,285	692,546	7.63%
7	Canada	8,723,964	525,952	6.03%
8	Belgium	8,300,668	1,531,645	18.45%
9	Italy	8,276,103	1,183,988	14.31%
10	Netherlands	6,294,889	2,123,384	33.73%
11	France	6,019,414	1,071,735	17.80%
12	Spain	5,404,035	1,510,402	27.95%
13	Hong Kong	5,070,903	484,051	9.55%
14	Australia	4,184,067	735,842	17.59%
15	Israel	3,658,267	408,294	11.16%
16	Singapore	3,381,900	156,061	4.61%
17	Indonesia	3,131,210	151,550	4.84%
18	Saudi Arabia	3,108,051	184,629	5.94%
19	Switzerland	2,760,137	799,836	28.98%
20	Brazil	2,546,132	210,263	8.26%

Most of the top 20 countries are in North America, Asia or the European Union. Although the total regions of Oceania and South America performed relatively poor, Australia and Brazil are included in the top 20 countries and should not be left out in formulating export promotion

⁶¹ The most recent trade data in the database obtained from the International Trade Centre is for 2007.

⁶² Due to the recent devastating earthquake and subsequent tsunami in Japan, real-time intelligence should be collected to ensure the export opportunities identified for South Africa in Japan are still viable. This is typically an example of why it is important to add real-time information to the results of the DSM (that is based on historical trade data (see section 7.4.2)).

strategies. The United States presents the highest total potential export value for South Africa, but South Africa only tapped into 13.28% of this potential.

Countries in which South Africa has tapped into the export potential to a relatively large extent include the Netherlands, Switzerland, Spain, the United Kingdom, Germany and Japan (mostly European Union countries). Countries that hold great potential that are not sufficiently utilised by South African exporters are India, Brazil, Canada, Hong Kong, Singapore, Indonesia and Saudi Arabia.

Depending on the export promotion strategy of the trade promotion organisation, the products identified by the DSM within these countries should be investigated and prioritised. Specific information contained in the DSM such as import market size, growth, main competitors and market access conditions should be taken into consideration as well as specific qualitative market information that could not be included in a model of this magnitude. The DSM results should therefore not be used in isolation, but be supplemented with real-time market intelligence and experience of policy makers and exporters (see section 7.4.2).

As previously mentioned, the potential export values calculated in this study only give an indication of the relative size of the potential in order to prioritise between countries and products (see section 4.2.2). The potential export values of countries and products relative to one another are therefore of more interest than the values themselves.

Table 5.8 contains the top 50 products identified as export opportunities in all countries. The ranking was based on the sum of the export potential values (US dollar thousand) in all countries in which the product was identified as an export opportunity for South Africa.

The South African products with the highest worldwide export potential can be categorised into mineral products (aviation spirit; iron, manganese, copper, nickel and precious metal ores; coal), transportation products (automobiles, trucks, wheels), stone/glass (diamonds, platinum, palladium, rhodium) and metals (aluminium, copper, ferro-chromium, iron, nickel, steel, stainless steel, zinc).

Table 5.8: Top 50 products with the highest worldwide export potential for South Africa

Product category	Potential export value (US\$ thousand)	Actual exports (US \$ thousand)	% of the total potential export value realised in actual exports
870323 - Automobiles, spark ignition engine of 1500-3000 cc	24,855,197	1,779,539	7.16%
271011 - Aviation spirit	12,142,041	134,872	1.11%
710239 - Diamonds (jewellery) worked but not mounted or set	11,742,358	622,912	5.30%
270112 - Bituminous coal, not agglomerated	9,333,857	1,947,036	20.86%
710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	7,500,043	1,686,705	22.49%
260300 - Copper ores and concentrates	6,359,309	185,925	2.92%
750210 - Nickel unwrought, not alloyed	5,330,762	194,448	3.65%
760110 - Aluminium unwrought, not alloyed	5,284,222	1,241,289	23.49%
711011 - Platinum unwrought or in powder form	4,923,708	3,211,755	65.23%
940190 - Parts of seats	3,960,131	417,015	10.53%
270119 - Coal except anthracite or bituminous, not agglomerate	3,923,292	10,836	0.28%
842139 - Filtering or purifying machinery for gases n.e.s.	3,915,289	3,023,682	77.23%
870421 - Diesel powered trucks weighing < 5 tons	2,783,233	495,045	17.79%
711031 - Rhodium unwrought or in powder form	2,592,926	1,999,924	77.13%
220421 - Grape wines n.e.s., fortified wine or must, pack < 2l	2,533,968	473,871	18.70%
470329 - Chemical wood pulp, soda/sulphate, non-coniferous, bleached	2,467,172	42,117	1.71%
870322 - Automobiles, spark ignition engine of 1000-1500 cc	2,412,930	2,716	0.11%
270799 - Coal tar distillation products n.e.s.	2,372,183	33,512	1.41%
260112 - Iron ore, concentrate, not iron pyrites, agglomerated	2,329,586	1,398,481	60.03%
720241 - Ferro-chromium, >4% carbon	2,227,206	1,751,142	78.63%
730890 - Structures and parts of structures, iron or steel, ne	2,041,379	70,432	3.45%
721049 - Flat rolled iron or non-alloy steel, coated with zinc, width >600 mm, ne	1,952,616	228,417	11.70%
711019 - Platinum in semi-manufactured forms	1,849,013	1,578,982	85.40%
284410 - Natural uranium, its compounds, mixtures	1,626,359	109,719	6.75%
840820 - Engines, diesel for motor vehicles	1,541,109	252,671	16.40%
720839 - Flat-rolled products/coils of iron/non-alloy steel of a thickness < 3 mm	1,449,149	146,930	10.14%
390210 - Polypropylene in primary forms	1,443,206	57,962	4.02%
852721 - Radio receivers, external power, sound recording for motor vehicles	1,443,059	81,247	5.63%
030420 - Fish fillets, frozen	1,433,756	96,826	6.75%
401120 - Pneumatic tyres new of rubber for buses or lorries	1,391,740	37,981	2.73%
721391 - Bars and rods of circular cross-section, less than 14 mm in diameter	1,315,818	30,193	2.29%
740400 - Copper/copper alloy waste or scrap	1,305,267	160,102	12.27%
711021 - Palladium unwrought or in powder form	1,208,851	478,938	39.62%
870870 - Wheels including parts/accessories for motor vehicles	1,204,137	92,994	7.72%
760612 - Aluminium alloy rectangular plate/sheet/strip, thickness >0.2 mm	1,182,518	265,682	22.47%
720110 - Pig iron, non-alloy, <0.5% phosphorus	1,078,054	101,891	9.45%
740200 - Unrefined copper, copper anodes, electrolytic refining	1,046,202	20,237	1.93%
870410 - Dump trucks designed for off-highway use	975,664	50,597	5.19%
260400 - Nickel ores and concentrates	949,697	120,203	12.66%
721934 - Cold rolled stainless steel, width >600 mm, thickness 0.5-1.0 mm	899,590	112,930	12.55%
261690 - Precious metal ores and concentrates except silver	894,123	467,194	52.25%
851150 - Generators and alternators	825,755	21,590	2.61%
170111 - Raw sugar, cane	803,906	3,355	0.42%
260200 - Manganese ores, concentrates, iron ores >20%	789,245	370,864	46.99%
230120 - Flour or meal, pellet, fish, etc for animal feed	771,024	19,722	2.56%
080610 - Grapes, fresh	743,825	288,094	38.73%
721933 - Cold rolled stainless steel, width >600 mm, thickness 1.0-3.0 mm	731,616	272,261	37.21%
790112 - Zinc, not alloyed, unwrought, < 99% pure	719,751	0	0.00%
842959 - Earth moving/road making equipment, self-propelled ne	696,911	2,500	0.36%
321519 - Printing ink other than black	689,962	22,639	3.28%

South Africa has tapped into the potential for platinum, ferro-chromium, filtering or purifying machinery for gases, rhodium, iron ore, precious metal ores, manganese ores, palladium, fresh grapes, cold rolled stainless steel and aluminium to a relatively large extent.

However, South Africa has not adequately utilised the potential for zinc, 1000 - 1500 cc and 1500 - 3000 cc automobiles, wheels for motor vehicles, coal, self-propelled earth moving/road making equipment, raw cane sugar, aviation spirit, wood pulp, copper, bars and rods, generators and alternators, pneumatic tyres for buses or lorries, colour printing ink, iron or steel structures, nickel, polypropylene, dump trucks, unworked diamonds, radio receivers, natural uranium, frozen fish fillets, flat rolled coils and non-agglomerated coal.

The top 50 worldwide product-country combinations with the highest export potential for South Africa are listed in Table 5.9.

There are 17 countries in which the top 50 worldwide export opportunities identified for South Africa are located. These include, in order of highest to lowest total export potential value, the United States, Japan, India, the United Kingdom, Canada, China, Germany, Israel, Hong Kong, the Netherlands, Australia, Belgium, Singapore, Indonesia, Saudi Arabia, Italy and Brazil. Although most of these countries are high income countries in North America, Eastern Asia and the European Union, the lower-middle income countries, China (Eastern Asia), India (South-Central Asia), Indonesia (South-Eastern Asia) and Israel (Western Asia) also show relatively high export potential.

Mineral products (coal, copper, aviation spirit); transportation products (1500 - 3000 cc automobile engines and diesel powered trucks), stone/glass (diamonds, platinum and rhodium) and metals (aluminium, iron/steel structures, nickel) are the product classifications that hold the biggest export opportunities for South Africa worldwide.

Table 5.9: Top 50 worldwide product-country combinations

Country	HS 6-digit product code and description	Filter 4 cell classification	Potential export value (US\$ thousand)	% of potential export value realised in actual exports
United States	870323 - Automobiles, spark ignition engine of 1500-3000 cc	11	\$10,704,206	4.44%
United States	710239 - Diamonds (jewellery) worked but not mounted or set	11	\$6,044,885	2.66%
Japan	270112 - Bituminous coal, not agglomerated	15	\$4,542,522	0.46%
Canada	870323 - Automobiles, spark ignition engine of 1500-3000 cc	5	\$3,381,686	0.00%
United States	271011 - Aviation spirit	9	\$2,333,627	1.14%
Hong Kong	710239 - Diamonds (jewellery) worked but not mounted or set	15	\$2,228,140	2.51%
India	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	13	\$2,176,369	0.60%
Japan	260300 - Copper ores and concentrates	15	\$2,172,167	0.01%
United Kingdom	270799 - Coal tar distillation products n.e.s.	15	\$2,171,031	0.03%
United States	940190 - Parts of seats	11	\$2,120,319	0.20%
United States	760110 - Aluminium unwrought, not alloyed	14	\$2,008,326	7.55%
United Kingdom	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	16	\$2,000,247	48.69%
Germany	271011 - Aviation spirit	3	\$1,637,182	0.01%
India	270119 - Coal except anthracite or bituminous, not agglomerate	15	\$1,543,164	0.55%
China	260300 - Copper ores and concentrates	15	\$1,473,534	6.32%
Singapore	271011 - Aviation spirit	5	\$1,402,538	3.95%
United States	711011 - Platinum unwrought or in powder form	18	\$1,394,900	83.98%
Australia	870323 - Automobiles, spark ignition engine of 1500-3000 cc	20	\$1,380,651	40.65%
Israel	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	13	\$1,341,170	19.38%
United States	750210 - Nickel unwrought, not alloyed	5	\$1,285,377	0.00%
Japan	711011 - Platinum unwrought or in powder form	20	\$1,283,548	51.76%
Japan	271011 - Aviation spirit	3	\$1,211,431	0.07%
United States	711031 - Rhodium unwrought or in powder form	16	\$1,201,187	100.00%
Japan	711019 - Platinum in semi-manufactured forms	19	\$1,169,450	100.00%
Japan	870323 - Automobiles, spark ignition engine of 1500-3000 cc	18	\$1,144,351	59.96%
China	870323 - Automobiles, spark ignition engine of 1500-3000 cc	2	\$1,074,816	0.00%
Indonesia	271011 - Aviation spirit	2	\$1,051,625	0.00%
Saudi Arabia	870323 - Automobiles, spark ignition engine of 1500-3000 cc	2	\$1,019,736	0.00%
Belgium	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	15	\$981,708	35.63%
India	271011 - Aviation spirit	3	\$968,758	0.58%
China	750210 - Nickel unwrought, not alloyed	5	\$955,988	0.00%
Israel	710239 - Diamonds (jewellery) worked but not mounted or set	11	\$930,617	8.76%
India	260300 - Copper ores and concentrates	15	\$873,873	3.19%
Japan	760110 - Aluminium unwrought, not alloyed	15	\$860,410	59.23%
Germany	870323 - Automobiles, spark ignition engine of 1500-3000 cc	1	\$853,217	0.19%
Germany	750210 - Nickel unwrought, not alloyed	5	\$850,487	0.00%
Canada	940190 - Parts of seats	11	\$804,150	2.26%
United States	220421 - Grape wines n.e.s., fortified wine or must, pack < 2l	15	\$800,901	4.60%
Netherlands	270112 - Bituminous coal, not agglomerated	20	\$775,304	100.00%
Italy	271011 - Aviation spirit	2	\$772,646	0.07%
Belgium	710239 - Diamonds (jewellery) worked but not mounted or set	11	\$757,323	12.46%
Australia	870421 - Diesel powered trucks weighing < 5 tons	5	\$688,769	0.00%
Brazil	870323 - Automobiles, spark ignition engine of 1500-3000 cc	2	\$684,750	0.01%
Germany	842139 - Filtering or purifying machinery for gases n.e.s.	9	\$671,639	100.00%
Japan	730890 - Structures and parts of structures, iron or steel, n.e.s.	9	\$668,626	4.16%
United Kingdom	270112 - Bituminous coal, not agglomerated	15	\$667,899	33.48%
United Kingdom	870323 - Automobiles, spark ignition engine of 1500-3000 cc	8	\$658,998	6.28%
Netherlands	271011 - Aviation spirit	5	\$657,123	3.21%
Netherlands	284410 - Natural uranium, its compounds, mixtures	5	\$645,120	0.00%
China	390210 - Polypropylene in primary forms	13	\$643,683	5.19%

Amongst the export opportunities with the highest potential for South Africa, there are product-country combinations to which South Africa has not exported at all in 2007. It means that South Africa is missing these export opportunities even though the political and commercial risks are not too high, demand is sizable and/or growing, competition is not too fierce, barriers to trade are not too high, South Africa is specialised in producing and exporting the product and the potential export value is relatively high in these markets. Examples include 1500 - 3000 cc automobiles to Canada and China, unwrought nickel to the United States, China and Germany, aviation spirit to Indonesia and natural uranium to the Netherlands. Other markets in which South Africa has not adequately tapped into the export potential include aviation spirit to Germany, Japan, Italy, India, the United States, the Netherlands and Singapore, copper ores to Japan, India and China, diamonds to India, Hong Kong, the United States and Israel, and 1500 - 3000 cc automobiles to Brazil, Germany, the United States and the United Kingdom. In order to be able to utilise these export opportunities, it is recommended that detailed market profiles for each identified product-country opportunity be undertaken.

On the other hand, there are product-country combinations in which South Africa has utilised the export potential to a relatively large degree. These include unwrought rhodium in powder form to the United States, platinum in semi-manufactured forms to Japan, bituminous coal to the Netherlands and filtering/purifying machinery for gases to Germany. Other markets in which South Africa has utilised its export potential to a relatively large extent include unwrought platinum in powder form to the United States and Japan, unworked diamonds to Belgium and the United Kingdom; 1500 - 3000 cc automobiles to Australia and Japan, bituminous coal to the United Kingdom and unwrought aluminium to Japan.

In section 5.4, product-country combinations that should be focused on as a first priority by trade promotion organisations will be provided.

5.4 More focused export promotion by trade promotion organisations

Cuyvers *et al* (1995:183) and Cuyvers (1997:14-15; 2004:270) recommend that when the governments' resources are rather limited, export promotion agencies should not actively promote export opportunities in cells 1 to 10 (see section 3.2.4 and Table 3.6), but rather gather market information on these opportunities and distribute this information to the relevant exporters (offensive market exploration export promotion strategy). Such export promotion

agencies can rather focus on the expansion of markets in cells 11 to 15 (offensive market expansion export promotion strategy) and the maintenance of markets in cells 16 to 20 (defensive market maintenance export promotion strategy)⁶³. Taking this into consideration, it is interesting to note from Table 5.5 and 5.6 that only 6.36% of the export opportunities selected falls into cells 11 to 15 when considering the *number* of export opportunities selected, but this number increases to 33.21% when the *potential export value* is considered. This indicates that the export opportunities in cells 11 to 15 are of a relatively higher value than those in cells 1 to 5 are.

South African trade promotion organisations should therefore focus their promotion efforts on export opportunities in cells 11 to 15 as a first priority. The top 50 product-country combinations in cells 11 to 15 are provided in Table 5.10.

There are 15 countries in which the top 50 opportunities that should be promoted (in cells 11 to 15) as a first priority are located. These include, in order of highest to lowest total export potential value, the United States, Japan, China, India, the United Kingdom, Israel, Hong Kong, Belgium, Canada, Germany, the Netherlands, Brazil, Switzerland, France and Italy. Most of these countries are high income countries in North America, Eastern Asia and the European Union. It is also interesting to note that the BRIC countries, China, India and Brazil are also included in these countries.

Minerals products (iron, manganese, nickel and chromium ores; coal), stone/glass (diamonds, platinum), transportation products (trucks, automobiles) and metals (aluminium, copper, ferro-chromium) are the product classifications that hold the highest potential value of export opportunities in cells 11 to 15.

⁶³ See section 2.3.4 for Papadopoulos et al's (2002:175) recommendations regarding export promotion strategies.

Table 5.10: Top 50 worldwide product-country combinations in cells 11 to 15

Country	HS 6-digit product code and description	Filter 4 cell classification	Potential export value (US\$ thousand)	Current SA Exports (US\$ thousand)
United States	870323 - Automobiles, spark ignition engine of 1500-3000 cc	11	10,704,206	475,053
United States	710239 - Diamonds (jewellery) worked but not mounted or set	11	6,044,885	160,730
Japan	270112 - Bituminous coal, not agglomerated	15	4,542,522	20,688
Hong Kong	710239 - Diamonds (jewellery) worked but not mounted or set	15	2,228,140	55,884
India	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	13	2,176,369	13,010
Japan	260300 - Copper ores and concentrates	15	2,172,167	220
United Kingdom	270799 - Coal tar distillation products n.e.s.	15	2,171,031	703
United States	940190 - Parts of seats	11	2,120,319	4,226
United States	760110 - Aluminium unwrought, not alloyed	14	2,008,326	151,640
India	270119 - Coal except anthracite or bituminous, not agglomerate	15	1,543,164	8,551
China	260300 - Copper ores and concentrates	15	1,473,534	93,181
Israel	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	13	1,341,170	259,948
Belgium	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	15	981,708	349,782
Israel	710239 - Diamonds (jewellery) worked but not mounted or set	11	930,617	81,500
India	260300 - Copper ores and concentrates	15	873,873	27,884
Japan	760110 - Aluminium unwrought, not alloyed	15	860,410	509,644
Canada	940190 - Parts of seats	11	804,150	18,138
United States	220421 - Grape wines n.e.s., fortified wine or must, pack < 2l	15	800,901	36,844
Belgium	710239 - Diamonds (jewellery) worked but not mounted or set	11	757,323	94,363
United Kingdom	270112 - Bituminous coal, not agglomerated	15	667,899	223,607
China	390210 - Polypropylene in primary forms	13	643,683	33,391
United States	852721 - Radio receivers, external power, sound recording for motor vehicles	11	627,941	1
China	260400 - Nickel ores and concentrates	15	603,410	1,650
Japan	260112 - Iron ore, concentrate, not iron pyrites, agglomerated	15	599,132	363,899
Brazil	270119 - Coal except anthracite or bituminous, not agglomerate	14	595,850	1,350
China	740400 - Copper/copper alloy waste or scrap	15	580,951	75,213
Germany	711011 - Platinum unwrought or in powder form	15	570,934	570,934
China	260112 - Iron ore, concentrate, not iron pyrites, agglomerated	15	556,204	556,204
China	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	15	533,636	78
Canada	842139 - Filtering or purifying machinery for gases n.e.s.	13	477,878	234,054
China	260200 - Manganese ores, concentrates, iron ores >20%	15	433,432	201,249
Canada	870410 - Dump trucks designed for off-highway use	15	399,284	102
China	261000 - Chromium ores and concentrates	15	398,148	398,148
Germany	260112 - Iron ore, concentrate, not iron pyrites, agglomerated	15	379,486	283,502
United States	760612 - Aluminium alloy rectangular plate/sheet/strip, thickness > 0.2 mm	14	357,365	137,838
Netherlands	760110 - Aluminium unwrought, not alloyed	15	354,682	169,415
Switzerland	711011 - Platinum unwrought or in powder form	11	344,955	344,955
China	230120 - Flour or meal, pellet, fish, etc for animal feed	15	337,866	13,872
United States	284410 - Natural uranium, its compounds, mixtures	11	326,566	3,446
Netherlands	842139 - Filtering or purifying machinery for gases n.e.s.	15	316,450	67,868
France	870421 - Diesel powered trucks weighing less than 5 tons	14	297,029	109,299
United States	030420 - Fish fillets, frozen	15	288,491	4,235
Japan	220421 - Grape wines n.e.s., fortified wine or must, pack < 2l	11	279,955	7,395
Canada	220421 - Grape wines n.e.s., fortified wine or must, pack < 2l	15	264,013	30,514
China	711011 - Platinum unwrought or in powder form	15	262,984	6,335
Germany	720241 - Ferro-chromium, >4% carbon	11	261,591	261,591
United States	220870 - Liqueurs and cordials	14	245,226	2,623
United States	220710 - Undenatured ethyl alcohol > 80% by volume	14	240,202	24,809
Belgium	270112 - Bituminous coal, not agglomerated	14	234,668	23,851
Italy	470329 - Chemical wood pulp, soda/sulphate, non-coniferous, bleached	15	230,781	678

As mentioned before, the DSM results reported in this chapter are merely “the tip of the iceberg”. Every individual region, country and product can be analysed in detail. A regional analysis for South Africa's export opportunities in the African continent follows in Chapter 6.

5.5 Summary

In this chapter the main results of the application of the refined DSM to identify export opportunities for South Africa in the rest of the world were discussed.

In section 5.2 the results for each filter were provided. The selection process and the results of each filter are summarised in Figure 5.1. After going through the filtering process and taking South Africa's production capacity into account, 15,389 export opportunities were identified as immediate export opportunities that are expected to yield export success. The selected 15,389 product-country combinations have been categorised into different cells of filter 4 as illustrated in Table 5.5 and 5.6. It has been found that most of the export opportunities identified for South Africa are classified into cells 1 to 5, in which South Africa has a relatively small market share. This implies that South Africa is not adequately tapping into the markets where political and commercial risks are not too high (determined in filter 1), demand is sizable and/or growing (determined in filters 1 and 2), competition is not too fierce (determined in the first part of filter 3), barriers to trade are not too high (determined in the second part of filter 3) and South Africa is specialised in producing and exporting the product.

Section 5.3 includes general results of the refined DSM applied to identify export opportunities for South Africa in the rest of the world, such as the overall highest ranked regions, countries and products. The *regional distribution* of the export opportunities identified for South Africa in the rest of the world is graphically illustrated in Figure 5.2 and 5.3. Northern America holds the highest potential export value for South Africa with 24.77% of the total potential export value of the export opportunities identified. Northern America is followed by Eastern Asia (20.16%) and Western Europe (17.59%). Almost 63% of the total export potential is therefore located in these three regions.

When considering the *countries* that hold the highest export potential for South Africa (see Table 5.7) it is interesting to note that most of these countries are situated in North America, Asia or the European Union. The United States presents the highest total potential export value

for South Africa, but South Africa only tapped into 13.28% of this potential. Countries in which South Africa has tapped into the export potential to a relatively large extent include the Netherlands, Switzerland, Spain, the United Kingdom, Germany and Japan (mostly European Union countries). Countries that hold high potential that have not been sufficiently utilised by South Africa are India, Brazil, Canada, Hong Kong, Singapore, Indonesia and Saudi Arabia.

The South African *products* with the highest worldwide export potential (see Table 5.8) can be categorised into mineral products (aviation spirit, iron, manganese, copper, nickel and precious metal ores, coal), transportation (automobiles, trucks, wheels), stone/glass (diamonds, platinum, palladium, rhodium) and metals (aluminium, copper, ferro-chromium, iron, nickel, steel, stainless steel, zinc).

When considering the top 50 worldwide *product-country combinations* identified as export opportunities for South Africa (see Table 5.9), 15 countries hold these opportunities. In order of highest to lowest total export potential value, these are the United States, Japan, India, the United Kingdom, Canada, China, Germany, Israel, Hong Kong, the Netherlands, Australia, Belgium, Singapore, Indonesia, Saudi Arabia, Italy and Brazil. Although most of these countries are high income countries in North America, Eastern Asia and the European Union, the lower-middle income countries, China (Eastern Asia), India (South-Central Asia), Indonesia (South-Eastern Asia) and Israel (Western Asia) also performed relatively well. Mineral products (coal, copper, aviation spirit), transportation products (1500 - 3000 cc automobile engines and diesel powered trucks), stone/glass (diamonds, platinum and rhodium) and metals (aluminium, iron/steel structures, nickel) are the product classifications in the top 50 product-country combinations with the highest potential export values for South Africa.

Amongst the export opportunities with the highest potential for South Africa, there are product-country combinations to which South Africa has not exported at all. Examples include 1500 - 3000 cc automobiles to Canada and China, unwrought nickel to the United States, China and Germany, aviation spirit to Indonesia and natural uranium to the Netherlands. On the other hand, there are product-country combinations to which South Africa has utilised the export potential to a very large degree. These include unwrought rhodium in powder form to the United States, platinum in semi-manufactured forms to Japan, bituminous coal to the Netherlands and filtering/ purifying machinery for gases to Germany.

Based on Cuyvers *et al* (1995) and Cuyvers' (1997, 2004) suggestion that trade promotion organisations should focus on promoting export opportunities in cells 11 to 15 (see section 3.2.4) as a *first priority*, the *product-country combinations* with the highest export potential values in these cells were identified in section 5.4. Fifteen countries have been identified in which the top 50 export opportunities in cells 11 to 15 are located (see Table 5.10). These include, in order of highest to lowest total export potential value, the United States, Japan, China, India, the United Kingdom, Israel, Hong Kong, Belgium, Canada, Germany, the Netherlands, Brazil, Switzerland, France and Italy. Mineral products (iron, manganese, nickel and chromium ores, coal), stone/glass (diamonds, platinum), transportation products (trucks, automobiles) and metals (aluminium, copper, ferro-chromium) are the product categories that should be promoted as a first priority (cells 11 to 15).

In Chapter 6 the results of the refined DSM applied to identify export opportunities for South Africa in the African continent (see motivation for focusing on Africa in section 1.3) are discussed.

CHAPTER 6: SOUTH AFRICAN EXPORT OPPORTUNITIES IN THE REST OF THE AFRICAN CONTINENT

6.1 Introduction

In Chapter 5 the results of the refined DSM (for details, see Chapter 3 and 4) to identify realistic export opportunities for South Africa in the rest of the world, were provided. In filter 1 of this application of the DSM, 16 African countries were eliminated based on too high commercial and political risk ratings and 27 countries based on too low GDP/GDP per capita and GDP/GDP per capita growth values. Therefore, in total, 42 of the 52 African countries (excluding South Africa) were already eliminated in filter 1. This left only 10 African countries that were analysed in filters 2 to 4.

There are several reasons why the strengthening of trade and economic links with countries in Africa is regarded a priority in trade policies of the South African government (DTI, 2006) (for more detail, see section 1.3.2). Therefore, the relatively small number of export opportunities identified in the rest of the African continent is an area of concern. Furthermore, South Africa's actual exports to the rest of the African continent contributed to 14.78% of total exports in 2007 (ITC, 2010c), while the export opportunities identified in the African continent in the DSM, applied to identify export opportunities for South Africa in the rest of the world, only contributed to 0.87% of the world total potential export value and 4.56% of the number of opportunities (see section 5.3). It therefore seems that South Africa is exporting to the rest of the African continent, regardless of the relatively high risk and low macroeconomic size and growth of African countries. The DTI indicated that a study in which all African countries are considered in filter 2, regardless of their risk ratings or GDP performance (filter 1), would assist them in determining their export strategy to the rest of the African continent. For a more detailed motivation for this special refinement and rerunning of the DSM for Africa, see section 1.3.2.

In this chapter the results of the rerun of this uniquely refined DSM for Africa, applied to identify export opportunities for South Africa in the rest of the African continent, will be discussed. In section 6.2 the results for each filter of the DSM will be discussed. In section 6.3 a detailed analysis of the regional-level results will be discussed, followed by the overall highest ranked countries in Africa in section 6.4. In section 6.5 sector-level results will be provided, followed by the highest ranked products and product-country combinations in Africa (section 6.6). Finally, in

section 6.7, product-country combinations that should be promoted as a first priority by trade promotion organisations will be provided in order to contribute to more focused export promotion.

6.2 Results of each filter of the Africa DSM

The results for each of the four filters of the DSM applied to identify export opportunities for South African in the rest of the African continent will be provided in sections 6.2.1 to 6.2.4.

6.2.1 Filter 1: The determination of preliminary export opportunities in Africa

As discussed in sections 1.3.2 and 6.1, filter 1 of the DSM was not applied in the case of identifying export opportunities for South Africa in the rest of the African continent. Therefore, all 52 African countries entered filter 2.

It is, however, important for exporters to be aware of the risks involved in trading with African countries. This is to insure themselves against these risks. The macroeconomic size and growth of these countries are also of interest to exporters. Therefore, in sections 6.2.1.1 and 6.2.1.2, more details on risk ratings and GDP-related values for the African countries will be provided.

6.2.1.1 Filter 1.1: Political and commercial risk assessment

To give an indication of the risks involved in trading with the different African countries, Table 6.1 provides the ONDD's risk scores (see section 3.2.1.1) of each of these countries.

Table 6.1: Political and commercial risk scores of African countries

African country	Political risk: Short term (scale of 1 to 7)	Political risk: Medium/long term (scale of 1 to 7)	Political risk: Special transactions (scale of 1 to 7)	Commercial risk (scale of A to C)	Index (scale from 0 to 10) ⁶⁴
Djibouti	7	7	7	C	10.00
Eritrea	7	7	7	C	10.00
Guinea	7	7	7	C	10.00
Liberia	7	7	7	C	10.00
Sao Tome and Principe	7	7	7	C	10.00
Seychelles	7	7	7	C	10.00
Somalia	7	7	7	C	10.00
Zimbabwe	7	7	7	C	10.00
Burundi	6	7	6	C	9.52
Congo (Democratic Republic)	6	7	6	C	9.52
Ethiopia	6	7	6	C	9.52
Malawi	6	7	6	C	9.52
Rwanda	6	7	6	C	9.52
Sudan	6	7	6	C	9.52
Côte d'Ivoire	5	7	6	C	9.29
Gambia	5	7	6	C	9.29
Mauritania	5	7	5	C	9.05
Sierra Leone	5	7	5	C	9.05
Burkina Faso	4	7	5	C	8.81
Central African Republic	4	7	5	C	8.81
Chad	4	7	5	C	8.81
Comoros	4	7	5	C	8.81
Congo (Republic)	4	7	5	C	8.81
Guinea-Bissau	4	7	5	C	8.81
Madagascar	5	6	5	C	8.81
Niger	4	7	5	C	8.81
Togo	4	7	5	C	8.81
Benin	4	6	5	C	8.57
Equatorial Guinea	3	7	5	C	8.57
Mozambique	4	6	5	C	8.57
Ghana	4	6	4	C	8.33
Kenya	4	6	4	C	8.33
Mali	4	6	4	C	8.33
Senegal	4	6	4	C	8.33

⁶⁴ See section 3.2.1 and Table 3.1 and 3.2 for the details on calculating this index.

Table 6.1: Political and commercial risk scores of African countries (continued)

African country	Political risk: Short term	Political risk: Medium/long term	Political risk: Special transactions	Commercial risk	Index
Tanzania	4	6	4	C	8.33
Zambia	4	6	4	C	8.33
Angola	3	6	4	C	8.10
Cameroon	3	6	4	C	8.10
Gabon	3	6	4	C	8.10
Nigeria	3	6	4	C	8.10
Uganda	3	6	4	C	8.10
Swaziland	3	6	3	C	7.86
Libya	2	6	3	C	7.62
Lesotho	2	5	3	C	7.38
Cape Verde	5	5	5	B	6.90
Egypt	2	4	2	C	6.90
Algeria	2	3	2	C	6.67
Namibia	2	3	2	C	6.67
Morocco	1	3	2	C	6.43
Mauritius	3	3	3	B	5.48
Tunisia	2	3	2	B	5.00
Botswana	1	2	1	B	4.29

Source: ONDD (2009) and calculations by author⁶⁵

The conversion of the political and commercial risk ratings into a single index on a scale of 1 (low risk) to 10 (high risk) is discussed in section 3.2.1.1.

It is clear that Djibouti, Eritrea, Guinea, Liberia, Sao Tome and Principe, Seychelles, Somalia and Zimbabwe have the highest possible risk ratings in all categories, making these the most risky countries in Africa to trade with. Burundi, the Democratic Republic of the Congo, Ethiopia, Malawi, Rwanda, Sudan, Côte d'Ivoire and Gambia were also eliminated in filter 1 of the DSM, applied to identify export opportunities for South Africa in the rest of the world, based on high political and commercial risk (above the cut-off value of 9.286, see section 3.2.1.1).

6.2.1.2 Filter 1.2: Macroeconomic size and growth

The cut-off values for GDP levels in the DSM, applied to identify export opportunities for South Africa in the rest of the world, were US\$167.89 billion for 2005, US\$175.03 billion for 2006 and US\$182.33 billion for 2007. GDP per capita cut-off values were US\$8813.87 in 2005,

⁶⁵ See section 3.2.1.1 and Table 3.1 and 3.2 for the details on calculating this index.

US\$9212.47 in 2006 and US\$9603.02 in 2007. Countries were selected if their GDP or GDP per capita values were higher than the cut-off values for at least two years (see section 3.2.1.2). In terms of GDP and GDP per capita values, no African country qualified to be selected in the DSM applied to identify export opportunities for South Africa in the rest of the world.

Countries were selected based on GDP growth and GDP per capita growth if the growth values were above the cut-off values for both growth measures for the three years, 2005, 2006 and 2007. In terms of GDP growth and GDP per capita growth, 10 African countries had GDP growth rates of more than 3.62% in 2005, 4.23% in 2006 and 3.94% in 2007 (cut-off values) as well as a GDP per capita growth rate of 2.5% in 2005, 3.48% in 2006 and 3.36% in 2007.

A country was selected to enter filter 2 of the DSM, applied to identify export opportunities in the rest of the world (see section 5.2.1), if it either qualified in terms of GDP or GDP per capita values or GDP growth and GDP growth values. Only Angola, Cape Verde, Egypt, Ethiopia, Ghana, Sierra Leone, Sudan, Tunisia, Tanzania and Zambia were selected to enter filter 2 of the DSM applied to identify export opportunities for South Africa in the rest of the world.

However, despite these eliminations of countries in the original DSM, all African countries entered filter 2 for the purposes of identifying export opportunities for South Africa in the rest of the African continent, as explained and motivated in sections 1.3.2 and 6.1.

6.2.2 Filter 2: The detection of possible export opportunities in Africa

The market potential of the 5,403 HS 6-digit level product classifications for the 52 African countries was assessed in filter 2. The same criteria and cut-off values that were used in the DSM for the world (see sections 3.2.2 and 5.2.2) were also used in filter 2 for Africa. The world was therefore used as the “standard” in selecting export opportunities for South Africa in the rest of the African continent. The export opportunities selected in the various African countries will therefore offer similar market potential to those opportunities selected in the rest of the world.

In filter 2 a total of 280,956⁶⁶ trade figures were analysed with the purpose of selecting the product-country combinations within the African continent that show promising size and/or growth in demand.

The results of filter 2 are presented in Table 6.2.

Table 6.2: Distribution of African product-country combinations according to import market type

Category	Short-term market growth	Long-term market growth	Relative market size	Number of product/country groupings
0	0	0	0	194425
1	1	0	0	26540
2	0	1	0	20984
3	0	0	1	214
4	1	1	0	37522
5	1	0	1	197
6	0	1	1	211
7	1	1	1	863
	64,309 [†]	58,833 [†]	1,479 [†]	39,007*

Notes: ^{*)} value comprises the sum of categories 3-7; ^{†)} number of products in each import market type.

As mentioned in section 3.2.2, only markets in categories 3 to 7 are selected to enter filter 3. This stage of the selection process ends up with 39,007 possible export opportunities for South Africa in the rest of the African continent.

6.2.3 Filter 3: The selection of realistic export opportunities in Africa

In filter 3, markets that are difficult to access due to concentration (filter 3.1) and other barriers to entry (filter 3.2) (as described in sections 3.2.3.1, 3.2.3.2 and 4.2.4) are eliminated.

6.2.3.1 Filter 3.1: Degree of market concentration

In the first part of filter 3, the concentration allowed in each African market is the same as the concentration levels allowed in the DSM for the world (see section 5.2.3.1). This is because the aim of the DSM is to provide a limited list of export opportunities and to identify the most realistic or attractive export opportunities in the rest of the African continent (using the world standard). The concentration allowed was therefore also no more than 48.1% in relatively large markets (category 3), no more than 49.9% in relatively large and growing markets (categories 4, 5 and 6)

⁶⁶ 5,403 HS 6-digit product classifications multiplied by 52 African countries.

and no more than 51.7% in markets that are relatively large and growing in the short and long term (category 7). Of the 39,007 possible export opportunities in Africa that entered filter 3, a total of 21,910 product-country combinations showed adequately low levels of concentration.

6.2.3.2 Filter 3.2: Trade barriers

In the second part of filter 3, a market accessibility index, as described in section 4.3.4, was calculated for each African market that entered filter 3. Again the cut-off value identified in the DSM for the world (see section 5.2.3.2) was used. Of the 39,007 possible export opportunities that entered filter 3, a total of 25,186 showed adequate levels of market accessibility. In Table 6.3 and 6.4 the 20 most and least accessible African countries from a South African point of view are provided.

As expected, some of the Southern African Customs Union (SACU) countries (namely Botswana, Lesotho, Namibia and Swaziland) are the most accessible to South Africa due to their proximity and the SACU free trade agreement between South Africa and these countries. It is, however, interesting that the non-SACU countries of Malawi and Mauritius are ranked above Namibia and Botswana. This is due to the relatively high cost and time of domestic transportation and other logistical procedures in Namibia and Botswana. Zimbabwe is another neighbouring country that is not in the top 10 most accessible countries due to domestic logistical constraints.

Most Southern African Development Community (SADC) countries are also included in the 20 most accessible countries to South Africa in the rest of the African continent, except for Angola and the Democratic Republic of the Congo. Angola and the Democratic Republic of the Congo are both included in the 20 least accessible African countries to South Africa (see Table 6.4) due to the very high time and cost of domestic logistics in these countries.

Other non-SACU and non-SADC countries included in the 20 most accessible countries to South Africa include Kenya, Uganda, Comoros and Burundi (Eastern Africa), Benin, Togo and Ghana (Western Africa) and Tunisia (Northern Africa).

Table 6.3: The 20 most accessible African countries to South Africa

Country	Inter-national shipment time (days)	Domestic time to import (days)	Inter-national shipment cost (US\$ per 20 ft container)	Domestic shipment costs (US\$ per 20 ft container)	LPI ⁶⁷	Average <i>ad valorem</i> Tariff %	Average NTB %	Average market accessibility index ⁶⁸
Swaziland	0	33	0	2249	3.46	0.00%	0.00%	2.922080
Lesotho	0	49	0	1715	3.46	0.00%	0.00%	2.747620
Malawi	0	51	0	2570	3.46	9.35%	2.02%	2.119778
Mauritius	11	14	510	689	2.72	0.53%	6.56%	1.810274
Namibia	1	24	0	1813	2.02	0.00%	0.00%	1.716950
Botswana	0	41	0	3264	2.32	0.00%	0.00%	1.352980
Madagascar	14	26	681	1660	2.66	2.22%	0.41%	1.045239
Kenya	4	25	660	2190	2.59	11.16%	0.82%	0.905657
Uganda	4	34	660	3390	2.82	11.16%	0.31%	0.667586
Mozambique	1	30	927	1475	2.29	0.84%	13.76%	0.555034
Zimbabwe	0	73	0	5101	3.46	17.47%	13.76%	0.500900
Comoros	28	21	685	1057	2.45	10.91%	0.46%	0.294108
Benin	16	32	1235	1400	2.79	10.53%	0.00%	0.137210
Seychelles	12	19	1210	1839	2.6	7.93%	13.76%	0.037125
United Republic of Tanzania	4	31	685	1475	2.6	11.17%	44.81%	-0.023142
Togo	9	29	1323	963	2.6	10.53%	17.66%	-0.138062
Zambia	4	64	685	3335	2.28	1.48%	1.65%	-0.170099
Ghana	9	29	1453	1203	2.47	12.53%	3.28%	-0.231615
Tunisia	20	21	1385	858	2.84	25.95%	11.51%	-0.562316
Burundi	4	71	685	4285	2.6	12.26%	0.46%	-0.574392
AFRICA AVERAGE	15.7	36.8	\$1,221.63	\$2,212.17	2.52	11.30%	11.21%	-0.687150⁶⁹
WORLD AVERAGE	26	20	\$1,259.90	\$1,292.11	3.11	6.32%	9.92%	0

Sources: linescape.com, World Bank (2009), Arvis *et al* (2010), ITC (2010a), Kee, Nicita and Olareaga (2008). See section 4.2.4.

In Table 6.4, the 20 least accessible African countries from a South African point of view are provided.

⁶⁷ Note that the LPI has an opposite effect on market accessibility than the other variables have. The higher the LPI, the more accessible the market. The market accessibility index was calculated in such a way that the higher the LPI value, the more accessible the market.

⁶⁸ See sections 4.2.4.1 to 4.2.4.8 for the details on calculating this index.

⁶⁹ This average market accessibility index value is not equal to 0 (as the world average) because of the fact that the world is used as the standard when the cut-off values in the different filters were calculated. African countries' market accessibility variables were included in the world data, and a cut-off value was calculated for the world. The average market accessibility index for Africa is therefore below the world average.

Table 6.4: The 20 least accessible African countries to South Africa

Country	Inter-national shipment time (days)	Domestic time to import (days)	Inter-national shipment cost (US\$ per 20 ft container)	Domestic shipment costs (US\$ per 20 ft container)	LPI	Average <i>Ad valorem</i> Tariff %	Average NTB %	Average market accessibility index
Chad	12	100	1560	6150	2.49	15.69%	0.73%	-3.138076
Sudan	36	46	1310	2900	2.21	17.75%	41.87%	-3.060984
Equatorial Guinea	16	49	3010	1411	2.55	15.69%	0.73%	-2.667906
Sierra Leone	23	31	2110	1639	1.97	12.91%	17.66%	-2.460713
Algeria	44	23	1385	1428	2.36	16.44%	38.35%	-2.323053
Angola	25	59	1518	3240	2.25	6.38%	13.76%	-2.202123
Eritrea	35	60	1310	1581	1.7	7.40%	0.46%	-2.198298
Central African Republic	12	62	1560	5554	2.55	15.69%	0.73%	-2.185769
Sao Tome and Principe	15	29	3010	577	2.55	15.93%	0.73%	-2.056855
Mauritania	37	42	1810	1523	2.86	11.11%	17.66%	-1.816380
Ethiopia	32	45	1333	2993	2.41	15.36%	0.27%	-1.744820
Democratic Republic of the Congo	12	63	1810	2483	2.68	11.58%	13.76%	-1.722709
Niger	16	64	1235	3545	2.54	10.53%	17.66%	-1.679019
Congo	5	62	1810	2959	2.48	15.69%	0.73%	-1.640404
Guinea-Bissau	26	22	1485	2349	2.1	10.53%	17.66%	-1.634217
Nigeria	9	41	1845	1440	2.59	9.85%	39.37%	-1.564351
Mali	22	37	1545	2955	2.27	10.53%	2.85%	-1.512061
Burkina Faso	16	49	1257	3830	2.23	10.53%	0.87%	-1.426474
Libya	30	15	1385	823	2.33	18.59%	27.78%	-1.401934
Liberia	15	15	2110	1212	2.38	11.16%	17.66%	-1.289136
AFRICA AVERAGE	15.7	36.8	\$1,221.63	\$2,212.17	2.52	11.30%	11.21%	-0.687150
WORLD AVERAGE	26	20	\$1,259.90	\$1,292.11	3.11	6.32%	9.92%	0

In Chad, Sudan, Angola, Central African Republic, Ethiopia, the Democratic Republic of the Congo, Niger, Congo and Burkina Faso, the time and costs associated with documentation, inland transportation, customs and handling are more than double the world average. The logistics performance indices for Eritrea and Sierra Leone are exceptionally low. Chad, Sudan, Equatorial Guinea, Sierra Leone, Algeria, Central African Republic, Sao Tome and Principe, Ethiopia, Congo and Libya also impose, on average, tariffs that are more than double the world average on South African products. Average non-tariff barriers in Sudan, Algeria, Nigeria and Libya are also exceptionally high (more than double the world average).

From Table 6.4 it is also clear that it takes, on average, almost 17 days longer than the world average to move a shipment from the nearest port to the capital city of African countries. The

average domestic cost to import to Africa is almost double the world average. The average African logistics performance index is also lower than the world average and the average *ad valorem* equivalent tariff in Africa is much higher than the world average. African countries therefore perform worse than the world average for all the measures of market accessibility except for the time and cost of international shipment. This is due to the proximity between South Africa and other African countries. The above-mentioned observations underline the fact that one of the biggest impediments to trade in Africa is poor infrastructure and other logistical problems.

In Table 6.5 the 20 least accessible product-country combinations for South Africa in the rest of the African continent are provided. It is interesting to note that liquor products are again the most highly protected/restricted products in Africa. Clutches and parts thereof originating from South Africa are also taxed with an extremely high tariff in Malawi.

Table 6.5: The 20⁷⁰ least accessible African product-country combinations to South Africa

Country	HS 6-digit product code and description	Inter-national shipment time (days)	Domestic Time to import (days)	International shipment cost (US\$ per 20 ft container)	Domestic shipment costs (US\$ per 20 ft container)	LPI	Ad valorem Tariff %	NTB %	Market accessibility index
Malawi	870893 - Clutches and parts thereof for motor vehicles	0	51	0	2570	3.46	2525.00%	0.00%	-85.3962
Seychelles	220850 - Gin and geneva	12	19	1210	1839	2.6	964.60%	19.28%	-33.38364
Zimbabwe	630900 - Worn clothing and other worn articles	0	73	0	5101	3.46	948.21%	2.25%	-31.63955
Seychelles	220890 - Alcoholic liqueurs n.e.s.	12	19	1210	1839	2.6	809.44%	48.30%	-28.62704
Seychelles	220840 - Rum and tafia	12	19	1210	1839	2.6	773.37%	61.33%	-27.66078
Seychelles	220300 - Beer made from malt	12	19	1210	1839	2.6	728.37%	24.98%	-25.28787
Libya	220840 - Rum and tafia	30	15	1385	823	2.33	624.60%	124.78%	-24.6473
Libya	220600 - Fermented beverages n.e.s.	30	15	1385	823	2.33	632.40%	35.57%	-22.93925
Libya	220590 - Vermouth and other flavoured grape wines	30	15	1385	823	2.33	643.80%	2.96%	-22.61233
Libya	220510 - Vermouth and other flavoured grape	30	15	1385	823	2.33	643.80%	0.00%	-22.54665
Libya	220820 - Spirits obtained by distilling grape wine	30	15	1385	823	2.33	624.60%	26.54%	-22.46728
Libya	220410 - Grape wines, sparkling	30	15	1385	823	2.33	632.40%	0.00%	-22.14985
Libya	220830 - Whiskies	30	15	1385	823	2.33	624.60%	11.25%	-22.12798
Libya	220850 - Gin and geneva	30	15	1385	823	2.33	624.60%	10.15%	-22.10358
Libya	220870 - Liqueurs and cordials	30	15	1385	823	2.33	630.60%	0.00%	-22.0872
Libya	220860 - Vodka	30	15	1385	823	2.33	624.60%	0.00%	-21.87838
Seychelles	220110 - Mineral and aerated waters not sweetened	12	19	1210	1839	2.6	609.72%	45.57%	-21.61492
Egypt	220430 - Grape must, unfermented, except as fruit juice	28	15	1385	823	2.61	600.00%	0.05%	-20.67109
Seychelles	220190 - Ice, snow and potable water not sweetened	12	19	1210	1839	2.6	578.15%	24.37%	-20.04562
Seychelles	220830 - Whiskies	12	19	1210	1839	2.6	513.33%	12.99%	-17.53695
WORLD AVERAGE		26	20	\$1,259.90	\$1,292.11	3.11	6.32%	9.92%	0

⁷⁰ These exclude the 15 products from Egypt that were indicated in Table 5.4 as the least accessible worldwide markets. These are again, for Africa, amongst the least accessible markets, but were excluded in this table to avoid repetition.

To enter filter 4, markets needed to show adequately low levels of concentration *and* high levels of market accessibility (low barriers to entry). Taking the union of the number of product-country combinations that shows acceptable levels of market concentration *and* market access, a total number of 15,057 export opportunities in Africa was selected to be analysed in filter 4.

6.2.4 Filter 4: Analysis of South Africa's realistic export opportunities in Africa

By following the methodology of filter 4 as described in section 3.2.4, the selected 15,057 product-country combinations were categorised in the 20 different cells (see Table 3.6).

After implementing the additional criterion (as introduced in section 4.2.3) that ensures that South Africa is specialised in producing the products that are identified as export opportunities ($RCA_j > 1$), 2,986 export opportunities were selected⁷¹.

The results reported from here onwards are for the 2,986 product-country combinations in Africa in which South Africa is specialised in producing. These products serve as immediate export opportunities for which fast export success can be expected⁷².

The results for filter 4 are summarised in Table 6.6 and 6.7.

It is interesting to note that both in terms of the number of opportunities selected and the potential export value, most export opportunities fall into either cells 1 to 5 or cells 16 to 20. South Africa therefore mostly has either a relatively large or a very small market share in the markets identified as export opportunities in the rest of the African continent, with very little in between. Also, in total, 96.05% (in terms of the number of opportunities selected) or 82.09% (in terms of the potential export value) of the total export opportunities selected in Africa is in growing, but not in large markets (cells 2, 7, 12 and 17).

⁷¹ If this criterion is not implemented, the list of 15,057 will include products that South Africa has never exported before, or has exported very little of. If the trade promotion organisation for which the DSM is applied, prefers to include these products to be able to assist exporters of products that South Africa is not specialised in producing and exporting in selecting appropriate markets, the list of results can easily be provided by the author.

⁷² Future studies might include a comparison of the two sets of results (see section 7.4.2).

Table 6.6: *Number* of realistic export opportunities in Africa according to South Africa's relative market share and the importers' market characteristics

	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) 5 (0.17%)	(Cell 6) 0 (0.00%)	(Cell 11) 1 (0.03%)	(Cell 16) 7 (0.23%)	13 (0.44%)
Growing (long- and short-term) product/market	(Cell 2) 1248 (41.80%)	(Cell 7) 58 (1.94%)	(Cell 12) 63 (2.11%)	(Cell 17) 1499 (50.20%)	2,868 (96.05%)
Large product/market short-term growth	(Cell 3) 6 (0.20%)	(Cell 8) 0 (0.00%)	(Cell 13) 0 (0.00%)	(Cell 18) 3 (0.10%)	9 (0.30%)
Large product/market long-term growth	(Cell 4) 6 (0.20%)	(Cell 9) 1 (0.03%)	(Cell 14) 0 (0.00%)	(Cell 19) 8 (0.27%)	15 (0.50%)
Large product/market short- and long-term growth	(Cell 5) 37 (1.24%)	(Cell 10) 3 (0.10%)	(Cell 15) 7 (0.23%)	(Cell 20) 34 (1.14%)	81 (2.71%)
Total	1,302 (43.60%)	62 (2.08%)	71 (2.38%)	1,551 (51.94)	2,986 (100%)

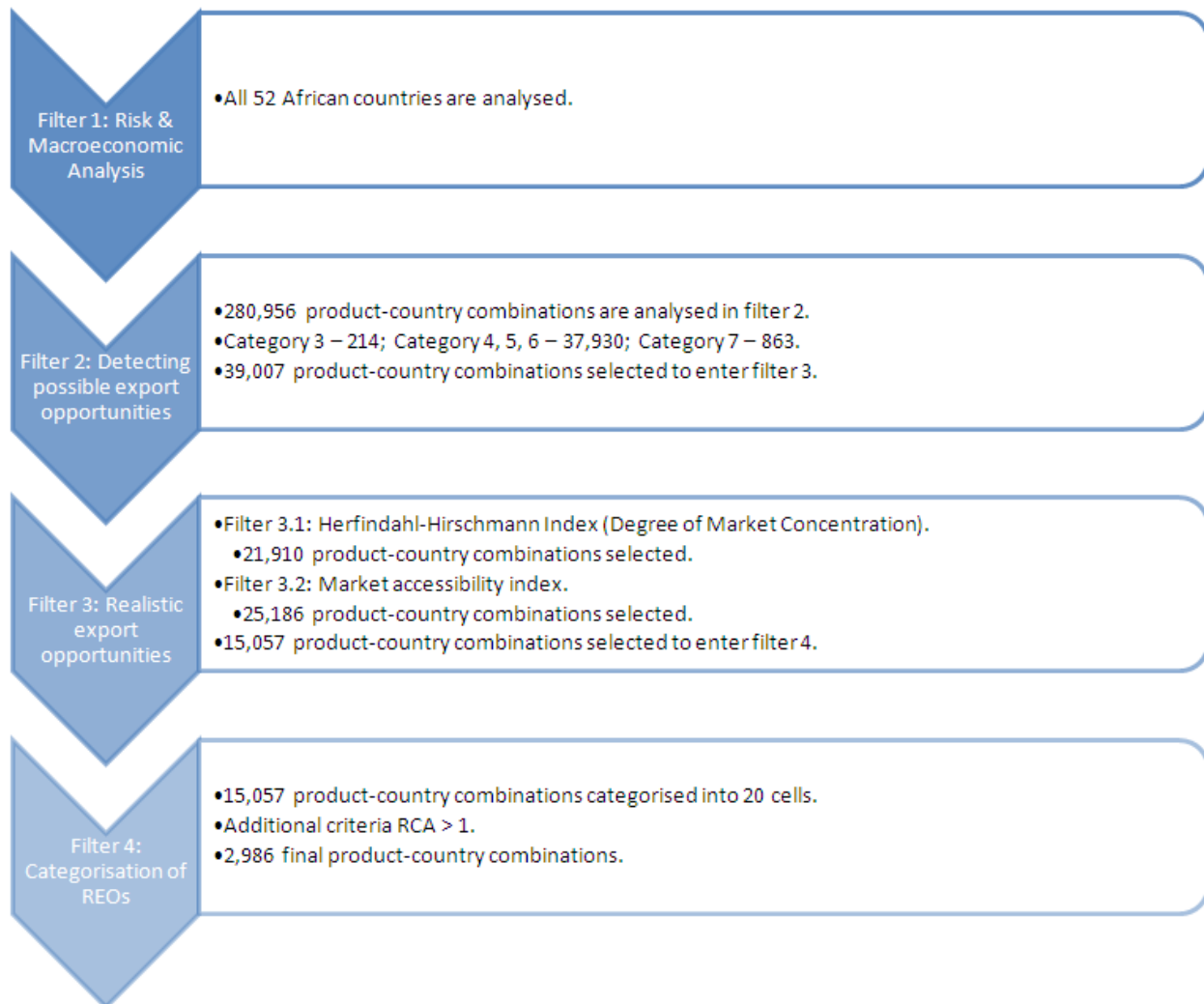
Table 6.7: *Potential export values* of realistic export opportunities in Africa according to South Africa's relative market and the importers' market characteristics (thousands of US\$)

	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) 44,852 (0.63%)	(Cell 6) 0 (0%)	(Cell 11) 15,061 (0.21%)	(Cell 16) 71,506 (1.01%)	131,419 (1.85%)
Growing (long- and short-term) product/market	(Cell 2) 2,352,359 (33.06%)	(Cell 7) 560,910 (7.88%)	(Cell 12) 123,776 (1.74%)	(Cell 17) 2,803,259 (39.40%)	5,840,304 (82.09%)
Large product/market short-term growth	(Cell 3) 35,888 (0.50%)	(Cell 8) 0 (0.00%)	(Cell 13) 0 (0.00%)	(Cell 18) 50,845 (0.71%)	86,733 (1.22%)
Large product/market long-term growth	(Cell 4) 195,906 (2.75%)	(Cell 9) 377 (0.01%)	(Cell 14) 0 (0.00%)	(Cell 19) 23,374 (0.33%)	219,657 (3.09%)
Large product/market short- and long-term growth	(Cell 5) 396,232 (5.57%)	(Cell 10) 307,66 (0.43%)	(Cell 15) 54,671 (0.77%)	(Cell 20) 354,579 (4.98%)	836,248 (11.75%)
Total	3,025,237 (42.52%)	592,053 (8.32%)	193,508 (2.72%)	3,303,563 (46.44%)	7,114,361 (100%)

Although the number and value of the African export opportunities are small in comparison to the total world export opportunities (see tables 5.5 and 5.6), this Africa-focused DSM run offers more export opportunities⁷³ in more African countries (see section 6.1) that can assist policy makers in their export promotion activities into the rest of the African continent (see section 6.1).

A summary of the DSM results in the African continent is contained in Figure 6.1 below.

Figure 6.1: Selection of realistic export opportunities for South Africa in Africa



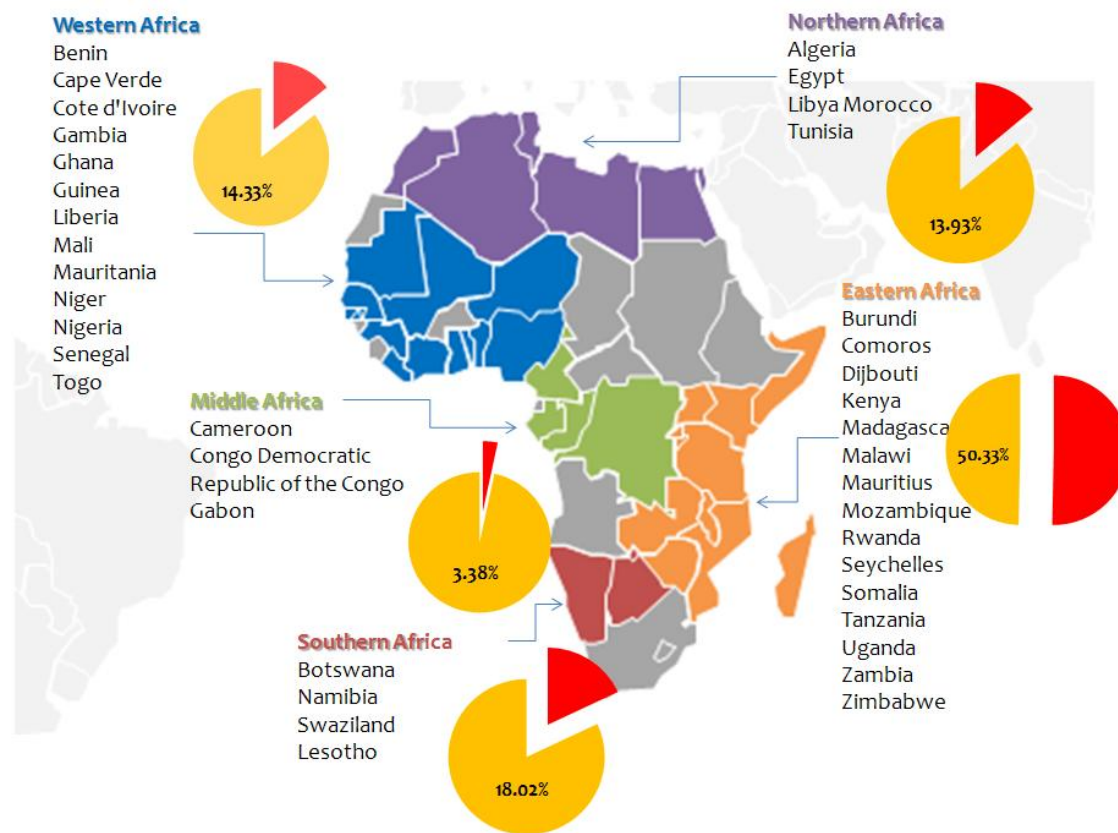
In section 6.3, an analysis of the regional results of the DSM applied to identify export opportunities for South Africa in the rest of the African continent will be provided.

⁷³ There are 2,986 African export opportunities identified in the “African run” (see table 6.6) of the DSM *versus* the 702 identified in Africa in the “world run” (see chapter 5) of the DSM. The potential value of the African export opportunities in the “African run” is US\$ 7,114,361 (see table 6.7) *versus* US\$ 2,021,940 in the “world run”.

6.3 Regional results of the Africa DSM

In this section the results of the DSM applied to identify export opportunities for South Africa in the rest of the African continent will be reported per region, namely Northern Africa, Eastern Africa, Southern Africa, Middle Africa and Western Africa⁷⁴. Figure 6.2 and 6.3 provide graphical illustrations of the DSM results per region based on the number of opportunities identified and the potential export values of these opportunities respectively.

Figure 6.2: Regional distribution of export opportunities in Africa: share in total *number of opportunities*

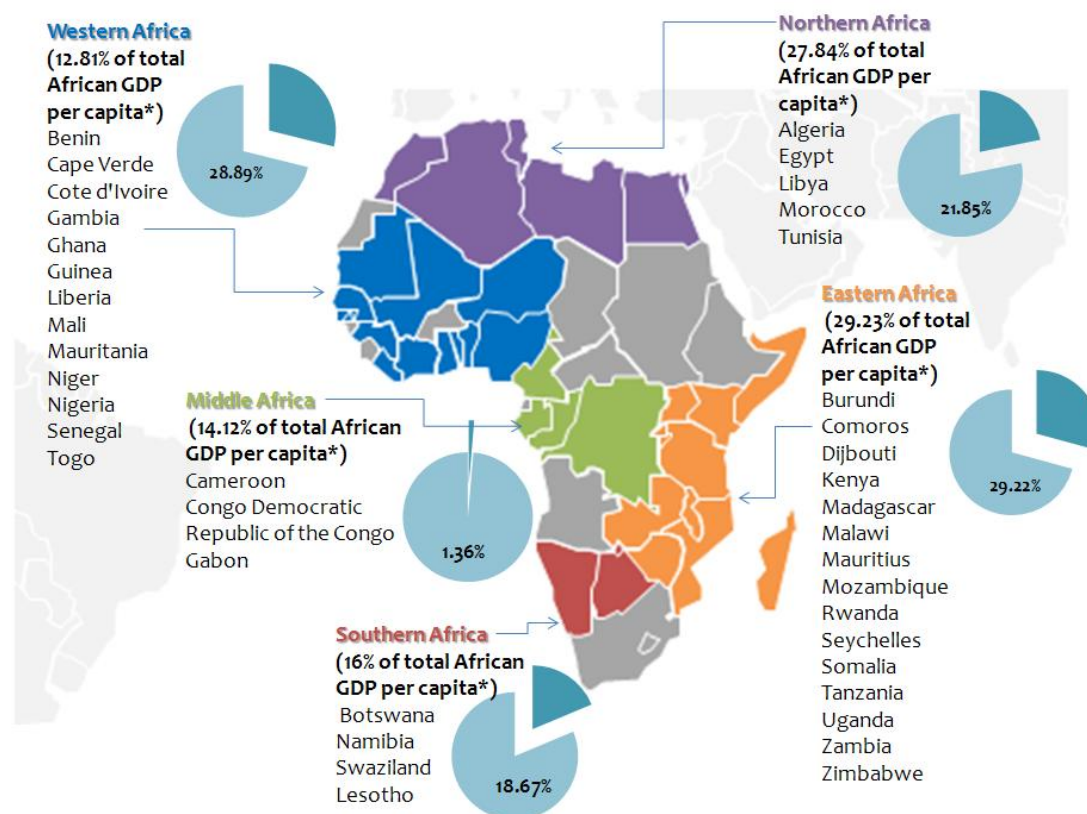


In terms of number of opportunities, Eastern Africa holds the highest export potential for South Africa in Africa with 50.33% of the opportunities in this region. Southern Africa follows with 18.92%. Western Africa (14.33%) and Northern Africa (13.95%) are in the third and fourth place, followed by Middle Africa with only 3.38% of the total number of opportunities selected in this region. This picture changes when the potential export values of the different export

⁷⁴ Regions as defined by the United Nations (2010).

opportunities identified for South Africa in the rest of the African continent are considered (see Figure 6.3).

Figure 6.3: Regional distribution of export opportunities in Africa: share in total *potential export value*



* Source: World Bank (2011).

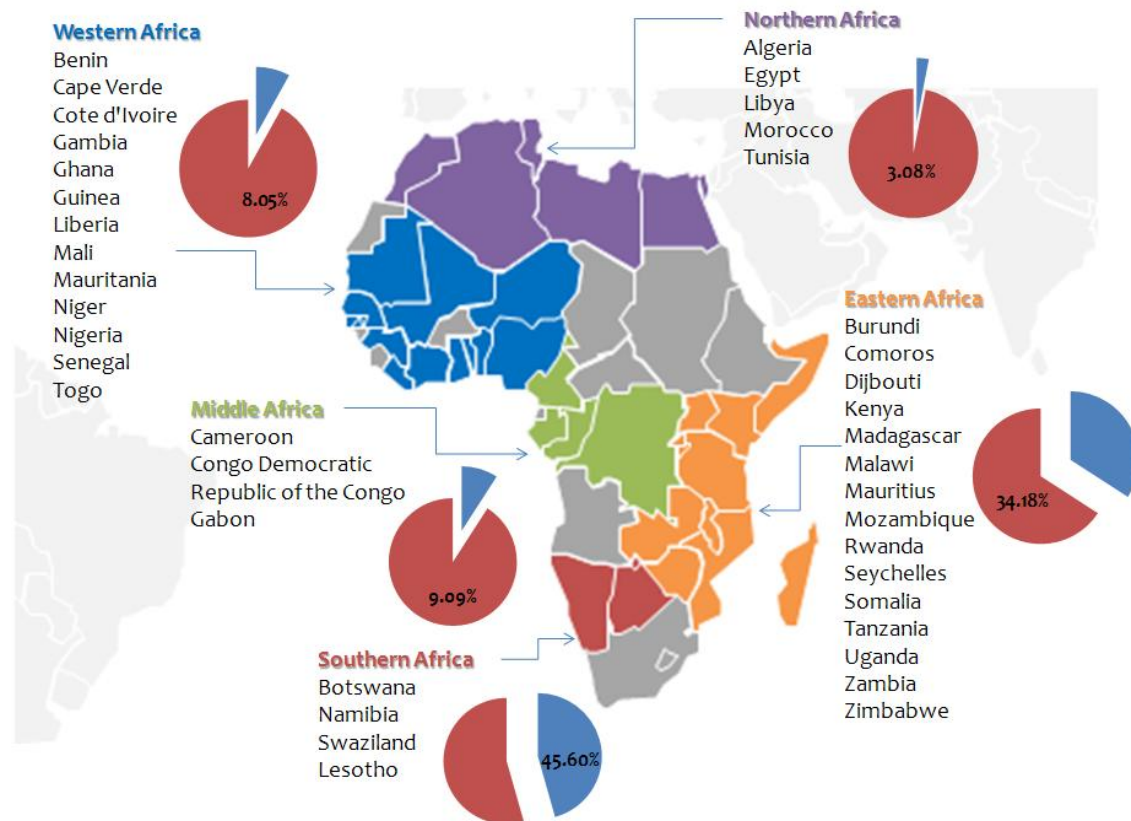
While Eastern Africa holds 50.33% of the number of export opportunities in Africa, this changes substantially when the potential export values of the export opportunities identified for South Africa in each African region are considered. Eastern Africa still holds the largest percentage of the export opportunities (29.22%), followed by Western and Northern Africa with 28.89% (as opposed to 14.33% in terms of number of opportunities) and 21.85% (as opposed to 13.93% in terms of number of opportunities) of the export opportunities in each of these regions.

Southern Africa still holds around 18% of the export opportunities, while Middle Africa is still in the last place with only 1.36% of the total potential export value of the export opportunities identified for South Africa that fall in this region.

When one compares the percentage share in total African⁷⁵ GDP per capita to the share in the total potential value of the export opportunities identified in Africa, as indicated in Figure 6.3, there is a high correlation between these percentages in Northern Africa, Eastern Africa and Southern Africa. Although Western Africa's percentage share in total African GDP per capita (12.81%) are considerably less than it's share in total African potential export value (28.89%), it holds 28.55% of total African GDP, which correlates well with the share in total potential export value. The same applies for Middle Africa that holds 5.74% of total African GDP, correlating better to its share in the total potential export value (1.36%).

Figure 6.4 provides an illustration of South Africa's actual exports to the product-country combinations identified as export opportunities in each region in the rest of the African continent. This will shed some light on the degree to which South Africa is utilising its export potential in each region.

Figure 6.4: Regional distribution of South Africa's actual exports to Africa



⁷⁵ This excludes South Africa and the countries in which no export opportunities were identified.

From Figure 6.3 and 6.4 it can be noted that South Africa is on the right track in exporting to Eastern, Southern and Middle Africa, but might be missing many export opportunities in Western and Northern Africa. To shed more light on this situation, Figure 6.5 illustrates the differences between potential and actual exports for the export opportunities identified in each of the African regions.

Figure 6.5: Potential export value realised in actual export values per African region

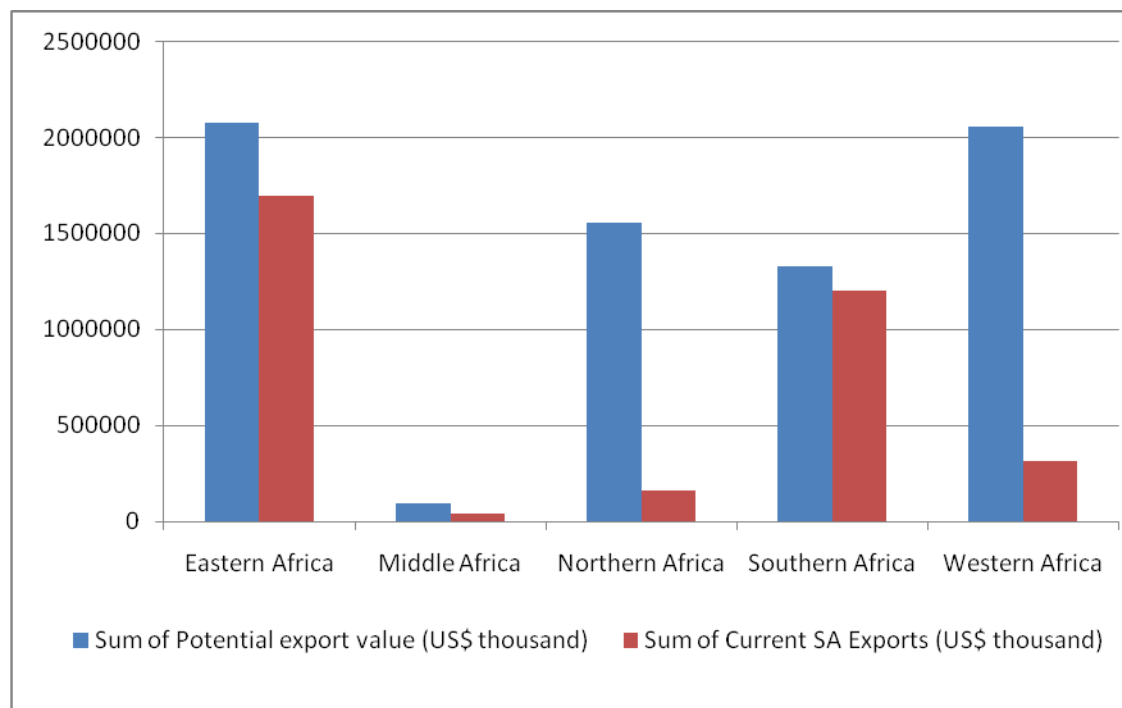


Figure 6.5 confirms that South Africa is, in general, utilising its export potential to a large extent in Eastern, Southern and Middle Africa, but falls short in Northern and Western Africa.

In order to be more specific, the countries with the highest export potential for South Africa in the rest of the African continent will be provided in section 6.4.

6.4 Country-level results of the Africa DSM

The top 20 African countries in terms of total potential export value are provided in Table 6.8.

The African countries with the highest potential export values for South Africa are situated in Western Africa, Eastern Africa and Northern Africa. Nigeria presents the highest total potential

export value for South Africa, but South Africa only tapped into 13.35% of this country's potential.

Table 6.8: Top 20 African countries based on total export potential values

Ranking	Country	Potential export value (2007) ⁷⁶ (US\$ thousand)	Current export value (2007) (US \$ thousand)	% of the total potential export value realised in actual exports ⁷⁷
1	Nigeria	1,213,631	162,028	13.35%
2	Namibia	1,019,333	924,307	90.68%
3	Ghana	631,990	127,986	20.25%
4	Egypt	573,624	19,200	3.35%
5	Morocco	544,189	134,985	24.80%
6	Zambia	523,376	504,549	96.40%
7	Kenya	342,553	241,339	70.45%
8	Tunisia	333,054	7,790	2.34%
9	Zimbabwe ⁷⁸	253,928	232,902	91.72%
10	Mauritius	230,736	165,817	71.86%
11	Botswana	230,272	198,877	86.37%
12	Mozambique	195,143	171,385	87.83%
13	Uganda	158,208	86,775	54.85%
14	Tanzania	114,348	94,153	82.34%
15	Malawi	105,616	98,218	93.00%
16	Madagascar	99,606	73,906	74.20%
17	Cote d'Ivoire	86,544	9,009	10.41%
18	Swaziland	78,868	77,064	97.71%
19	Senegal	70,341	8,269	11.76%
20	Algeria	67,017	233	0.35%

Countries in which South Africa has tapped into the export potential to a relatively large extent include Namibia, Zambia, Zimbabwe, Botswana, Mozambique, Tanzania, Malawi and Swaziland (all SADC countries). Countries that hold high potential that are not adequately utilised by South Africa include Nigeria, Egypt, Tunisia, Cote d'Ivoire, Senegal, Ghana and Morocco.

The country-level results of the DSM for Africa can also be illustrated graphically. Figure 6.6 and 6.7 illustrate the distribution of the export opportunities identified in the different African countries both in terms of the *number* of export opportunities and the *potential export value* of these opportunities.

⁷⁶ The most recent trade data in the database obtained from the International Trade Centre are for 2007.

⁷⁷ This ratio is the sum of the actual exports of only the products for which realistic export opportunities were identified divided by the potential export value (see column 1).

⁷⁸ The export opportunities identified in Zimbabwe should be interpreted bearing the current political and economic instability in Zimbabwe in mind.

Figure 6.6 Country-level distribution of export opportunities in Africa: *number* of opportunities

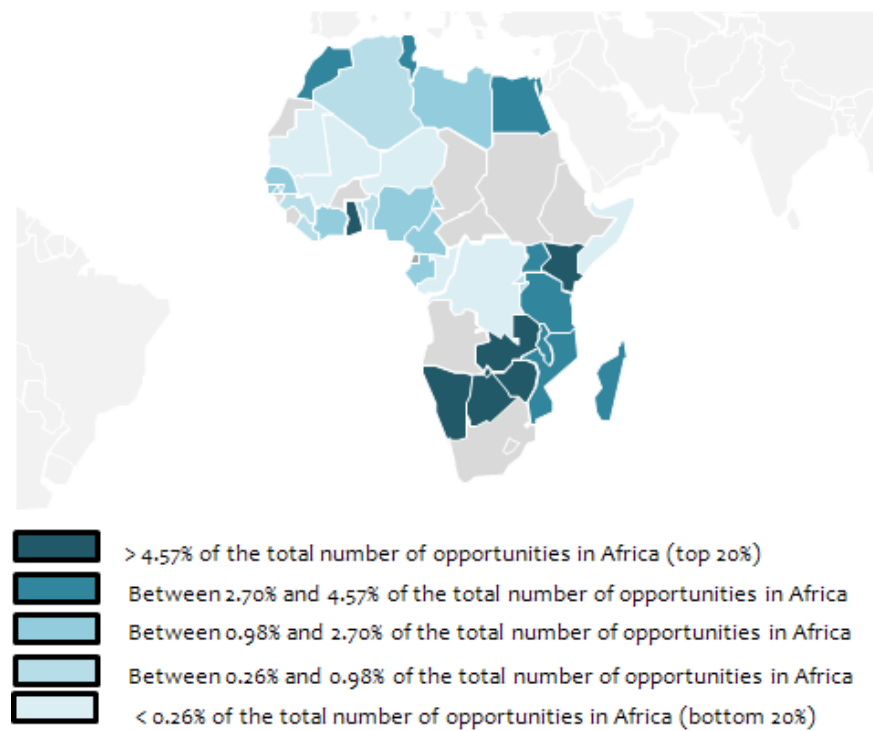
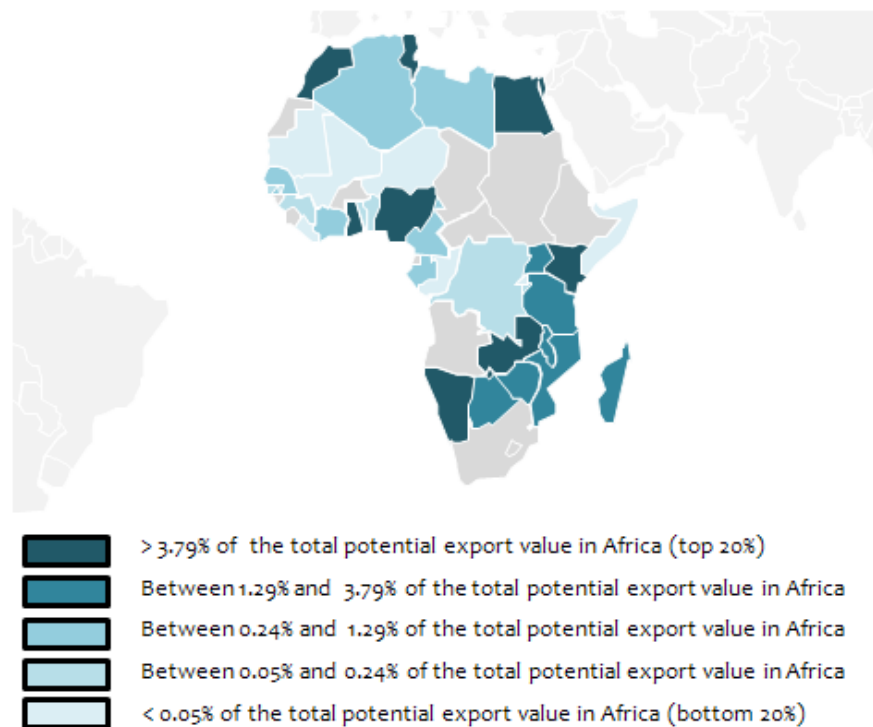


Figure 6.7: Country-level distribution of export opportunities in Africa: *potential export values*



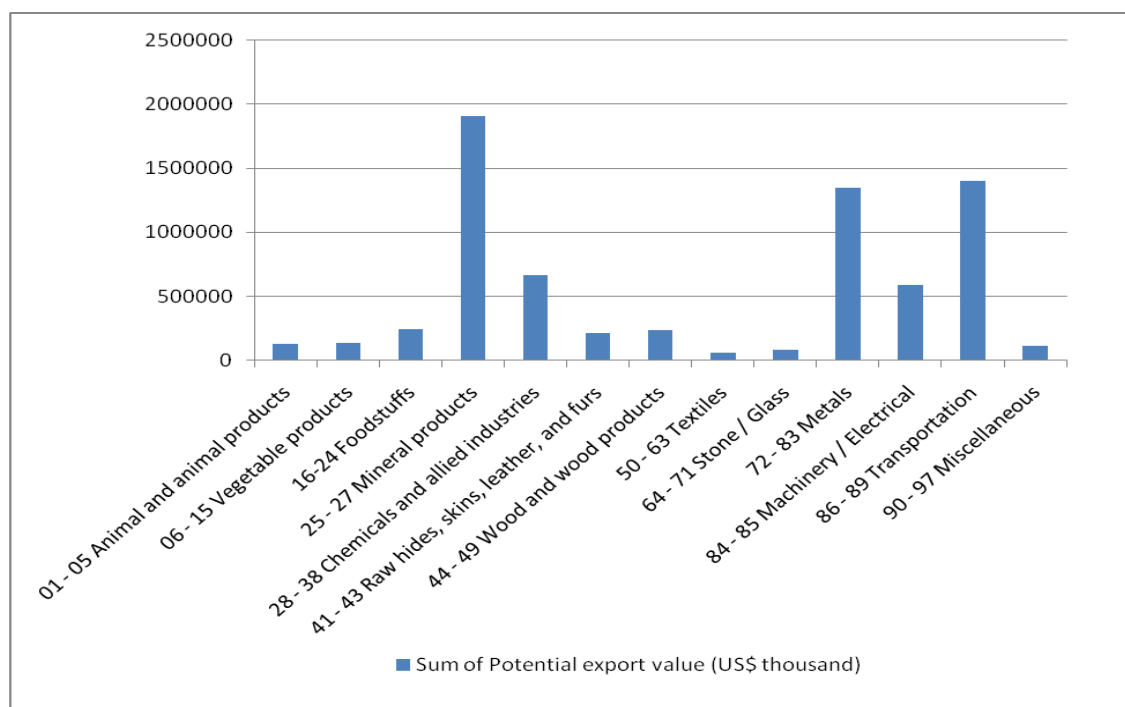
From Figure 6.6 and 6.7 it is interesting to note that Botswana, Egypt, Morocco, Nigeria, Senegal, Libya and Algeria performed better in terms of potential export value than in terms of number of opportunities. On the other hand, Mauritius, Mozambique, Swaziland, Zimbabwe, Madagascar, Malawi and Seychelles performed worse in terms of potential export value than in terms of the number of opportunities. It is therefore important to note that although a high number of export opportunities is identified for a particular country, these opportunities can hold less potential in terms of the projected export value (size of demand potential).

In section 6.5 a sector-level analysis (HS 2-digit) of the results of the DSM applied to identify export opportunities for South Africa in the rest of the African continent follows.

6.5 Sector-level (HS 2-digit level) results of the Africa DSM

This section will report in more detail on the sector-level (HS 2-digit level) results of the DSM applied to identify export opportunities for South Africa in the rest of the African continent. Firstly, to gain an overview of the different types of product groups identified as export opportunities in Africa, a comparison of the potential export values for each product category is provided in Figure 6.8.

Figure 6.8: Comparison of potential export values per product group in Africa



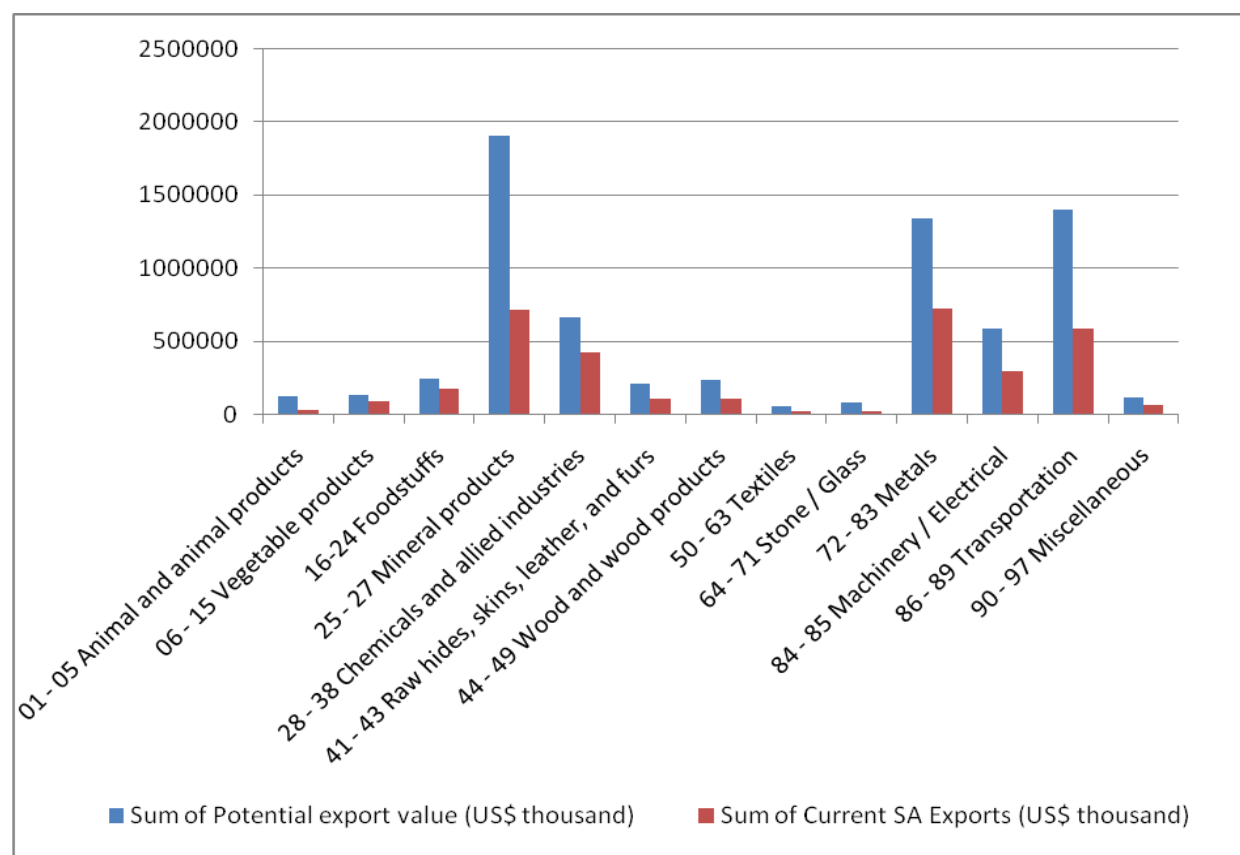
The product groups with the highest export potential for South Africa in the rest of the African continent include mineral products, metals and transportation. Chemicals and allied industries also hold high export potential for South Africa in Africa.

Table 6.9 presents the percentage of the potential export values for the different product categories realised in actual exports. These percentages should be interpreted together with the relative size of the export potential in each product category as illustrated in Figure 6.9.

Table 6.9: Potential export value realised in actual export values for export opportunities identified per product group in Africa

	Potential export value (US\$ thousand)	Actual SA export value (US\$ thousand)	% of the total potential export value realised in actual exports
01 - 05 Animal and animal products	127,657	33,191	26.00%
06 - 15 Vegetable products	134,132	96,612	72.03%
16-24 Foodstuffs	247,491	174,843	70.65%
25 - 27 Mineral products	1,908,724	719,517	37.70%
28 - 38 Chemicals and allied industries	665,812	428,658	64.38%
41 - 43 Raw hides, skins, leather and furs	213,906	112,598	52.64%
44 - 49 Wood and wood products	236,105	113,377	48.02%
50 - 63 Textiles	57,499	26,441	45.99%
64 - 71 Stone/Glass	81,280	27,571	33.92%
72 - 83 Metals	1,344,067	722,214	53.73%
84 - 85 Machinery/Electrical	585,196	300,264	51.31%
86 - 89 Transportation	1,397,269	591,355	42.32%
90 - 97 Miscellaneous	115,223	69,253	60.10%
Total	7,114,361	3,415,894	48.01%

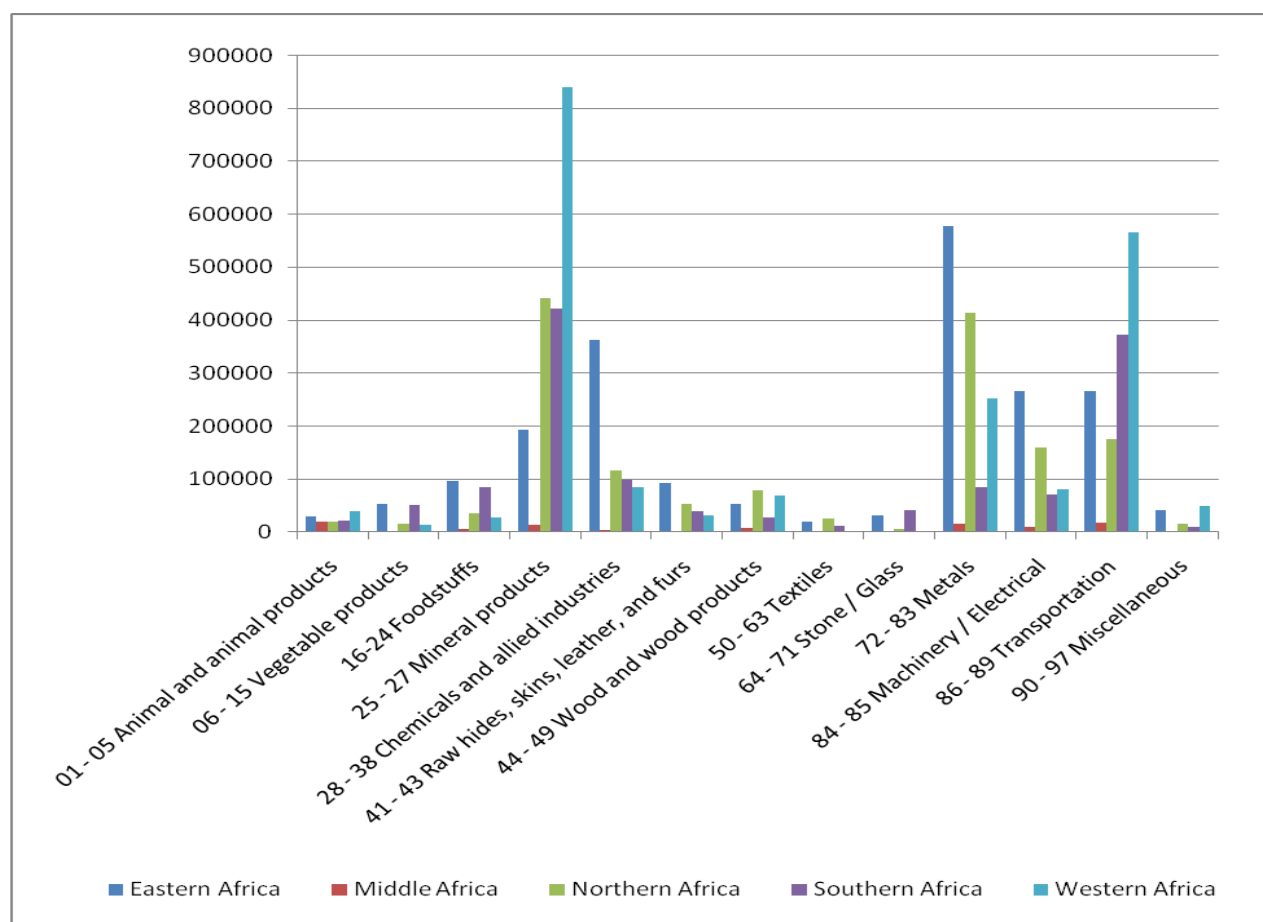
Figure 6.9: Potential export value realised in actual export values per product group in Africa



From Table 6.9 and Figure 6.9 it is clear that the sectors with the highest export potential *and* the biggest shortfalls in actual exports *versus* potential export values are mineral products, transportation products and metals. The export promotion of these product groups in African countries can therefore be regarded as first priorities by South African export promotion agencies.

In order to combine the regional (section 6.3) and sector-level results, the product groups with the most potential in each African region have been identified in Figure 6.10.

Figure 6.10: Potential export values of the different product groups per African region



Mineral products to Western Africa far outweigh the other export opportunities for South Africa in the rest of the African continent. Metals to Eastern Africa, transportation products to Western Africa, mineral products and metals to Northern Africa, mineral and transportation products to Southern Africa as well as chemicals and allied industries to Eastern Africa also hold relatively high export potential for South Africa.

Following on the sector-level analysis of the results of the African DSM, the specific HS 6-digit level products with the highest export potential for South Africa in the rest of the African continent will be discussed in section 6.6.

6.6 Product and product-country level results of the Africa DSM

The top 50 HS 6-digit products in Africa that hold the highest export potential values for South Africa are provided in Table 6.10.

Table 6.10: Top 50 products with the highest export potential for South Africa in Africa

Rank	Product category	Potential export value (US\$ thousand)	Actual SA export value (US\$ thousand)	% of potential value realised
1	271011 – Aviation spirit	1,249,734	426,635	34.14%
2	870323 - Automobiles, spark ignition engines of 1500-3000 cc	827,972	248,884	30.06%
3	870421 - Diesel powered trucks weighing less than 5 tons	237,282	183,876	77.49%
4	270119 - Coal except anthracite or bituminous, not agglomerate	223,845	197,650	88.30%
5	720839 - Flat-rolled products/coils of iron/non-alloy steel of a thickness less than 3 mm	220,096	141,362	64.23%
6	260112 - Iron ores and concentrates, excluding iron pyrites, agglomerated	177,938	0	0.00%
7	720719 - Semi-finished products of iron/non-alloy steel, containing by weight less than 0.25% of carbon, n.e.s.	113,974	7,162	6.28%
8	250300 - Sulphur of all kinds	109,700	21,810	19.88%
9	870322 - Automobiles, spark ignition engines of 1000-1500 cc	105,051	2,546	2.42%
10	870410 - Dump trucks designed for off-highway use	100,867	82,396	81.69%
11	730890 - Structures and parts of structures of iron or steel, n.e.s.	95,682	84,078	87.87%
12	730410 - Line pipe of iron or steel used for oil or gas pipelines	93,479	276	0.30%
13	310520 - Nitrogen-phosphorus-potassium fertilizers, pack >10 kg	73,761	50,894	69.00%
14	847490 - Parts of machinery for mineral sorting, screening, mixing, etc	72,679	54,444	74.91%
15	390210 - Polypropylene in primary forms	72,642	41,858	57.62%
16	401120 - Pneumatic tyres new of rubber for buses or lorries	66,375	32,223	48.55%
17	030374 - Mackerel, frozen, whole	61,039	945	1.55%
18	721391 - Bars and rods of circular cross-section, less than 14 mm in diameter	60,623	21,286	35.11%
19	760110 - Aluminium unwrought, not alloyed	54,312	51,371	94.58%
20	720918 – Flat-rolled products of iron /non-alloy steel, in coils, less than 0.5 mm thick	53,742	15,093	28.08%
21	841381 - Pumps n.e.s.	53,301	27,069	50.79%
22	730690 - Tube/pipe/hollow profile of iron/steel, n.e.s.	47,373	35,687	75.33%
23	721049 - Flat-rolled products of iron or non-alloy steel, coated with zinc, of a width of 600 mm or more, other than corrugated	45,696	27,197	59.52%
24	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	43,386	6,714	15.48%
25	360200 - Prepared explosives, except propellant powders	42,115	37,091	88.07%
26	847420 - Machines to crush or grind stone, ores and minerals	41,813	20,022	47.88%
27	721633 - Angles, shapes and sections of iron/non-alloy steel, H-sections, hot-rolled/ hot-drawn/extruded of a height of 80 mm or more	39,979	12,281	30.72%
28	852510 - Transmission apparatus for radio, telephone and TV	39,570	2,295	5.80%
29	280700 - Sulphuric acid, oleum	38,356	27,133	70.74%
30	902830 - Electricity supply, production and calibrating meters	37,466	24,462	65.29%
31	380830 - Herbicides, sprouting and growth regulators	37,187	16,041	43.14%
32	730820 - Towers and lattice masts of iron or steel	35,478	32,961	92.91%
33	721310 - Bars and rods of iron or non-alloy steel, hot-rolled in irregular wound coils	35,403	31,779	89.76%
34	030379 - Fish n.e.s., frozen, whole	32,842	12,329	37.54%
35	310590 - Fertilizers, mixes, n.e.s.	32,291	29,248	90.58%
36	940600 - Prefabricated buildings	32,120	21,010	65.41%
37	310230 - Ammonium nitrate, including solution, in pack >10 kg	30,249	9,031	29.86%
38	491199 - Printed matter, n.e.s.	29,810	16,662	55.89%
39	480256 - Paper and paperboard, not cont, fibres obt by a mech/chemi-mech process	29,369	26,779	91.18%
40	854460 - Electric conductors for over 1,000 volts, n.e.s.	29,122	13,641	46.84%
41	760511 - Wire, aluminium, not alloyed, of which the cross-sectional dimension > 7 mm	28,922	1,236	4.27%
42	170199 - Refined sugar, in solid form, n.e.s., pure sucrose	28,771	27,665	96.16%
43	260700 - Lead ores and concentrates	28,765	0	0.00%
44	310240 - Ammonium nitrate limestone, etc mixes, pack >10 kg	27,780	27,780	100.00%
45	480421 - Sack kraft paper, unbleached, uncoated	26,476	1,738	6.56%
46	300680 - Waste pharmaceuticals	24,025	20,110	83.70%
47	220421 - Grape wines n.e.s., fortified wine or must, pack < 2l	23,943	21,413	89.43%
48	720852 - Flat-rolled products of iron /non-alloy steel, in coils, less than 4.75 mm thick	22,971	19,138	83.31%
49	721190 - Flat-rolled iron or non-alloy steel of a width less than 600 mm, not clad/ plated/coated, n.e.s.	22,945	22,688	98.88%
50	240120 - Tobacco, unmanufactured, stemmed or stripped	22,717	5,174	22.78%

These products are diverse, but those with the highest potential export values include mineral products (eg, aviation spirit, coal, iron ores, sulphur), transportation products (eg, 1000 cc – 3000 cc automobiles, diesel trucks weighing less than five tons and dump trucks for off-highway use) and metals (eg, flat-rolled products of iron/non-alloy steel of different thicknesses, semi-finished products of iron/non-alloy steel, iron or steel structures and parts of structures, line pipe used for oil/gas pipelines of iron or steel).

South Africa has tapped into the potential to a relatively large extent in the following products: ammonium nitrate limestone mixes, flat-rolled iron/non-alloy steel, refined sugar, aluminium, iron or steel towers and lattice masts, paper and paperboard, fertilizers, hot rolled bars, grape fines, coal, prepared explosives, structures and parts of structures of iron or steel, waste pharmaceuticals, dump trucks for off-highway use, diesel powered trucks weighing less than 5 tons and tube, pipe and hollow profile of iron or steel.

However, for the following products South Africa has not adequately tapped into the export potential: lead ores, iron ore, line pipe used for oil/gas pipelines of iron or steel, frozen mackerel, 1000 – 1500 cc automobiles, aluminium wire, transmission apparatus for radio, telephone and television, semi-finished products of iron or non-alloy steel, sack kraft paper, unworked diamonds, sulphur and tobacco.

The 50 *product-country combinations* with the highest export potential for South Africa in the rest of the African continent are provided in Table 6.11.

Table 6.11: Top 50 product-country combinations in Africa

Country	HS 6-digit product code and description	Filter 4 cell classification ⁷⁹	Potential export value (US\$ thousand)	Actual SA Exports (US\$ thousand)
Nigeria	271011 - Aviation spirit	2	781,698	63,025
Namibia	271011 - Aviation spirit	17	391,642	350,000
Ghana	870323 - Automobiles, spark ignition engine of 1500-3000 cc	7	317,623	486
Namibia	870323 - Automobiles, spark ignition engine of 1500-3000 cc	17	249,881	223,563
Egypt	260112 - Iron ores and concentrates, excluding iron pyrites, agglomerated	4	164,777	0
Nigeria	870323 - Automobiles, spark ignition engine of 1500-3000 cc	17	153,468	13,589
Morocco	270119 - Coal except anthracite or bituminous, not agglomerate	20	128,331	102,147
Tunisia	720719 - Semi-finished products of iron/non-alloy steel, containing by weight less than 0.25% of carbon, n.e.s.	5	106,802	0
Kenya	720839 - Flat-rolled products/coils of iron/non-alloy steel of a thickness < 3 mm	17	79,686	79,686
Egypt	870322 - Automobiles, spark ignition engine of 1000-1500 cc	2	66,427	1,925
Morocco	720839 - Flat-rolled products/coils of iron/non-alloy steel of a thickness < 3 mm	2	59,468	0
Zimbabwe	870421 - Diesel powered trucks weighing less than 5 tons	2	56,106	47,102
Morocco	250300 - Sulphur of all kinds	5	56,052	0
Mauritius	270119 - Coal except anthracite or bituminous, not agglomerate	17	51,473	51,473
Nigeria	720918 - Flat-rolled products of iron /non-alloy steel, in coils, < 0.5 mm thick	18	48,086	10,486
Zambia	730890 - Structures and parts of structures of iron or steel, n.e.s.	17	44,599	44,599
Nigeria	730410 - Line pipe of iron or steel used for oil or gas pipelines	5	41,057	0
Zambia	870410 - Dump trucks designed for off-highway use	17	39,458	39,458
Tanzania	720839 - Flat-rolled products/coils of iron/non-alloy steel of a thickness < 3 mm	17	38,548	31,755
Ghana	870421 - Diesel powered trucks weighing less than 5 tons	17	36,876	36,876
Zambia	847490 - Parts of machinery for mineral sorting, screening, mixing, etc	17	35,205	35,205
Kenya	870421 - Diesel powered trucks weighing less than 5 tons	7	35,054	18,093
Uganda	271011 - Aviation spirit	2	35,032	3,243
Botswana	870410 - Dump trucks designed for off-highway use	17	33,373	33,373
Botswana	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	7	32,572	5,513
Ghana	760110 - Aluminium unwrought, not alloyed	17	31,374	31,374
Tunisia	250300 - Sulphur of all kinds	1	30,166	0
Namibia	870421 - Diesel powered trucks weighing less than 5 tons	7	29,203	25,562
Tunisia	870323 - Automobiles, spark ignition engine of 1500-3000 cc	2	29,111	0
Uganda	870421 - Diesel powered trucks weighing less than 5 tons	2	28,994	15,507
Uganda	720839 - Flat-rolled products/coils of iron/non-alloy steel of a thickness < 3 mm	17	28,974	28,648
Morocco	260700 - Lead ores and concentrates	2	28,765	0
Zambia	280700 - Sulphuric acid, oleum	16	27,771	25,638
Senegal	721391 - Bars and rods of circular cross-section, less than 14 mm in diameter	12	27,132	858
Zimbabwe	310520 - Nitrogen-phosphorus-potassium fertilizers, pack >10 kg	17	27,008	23,814
Morocco	870322 - Automobiles, spark ignition engine of 1000-1500 cc	12	26,716	621
Mozambique	270119 - Coal except anthracite or bituminous, not agglomerate	17	26,031	26,031
Zambia	310590 - Fertilizers, mixes, n.e.s.	20	26,027	23,606
Algeria	730410 - Line pipe of iron or steel used for oil or gas pipelines	5	24,976	58
Ghana	852510 - Transmission apparatus for radio, telephone and TV	10	24,870	228
Zambia	300680 - Waste pharmaceuticals	16	24,025	20,110
Nigeria	401120 - Pneumatic tyres new of rubber for buses or lorries	7	22,861	294
Egypt	721633 - Angles, shapes and sections of iron/non-alloy steel, H-sections, hot-rolled/hot-drawn/extruded of a height of 80 mm or more	2	22,804	0
Malawi	310520 - Nitrogen-phosphorus-potassium fertilizers, pack >10 kg	7	22,722	22,722
Morocco	721190 - Flat-rolled iron or non-alloy steel of a width less than 600 mm, not clad/plated/coated, n.e.s.	17	22,253	22,253
Kenya	760110 - Aluminium unwrought, not alloyed	2	22,093	19,152
Zambia	250300 - Sulphur of all kinds	20	21,810	21,810
Kenya	721310 - Bars and rods of iron or non-alloy steel, hot-rolled in irregular coils	17	21,351	21,351
Egypt	390210 - Polypropylene in primary forms	2	20,767	0
Cote d'Ivoire	870323 - Automobiles, spark ignition engine of 1500-3000 cc	7	20,619	2

⁷⁹ See Table 3.6

There are 18 countries in which the top 50 export opportunities for South Africa in the rest of the African continent are located. These include, in order of highest to lowest total export potential value, Nigeria, Namibia, Ghana, Morocco, Egypt, Zambia, Tunisia, Kenya, Uganda, Zimbabwe, Botswana, Mauritius, Tanzania, Senegal, Mozambique, Algeria, Malawi and Cote d'Ivoire.

The products with the highest potential export values in the top 50 product-country combinations for South Africa in Africa are mineral products (aviation spirit, iron ore, sulphur and coal) and transportation products (1500 - 3000 cc automobile engines and diesel powered trucks weighing less than 5 tons).

Amongst the product-country combinations with the highest potential for South Africa in the rest of the African continent, there are product-country combinations to which South Africa has not exported at all. It means that South Africa is not tapping the export potential of these markets even though the political and commercial risks are not too high, the demand is sizable and/or growing, the competition is not too fierce, barriers to trade are not too high, South Africa is specialised in producing and exporting the product and the potential export value is high. Examples include iron ore to Egypt, semi-finished iron or non-alloy steel products to Tunisia, flat-rolled products of iron/non-alloy steel in coils less than 3 mm thick to Morocco, sulphur to Morocco and Tunisia, pipe line of iron or steel for oil or gas pipelines to Nigeria, 1500-3000 cc automobiles to Tunisia, lead ores to Morocco, polypropylene to Egypt and H sections angles, shapes and sections of iron/non-alloy steel of a height of 80 mm or more to Egypt. It is interesting to note that most of these opportunities are in Northern Africa.

On the other hand, there are product-country combinations to which South Africa has utilised the export potential to a relatively large degree. These include flat-rolled products of iron/non-alloy steel in coils less than 3 mm thick and hot-rolled bars and rods of iron/non-alloy steel to Kenya, coal to Mauritius and Mozambique, structures and parts of structures of iron and steel, parts for mineral sorting, screening and mixing machinery, sulphur, sulphuric acid and fertilizers to Zambia, dump trucks for off-highway use to Botswana and Zambia and diesel powered trucks weighing less than 5 tons and aluminium to Ghana. It is interesting to note that most of these opportunities are situated in Eastern Africa.

If the trade promotion organisations (TPOs) want to focus their export promotion efforts (their resources), they can do so by only focusing on certain product-country combinations as

described by Cuyvers *et al* (1995:183) and Cuyvers (1997:14-15; 2004:270). These recommended actions will now be discussed.

6.7 Focused export promotion into Africa by trade promotion organisations

As mentioned in section 5.4, Cuyvers *et al* (1995:183) and Cuyvers (1997:14-15; 2004:270) recommend that when resources are limited, export promotion agencies should not actively promote export opportunities in cells 1 to 10, but rather focus on expanding markets in cells 11 to 15. As most markets in the rest of the African continent are either in cells 1 to 5 or in cells 16 to 20, South African export promotion organisations have the following options in deciding on the export promotion strategy to follow in the rest of the African continent. Firstly, to focus on actively promoting the 71 export opportunities identified in cells 11 to 15 (this strategy is advised when resources are very limited). Secondly, if resources allow, to actively promote the 50.84% export opportunities in cells 1 to 10 by doing in-depth market research on these opportunities, distributing the information to the relevant exporters and actively engaging in penetrating the markets by means of various export promotion instruments (national pavilions, trade missions, etc). Resources should not be used to actively promote exports to markets in cells 16 to 20 where South Africa already has a large market share and exporters are familiar with their markets. These markets should rather be maintained by the exporters themselves. In Table 6.12 and 6.13 the top 50 product-country combinations selected in Africa, which are categorised in cells 1 to 10 and cells 11 to 15 respectively, are provided.

The countries that hold the highest potential export value in cells 1 to 10 are situated in Western Africa (Nigeria, Ghana) and Northern Africa (Egypt, Morocco, Tunisia). The product categories in cells 1 to 10 that hold the highest potential export value are mineral products (eg, aviation spirit, iron ore and sulphur), transportation products (eg, 1000 – 1500 cc and 1500 – 3000 cc automobiles and diesel powered trucks weighing less than 5 tons) and metals (eg, semi-finished iron or steel products and iron or steel pipes for oil or gas pipelines).

Table 6.12: Top 50 African product-country combinations in cells 1 to 10

Country	HS 6-digit product code and description	Filter 4 cell	Potential export value (2007)	Actual SA export value (2007)
Nigeria	271011 - Aviation spirit	2	781,698	63,025
Ghana	870323 - Automobiles, spark ignition engine of 1500-3000 cc	7	317,623	486
Egypt	260112 - Iron ores and concentrates, excluding iron pyrites, agglomerated	4	164,777	0
Tunisia	720719 - Semi-finished products of iron/non-alloy steel, containing by weight less than 0.25% of carbon, n.e.s.	5	106,802	0
Egypt	870322 - Automobiles, spark ignition engine of 1000-1500 cc	2	66,427	1,925
Morocco	720839 - Flat-rolled products/coils of iron/non-alloy steel of a thickness < 3 mm	2	59,468	0
Zimbabwe	870421 - Diesel powered trucks weighing less than 5 tons	2	56,106	47,102
Morocco	250300 - Sulphur of all kinds	5	56,052	0
Nigeria	730410 - Line pipe of iron or steel used for oil or gas pipelines	5	41,057	0
Kenya	870421 - Diesel powered trucks weighing less than 5 tons	7	35,054	18,093
Uganda	271011 - Aviation spirit	2	35,032	3,243
Botswana	710231 - Diamonds (jewellery) unworked or simply sawn, cleaved	7	32,572	5,513
Tunisia	250300 - Sulphur of all kinds	1	30,166	0
Namibia	870421 - Diesel powered trucks weighing less than 5 tons	7	29,203	25,562
Tunisia	870323 - Automobiles, spark ignition engine of 1500-3000 cc	2	29,111	0
Uganda	870421 - Diesel powered trucks weighing less than 5 tons	2	28,994	15,507
Morocco	260700 - Lead ores and concentrates	2	28,765	0
Algeria	730410 - Line pipe of iron or steel used for oil or gas pipelines	5	24,976	58
Ghana	852510 - Transmission apparatus for radio, telephone and TV	10	24,870	228
Nigeria	401120 - Pneumatic tyres new of rubber for buses or lorries	7	22,861	294
Egypt	721633 - Angles, shapes and sections of iron/non-alloy steel, H-sections, hot-rolled/hot-drawn/extruded of a height of 80 mm or more	2	22,804	0
Malawi	310520 - Nitrogen-phosphorus-potassium fertilizers, pack >10 kg	7	22,722	22,722
Kenya	760110 - Aluminium unwrought, not alloyed	2	22,093	19,152
Egypt	390210 - Polypropylene in primary forms	2	20,767	0
Cote d'Ivoire	870323 - Automobiles, spark ignition engine of 1500-3000 cc	7	20,619	2
Morocco	310230 - Ammonium nitrate, including solution, in pack >10 kg	4	20,323	0
Cameroon	030374 - Mackerel, frozen, whole	5	18,941	667
Egypt	847490 - Parts of machinery for mineral sorting, screening, mixing, etc	2	17,830	0
Zambia	390210 - Polypropylene in primary forms	2	17,450	16,065
Morocco	870323 - Automobiles, spark ignition engine of 1500-3000 cc	7	17,140	11
Nigeria	030374 - Mackerel, frozen, whole	3	16,700	0
Cote d'Ivoire	271011 - Aviation spirit	2	16,070	353
Nigeria	380830 - Herbicides, sprouting and growth regulators	2	15,930	7
Ghana	030374 - Mackerel, frozen, whole	5	15,636	0
Mozambique	030379 - Fish not elsewhere specified, frozen, whole	2	14,401	4,732
Egypt	841381 - Pumps not elsewhere specified	2	14,222	8
Ghana	310520 - Nitrogen-phosphorus-potassium fertilizers, pack >10 kg	2	14,214	0
Egypt	730410 - Line pipe of iron or steel used for oil or gas pipelines	2	13,749	0
Cote d'Ivoire	261800 - Granulated slag (slag sand) from the manufacture of iron/steel	5	13,284	32
Algeria	260112 - Iron ores and concentrates, excluding iron pyrites, agglomerated	2	13,161	0
Ghana	902830 - Electricity supply, production and calibrating meters	2	12,838	45
Egypt	240110 - Tobacco, unmanufactured, not stemmed or stripped	5	12,690	0
Kenya	240120 - Tobacco, unmanufactured, stemmed or stripped	2	12,407	166
Egypt	730512 - Pipe-line longitudinal n.e.s. welded steel, diameter>406 m	5	12,334	0
Tunisia	720839 - Flat-rolled products/coils of iron/non-alloy steel of a thickness < 3 mm	2	11,862	0
Morocco	721650 - Angles, shapes and sections of iron/non-alloy steel, not further worked than hot-rolled/hot-drawn/extruded, n.e.s	2	11,840	0
Egypt	760511 - Wire, aluminium, not alloyed, cross-sectional dimension > 7 mm	2	11,706	0
Morocco	760511 - Wire, aluminium, not alloyed, cross-sectional dimension > 7 mm	5	11,310	0
Ghana	271011 - Aviation spirit	2	11,109	2,056

Table 6.13: Top 50 African product-country combinations in cells 11 to 15

Country	HS 6-digit product code and description	Filter 4 cell classification	Potential export value (US\$ thousand) (2007)	Actual SA export value (US\$ thousand) (2007)
Senegal	721391 - Bars and rods of circular cross-section, less than 14 mm in diameter	12	27,132	858
Morocco	870322 - Automobiles, spark ignition engine of 1000-1500 cc	12	26,716	621
Ghana	283711 - Cyanides and cyanide oxides of sodium	15	15,324	107
Egypt	480421 - Sack kraft paper, unbleached, uncoated	11	15,061	248
Zambia	360200 - Prepared explosives, except propellant powders	15	14,463	13,977
Tanzania	730820 - Towers and lattice masts of iron or steel	12	12,959	12,959
Egypt	320710 - Pigment, opacifier, colours, etc for ceramics or glass	15	10,005	18
Kenya	440310 - Poles, treated or painted with preservatives	15	9,490	5,208
Egypt	480255 - Paper and paperboard	12	9,197	544
Nigeria	480419 - Paper, kraft liner, other than unbleached, uncoated	12	5,492	96
Kenya	842919 - Bulldozers and angledozers, wheeled	15	3,178	290
Madagascar	310520 - Nitrogen-phosphorus-potassium fertilizers, pack >10 kg	12	3,068	1,385
Uganda	852510 - Transmission apparatus for radio, telephone and TV	12	2,955	492
Ghana	940180 - Seats n.e.s	12	2,506	92
Egypt	843629 - Poultry-keeping machinery, other than poultry incubators and brooders	12	2,476	13
Morocco	300230 - Vaccines, veterinary use	12	2,235	75
Tunisia	842123 - Oil/petrol filters for internal combustion engines	12	2,150	59
Morocco	580890 - Ornamental trimmings in the piece	15	2,033	266
Tunisia	380830 - Herbicides, sprouting and growth regulators	12	1,930	257
Uganda	850433 - Electrical transformers having a power capacity of 16-500 kVA	12	1,679	251
Ghana	842123 - Oil/petrol filters for internal combustion engines	12	1,531	82
Botswana	630629 - Tents, of textile material n.e.s	12	1,529	1,529
Tanzania	730690 - Tube/pipe/hollow profile of iron/steel, n.e.s	12	1,186	618
Ghana	842131 - Intake air filters for internal combustion engines	12	1,123	91
Egypt	380400 - Residual lyes from the manufacture of wood pulp	12	1,083	314
Tunisia	291612 - Acrylic acid esters	12	1,058	217
Egypt	843050 - Construction equipment, self-propelled n.e.s	12	1,052	20
Kenya	847490 - Parts of machinery for mineral sorting, screening, mixing, etc	12	913	508
Kenya	271290 - Mineral waxes n.e.s	12	897	662
Mauritius	842959 - Earth moving/road making equipment, self-propelled ne	12	889	200
Egypt	731582 - Chain, welded link, iron or steel	12	880	13
Tunisia	848420 - Mechanical seals	12	780	12
Gabon	842131 - Intake air filters for internal combustion engines	12	665	12
Ghana	401019 - Conveyor belts n.e.s	12	603	80
Mauritius	390210 - Polypropylene in primary forms	12	540	88
Mozambique	630510 - Sacks and bags of jute or other bast fibres, used for packing of goods	12	525	56
Madagascar	860900 - Cargo containers designed for carriage	12	519	519
Zimbabwe	842139 - Filtering or purifying machinery for gases n.e.s	12	519	430
Tanzania	680223 - Cut or sawn slabs of granite	12	471	471
Mauritius	283319 - Sodium sulphates other than disodium sulphate	12	448	7
Mauritius	030420 - Fish fillets, frozen	12	430	347
Morocco	220870 - Liqueurs and cordials	12	428	8
Mali	852510 - Transmission apparatus for radio, telephone and TV	12	413	58
Seychelles	730690 - Tube/pipe/hollow profile of iron/steel, n.e.s	12	351	101
Djibouti	842959 - Earth moving/road making equipment, self-propelled ne	12	332	152
Cameroon	220429 - Grape wines, alcoholic grape must n.e.s	12	314	34
Kenya	080610 - Grapes, fresh	12	314	314

The top 50 export opportunities in cells 11 to 15 with the highest export potential values are situated in Northern Africa (Egypt and Morocco), Eastern Africa (Kenya, Zambia and Tanzania) and Western Africa (Senegal and Ghana). The product categories in cells 11 to 15 that hold the highest potential export value are chemical and allied industries (cyanides, prepared explosives and pigment or colour for ceramics or glass), metals (circular cross bars and rods and iron or steel towers and lattice masts), wood and wood products (unbleached, uncoated paper and sack kraft, poles treated or painted with preservatives and paper and paper board) and transportation products (1000 – 1500 cc automobiles).

A summary of the findings contained in this chapter follows in section 6.7.

6.8 Summary

In this chapter the main results of the refined DSM applied to identify export opportunities for South Africa in the rest of the African continent have been discussed.

In section 6.2 the results for each filter have been provided. After the filtering process, there were 2,986 export opportunities identified as realistic export opportunities for South Africa in the rest of the African continent.

In section 6.3 an analysis has been done of the *regional results* of the DSM applied to identify export opportunities for South Africa in the rest of the African continent. Eastern Africa holds the largest export potential for South Africa, followed by Western, Northern and Southern Africa (see Figure 6.3). South Africa is utilising its export potential to a large extent in Eastern, Southern and Middle Africa, but falls short in Northern and Western Africa (see Figure 6.5).

In section 6.4 the *countries* with the highest export potential for South Africa in the rest of the African continent have been provided. These countries include Nigeria, Namibia, Ghana, Morocco, Egypt, Zambia, Tunisia, Kenya, Uganda and Zimbabwe (see Table 6.8). Countries in which South Africa has tapped into the export potential to a relatively large extent include Namibia, Zambia, Zimbabwe, Botswana, Mozambique, Tanzania, Malawi and Swaziland (all SADC countries). Countries that hold unutilised potential and need attention from South African export promotion organisations are Nigeria, Egypt, Tunisia, Cote d'Ivoire, Senegal, Ghana and Morocco (see Table 6.8).

Section 6.5 includes an in-depth analysis of the *sector level results* of the DSM applied to identify export opportunities for South Africa in the rest of the African continent. The product groups (HS 2-digit level) with the highest export potential for South Africa in the rest of the African continent include mineral products, metals and transportation products. Chemicals and allied industries also hold relatively large export potential (see Figure 6.8). The product groups with the largest export potential *and* the biggest shortfall in actual exports as compared with potential export values are for mineral products, transportation products and metals (see Figure 6.9).

If the regional and sectoral results are combined, mineral products to Western Africa far outperform the other export opportunities for South Africa in the rest of the African continent. Metals to Eastern Africa, transportation products to Western Africa, mineral products and metals to Northern Africa, mineral and transportation products to Southern Africa as well as chemicals and allied industries to Eastern Africa also hold relatively large export potential for South Africa (see Figure 6.10).

The HS 6-digit level *products* and *product-country* combinations with the highest potential export values for South Africa in the rest of the African continent were identified in section 6.6. The products with the highest potential export values have been provided in Table 6.10. South Africa has tapped into the potential of the following products to a relatively large extent: ammonium nitrate limestone mixes, flat-rolled iron/non-alloy steel, refined sugar, aluminium, iron or steel towers and lattice masts, paper and paperboard, fertilizers, hot rolled bars, grape fines, coal, prepared explosives, structures and parts of structures of iron or steel, waste pharmaceuticals, dump trucks for off-highway use, diesel powered trucks weighing less than 5 tons and tube, pipe and hollow profile of iron or steel. However, for the following products South Africa has not adequately tapped into the export potential: lead ores, iron ore, line pipe used for oil/gas pipelines of iron or steel, frozen mackerel, 1000 – 1500 cc automobiles, aluminium wire, transmission apparatus for radio, telephone and television, semi-finished products of iron or non-alloy steel, sack kraft paper, unworked diamonds, sulphur and tobacco (see Table 6.10). With regard to the *product-country* combinations with the highest export potential for South Africa in the rest of the African continent, there are 18 countries in which the top 50 export opportunities for South Africa in the rest of the African continent are located. These include, in order of highest to lowest total export potential value, Nigeria, Namibia, Ghana, Morocco, Egypt, Zambia, Tunisia, Kenya, Uganda, Zimbabwe, Botswana, Mauritius, Tanzania, Senegal,

Mozambique, Algeria, Malawi and Cote d'Ivoire. The products with the highest potential export values in the top 50 product-country combinations for South Africa in Africa are mineral products (aviation spirit, iron ore, sulphur and coal) and transportation products (1500 – 3000 cc automobile engines and diesel powered trucks weighing less than 5 tons) (see Table 6.11).

Markets in which South Africa is not sufficiently tapping into the export potential include iron ore to Egypt, semi-finished iron or non-alloy steel products to Tunisia, flat-rolled products of iron/non-alloy steel in coils less than 3 mm thick to Morocco, sulphur to Morocco and Tunisia, pipe line of iron or steel for oil or gas pipelines to Nigeria, 1500-3000 cc automobiles to Tunisia, Lead ores to Morocco, polypropylene to Egypt and H sections angles, shapes and sections of iron/non-alloy steel of a height of 80mm or more to Egypt (see Table 6.11).

In section 6.6 product-country combinations that should be promoted as a first priority by trade promotion organisations were identified. These were provided in Table 6.12 and 6.13.

The summary, conclusions and recommendations of this study follows in Chapter 7.

CHAPTER 7: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The main aim of this study was to identify export opportunities for South African products in the rest of the world and specifically in the rest of the *African* continent. The method chosen to achieve this aim was the Decision Support Model developed by Cuyvers *et al* (1995) and Cuyvers (1997). This model was embedded in the international market selection literature and refinements had to be made to address some of the limitations of the model (see sections 1.2 and 4.2).

In Chapter 2 the international market selection literature was classified into various categories of studies and the DSM was categorised as a country-level market estimation model (see Figure 2.2). A detailed description of the methodology of the DSM as well as studies that support the use of the different variables used in the filters of the DSM have been provided in Chapter 3. In Chapter 4, four main refinements to the DSM methodology have been introduced to address the limitations of the DSM and to make the DSM more applicable for the South African international trade conditions. Chapter 5 contains the main results of the refined DSM applied to identify export opportunities for South Africa in the rest of the *world*. In Chapter 6 the results of the application of the refined DSM to identify export opportunities for South Africa in the rest of the *African continent* have been presented.

Table 7.1 provides a summary of the chapters in which the different objectives of this study were addressed.

Table 7.1: Meeting of objectives (stated in section 1.5)

	Objective	Where reached
1.	Position the DSM in the international market selection literature.	Chapter 2
2.	Introduce refinements to the DSM to address the limitations mentioned in section 1.2: - Use HS 6-digit level trade data. - Calculate the potential export value of each export opportunity in order to prioritise between the product-country combinations identified as realistic export opportunities. - Take the production capacity of South Africa into account in the process of prioritising between export opportunities. - Measure the market accessibility of different product-country combinations from a South African point of view and incorporate this measure into filter 3.2 of the DSM.	Chapter 4 and implemented in Chapter 5 and 6
3.	Run the refined DSM to identify export opportunities for South Africa in the rest of the world.	Chapter 5
4.	Run the refined DSM from filter 2 to identify export opportunities for South Africa in the rest of the African continent.	Chapter 6

7.2 Summary of the results and conclusions of the study

In Chapter 2 the international market selection literature was classified into various categories of studies (see Figure 2.1). These categories include qualitative and quantitative studies. Quantitative studies can be divided into market grouping and market estimation methods. For the purposes of this study, the market estimation category was divided into firm-level and country-level methods. The DSM was categorised as a country-level market estimation model (see Figure 2.2) together with nine other models with similar objectives found in the literature. These methods were summarised in Table 2.2. The variables typically used in these models to identify export markets for a specific country include macroeconomic size and growth, indicators of economic development, import market size and growth, current export performance, indicators of production capacity and market access conditions, including tariff and non-tariff barriers, exchange rates, distances between countries and infrastructure. The main uniqueness of the DSM is the fact that it is designed to evaluate all world markets as possible export opportunities. It is therefore capable of evaluating a large number of product-country combinations to single out the markets with the highest export potential for the exporting country. Also, the Decision Support Model (DSM) was specifically developed to assist export promotion institutions in planning and assessing their export promotion activities. As opposed to many of the other market selection approaches mentioned in Chapter 2, the DSM mainly follows a demand side approach. In other words, the demand potential of the different product-country combinations and the accessibility of these markets are the main determinants of export opportunity, while the exporting countries' current exports are only considered later in the model (filter 4). This ensures that not only the traditional trading partners of the exporting country are selected as potential trading partners, but also new ones.

With the DSM embedded in the appropriate literature, a detailed discussion of the methodology of the previous applications of the DSM followed in Chapter 3 (see section 3.2). The DSM consists of four filters that are designed to eliminate less interesting product-country combinations to eventually arrive at a list of the most promising export opportunities. In short, filter 1 eliminates countries that hold too high a political and/or commercial risk to the exporting country and do not show adequate macroeconomic size or growth. The rationale for this is that, with all the countries of the world as a starting point, filter 1 enables the researchers to eliminate uninteresting countries in order to concentrate in detail on a more limited set of product-country combinations in the consecutive filters. Countries that lack general potential are therefore

eliminated in this filter. In *filter 2* an assessment of the various product categories for the remaining countries is done to identify product-country combinations (markets) that show adequate import size and growth. Being selected on the basis of size and growth does not necessarily mean that markets can be easily penetrated. Therefore, in *filter 3* 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 concentration* (competitor analysis) and *trade restrictions*. In order to eliminate less interesting markets, a cut-off value for each of the measures in the different filters is determined. The calculation of each cut-off value is described in sections 3.2.1 to 3.2.3. In the *last stage* of the analysis, the realistic export opportunities, which were identified as export opportunities in filters 1 to 3, are categorised according to import market size and growth and the exporting country's current market share. This analysis enables policy makers to formulate export promotion strategies for different groups of export opportunities in order to cater for different market characteristics. To conclude Chapter 3, a summary of international market selection studies that support the use of the variables included in the different filters of the DSM are provided (see Table 3.7).

In Chapter 4, four main refinements to the previous applications of the DSM were introduced for the purposes of identifying export opportunities for South Africa (see sections 1.2 and 4.2). Firstly, the use of Harmonised System (HS) six-digit level trade data instead of SITC 4-digit data was introduced. This is due to the benefits this detailed classification has for the effective use and application of the DSM results by South African exporters.

A second refinement was the calculation of a potential export value for each selected product-country combination in order to prioritise between export opportunities. Even though limited lists of export opportunities (starting with all possible worldwide export opportunities and selecting those with the most export potential) were provided in the previous applications of the DSM, it was still difficult to prioritise between these opportunities, as no value was attached to the selected product-country combinations. The addition of potential export values to prioritise between the export opportunities, based on the size of the export potential of every export opportunity, contributes to the practical implementation of the DSM results and more focused export promotion strategies.

Due to the fact that the DSM mostly focuses on determining the demand potential (size, growth, competitors and market access) for products in different countries, export opportunities may be identified for which the exporting country does not have the necessary production capacity. As the third refinement, South Africa's production capacity was therefore taken into account in the final selection of export opportunities. This was done by adding a criterion that South Africa should be specialised in producing and exporting a particular product ($RCA > 1$) for it to be selected as an export opportunity.

Finally, a new method of measuring the market accessibility of South Africa in the different product-country combinations (filter 3.2) was introduced. This index takes the international shipping time and cost per country, domestic time and cost to import per country, logistics performance per country, *ad valorem* equivalent tariffs and *ad valorem* equivalent non-tariff barriers per product-country combination into account. Support from the literature for using these variables to measure market accessibility is provided in Table 4.1. Although restricted by data limitations, this refinement to the DSM is considered one of the biggest contributions of this study due to the fact that it measures market accessibility from a South African exporters' point of view on a disaggregated (HS 6-digit) product level.

As the DSM results provide such a wide range of detailed information, it is impossible to report on all the results for every country and every product. Therefore, in Chapter 5 an attempt was made to report on the main results of the refined DSM as applied to identify export opportunities for South Africa in the rest of the world.

After analysing the political and commercial risk as well as the macroeconomic size and growth of all worldwide countries, 101 countries entered filter 2 and a total of 545,703⁸⁰ product-country combinations were subsequently analysed in filter 2. 136,581 possible export opportunities showed adequate size and growth in demand and entered filter 3 to be analysed in terms of their concentration and accessibility. 78,098 product-country combinations showed acceptable levels of market concentration *and* market access and were selected to enter filter 4. After taking South Africa's production capacity into account, 15,398 export opportunities were identified as realistic export opportunities that are expected to yield export success. The selected 15,398 product-country combinations have been categorised into different cells of filter 4 as illustrated in Table 5.5 and 5.6.

⁸⁰ 5,403 HS 6-digit product categories multiplied by 101 countries.

It has been found that most of the export opportunities identified for South Africa are classified into cells 1 to 5, in which South Africa has a relatively small market share. This implies that South Africa is not adequately tapping into the markets where political and commercial risks are not too high (determined in filter 1), import demand is sizable and/or growing (determined in filters 1 and 2), competition is not too fierce (determined in filter 3.1), barriers to trade are not too high (determined in filter 3.2) and South Africa is specialised in producing and exporting the product.

Based on a *regional* analysis of the results (see Figure 5.2 and 5.3) it was found that Northern America holds the highest potential export value for South Africa with 24.77% of the total potential export value of the export opportunities identified. Northern America is followed by Eastern Asia (20.16%) and Western Europe (17.59%). Almost 63% of the total export potential is therefore located in these three regions. Northern Europe (8.94%), Southern Europe (6.84%), South-East Asia (5.04%), the Middle East (4.51%), South-Central Asia (4.33%) and Eastern Europe (3.34%) contribute another 33% of the export potential. South America, Oceania, Africa and Central America and the Caribbean contribute to less than 5% of the total potential export value.

The *country* that holds the highest export potential for South Africa is the United States, followed by Japan⁸¹, China, Germany, the United Kingdom, India, Canada, Belgium, Italy, the Netherlands, France, Spain, Hong Kong, Australia, Israel, Singapore, Indonesia, Saudi Arabia, Switzerland and Brazil.

The South African *products* with the highest worldwide export potential (see Table 5.8) can be categorised into mineral products (aviation spirit, iron, manganese, copper, nickel and precious metal ores, coal), transportation products (automobiles, trucks, wheels), stone/glass (diamonds, platinum, palladium, rhodium) and metals (aluminium, copper, ferro-chromium, iron, nickel, steel, stainless steel, zinc).

There are 17 countries in which the top 50 worldwide *product-country combinations* identified as export opportunities for South Africa are located (see Table 5.9). These include, in order of

⁸¹ Due to the recent devastating earthquake and subsequent tsunami in Japan, real-time intelligence (see section 7.4.2) should be collected to ensure the export opportunities identified for South Africa in Japan are still viable. This is typically an example of why it is important to add real-time information to the results of the DSM (that is based on historical trade data (see section 7.4.2)).

highest to lowest total export potential value, the United States, Japan, India, the United Kingdom, Canada, China, Germany, Israel, Hong Kong, the Netherlands, Australia, Belgium, Singapore, Indonesia, Saudi Arabia, Italy and Brazil. Although most of these countries are high income countries in North America, Eastern Asia and the European Union, the lower-middle income countries, China (Eastern Asia), India (South-Central Asia), Indonesia (South-Eastern Asia) and Israel (Western Asia) also hold high export potential for South Africa. Mineral products (coal, copper, aviation spirit), transportation products (1500 – 3000 cc automobile engines and diesel powered trucks), stone/glass (diamonds, platinum, rhodium) and metals (aluminium, iron/steel structures, nickel) are the product classifications within the top 50 worldwide *product-country combinations* that hold the largest export opportunities for South Africa worldwide.

Chapter 6 contains the results of the refined DSM applied to identify export opportunities for South Africa in the rest of the African continent (see section 1.3.2 for motivation). All 52 African countries entered filter 2 and therefore 280,956 product-country combinations were analysed in filter 2 with the purpose of selecting the product-country combinations within the African continent that show adequate size and/or growth in demand. Of these, 39,007 possible export opportunities showed adequate size and growth in demand and entered filter 3 to be analysed in terms of their concentration and accessibility (see Table 6.2). Henceforth, 15,057 product-country combinations showed acceptable levels of market concentration *and* market access and were selected to enter filter 4. After taking South Africa's production capacity into account, 2,986 export opportunities were identified as immediate export opportunities that are expected to yield export success.

The *regional results* of the DSM applied to identify export opportunities for South Africa in the rest of the African continent showed that Eastern Africa holds the largest percentage of the export opportunities in terms of potential export values (29.22%), followed by Western (28.89%) and Northern Africa (21.85%). Southern Africa holds around 18% of the export opportunities, while Middle Africa holds only 1.36% of the total potential export value of the export opportunities identified for South Africa (see Figure 6.3).

The *countries* with the highest export potential for South Africa in the rest of the African continent include Nigeria, Namibia, Ghana, Egypt, Morocco, Zambia, Kenya, Tunisia,

Zimbabwe⁸², Mauritius, Botswana, Mozambique, Uganda, Tanzania, Malawi, Madagascar, Cote d'Ivoire, Swaziland, Senegal and Algeria (see Table 6.8).

The *sector-level results* (HS 2-digit level product categories) show that the product categories with the highest export potential for South Africa in the rest of the African continent include mineral products, metals, transportation products and chemicals and allied industries (see Figure 6.8). If the regional and sectoral results are combined, mineral products to Western Africa show very high export potential compared with the other sectors and regions. Metals to Eastern Africa, transportation products to Western Africa, mineral products and metals to Northern Africa, mineral and transportation products to Southern Africa as well as chemicals and allied industries to Eastern Africa hold relatively high export potential for South Africa (see Figure 6.10).

The HS 6-digit level *products* with the highest potential export values for South Africa in the rest of the African continent can be categorised as mineral products (eg, aviation spirit, coal, iron ores, sulphur), transportation products (eg, 1000 cc – 3000 cc automobiles, diesel trucks weighing less than five tons and dump trucks for off-highway use) and metals (eg, flat-rolled products of iron/non-alloy steel of different thicknesses, semi-finished products of iron/non-alloy steel, iron or steel structures and parts of structures, line pipe used for oil/gas pipelines of iron or steel).

In terms of the *product-country* combinations with the highest export potential for South Africa in the rest of the African continent, there are 18 countries in which the top 50 product-country combinations for South Africa in the rest of the African continent are located. These include, in order of highest to lowest total export potential value, Nigeria, Namibia, Ghana, Morocco, Egypt, Zambia, Tunisia, Kenya, Uganda, Zimbabwe, Botswana, Mauritius, Tanzania, Senegal, Mozambique, Algeria, Malawi and Cote d'Ivoire. The products with the highest potential export values in the top 50 product-country combinations for South Africa in Africa are mineral products (aviation spirit, iron ore, sulphur and coal) and transportation products (1500 – 3000 cc automobile engines and diesel powered trucks weighing less than 5 tons) (see Table 6.11).

⁸² The export opportunities identified in Zimbabwe should be interpreted bearing the current political and economic instability in Zimbabwe in mind.

7.3 Contributions of the study

This study contributes to the current literature on international market selection and to the identification of export opportunities for South Africa in the rest of the world and specifically to the rest of the African continent.

The specific contributions of this study are the following:

- The positioning of the DSM into the international market selection literature (see Chapter 2).
- The running of the DSM on a HS 6-digit level, which will make the use of the DSM results much easier (motivation described in sections 1.2 and 4.2.1 and results reported in Chapter 5 and 6).
- The introduction of a method to calculate the potential export value for each identified export opportunity (motivation and method described in sections 1.2 and 4.2.2 and results reported in Chapter 5 and 6).
- To take the production capacity of South Africa into consideration to identify export opportunities that show potential and can immediately be pursued due to South Africa's revealed comparative advantage in the production and exportation of these products (motivation and method described in sections 1.2 and 4.2.3 and results reported in Chapter 5 and 6).
- The calculation of a market accessibility index per product-country combination from a South African point of view on a HS 6-digit level (motivation and method described in sections 1.2 and 4.2.4 and results reported in section 5.2 (see Table 5.2, 5.3 and 5.4) and section 6.2 (see Table 6.3, 6.4 and 6.5)).
- The identification of export opportunities for South Africa in the rest of the African continent (see section 1.3.2 for a motivation of the importance of South Africa's trade with the rest of the African continent, and results in Chapter 6).

7.4 Recommendations

7.4.1 Recommendations to the South African national export promotion agency (DTI)

The following results of this study can be highlighted and serve as recommendations to South African trade promotion organisations.

In terms of worldwide export opportunities, the *countries* that hold high export potential that are not sufficiently utilised by South African exporters are India, Brazil, Canada, Hong Kong, Singapore, Indonesia and Saudi Arabia. *Products* with unutilised overall potential include zinc, 1000 – 1500 cc and 1500 – 3000 cc automobiles, wheels for motor vehicles, coal, self-propelled earth moving/road making equipment, raw cane sugar, aviation spirit, wood pulp, copper, bars and rods, generators and alternators, pneumatic tyres for buses or lorries, colour printing ink, iron or steel structures, nickel, polypropylene, dump trucks, unworked diamonds, radio receivers, natural uranium, frozen fish fillets, flat rolled coils and non-agglomerated coal. To be more specific, the *product-country* combinations of which South Africa is not sufficiently utilising the relatively high export potential include 1500 – 3000 cc automobiles to Canada, China, Brazil, Germany, the United States and the United Kingdom, unwrought nickel to the United States, China and Germany, aviation spirit to Indonesia, Germany, Japan, Italy, India, the United States, the Netherlands and Singapore, natural uranium to the Netherlands, copper ores to Japan, India and China and diamonds to India, Hong Kong, the United States and Israel.

Cuyvers *et al* (1995:183) and Cuyvers (1997:14-15; 2004:270) suggest that if trade promotion organisations (TPOs) want to focus their export promotion efforts and therefore their resources, they can do so by focusing on product-country combinations in cells 11 to 15 (see Table 3.6) as a first priority. These recommended actions have been discussed in section 5.4. There are 15 countries in which the top 50 opportunities (in cells 11 to 15) that should be promoted as a first priority, are located. These include, in order of highest to lowest total export potential value, the United States, Japan, China, India, the United Kingdom, Israel, Hong Kong, Belgium, Canada, Germany, the Netherlands, Brazil, Switzerland, France and Italy. Most of these countries are high income countries in North America, Eastern Asia and the European Union. It is also interesting to note that the BRIC countries, China, India and Brazil, are also included in these countries. Mineral products (iron, manganese, nickel and chromium ores, coal), stone/glass (diamonds, platinum), transportation products (trucks, automobiles) and metals (aluminium, copper, ferro-chromium) are the product classifications with the highest export potential value of opportunities in cells 11 to 15 (see Table 5.10).

In terms of the export opportunities identified for South Africa in the rest of the African continent, the *countries* that hold high export potential that are not adequately utilised by South Africa include Nigeria, Egypt, Tunisia, Cote d'Ivoire, Senegal, Ghana and Morocco. *Products* with high export potential in Africa that South Africa has not adequately tapped into include lead ores, iron

ore, line pipe used for oil/gas pipelines of iron or steel, frozen mackerel, 1000 – 1500 cc automobiles, aluminium wire, transmission apparatus for radio, telephone and television, semi-finished products of iron or non-alloy steel, sack kraft paper, unworked diamonds, sulphur and tobacco. The *product-country* combinations of which South Africa is not sufficiently utilising the relatively high export potential include iron ore to Egypt, semi-finished iron or non-alloy steel products to Tunisia, flat-rolled products of iron/non-alloy steel in coils less than 3 mm thick to Morocco, sulphur to Morocco and Tunisia, pipe line of iron or steel for oil or gas pipelines to Nigeria, 1500 – 3000 cc automobiles to Tunisia, lead ores to Morocco, polypropylene to Egypt and H-sections angles, shapes and sections of iron/non-alloy steel of a height of 80 mm or more to Egypt. It is interesting to note that most of these opportunities are situated in Northern Africa.

The product-country combinations in cells 11 to 15 that should be promoted as a first priority in Africa have been identified in section 6.6. These export opportunities are situated in Northern Africa (Egypt and Morocco), Eastern Africa (Kenya, Zambia and Tanzania) and Western Africa (Senegal and Ghana). The product categories in cells 11 to 15 that hold the highest potential export value are chemical and allied industries (cyanides, prepared explosives and pigment or colour for ceramics or glass), metals (circular cross bars and rods and iron or steel towers and lattice masts), wood and wood products (unbleached, uncoated paper and sack kraft, poles treated or painted with preservatives and paper and paper board) and transportation products (1000 – 1500 cc automobiles).

The Department of Trade and Industry (DTI) can therefore, as a starting point, focus on gathering information on and deriving export promotion strategies for the above-mentioned specific countries, products and product-country combinations. Thereafter, the results of the top regions, countries, products and product-country combinations contained in Chapter 5 and 6 can be analysed and more priorities can be established. The DTI can also use the entire list of 15,389 realistic export opportunities for South Africa in the rest of the world and 2,986 realistic export opportunities in the rest of the African continent to extract the results per country or product group. This information can be very helpful in supplying foreign offices and export councils with specific export opportunities in their countries or products. If information on the products produced in every province in South Africa is available, the results per province can also be extracted from the results lists to provide the provincial trade promotion organisations in South Africa with the specific product-country combinations with high export potential in the world and in Africa.

As a final recommendation, it is highlighted that it is unwise to rest all export promotion decisions upon the DSM results alone (see section 2.3.1) (Cuyvers *et al*, 1995:174). It is important not to use the results of the DSM in isolation. The model uses quantitative information to provide a limited list of export opportunities, but qualitative information concerning each product-country combination individually should also be taken into consideration in the export promotion process. This information might include specific diplomatic and political issues between the exporting and importing countries, consumer tastes, product adaptation, packaging, labelling and a wide range of other factors. Product and country-specific research should therefore compliment the DSM to deliver optimal results.

7.4.2 Recommendations for future research

Since the DSM considers all worldwide product-country combinations as a starting point in the filtering process, the analysis is limited to quantitative variables that are relatively easily obtainable for most product-country combinations around the world. Information such as each importing country's production, consumption and average hourly wages as used in other international market selection studies (see section 2.3 and Table 2.2) is not easily obtainable on a HS 6-digit product level for a large number of markets and could not be included in the DSM. Qualitative information could also not be included in the analysis due to the difficulty of obtaining this information for a large number of markets. It is therefore recommended that market profiles (in-depth market studies) on specific priority product-country combinations be conducted to compliment the DSM results (see section 2.2). Another reason for supplementing the DSM results with in-depth market studies is the fact that the DSM uses historical data to measure market potential (see section 2.3.1). Real-time intelligence should therefore be added to the results in these market profiles.

The DSM's robustness or the sensitivity of the end-results to changes in cut-off values in the different filters has not been tested. Due to the large amount of data used in the DSM, it is difficult to make changes and compare the results. Future studies could be conducted to test the robustness of the model and convert it to software, which is database supported and programmed to run the four filters more efficiently.

In this study a first attempt was made to calculate a potential export value for each product-country combination selected as a realistic export opportunity. The potential export values calculated in this study give an indication of the relative size of the demand for a particular product in a particular country, taking into consideration the number of competitors in the market. The main purpose for calculating these values was to prioritise between different export opportunities. The size of the values relative to one another is therefore of greater importance than the values themselves. Future studies should be conducted to consider and propose other options for this calculation⁸³.

⁸³ A meeting with the International Trade Centre (ITC) in Geneva is planned for May 2011 to discuss this further.

Due to limited information on production and supply conditions in South Africa on HS 6-digit level, this study introduced the revealed comparative advantage (based on current exports) as a measure of the production capacity of South Africa per HS 6-digit product. It would, however, be better to survey South African companies in each industry in a future study to gather more information on production capacity, such as current production, limitations to increasing production, production costs, process technology, supporting industries and infrastructure costs.

Despite the benefits of introducing the additional criterion of $RCA > 1$ (see sections 1.2 and 4.2.3), the introduction of this criterion might cause opportunities for new exporters of products that South Africa is not yet specialised in exporting and producing, to be overlooked. Future studies should therefore look into the list of product-country combinations that entered filter 4, but were not selected based on the additional RCA criterion in order to identify products or sectors that might be worthwhile to promote and/or attract foreign investment in order to build capacity. The DTI could also be provided with the full lists of product-country combinations that entered filter 4 in order for them to be able to identify products or sectors that might be worthwhile to support in terms of investment and capacity building.

As mentioned in section 4.2.4, the limitations of the market accessibility index developed in this study for the refinement of filter 3.2, include the following:

- Due to the difficulty of obtaining transportation quotes and time in transit for all modes of transport, only one mode of transport in international shipping time and cost, namely ocean freight, was used.
- Due to the large amount of data required (136,581 product-country combinations entered filter 3) and the data limitations (see sections 4.2.4.1 to 4.2.4.7), missing values had to be dealt with in different ways. Although this was done as responsibly as possible, the use of substitute values is not optimal. The use of alternative sources or variables can therefore be investigated in future studies.
- From the principle components analysis, it is difficult to determine what weight is assigned to each variable for each product-country combination. One could consider consulting a panel of experts to give advice on the variables used to measure market accessibility and the weighting between these variables in a future study.

The purpose for developing a market accessibility index from a South African point of view on a HS 6-digit level was to be able to eliminate product-country combinations that are very difficult to

access compared to other product-country combinations. Therefore, only an indication of the “relative” market accessibility of each product-country combination that entered filter 3 had to be established. The index for a particular product-country combination calculated in this study therefore does not mean much on its own and needs to be interpreted relative to other product-country combinations. Future studies could attempt to develop indices that are more “meaningful” on their own, eg, on a scale of 0 to 100, on how accessible a particular market is. Future studies could also include surveying South African exporters on the barriers to trade they face in different markets and how they circumvent these barriers.

This study mentioned different export promotion strategies suggested in the literature (see sections 2.3.4, 3.2.4, 5.4 and 6.7). Papadopoulos *et al* (2002:175) suggested that the selection of priority markets be based on the export promotion strategy of the exporter under consideration, and Cuyvers *et al* (1995:183) and Cuyvers (1997:14-15; 2004:270) recommended different export promotion strategies according to the cell classification in filter 4. Future studies could look into a more detailed formulation of export promotion strategies and the export promotion instruments that are best suited for each of these strategies.

Due to the fact that the DSM and the gravity model (see section 2.3.7) are both used by the South African Department of Trade and Industry to identify priority export markets for South Africa, it could be helpful to compare the DSM and the South African trade potential gravity model results. This can be done by converting and aggregating the DSM results to a SITC 2-digit level and comparing these results with the results of the South African trade potential gravity model.

APPENDIX A: DSM FOR THE WORLD – FILTER 1 COUNTRY SELECTION

Table A.1: Country selection filter 1 (refined South African DSM for the world)

Country	Selected/Eliminated
Afghanistan	Eliminated – filter 1.1
Albania	Selected
Algeria	Eliminated – filter 1.2
Andorra	No GDP data
Angola	Selected
Anguilla (Great-Britain)	No GDP data
Antigua and Barbuda	No trade data
Argentina	Selected
Armenia	Selected
Aruba (Netherlands)	Selected
Australia	Selected
Austria	Selected
Azerbaijan	Selected
Azores (Portugal)	No GDP data
Bahamas	Selected
Bahrain	Selected
Bangladesh	Selected
Barbados	Selected
Belarus	Selected
Belgium	Selected
Belize	Eliminated – filter 1.2
Benin	Eliminated – filter 1.2
Bermuda (Great-Britain)	Selected
Bhutan	Selected
BIOT (Chagos) (Great-Britain)	No GDP data
Bolivia	Eliminated – filter 1.2
Bosnia and Herzegovina	Selected
Botswana	Eliminated – filter 1.2
Brazil	Selected
Brunei	Selected
Bulgaria	Selected
Burkina Faso	Eliminated – filter 1.2
Burundi	Eliminated – filter 1.1
Cambodia	Eliminated – filter 1.1
Cameroon	Eliminated – filter 1.2
Canada	Selected
Canary Islands (Spain)	No GDP data
Cape Verde	Selected
Cayman Islands (Great-Britain)	No GDP data
Central African Republic	Eliminated – filter 1.2
Ceuta and Melilla (Spain)	No GDP data
Chad	Eliminated – filter 1.2
Channel Islands (Great-Britain)	No trade data
Chile	Selected
China	Selected
Christmas Island (Australia)	No GDP data
Colombia	Selected
Comoros	Eliminated – filter 1.2
Congo (Democratic Republic) (Zaire)	Eliminated – filter 1.1
Congo (Republic)	Eliminated – filter 1.2
Cook Islands	No GDP data
Coral Sea Islands (Australia)	No GDP data

Table A.1: Country selection filter 1 (continued)

Costa Rica	Selected
Côte d'Ivoire	Eliminated – filter 1.1
Croatia	Selected
Cuba	Eliminated – filter 1.1
Cyprus (Greek) (South)	No GDP data
Cyprus (Turkish) (North)	Selected
Czech Republic	Selected
Denmark	Selected
Djibouti	Eliminated – filter 1.1
Dominica	Eliminated – filter 1.2
Dominican Republic	Selected
Ecuador	Eliminated – filter 1.2
Egypt	Selected
El Salvador	Eliminated – filter 1.2
Equatorial Guinea	Eliminated – filter 1.2
Eritrea	Eliminated – filter 1.1
Estonia	Selected
Ethiopia	Eliminated – filter 1.1
Faeroe Islands (Denmark)	No GDP data
Falkland Islands (Great-Britain)	No GDP data
Fiji	Eliminated – filter 1.2
Finland	Selected
France	Selected
French Guiana (France)	No GDP data
French Polynesia (France)	Selected
Gabon	Eliminated – filter 1.2
Gambia	Eliminated – filter 1.1
Georgia	Selected
Germany	Selected
Ghana	Selected
Gibraltar (Great-Britain)	No GDP data
Greece	Selected
Greenland (Denmark)	No GDP data
Grenada	Eliminated – filter 1.2
Guadeloupe (France)	No GDP data
Guam (United States)	No GDP data
Guatemala	Eliminated – filter 1.2
Guinea	Eliminated – filter 1.1
Guinea-Bissau	Eliminated – filter 1.2
Guyana	Eliminated – filter 1.1
Haiti	Eliminated – filter 1.1
Honduras	Eliminated – filter 1.2
Hong Kong (China)	Selected
Hungary	Selected
Iceland	Selected
India	Selected
Indonesia	Selected
Iran	Selected
Iraq	Eliminated – filter 1.1
Ireland	Selected
Israel	Selected
Italy	Selected
Jamaica	Eliminated – filter 1.2
Japan	Selected
Jordan	Selected
Kazakhstan	Selected
Kenya	Eliminated – filter 1.2

Table A.1: Country selection filter 1 (continued)

Kiribati	Eliminated – filter 1.2
Korea (North)	Eliminated – filter 1.1
Korea (South)	Selected
Kosovo	Eliminated – filter 1.1
Kuwait	Selected
Kyrgyzstan	Eliminated – filter 1.2
Lao	Eliminated – filter 1.1
Latvia	Selected
Lebanon	Eliminated – filter 1.1
Lesotho	Eliminated – filter 1.2
Liberia	Eliminated – filter 1.1
Libya	Eliminated – filter 1.2
Liechtenstein	No GDP data
Lithuania	Selected
Luxembourg	Selected
Macau	Selected
Macedonia	Eliminated – filter 1.2
Madagascar	Eliminated – filter 1.2
Madeira (Portugal)	No GDP data
Malawi	Eliminated – filter 1.1
Malaysia	Selected
Maldives	Eliminated – filter 1.2
Mali	Eliminated – filter 1.2
Malta	Selected
Man (Isle of) (Great-Britain)	No GDP data
Mariana Islands (Northern)	No GDP data
Marshall Islands	Eliminated – filter 1.1
Martinique (France)	No GDP data
Mauritania	Eliminated – filter 1.2
Mauritius	Eliminated – filter 1.2
Mayotte (France)	No GDP data
Mexico	Selected
Micronesia	Eliminated – filter 1.2
Moldova	Eliminated – filter 1.2
Monaco	No GDP data
Mongolia	Selected
Montenegro	Eliminated – filter 1.2
Montserrat (Great-Britain)	No GDP data
Morocco	Eliminated – filter 1.2
Mozambique	Eliminated – filter 1.2
Myanmar	Eliminated – filter 1.1
Namibia	Eliminated – filter 1.2
Nauru	No GDP data
Nepal	Eliminated – filter 1.2
Netherlands	Selected
Netherlands Antilles (Netherlands)	Selected
New Caledonia (France)	Selected
New Zealand	Selected
Nicaragua	Eliminated – filter 1.2
Niger	Eliminated – filter 1.2
Nigeria	Eliminated – filter 1.2
Niue (New Zealand)	No GDP data
Norfolk (Australia)	No GDP data
Norway	Selected
Oman	Selected
Pakistan	Eliminated – filter 1.1
Palau	Eliminated – filter 1.2

Table A.1: Country selection filter 1 (continued)

Palestine	Eliminated – filter 1.1
Panama	Selected
Papua New Guinea	Eliminated – filter 1.2
Paraguay	Eliminated – filter 1.2
Peru	Selected
Philippines	Eliminated – filter 1.2
Pitcairn (Great-Britain)	No GDP data
Poland	Selected
Portugal	Selected
Puerto Rico (United States)	No trade data
Qatar	Selected
Reunion (France)	No GDP data
Romania	Selected
Russia	Selected
Rwanda	Eliminated – filter 1.1
Samoa (American)	Eliminated – filter 1.2
Samoa (Western)	No GDP data
San Marino	No trade data
Sao Tome and Principe	Eliminated – filter 1.1
Saudi Arabia	Selected
Senegal	Eliminated – filter 1.2
Serbia	Selected
Seychelles	Eliminated – filter 1.1
Sierra Leone	Selected
Singapore	Selected
Slovakia	Selected
Slovenia	Selected
Solomon Islands	Eliminated – filter 1.2
Somalia	Eliminated – filter 1.1
South Africa	Selected
Spain	Selected
Sri Lanka	Selected
St Helena (Great-Britain)	No GDP data
St Kitts and Nevis	Selected
St Lucia	Eliminated – filter 1.2
St Pierre and Miquelon (France)	No GDP data
St Vincent and the Grenadines	Eliminated – filter 1.2
Sudan	Eliminated – filter 1.1
Suriname	Selected
Swaziland	Eliminated – filter 1.2
Sweden	Selected
Switzerland	Selected
Syria	Eliminated – filter 1.2
Taiwan	No trade data
Tajikistan	Eliminated – filter 1.1
Tanzania	Selected
Thailand	Selected
Timor-Leste	Eliminated – filter 1.1
Togo	Eliminated – filter 1.2
Tokelau (New Zealand)	No GDP data
Tonga	Eliminated – filter 1.2
Trinidad and Tobago	Selected
Tunisia	Selected
Turkey	Selected
Turkmenistan	Selected
Turks and Caicos Islands (Great-Britain)	No GDP data
Tuvalu	No GDP data

Table A.1: Country selection filter 1 (continued)

Uganda	Eliminated – filter 1.2
Ukraine	Eliminated – filter 1.2
United Arab Emirates	Selected
United Kingdom	Selected
United States	Selected
Uruguay	Selected
Uzbekistan	Selected
Vanuatu	Eliminated – filter 1.2
Vatican City	No GDP data
Venezuela	Selected
Vietnam	Selected
Virgin Islands (American)	No GDP data
Virgin Islands (British)	No GDP data
Wallis and Futuna (France)	No GDP data
Western Sahara	No GDP data
Yemen	Eliminated – filter 1.2
Zambia	Selected
Zimbabwe	Eliminated – filter 1.1

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