The Identification Of Realistic Export Opportunities For The South African Pharmaceutical Industry

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ABSTRACT

South Africa needs to advance its industrialisation process and diversify its exports if it is to enhance its global competitiveness ranking and meaningfully tackle the double scourge of unemployment and poverty.

The pharmaceutical industry makes a significant contribution to the country's economy, and has a growing international footprint. However, export activity is largely centred on Southern and Eastern Africa, while markets in other parts of the world remain largely untapped. A longstanding concern of the government has been that export market selection has not been conducted in a scientific manner. Added to this is the problem of limited resources on the part of export promotion organisations.

A Decision Support Model (DSM), originally conceived by Cuyvers et al. (1995) and then developed for the South African environment by Viviers, Steenkamp, Rossouw, and Cuyvers (2009, 2010), was used in this study to identify those export opportunities with the greatest potential for the South African pharmaceutical industry. Through a systematic filtering and elimination process, the DSM revealed that there are a large number of export opportunities for South African pharmaceutical products, particularly in Western Europe, North America, and Africa. Such information constitutes an important basis for strategic decision making on the part of industry and government stakeholders.

Keywords: Pharmaceutical Products; Healthcare; Export Opportunities; Export Promotion; Decision Support Model (DSM)

1. INTRODUCTION

The importance of increased industrialisation, as well as the need to enhance and diversify South Africa's exports are highlighted in various national documents, for example, the National Industrial Policy Framework (NIPF) (DTI, 2010a), the South African Trade Policy and Strategy Framework (TPSF) (DTI, 2010b), and the Industrial Policy Action Plan 2 (IPAP-2) (DTI, 2011).

South Africa's National Industrial Policy Framework (NIPF) is the government's broad approach to industrialisation and was adopted by the National Cabinet in January 2007. The NIPF seeks to encourage value-added, labour-absorbing industrial production and diversify the economy away from its current over-reliance on traditional commodities and non-tradable services, thereby creating the catalyst for employment growth (DTI, 2010a, p. 10). The implementation of the NIPF policy is set out in the IPAP-2 which was adopted by the National Cabinet in February 2010 (DTI, 2011).

The IPAP-2 therefore also highlights the importance of extending the reach and impact of the South African manufacturing sector in order to reduce the country's current reliance on traditional commodities. One of the key components in this process is building new areas of competitiveness for different product groups by identifying growth opportunities in key export markets. In this regard, the plastics, pharmaceutical, and chemical industries are given special attention in the IPAP-2 (DTI, 2011).

The pharmaceutical industry is a key stakeholder in the healthcare field, making a significant and unique contribution on both a national and global scale. South Africa has a well-developed pharmaceutical industry, with local and multinational corporations providing medications for both primary and secondary healthcare purposes. Given the growing incidence of infectious diseases, such as HIV/AIDS, malaria, and tuberculosis, as well as lifestyle diseases, such as cardiovascular deficiencies and diabetes (Maloney & Segal, 2007), the pharmaceutical industry has an increasingly important role to play in improving citizens' access to healthcare. In fact, this is seen as a public policy priority. There is a strong and growing demand for pharmaceutical products both in South Africa and throughout the southern African region. The question, though, is: How can the pharmaceutical industry best take advantage of this growing demand, particularly in the rest of Africa?

To enhance the export performance of South Africa's pharmaceutical industry, the export opportunities presenting themselves to the industry should be systematically explored. The first aim of this study is therefore to identify and analyse the South African pharmaceutical industry's export opportunities in different parts of the world, and specifically on the African continent. The second aim is to propose which of these opportunities, due to their high potential, should be given priority in terms of the country's export promotion efforts. To this end, the Decision Support Model (DSM), as developed for the South African trade environment by Viviers, Steenkamp, Rossouw, and Cuyvers (2009, 2010), is a focused market selection model designed to identify the most promising export opportunities from a large number of potential product-market combinations. At a practical level, the DSM helps the South African government and private sector to prioritise the production and export of a range of products for particular markets. The model can also be effectively applied to the pharmaceutical industry.

The results of this study will provide relevant stakeholders in the pharmaceutical industry with thorough insights into which and how many of the identified pharmaceutical products constitute realistic export opportunities in which countries, as well as the potential export value and market accessibility of each identified opportunity. The DSM thus strongly supports the government's drive to diversify South Africa's exports.

This paper is organised as follows: first, South Africa's current export climate and need for focused export promotion will be discussed, and an overview of the country's pharmaceutical industry will be provided. The methodology of the DSM, which was applied to identify export opportunities for South African pharmaceutical products, will then be described. Finally, the results of this application of the DSM will be provided, with special attention being given to the export opportunities emanating from other African countries.

2. SOUTH AFRICA'S EXPORTS AND EXPORT PROMOTION NEEDS

Since 1994, the achievement of economic growth through the acceleration of exports has been an acknowledged policy imperative of the South African government. However, South Africa makes minimal contribution to global growth and is responsible for only about 0.5% of world exports (ITC, 2012). Trade with the EU, a traditional trading region for South Africa, accounts for a sizeable 25% of South Africa's total exports and 32% of its total imports (ITC, 2012). However, South Africa's growing economic co-operation with other regions offers scope for the country to expand its trading network. In particular, the dynamic economic growth patterns of many countries in the South should nourish South Africa's trade relationships with such countries which, in turn, could be a cornerstone of South Africa's diversification and industrialisation efforts (DTI, 2010a). In addition, growing the country's trade with the rest of the African continent through the SADC Free Trade Agreement is a key strategic goal of the South African government (NKC, 2012).

It is important to note, however, that although a country's exporters may have the potential to diversify their production capabilities and exports, the exporters on their own will not necessarily be able to create new areas of competitive advantage. Strong government and institutional frameworks are needed to tackle market failures and

create incentives that encourage and facilitate new economic pursuits. In line with this process, forward-thinking trade policies can help to shift the country's dependence from commodity-based production to value-added manufacturing, and from static comparative advantages to 'new' export opportunities (that is, new export products to new markets, as well as existing export products to new markets). Such a strategic reorientation can also induce stronger medium- and high-level technological capabilities (DTI, 2010a, p. 21).

For a new export promotion strategy to be developed or existing export promotion programmes to be evaluated, hard, quantitative data are needed on a range of foreign markets. As export promotion organisations have only limited resources at their disposal, the most promising markets and product groups (product-country combinations) should be given attention. Identifying the leading export opportunities is central to this process.

However, it is stated in South Africa's National Export Strategy that the absence of a scientific method to prioritise markets and products has resulted in a 'shotgun' approach to export promotion (DTI, 2006). The challenge lies in knowing how to select and prioritise markets from the innumerable export opportunities that are scattered across the globe.

In order to assist export promotion organisations to design their promotional programmes in a more efficient and focused manner, Cuyvers et al. (see Cuyvers, De Pelsmacker, Rayp, & Roozen, 1995) developed a Decision Support Model (DSM) for the identification of export opportunities. The DSM was first applied to Belgium (Cuyvers et al., 1995) and then to Thailand (Cuyvers, 1996, 2004). After that, the methodology was refined for South Africa in 2007, 2009, and 2010 (Viviers & Pearson, 2007; Viviers, Rossouw, & Steenkamp, 2009; Pearson, Viviers, Naude, & Cuyvers, 2010; Viviers, Steenkamp, Rossouw, & Cuyvers, 2010; Steenkamp, 2011).

The DSM was used in this study specifically to identify the export opportunities for the South African pharmaceutical industry. The approach taken and the results of the application will be covered in the remaining sections of this paper.

3. THE SOUTH AFRICAN PHARMACEUTICAL INDUSTRY

South Africa has a dichotomous healthcare system, comprising a public healthcare sector that often lacks the systems, skills and resources to run facilities optimally and deliver efficient services, and a well-resourced and highly skilled private healthcare sector that serves a minority of the population.

The World Health Organization (WHO) recommends that countries should spend at least 5% of their GDP on healthcare. South Africa already spends 8.3% of its GDP on health, exceeding the WHO's recommended figure (Department of Health 2011). This 8.3% is allocated as follows: 4.1% is spent on private healthcare and 4.2% on public healthcare. The 4.1% spend covers 16% of the population (8.2 million people) who largely belong to medical schemes. The other 4.2% covers the remaining 84% of the population (42 million people) who are not covered by medical aid or health insurance and mainly rely on the public healthcare sector. Despite South Africa's high expenditure on healthcare, the country's health outcomes remain poor when compared with those of similar middle-income countries. This poor performance has been attributed largely to the inequities between the public and private sector.

Notwithstanding South Africa's generally poor health record, the Deloitte Report (2007) emphasised that the country's pharmaceutical market is well developed compared with other African countries. According to the Deloitte Report (2010), the pharmaceutical industry – which focuses mainly on the production of generics - contributed 1.58% of South Africa's GDP in the 2008/2009 financial year. The sector's revenue that year was R36.1-billion (approximately US$4 billion), with exports contributing R2.5-billion (approximately US$278 million).

These impressive figures aside, the South African pharmaceutical industry faces the same challenges that the healthcare system and country as a whole are grappling with. The high prevalence of infectious diseases, such as HIV/AIDS, malaria and tuberculosis, and lifestyle diseases, such as cardiovascular deficiencies and diabetes, are placing a considerable strain on both the private and public healthcare sectors. In addition, widespread unemployment and poverty negatively affect the delivery of healthcare services (Maloney & Segal, 2007; Deloitte Report, 2007).

South African pharmaceutical output grew dramatically from the mid to the late 1990s (Dummett, 2002). Several multinational corporations have a presence in South Africa through local subsidiaries, and they are increasingly viewing the country as a stable base from which to access the sub-Saharan African market. In particular, they are taking advantage of the public sector's tendering process which is highly competitive and the source of huge opportunity.

Domestic manufacturers meet around one third of the country's demand for pharmaceuticals, with a higher percentage in the generics sector. The two largest South African-owned pharmaceutical manufacturers are Aspen Pharmacare and Adcock Ingram. Aspen is Africa's largest pharmaceutical manufacturer and the largest generics manufacturer in the southern hemisphere. The group - which has 18 manufacturing facilities at 13 sites on 6 continents - is represented in South Africa, Australia, Hong Kong, Philippines, Kenya, Tanzania, Uganda, Dubai, Germany, Ireland, Mauritius, Brazil, Mexico, and Venezuela. Adcock Ingram, in turn, provides an extensive range of branded and generic prescription and over-the-counter products across a wide range of therapeutic classes.

According to the UN Comtrade database, the top foreign supplier of pharmaceutical products to South Africa during 2011 was Germany, with sales valued at US$271.85 million. Next came the United States of America and India with sales valued at US$270.42 million and US$264.88 million, respectively. France supplied US$238.98 million-worth of pharmaceutical products, followed by the United Kingdom with US$197.56 million-worth of products (ITC, 2012). In June 2010, South Africa's Minister of Trade and Industry extended an invitation to Indian pharmaceutical companies to establish manufacturing units in the country. This initiative formed part of the South African government's larger industrial policy framework (Essack et al., 2011: see also 1).

The UN Comtrade database also reveals that the South African pharmaceutical industry exported products worth US$178.32 million in 2011. The top export destination for South Africa was the United States of America which received US$24.25 million-worth of pharmaceutical products, followed by Kenya (US$19.04 million-worth), Zimbabwe (US$15.15 million-worth), Zambia (US$12.99 million-worth), and Mauritius (US$10.43 million-worth) (ITC 2012). In 2011 South Africa exported US$93.63 million-worth of pharmaceutical products (or 52.5% of the total) to other countries on the African continent.

The Genesis Report (Maloney & Segal, 2007, p. 31) asserts that the pharmaceutical industry is a strategically important player in the whole healthcare system in South Africa and has the potential to grow. However, the report further suggests that South Africa needs to decide how to direct its energies, that is (i) domestic vs. export production and development, and (ii) all products vs. a limited number of niche products and activities in the pharmaceutical value chain.

By providing information on export opportunities for South Africa's pharmaceutical industry, this study makes an important contribution to the strategic conversation taking place among private and public sector stakeholders.

4. THE DECISION SUPPORT MODEL (DSM) METHODOLOGY

The DSM was first developed by Cuyvers et al., (1995, pp. 173-186) in order to identify the product-country combinations with the highest export potential for a specific country. It was designed to give export promotion organisations, in particular, a more scientific means of determining those products and destination countries that they should concentrate on in their export promotion activities.

The DSM methodology starts by considering all possible countries and products world-wide. Using four sequential filters, the DSM eliminates less interesting/promising product-country combinations with a view to categorising and prioritising realistic export opportunities (REOs) for the country to which the model is applied.

The first filter assesses all countries in terms of their political and commercial risk, and also investigates macro-economic indicators to determine whether the countries display sufficient overall market size and growth. The second filter assesses the market potential of the various product groups for the remaining countries, as reflected in the size and growth of import demand. The third filter examines the accessibility of each market by assessing the

degree of market concentration, as measured by the Herfindahl-Hirschman index, and different barriers to entry, such as shipping time and cost, logistical efficiency, ad valorem tariffs and non-tariff barriers. It is after the third filter that a list of potential export opportunities (product-country combinations) can be extracted. Finally, the fourth filter categorises these potential export markets on the basis of South Africa's relative market share in the markets (compared with the share enjoyed by the top six competitors in the markets concerned), and the import size and growth of each of the identified markets. This categorisation is illustrated in Table 1.

Table 1: Final Categorisation of Realistic Export Opportunities

	Market Share of Country *n* (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, Steenkamp, & Viviers (2012)

From Table 1 it is clear that a total of 20 different kinds of market are distinguished in the DSM. The exporting country to which the model is applied will therefore know what the potential (demand) in the market is (import size and growth) and the extent to which this opportunity has been utilised, based on the relative market share. If a product-country combination is classified in Cell 5, for instance, it means that the demand in that market is high and growing over the short and long terms, but the exporting country under consideration has a relatively small share of that market.

The most recent application of the DSM on the HS 6-digit level extended the earlier methodology by calculating a potential export value for each realistic export opportunity. This was done by dividing the total imports of product *j* by country *i* by the number of countries that supplies 80% of these imports. This estimation of export potential gives an indication of the size of the import demand for each product-country combination relative to one another. The export potential should thus not be interpreted as a target value, but rather as a means to prioritise the export opportunities.

For more detail on the DSM methodology, and specifically how the cut-off values in each filter are determined, see Cuyvers, Steenkamp, and Viviers (2012).

5. DSM RESULTS FOR THE SOUTH AFRICAN PHARMACEUTICAL INDUSTRY

For this study the DSM was applied on a HS 6-digit level and a total of 31 HS 6-digit level pharmaceutical products were subject to analysis.

South Africa has exported 22 of these 31 products before. Studies have shown that existing exporters are better equipped to overcome the costs of entering export markets (Bernard, Jensen, Redding, & Schott, 2011, p. 2). Therefore, in order to give the South African pharmaceutical industry a more realistic indication of its export opportunities, only the results of these 22 products are reported in this study.

5.1 Export Opportunities for South African Pharmaceutical Products in the Rest of the World

Using the DSM methodology, a total of 403 export opportunities were identified for the South African pharmaceutical industry in the rest of the world. These will now be examined on a regional, country, product, and product-country level.

Figure 1 shows the regional distribution of export opportunities for South African pharmaceutical products. It is clear that almost half of the export potential lies in Western Europe (47.42%), followed by North America (28.77%), Central Europe (9.34%), South West Europe (4.86%), and Southern Europe (4.48%).

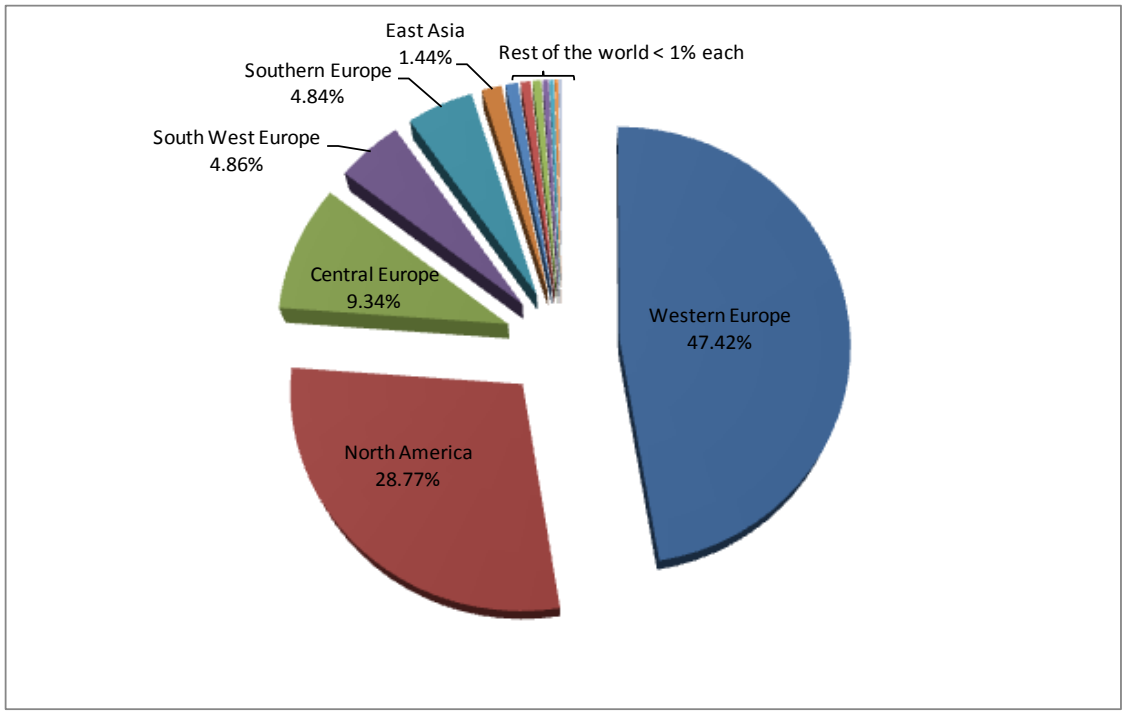

Figure 1: Regional Distribution of the Export Opportunities for South African Pharmaceutical Products

The extent to which South Africa has utilised this export potential is set out in Table 2.

Table 2: South Africa's Utilisation of the Export Potential for Pharmaceutical Products in each World-Wide Region

Rank Based on Export Potential	Region	% Utilisation of Export Potential by South Africa
1	Western Europe	0.14%
2	North America	0.04%
3	Central Europe	0.04%
4	South West Europe	0.21%
5	Southern Europe	0.01%
6	East Asia	0.02%
7	Pacific	0.81%
8	South East Europe	0.09%
9	Northern Asia	0.00%
10	South West Asia	0.27%
11	South America	0.81%
12	South East Asia	0.24%
13	Northern Europe	0.07%
14	Eastern Europe	0.04%
15	Northern Africa	0.00%
16	Southern Africa	78.66%
17	Central Asia	0.00%
18	South Asia	0.15%
19	Central America	0.00%
20	Western Africa	17.17%
21	West Indies	0.00%
22	Eastern Africa	61.70%

Table 2 clearly shows that in the top 10 regions South Africa has utilised the export potential for its pharmaceutical products by less than 1%. Furthermore, the country is paying practically no attention to the export opportunities in Northern Asia, Northern Africa, Central Asia, and the West Indies. South Africa might have exported pharmaceutical products to these regions before but not according to the specific product-country combinations identified as realistic export opportunities. In contrast, in Southern Africa and Eastern Africa, South Africa has utilised the export potential for its pharmaceutical products by an impressive 78.66% and 61.70%, respectively, (The DSM results for the African continent will be explored more fully in Section 5 below.)

Figure 2 shows the 20 countries with the highest export potential world-wide for South African pharmaceutical products, while Table 3 reveals the extent to which South Africa has utilised the export potential in the top 30 export destinations for its pharmaceutical products.

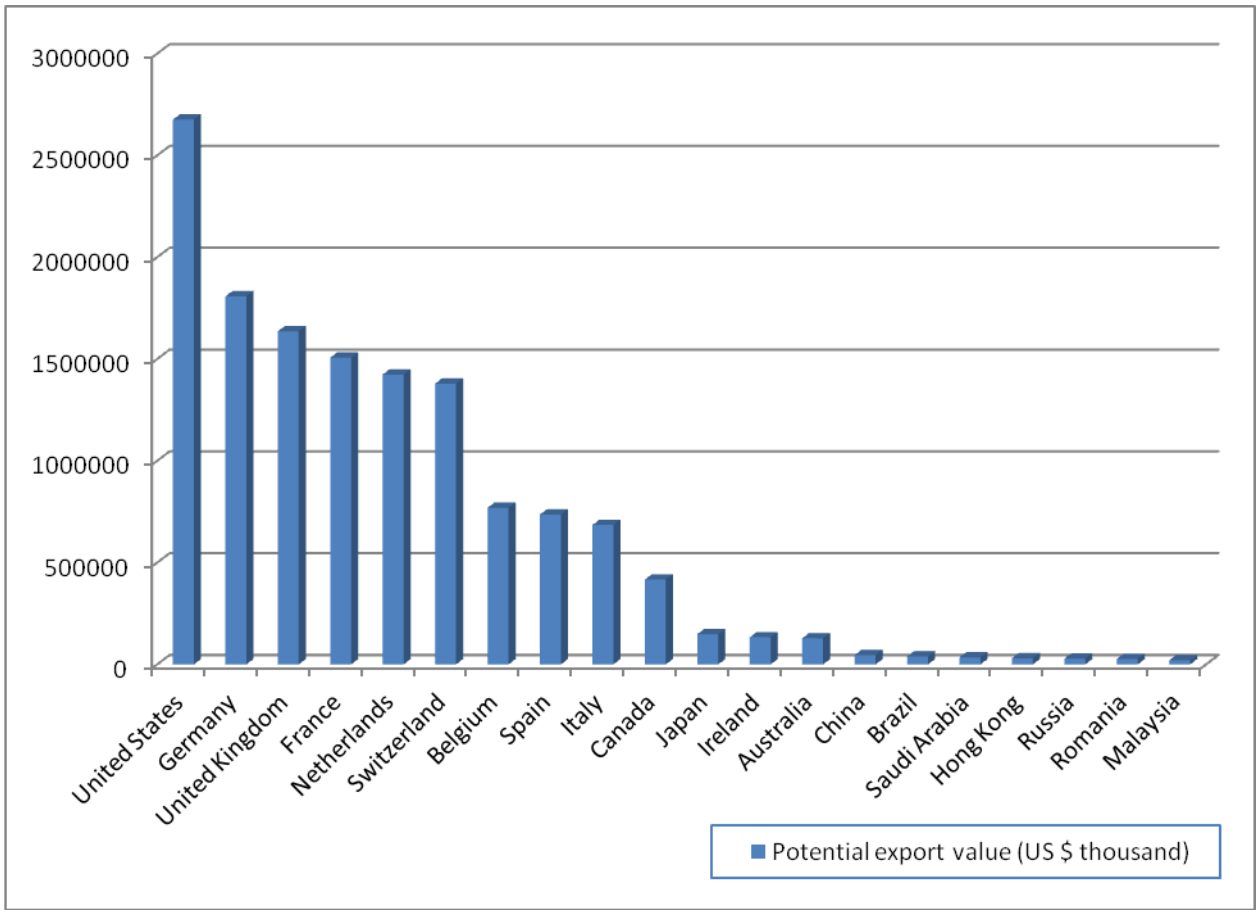

Figure 2: Top 20 Countries in Terms of Export Potential for South African Pharmaceutical Products

Table 3: South Africa's Utilisation of the Export Potential in each of the Top 30 Export Destinations for South African Pharmaceutical Products

Rank Based on Export Potential	Country	% Utilisation of Export Potential by South Africa
1	United States	0.07%
2	Germany	0.32%
3	United Kingdom	0.39%
4	France	0.14%
5	Netherlands	0.10%
6	Switzerland	0.06%
7	Belgium	0.11%
8	Spain	0.36%
9	Italy	0.01%
10	Canada	0.28%
11	Japan	0.04%
12	Ireland	0.02%
13	Australia	1.39%
14	China	0.01%
15	Brazil	1.87%
16	Saudi Arabia	0.37%
17	Hong Kong	0.07%
18	Russia	0.00%
19	Romania	0.19%
20	Malaysia	0.08%
21	Singapore	0.56%
22	Sweden	0.00%
23	Poland	0.09%
24	Thailand	0.32%
25	Egypt	0.00%
26	Zambia	98.32%
27	Greece	0.39%
28	Norway	0.46%
29	Czech Republic	0.00%
30	Slovenia	0.00%

Again, North American and European countries feature in the top 10 when it comes to export potential for South African pharmaceutical products. Other promising countries in the top 20, in other regions, include Japan, Australia, Russia, Brazil, China, Saudi Arabia, Hong Kong, Romania, and Malaysia.

Overall, South Africa has utilised the export potential for its pharmaceutical products to a very limited extent. Interestingly, China, Brazil, and Russia - which are BRICS members – are among the top 20 countries as far as export potential is concerned, but South Africa has hardly tapped these markets. The BRICS grouping could be a key opportunity area for the South African pharmaceutical industry given the government's call for the country's exporters to turn their attention to BRICS and other emerging markets.

Those countries with relatively high export potential that has not been utilised at all (0.00%) by the South African pharmaceutical industry include Russia, Sweden, Egypt, the Czech Republic, and Slovenia. This does not mean that South Africa has never exported pharmaceutical products to these countries, but rather that it has not exported the specific pharmaceutical products identified as having high export potential to these countries.

The only African country that made it to the list of the top 30 export destinations for South African pharmaceutical products is Zambia, where South Africa has utilised 98.32% of its export potential. (The DSM results for African countries will be discussed more fully in Section 5 below.)

Figure 3 shows the 15 pharmaceutical products with the highest export potential for South Africa.

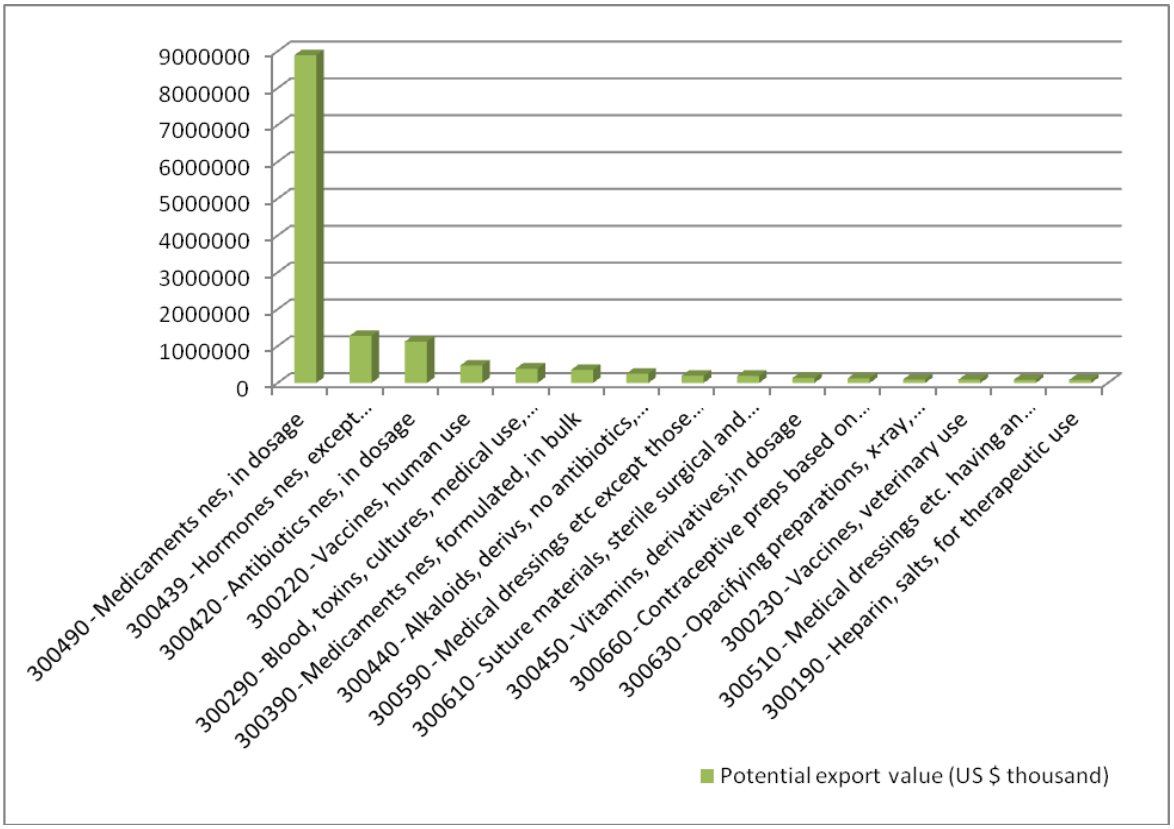

Figure 3: Top 15 Pharmaceutical Products in Terms of Export Potential for South Africa

It is clear that 'HS 300490 - Medicaments not elsewhere specified, in dosage' has, by far, the highest export potential for South Africa. This product category includes medicine consisting of products for therapeutic or prophylactic purposes in measured doses, excluding medication containing antibiotics, hormones, alkaloids, or vitamins. The high potential export value of this product category can probably be attributed to the fact that many products are classified together under this particular HS code. The DSM is applied on a HS 6-digit level because this is the highest level of product classification that is standardised across all countries. HS 8-, 10- and 12-digit classifications will provide more specific product descriptions, but these are not standardised throughout the world and different countries might use different codes for the same product.

More in-depth, market-specific studies can be undertaken to determine the products in the HS 8-, 10- or 12-digit classifications with the highest export potential in each country under consideration.

Figure 4 shows the 15 pharmaceutical products with the highest export potential for South Africa, but excludes 'HS 300490 – Medicaments not elsewhere specified, in dosage' to offer a more balanced perspective on the relative export potential of the remaining products.

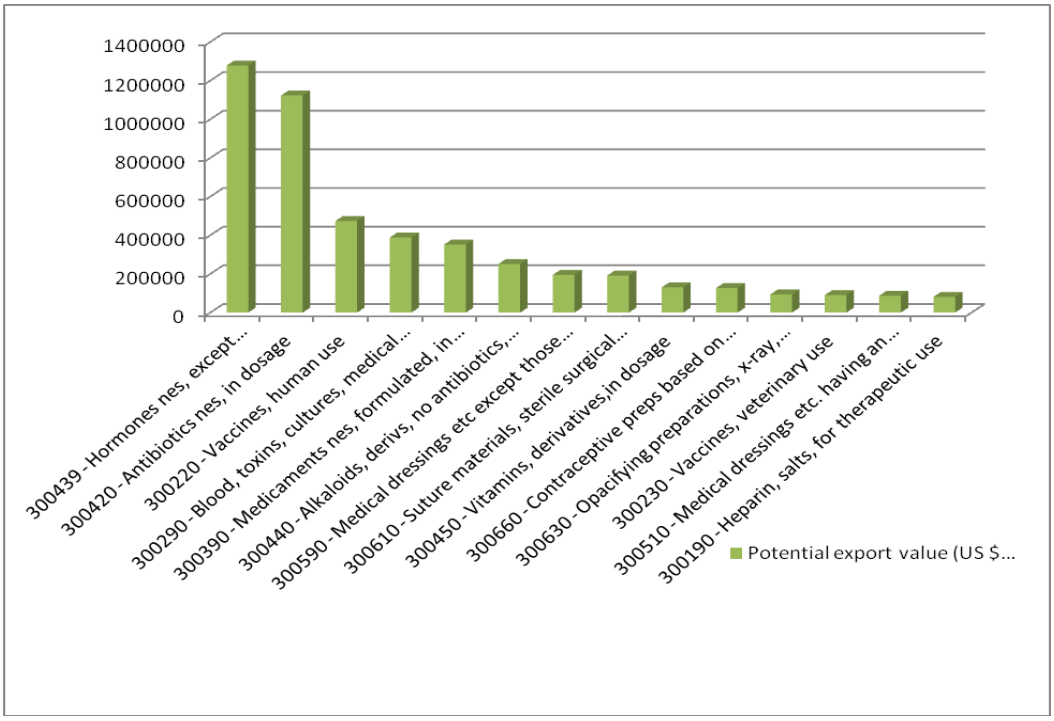

Figure 4: Top 15 Pharmaceutical Products in Terms of Export Potential for South Africa, Excluding HS 300490

Table 4 ranks the 22 pharmaceutical products included in this study according to their export potential for South Africa.

Table 4: Ranking of South African Pharmaceutical Products in Terms of Export Potential

Rank Based on Export	HS 6-Digit Product Code and Description	% Utilisation of Export Potential
1	300490 - Medicaments not elsewhere specified, in dosage	0.21%
2	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	0.08%
3	300420 - Antibiotics not elsewhere specified, in dosage	0.16%
4	300220 - Vaccines, human use	0.01%
5	300290 - Blood, toxins, cultures, medical use, not elsewhere specified	0.05%
6	300390 - Medicaments not elsewhere specified, formulated, in bulk	0.03%
7	300440 - Alkaloids, derivs, no antibiotics, hormones, in dosage	0.01%
8	300590 - Medical dressings etc. except those with adhesive layer	1.93%
9	300610 - Suture materials, sterile surgical and dental goods	0.27%
10	300450 - Vitamins, derivatives, in dosage	0.26%
11	300660 - Contraceptive preps based on hormones or spermicides	0.00%
12	300630 - Opacifying preparations, x-ray, diagnostic reagents	0.41%
13	300230 - Vaccines, veterinary use	0.70%
14	300510 - Medical dressings etc. having an adhesive layer	9.39%
15	300190 - Heparin, salts, for therapeutic use	0.00%
16	300320 - Antibiotics not elsewhere specified, formulated, in bulk	0.00%
17	300650 - First-aid boxes and kits	0.77%
18	300120 - Extracts of glands etc. for therapeutic use	0.33%

Table 4 cont.

19	300620 - Blood-grouping reagents	0.00%
20	300339 - Hormones not elsewhere specified, no antibiotics, bulk, not contraceptive	0.00%
21	300670 - Gel preps. designed to be used in human/veterinary medicine as a lubricant...	1.50%
22	300340 - Alkaloids, derives, without antibiotics, hormones, bulk	0.00%

In respect of most of the pharmaceutical products included in this study, South Africa has utilised the export potential to a very limited extent. Only the export potential of 'HS 300510 - Medical Dressings, having an adhesive layer' has been utilised to a meaningful extent (9.39%) compared with that presented by the other products (all less than 2%).

Those products that the South African pharmaceutical industry has not exported to the countries identified as having the highest export potential for such products are: 'HS 300660 - Contraceptive preparations based on hormones or spermicides,' 'HS 300190 - Heparin, salts, for therapeutic use,' 'HS 300320 - Antibiotics not elsewhere specified, formulated, in bulk,' 'HS 300620 - Blood-grouping reagents,' and 'HS 300339 - Hormones not elsewhere specified, no antibiotics, bulk, not contraceptive' have not been exported by the South African pharmaceutical industry to the countries identified as having the highest export potential for these products.

To be more specific, Table 5 sets out the pharmaceutical product-country combinations with the highest export potential for South Africa.

Table 5: Top 30 Pharmaceutical Product-Country Combinations in Terms of Export Potential

Rank Based on Export Potential	HS 6-Digit Product Code and Description	Country	Cell
1	300490 - Medicaments not elsewhere specified, in dosage	United States	6
2	300490 - Medicaments not elsewhere specified, in dosage	Germany	11
3	300490 - Medicaments not elsewhere specified, in dosage	France	11
4	300490 - Medicaments not elsewhere specified, in dosage	Netherlands	11
5	300490 - Medicaments not elsewhere specified, in dosage	United Kingdom	11
6	300490 - Medicaments not elsewhere specified, in dosage	Switzerland	6
7	300490 - Medicaments not elsewhere specified, in dosage	Belgium	11
8	300490 - Medicaments not elsewhere specified, in dosage	Italy	11
9	300420 - Antibiotics not elsewhere specified, in dosage	Switzerland	1
10	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	United Kingdom	11
11	300490 - Medicaments not elsewhere specified, in dosage	Spain	11
12	300490 - Medicaments not elsewhere specified, in dosage	Canada	11
13	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	Switzerland	4
14	300220 - Vaccines, human use	United States	6
15	300390 - Medicaments not elsewhere specified, formulated, in bulk	Spain	5
16	300420 - Antibiotics not elsewhere specified, in dosage	Netherlands	3
17	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	United States	11
18	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	Spain	3
19	300440 - Alkaloids, derives, no antibiotics, hormones, in dosage	United States	3
20	300290 - Blood, toxins, cultures, medical use, not elsewhere specified	Germany	11
21	300610 - Suture materials, sterile surgical and dental goods	Germany	4
22	300420 - Antibiotics not elsewhere specified, in dosage	Belgium	5
23	300220 - Vaccines, human use	Australia	3
24	300290 - Blood, toxins, cultures, medical use, not elsewhere specified	United Kingdom	14
25	300390 - Medicaments not elsewhere specified, formulated, in bulk	Ireland	5
26	300290 - Blood, toxins, cultures, medical use, not elsewhere specified	United States	6
27	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	Netherlands	6
28	300660 - Contraceptive preps based on hormones or spermicides	United States	5
29	300420 - Antibiotics not elsewhere specified, in dosage	Italy	1
30	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	Japan	3

In the top 15 product-country combinations, 'Medicaments not elsewhere specified, in dosage' appears 12 times. These export opportunities are all classified in either Cell 6 or Cell 11, which points to the fact that there is high demand for the products concerned in these markets, but the demand is not growing sufficiently in the short and long terms. Compared with its main competitors, South Africa has an intermediately small market share in the countries in Cell 6, and an intermediately large market share in the countries in Cell 11.

Most of the European and Northern American markets are traditionally large, but the lack of any noteworthy growth in these markets could be due to the global financial crisis of 2008/2009 and the subsequent economic slowdown in Europe in the wake of the eurozone crisis.

Apart from those assigned to Cells 6 and 11, many of the export opportunities in the top 50 are classified in Cells 5, 10, and 15. These are large markets, indicating growth in the short and long terms, and they might be considered to be the most lucrative markets to target for export promotion purposes.

Cuyvers et al., (1995, p. 183) and Cuyvers (1997, pp. 14-15; 2004, p. 270) suggested that the markets classified in Cells 11 to 15 should be promoted as a first priority as South Africa already has a definite comparative advantage in these markets but could grow its market share.

Table 6 sets out the pharmaceutical product-country combinations (export opportunities) that should be targeted as a first priority by export promotion organisations in South Africa. Since import demand in the product-country combinations in Cell 11 is large but does not show any noteworthy growth, these combinations are not included in Table 6.

Table 6: Pharmaceutical Export Opportunities that should be Targeted as a First Priority

Rank Based on Export Potential	HS 6-Digit Product Code and Description	Country	Cell
1	300290 - Blood, toxins, cultures, medical use, not elsewhere specified	United Kingdom	14
2	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	France	15
3	300220 - Vaccines, human use	Switzerland	12
4	300510 - Medical dressings etc. having an adhesive layer	United Kingdom	14
5	300590 - Medical dressings etc. except those with adhesive layer	Spain	15
6	300230 - Vaccines, veterinary use	Brazil	15
7	300590 - Medical dressings etc. except those with adhesive layer	Poland	12
8	300230 - Vaccines, veterinary use	Germany	15
9	300220 - Vaccines, human use	Jordan	12
10	300610 - Suture materials, sterile surgical and dental goods	Singapore	12
11	300590 - Medical dressings etc. except those with adhesive layer	Israel	12

Vaccines for human and veterinary use and medical dressings appear more than once in the above priority list. It is interesting that, other than the European countries, Brazil, Jordan, Singapore, and Israel present first priority export opportunities.

It was shown in Section 3 that South Africa currently exports almost half of its pharmaceutical products to other countries on the African continent. These do not feature in the DSM results presented in this and the previous section because most African countries were eliminated in filter 1 of the DSM due to their excessive political and/or commercial risk, or inadequate GDP and GDP per capita size and growth rates. However, the South African government regards the strengthening of trade links with other African countries as a priority because South Africa's economic development is linked to the development of the continent as a whole (DTI, 2006). Furthermore, South Africa is the leading economy in Africa, which affords it unique trade and investment opportunities, and the country needs to retain its competitive edge in the face of the growing world-wide interest in Africa.

According to the DTI (2010), the African continent is one of the most important and fastest growing export destinations for South Africa – and for the pharmaceutical industry, particularly given its multinational character and expansionary goals.

In view of Africa's importance to South Africa's pharmaceutical sector, the DSM process was repeated without filter 1 in order to include all African countries (assuming that exporters would be able to insure against political and commercial risk, and product-specific demand would be more important than general demand). The results of this special application of the DSM are presented in Section 5.2 below.

5.2 Export Opportunities for South African Pharmaceutical Products in the Rest of Africa

A total of 87 export opportunities (product-country combinations) were identified for South African pharmaceutical products in the rest of Africa.

The distribution of export potential across the different African regions is illustrated in Figure 5. It is clear that most of the potential lies in Southern Africa (48.14%), followed by Northern Africa (18.13%), Western Africa (18.10%), and Eastern Africa (15.64%).

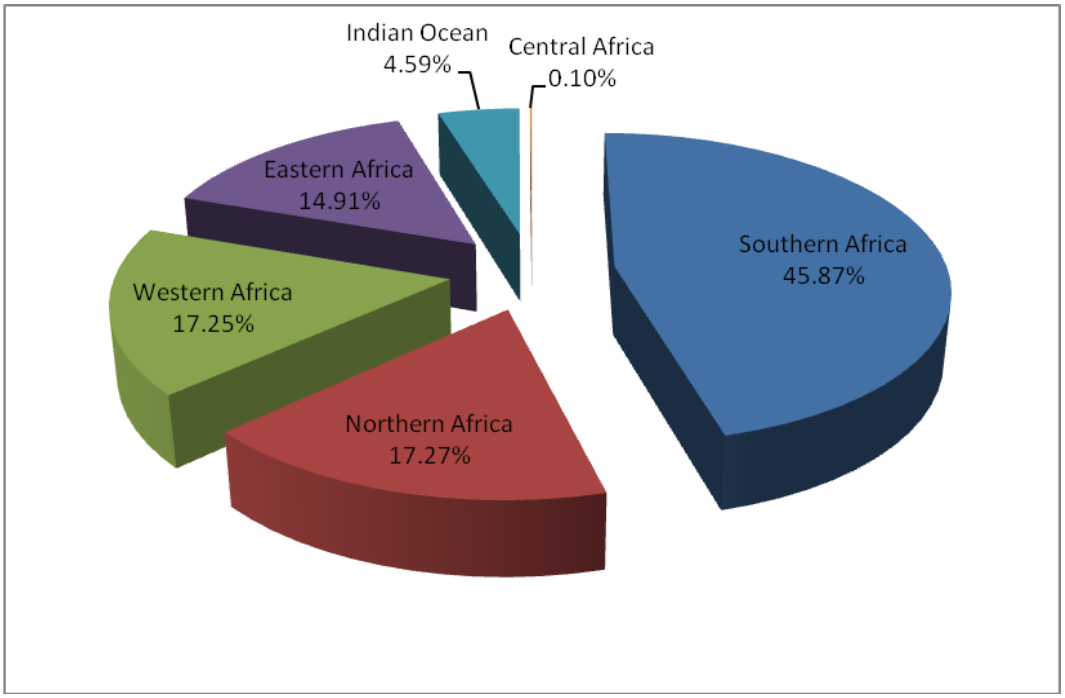

Figure 5: Distribution of Export Potential for South African Pharmaceutical Products across the Different African Regions

Figure 6, in turn, shows the extent to which South Africa has utilised the export potential in the different African regions.

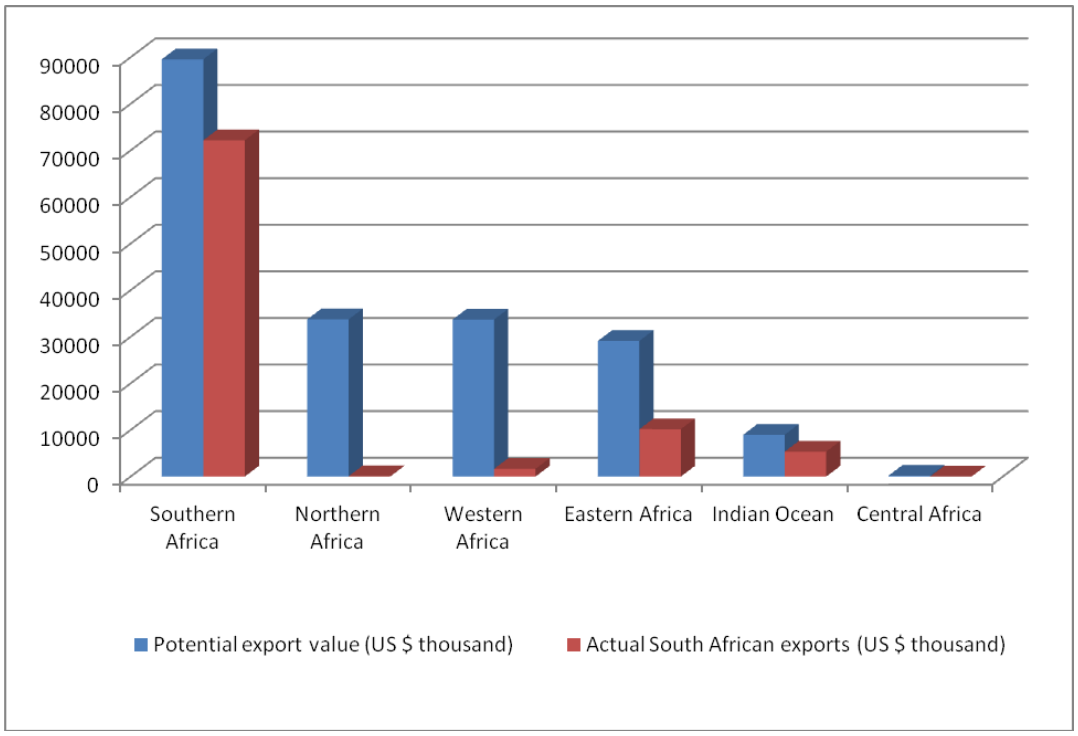

Figure 6: South Africa's Utilisation of the Export Potential for Pharmaceutical Products in the Different African Regions[1]

It is clear that, overall, South Africa has utilised the export potential for pharmaceutical products to a great extent in Southern Africa and the Indian Ocean countries, but has made far less headway in Northern and Western Africa. The former phenomenon might be due to South Africa's proximity to other Southern African countries and the impact of the SACU and SADC agreements.

[1]Table 2 shows South Africa's utilisation of the export potential for pharmaceutical products in different world regions. These regions comprise the countries that passed filter 1 of the DSM applied to identify export opportunities for South Africa in the rest of the world. In this application of the DSM, only five African countries were included, namely, Egypt and Tunisia (Northern Africa), Ghana (Western Africa), Tanzania (Eastern Africa), and Zambia (Southern Africa). When the DSM was applied to identify export opportunities for South Africa across the rest of the African continent, filter 1 was not used, and export opportunities were identified in a total of 32 African countries. This is why the figures in Table 2 do not correlate with those in Figure 6.

The 20 African countries with the highest export potential for South African pharmaceutical products are shown in Figure 7, along with South Africa's utilisation of the export potential in each of these countries.

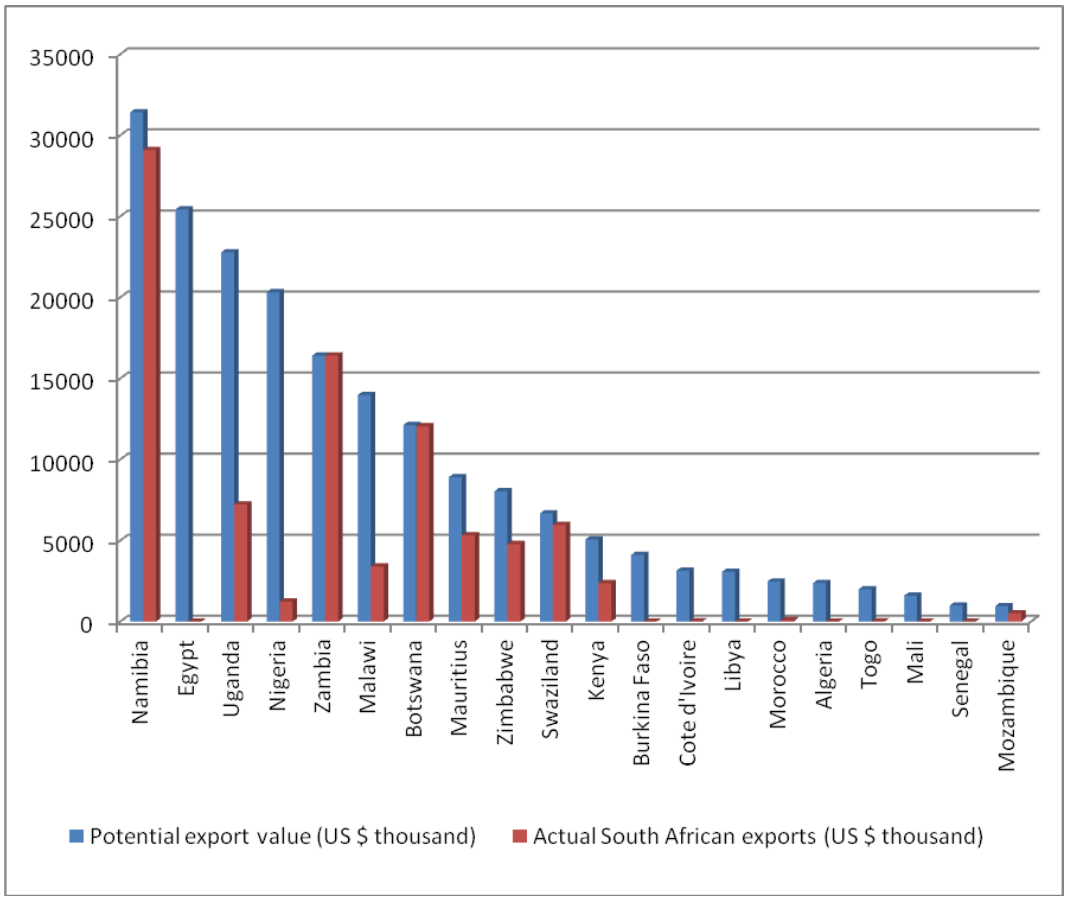

Figure 7: Top 20 African Countries in Terms of Export Potential for South African Pharmaceutical Products

The 10 African countries with the highest export potential for South African pharmaceutical products are mainly found in Southern Africa, with the exception of Egypt (Northern Africa), Uganda (Eastern Africa), Nigeria (Western Africa), and Mauritius (Indian Ocean countries).

Although Egypt holds the second largest export potential for South African pharmaceutical products, South Africa has not tapped this potential at all. Again, South Africa might have exported pharmaceutical products to Egypt before, but not those that were identified as having high export potential. It is also noteworthy that South Africa's utilisation of export potential has been very low in most other Northern African countries in the top 20.

The pharmaceutical products with the highest export potential across the rest of the African continent, and South Africa's utilisation of this potential, are shown in Figure 8.

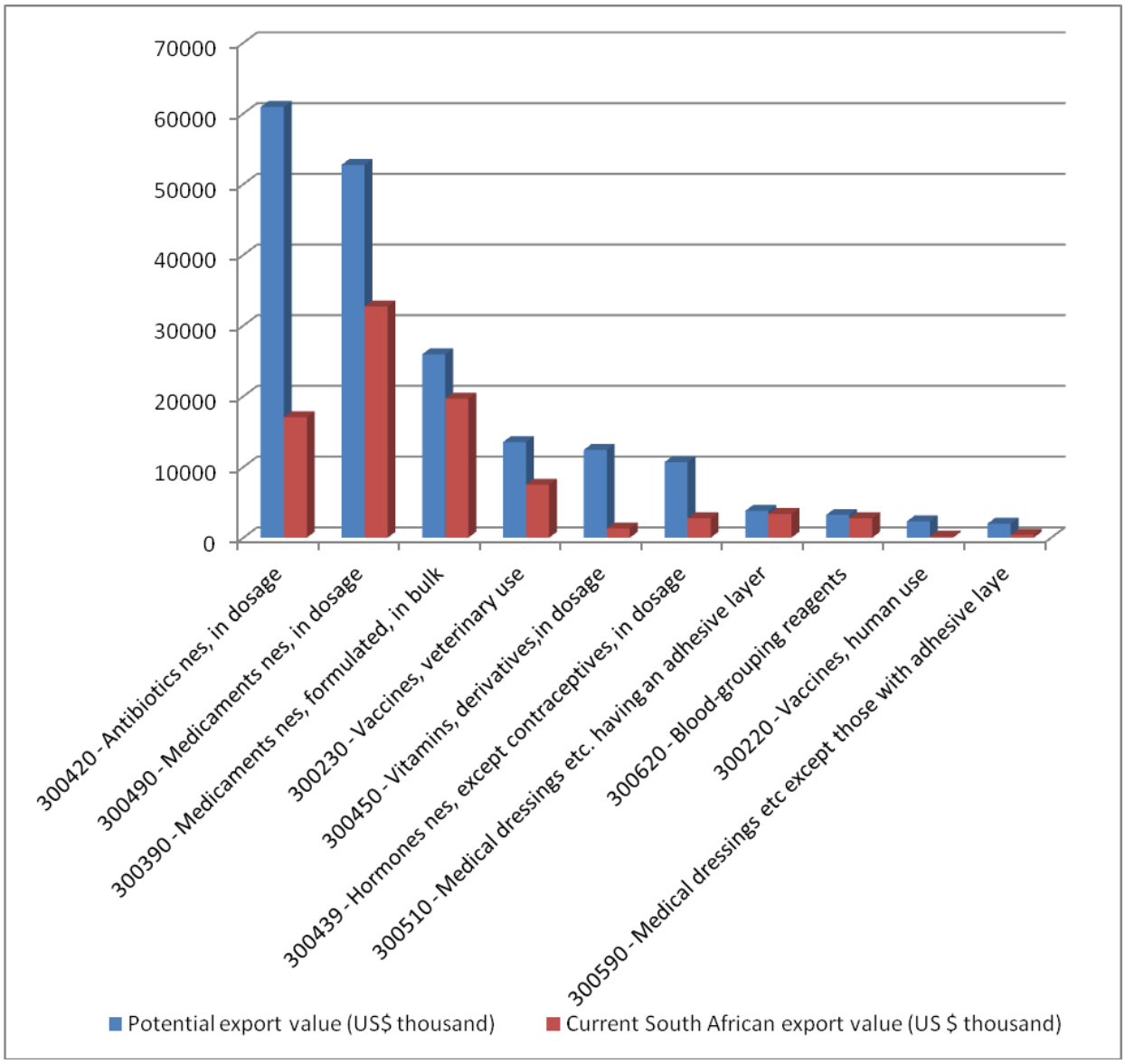

Figure 8: Top 10 Pharmaceutical Products in Terms of Export Potential for South Africa in the Rest of Africa

'HS 300420 - Antibiotics not elsewhere specified, in dosage' and 'HS 300490 - Medicaments not elsewhere specified, in dosage' hold by far the highest export potential for South Africa on the rest of the African continent. Medicaments in bulk, vaccines for veterinary use, vitamins, and hormones also hold relatively high potential for South Africa.

In most cases, the export potential has been utilised to a large extent. Exceptions, however, are 'HS 300220 – Vaccines, human use,' 'HS 300450 – Vitamins, derivatives, in dosage,' and 'HS 300590 - Medical dressings etc. except those with adhesive layer,' where the utilisation rate is less than 20%.

Table 7 ranks the 21[2] pharmaceutical products included in this study according to their export potential for South Africa in the rest of Africa, and shows the extent to which South Africa has utilised the potential of each product.

Table 7: Ranking of South African Pharmaceutical Products in Terms of Export Potential in the Rest of Africa

Rank Based on Export Potential	HS 6-Digit Product Code and Description	% Utilisation of Export Potential by South Africa
1	300420 - Antibiotics not elsewhere specified, in dosage	27.96%
2	300490 - Medicaments not elsewhere specified, in dosage	62.04%
3	300390 - Medicaments not elsewhere specified, formulated, in bulk	75.81%
4	300230 - Vaccines, veterinary use	55.43%
5	300450 - Vitamins, derivatives, in dosage	10.61%
6	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	25.79%
7	300510 - Medical dressings etc. having an adhesive layer	87.97%
8	300620 - Blood-grouping reagents	85.15%
9	300220 - Vaccines, human use	7.47%
10	300590 - Medical dressings etc. except those with adhesive layer	20.70%
11	300320 - Antibiotics not elsewhere specified, formulated, in bulk	18.41%
12	300610 - Suture materials, sterile surgical and dental goods	15.86%
13	300440 - Alkaloids, derives, no antibiotics, hormones, in dosage	1.66%
14	300660 - Contraceptive preps based on hormones or spermicides	32.45%
15	300290 - Blood, toxins, cultures, medical use, not elsewhere specified	12.96%
16	300339 - Hormones not elsewhere specified, no antibiotics, in bulk, not contraceptive	85.98%
17	300670 - Gel preparations designed to be used in human/veterinary medicine as a lubricant...	18.46%
18	300650 - First-aid boxes and kits	24.47%
19	300340 - Alkaloids, derives, without antibiotics, hormones, in bulk	100.00%
20	300630 - Opacifying preparations, x-ray, diagnostic reagents	0.00%
21	300120 - Extracts of glands etc. for therapeutic use	100.00%

It is interesting to note from Table 7 that the export potential for 'HS 300340 - Alkaloids, ... in bulk' (ranked 19th) has been fully utilised, while only 1.66% of the potential of 'HS 300340 – Alkaloids, … in dosage' (ranked 13th) has been utilised. This highlights an opportunity to package the product in dosage, and utilise this unexplored export potential for a product that is already being successfully produced and exported. The same argument applies in the case of 'HS 300339 - Hormones, ... in bulk' (85.98% utilisation, ranked 16th in terms of export potential) and 'HS 300439 Hormones, ... in dosage' (25.79% utilisation, ranked 6th in terms of export potential).

[2] HS 300190 Heparin salts for therapeutic use was not identified as an export opportunity in any African country and therefore only 21 products remain in Table 7.

Table 8 sets out the product-country combinations with the highest export potential in Africa.

Table 8: Top 30 African Pharmaceutical Product-Country Combinations in Terms of Export Potential for South Africa

Rank Based on Export Potential	HS 6-Digit Product Code and Description	Country	Cell
1	300420 - Antibiotics not elsewhere specified, in dosage	Egypt	2
2	300420 - Antibiotics not elsewhere specified, in dosage	Namibia	17
3	300490 - Medicaments not elsewhere specified, in dosage	Zambia	17
4	300490 - Medicaments not elsewhere specified, in dosage	Uganda	17
5	300390 - Medicaments not elsewhere specified, formulated, in bulk	Botswana	17
6	300450 - Vitamins, derivatives, in dosage	Nigeria	17
7	300420 - Antibiotics not elsewhere specified, in dosage	Nigeria	17
8	300490 - Medicaments not elsewhere specified, in dosage	Zimbabwe	17
9	300490 - Medicaments not elsewhere specified, in dosage	Malawi	17
10	300490 - Medicaments not elsewhere specified, in dosage	Mauritius	17
11	300230 - Vaccines, veterinary use	Namibia	17
12	300390 - Medicaments not elsewhere specified, formulated, in bulk	Uganda	17
13	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	Malawi	17
14	300390 - Medicaments not elsewhere specified, formulated, in bulk	Swaziland	17
15	300439 - Hormones not elsewhere specified, except contraceptives, in dosage	Kenya	17
16	300420 - Antibiotics not elsewhere specified, in dosage	Burkina Faso	2
17	300510 - Medical dressings etc. having an adhesive layer	Namibia	17
18	300420 - Antibiotics not elsewhere specified, in dosage	Cote d'Ivoire	2
19	300230 - Vaccines, veterinary use	Morocco	12
20	300220 - Vaccines, human use	Togo	2
21	300230 - Vaccines, veterinary use	Algeria	2
22	300390 - Medicaments not elsewhere specified, formulated, in bulk	Namibia	17
23	300440 - Alkaloids, derives, no antibiotics, hormones, in dosage	Libya	2
24	300620 - Blood-grouping reagents	Malawi	17
25	300620 - Blood-grouping reagents	Namibia	17
26	300420 - Antibiotics not elsewhere specified, in dosage	Swaziland	17
27	300590 - Medical dressings etc. except those with adhesive layer	Uganda	2
28	300390 - Medicaments not elsewhere specified, formulated, in bulk	Mali	2
29	300320 - Antibiotics not elsewhere specified, formulated, in bulk	Namibia	17
30	300420 - Antibiotics not elsewhere specified, in dosage	Egypt	2

Again, it is 'HS 300420 - Antibiotics not elsewhere specified, in dosage' and 'HS 300490 - Medicaments not elsewhere specified, in bulk' that mainly feature in the top 10 African pharmaceutical export opportunities for South Africa. Furthermore, 14 of the top 30 export opportunities for the South African pharmaceutical industry are located in Southern Africa. Namibia, Malawi, and Uganda appear most frequently in the top 30, and the products making up this list are mostly drawn from the top 10 appearing in Figure 8.

From Table 8 it is evident that most of the top 30 export opportunities (product-country combinations) for the South African pharmaceutical industry in the rest of African are classified in either Cell 2 or Cell 17. This means that the demand for the specific products in the countries concerned is growing in the short and long term, but is not considered high. Those export opportunities classified in Cell 2 have in most cases not been utilised at all; yet when it comes to the opportunities classified in Cell 17, South Africa has a large market share compared with the top six competitors in each market.

If one compares the top 30 world-wide export opportunities listed in Table 5 with the top 30 export opportunities in the rest of Africa listed in Table 8, it is evident that while most of the top 30 world-wide export

opportunities are located in Cell 6 or 11 (not growing but large import markets), most of the top 30 African export opportunities are located in Cells 2 and 17 (growing but not large import markets).

'HS 300230 – Vaccines, veterinary use' to Morocco is the only export opportunity for the South African pharmaceutical industry across the rest of the African continent that is not classified in either Cell 2 or Cell 17. It is assigned to Cell 12, which indicates that this is a growing, but not large import market in which South Africa has established an intermediately high market share compared with its main competitors in the market. This opportunity can also be explored as a first priority (see also Table 6 and the ensuing discussion).

6. CONCLUSIONS AND RECOMMENDATIONS

The need to accelerate South Africa's industrialisation process and diversify its exports towards more value-added manufactured goods is a common theme running through the government's key strategy documents and official statements.

The pharmaceutical industry plays a pivotal role in the South African economy as a manufacturer and exporter, and is facing growing demand for its products, particularly in the Southern African region. However, the export community on its own cannot easily exploit the opportunities that await them in foreign markets. The advice, practical assistance and financial support given to exporters by South Africa's export promotion organisations are key elements in the quest to extend the country's international footprint and improve its competitiveness. Yet the difficulty of selecting the right markets, and the capacity and resource constraints of export promotion organisations conspire to make export market development a challenging exercise – particularly for new and/or inexperienced exporters.

The Decision Support Model (DSM) has, following various applications and revisions, proved itself to be an innovative and practical market selection tool that brings a high level of precision to the business of identifying opportunities for different products in different markets. The DSM methodology was used for the purpose of this study to identify the export opportunities with the greatest potential for South Africa's pharmaceutical industry – both in the world at large and, specifically, in the rest of Africa.

Among the results were that about half of the export potential for South African pharmaceutical products lies in Western Europe, followed by North America. Other world regions, such as Central Europe, Southern Europe, East Asia, and South America, reflect progressively lower demand and opportunity, although selected countries in these regions do present interesting possibilities. Of concern is the fact that South Africa has utilised the available potential for its pharmaceutical products to a very limited extent – suggesting a huge marketing opportunity for the country's pharmaceutical producers. It is only in Southern Africa and Eastern Africa that South Africa has tapped the available potential in a significant way. Currently South Africa exports about 50% of its pharmaceutical products to the rest of Africa.

The DSM results show that, world-wide, 'HS 300490 – Medicaments not elsewhere specified, in dosage' has by far the highest export potential for South Africa. According to the cell classification of the identified export opportunities, it is noteworthy that – besides European countries – Brazil, Jordan, Singapore, and Israel are among the countries recommended as high priority export opportunities. In Africa, 'HS 300420 – Antibiotics not elsewhere specified, in dosage' and 'HS 300490 – Medicaments not elsewhere specified, in dosage' are the product categories, and Namibia and Egypt are the countries, with the highest export potential for South Africa.

The results of this study highlight the fact that producers of pharmaceutical products and other decision makers essentially have a strategic choice to make: to explore the export potential of the growing African market in which South Africa already has an established presence, or to try and extend the industry's reach into the large but generally static market environment of Europe and other developed regions where South Africa has a relatively small presence.

By adopting a focused and informed approach to export market selection, the pharmaceutical industry will be able to deliver a stronger return on investment, and South Africa's export promotion organisations will be able to act as worthy partners to the private sector in directing their resources at clear and sustainable opportunities.

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REFERENCES

1. Adcock Ingram. (2012). *Adcock Ingram*. Retrieved from http://www.adcock.co.za/AboutUs_CompanyProfile.aspx
2. Aspen Holdings. (2012). *Aspen South Africa*. Retrieved from http://www.aspenpharma.com/default.aspx?pid=9&stepid=1&oid= 129
3. Bernard, A.B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2011). *The empirics of firm heterogeneity and international trade*. (Working Paper 17627). National Bureau of Economic Research.
4. Cuyvers, L. (1997). Export opportunities of Thailand: A decision support model approach. (CAS discussion Paper, No. 9). Retrieved from http://webhost.ua.ac.be/cas/PDF/CAS09.pdf
5. Cuyvers, L. (2004). Identifying export opportunities: The case of Thailand. *International Marketing Review, 21*(3), 255-278.
6. Cuyvers, L., De Pelsmacker, P., Rayp, G., & Roozen, I. T. M. (1995). A decision support model for the planning and assessment of export promotion activities by government export promotion institutions: The Belgian case. *International Journal of Research in Marketing, 12*(2), 173-186.
7. Cuyvers, L., Steenkamp, E. A., & Viviers, W. (2012). The methodology of the Decision Support Model (DSM). In L. Cuyvers, & W. Viviers (eds), *Export promotion: A decision support model approach*. Stellenbosch: Sun Media Metro.

8. Cuyvers, L., Viviers, W., Sithole, W., & Muller, M.-L. (2012). Developing strategies for export promotion using a decision support model. In L. Cuyvers, & W. Viviers (eds), *Export promotion: A decision support model approach*. Stellenbosch: Sun Media Metro.
9. Deloitte Consulting (Pty) Ltd. (2007). *The economic & socio-economic benefits of R&D-based multinational pharmaceuticals on the South African economy*. Johannesburg: Future World® powered by Deloitte.
10. Deloitte. (2010). Insights into the high-level financial contribution of the Pharmaceutical Industry in South Africa.
11. Department of Health. (2011). *National health insurance in South Africa*. Policy paper. Pretoria: Department of Health.
12. Dummet, H. (2002). *An overview of supply and demand in South Africa's pharmaceutical industry – opportunity and risk*. Business Briefing: Pharmatech, 49-54.
13. DTI. see South Africa. Department of Trade and Industry.
14. Essack, S. Y., Schellack, N., Pople, T., Van der Merwe, L., Suleman, F., Meyer, J. C., Gous, A. G. S., & Benjamin, D. (2011). Part III. Antibiotic supply chain and management in human health. *South African Medical Journal, 101*(8), 562-566.
15. International Trade Centre. (2012). Trade map: Trade statistics for international business development. Retrieved from http://www.trademap.org/Country_SelProduct_TS.aspx
16. Maloney, C., & Segal, N. (2007). *Genesis: The growth potential of the pharmaceutical sector in South Africa*. Johannesburg: Genesis Analytics (Pty) Ltd.
17. Mdluli, A. (2012). *State allocates R102bn to NGP and IPAP sectors over 5 years*. Retrieved from http://www.iol.co.za/business/business-news
18. NKC. (2012). Monitoring African sovereign risk. *South African Quarterly Update*, March 2012.
19. Pearson, J. J. A. P., Viviers, W., Cuyvers, L., & Naudé, W. (2010). Spotting opportunities for international entrepreneurship in the southern engines: A DSM approach. *International Business Review, 19*(4), 345-359.
20. South Africa. Department of Trade and Industry. (2006). *Draft export strategy 2006-2009: Trade and investment South Africa, export development and promotion*. (Internal document, Unpublished) 101 p.
21. South Africa. Department of Trade and Industry. (2010a). *The South African national industrial policy framework*. The dti Campus, Pretoria.
22. South Africa. Department of Trade and Industry. (2010b). *The South African trade policy and strategy framework*. The dti Campus, Pretoria. 64p.
23. South Africa. Department of Trade and Industry. (2010c). *A South African trade policy and strategy framework*. Retrieved from http://www.thedti.gov.za/trade_policy/TPSF.htm
24. South Africa. Department of Trade and Industry. (2011). Industrial policy action plan. 2011/12-2013/13. Economic sectors and employment cluster. February 2011.
25. Steenkamp, E. A. (2011). *The identification of export opportunities for South African products with special reference to Africa*. (Thesis – PhD). Potchefstroom: North-West University.
26. Viviers, W., & Pearson, J. J. A. P. (2007). *The construction of a decision support model for evaluating and identifying realistic export opportunities in South Africa: report prepared for the Department of Trade and Industry, South Africa*. May. (Unpublished). 92 p.
27. Viviers, W., Rossouw, R., & Steenkamp, E. A. (2009*). The sustainability of the DSM for identifying realistic export opportunities for South Africa: 2007-2008: Report prepared for the Department of Trade and Industry, South Africa*. February. (Unpublished). 105 p.
28. Viviers, W., Steenkamp, E. A., & Rossouw, R. (2010). *Identification of realistic export opportunities for South Africa: application of a decision support model (DSM) using HS 6-digit level product data: report prepared for the Department of Trade and Industry, South Africa*. September. (Unpublished). 57 p.

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