South Africa's maize exports: A Strategic Export Market Analysis model approach

By

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Abstract

Outside of the Southern African Customs Union (SACU) and certain Southern African Development Community (SADC) countries, South Africa's maize exports are generally irregular and inconsistent. This lack of consistency is primarily attributed to uneven surplus levels which, in certain years, preclude South Africa's regular participation in larger import markets. We therefore apply a Strategic Export Market Analysis (SEMA) model to identify export markets in which South Africa has a high trade potential with the vision of defining the basis for a longer term sustainable export market development strategy. We found that South Africa's maize exports are growing faster than the world's annual average growth, and that these exports are concentrated among a few countries. These two features underline the need to expand South Africa's export presence beyond its traditional markets. Identified as high potential strategic markets is Japan, Mexico, Taiwan, United Arab Emirates, Thailand and Zimbabwe. Moreover, there is an even higher potential to export to major global maize importers in Asia (i.e. China, Indonesia, Vietnam, Malaysia), South America (i.e. Venezuela) and the Middle East (i.e. Iran, Saudi Arabia). To compete in such markets, South Africa has to reduce its logistics and production costs. Essential is the need to seek preferential market access in these countries in order to lock the existing export opportunities. To reposition South Africa within the global context, we recommend the formulation of a maize sector export strategy that focuses on increasing the competitiveness of maize exports, and market development.

Keywords: growth-share matrix, trade potential, strategic markets

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Introduction

Maize is the most important field crop produced in South Africa. It is the staple food for the majority of the population, particularly the poor (Maize Trust, 2014). The maize industry has a significant contribution to the economy, both upstream to the input industries and downstream into milling, animal feed and food processing industries.

The maize area planted vary on yearly basis, depending on weather and market conditions, but on average approximately 2.5–2.75 million hectares of hybrid maize is planted in South Africa each year (Maize Trust, 2014). Furthermore, about 350 000–500 000 hectares are planted by small-scale farmers. According to the Maize Trust (2014) the total crop planted constitutes approximately 85% GM maize. South Africa leads the continent in technology adoption and has seen productivity of up to 12 tons/ha in the Northern Cape region in 2007/08 production year; the highest yield in the African continent (Grain South Africa (GSA, 2014)). In 1998, South Africa became the first African country to grow biotech crops commercially. By 2010, it was the world's ninth largest cultivator of biotech crops, with more than 2.2 million hectares under cultivation (Pioneer, n.d.).

White maize is mainly for human consumption and yellow maize for animal feed. Approximately 10 to 12 million tons of maize is produced in South Africa annually. On a ten year average, maize for human consumption totals about 4.2 million tons, for animal feed about 4 million tons and the starch and glucose manufacturing industries consume about 650 000 tons of maize annually (GSA, 2014). Feed production in South Africa is estimated at more than 11 million tons per annum, and maize represents about 51% of the total feed produced annually (Maize Trust, 2014).

On ten year average, South Africa normally produces approximately 1.7 million tons surplus of maize for the export markets, making it the largest exporter of maize on the continent (GSA, 2014). South Africa's maize exports have increased by an average annual growth rate of 21% between 2001 and 2013; which is far higher than the 13% rate of growth of global maize imports (Author's calculations based on ITC, 2014). As such, re-assessing the country's maize export markets is critical as South Africa seeks to expand its burgeoning surpluses to new markets.

This paper applies a strategic export market analysis (SEMA) model in order to identify high potential markets for South African maize exports which can be considered to be of strategic value (i.e. countries in which South Africa can expand its maize exports). To put the analysis into context, we first explore the structure of South Africa's maize exports. Against this background we apply the SEMA model and chronicle the export potential, growth and share characteristics of selected markets. The paper closes with some conclusions and summary of key points.

Concept and operationalization of the SEMA model

In order to answer the main question of South Africa's strategic markets, this paper develops the concept of a Strategic Export Market Analysis (SEMA) model. In the model, we attempt to

methodically unpack the five critical elements of importance to South Africa's maize industry namely, market access, market growth, market share, market competition and market size (see Figure 1).

Putting the approach pursued in this paper in the South African context, the model deals with the influence of the trade environment (i.e. barriers to maize exports, competition from major global exporters, export opportunities, and the rate at which maize exports are growing in global markets). This makes the approach an outward-looking one. Based on the specific characteristics of any given market, defined by the five elements outlined, the analysis of that particular market would lead to four key decisions. The decision rules are to either:

- Acquire the market, where South Africa has no market presence
- Convert the market, where growth, export potential and market share is declining
- Optimize the market, where South Africa is well established
- Retain and grow the market, where South Africa's export potential is beginning to emerge.

The SEMA model lends itself to a practically informed understanding of the trade environment in the global markets. An insight of the trade trends and statistics helps establish an understanding of market opportunities and threats. Emanating from the analysis is the "trade intelligence" that allows for a more strategic approach to exploiting market potential in countries where South Africa has a presence, as well as those countries where South Africa has a weak (or no) presence.

To operationalize the model, the paper will unpack the five key elements through an in-depth analysis of the following:

- The concentration and structure of South Africa's maize exports
- A growth-share analysis of South Africa's maize markets
- Analysis of export potential of South Africa's major export destinations and also those larger global destinations where South Africa has little or no presence
- An analysis of South Africa's competitiveness compared to other major global exporters
- An analysis of tariff and non-tariff barriers in South Africa's strategic and "potentially strategic" export destinations

As the analysis seeks to establish attractive markets and countries where South Africa could attain large gains from trade, policy and private sector strategies (i.e. decisions taken by politicians and businessmen) will matter for South Africa's growth in these markets. Market potential in certain countries may offer opportunities that politicians and businessmen may or may not take. The export opportunities could ultimately be determined set of institutional constraints in particular markers that are important but authors may not have considered.

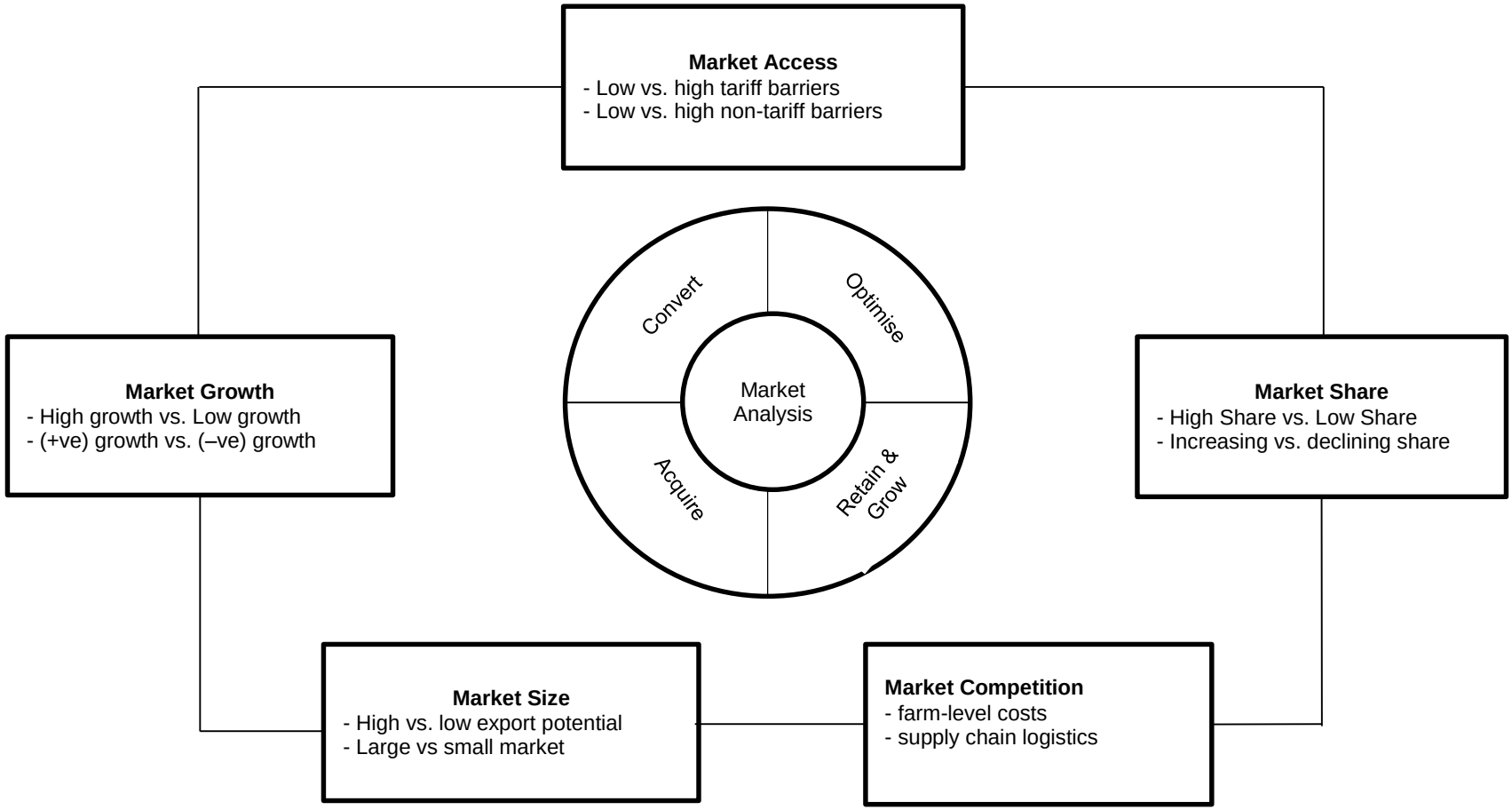


Figure 1: Strategic Export Market Analysis Model

Source: Authors' deductions

Structure of South Africa's maize exports

South Africa's maize exports within the global context

About 90% of global maize traded is yellow maize, with the balance being white maize traded mostly in Mexico and parts of Southern and Eastern Africa (mainly South Africa, Zimbabwe, Zambia, Malawi, Uganda, Tanzania and Kenya) (BFAP, 2014). In a more generic context, most trade analysis literature focuses on maize as a homogenous product, with little attention paid to its heterogeneity. Even in more focused and region-specific studies, increasing attention is paid to trade flows, with similar disregard of the product heterogeneity. Part of the reason for this approach is systemic. That is, trade databases do not offer more nuanced product differentiation, and as a result, both yellow and white maize statistics conflate into a singular product. This paper makes use of the International Trade Centre's (ITC) Harmonized Systems classification, quoting the product line "HS100590" (i.e. maize (corn) nes (not elsewhere specified)) which essentially treats maize as a homogenous product.

According to the International Trade Centre (ITC) database (2014), South Africa is, by value, the 8th largest exporter of maize in the world, after the United States of America (USA), Brazil, Argentina, Ukraine, France, India and Romania. Global maize exports are concentrated within the top 4 largest exporters (i.e. USA Brazil, Argentina, and Ukraine) who account for 70% of total global exports. Meanwhile, 97% of the value of the world's maize exports comes for the top 20 exporters (See Table 1).

South Africa can be considered as one of the smaller players in the global maize export market, contributing a modest 2.2% of total world maize exports (See Table 1). Over the 10 year period between 2004 and 2013, South Africa's share of the value of global exports has averaged 1.5%. Given the relatively small size of South Africa in the global context, the domestic industry has been a price taker, with production and exports in the big four countries largely determining the global prices (Mofokeng, 2012). According to Bahta (2004) South Africa's participation in global markets has seen some fierce competition from the larger exporters, particularly those among the top four global players.

With the exception of Argentina, Hungary, France, and USA, all the other countries within the top 10 largest exporters are growing at a faster pace than South Africa's exports. Russia, India, Romania, Ukraine and Brazil, have shown phenomenal growth rates in export revenues between 2001 and 2013, with average annual growth rates of between 30% and 104%. South Africa's exports have grown by 21% over the same period, which is above the world average of 13% (See Table 1).

Table 1: Ranking of the 20 largest maize exporters in the world in 2013

Rank	Country	Value of exports (US$ millions)	Share of world total (%)	Growth rate of exports (2004-2013)
1	United States of America	31 435	20.7%	7.4%

2	Brazil	6 506	19.9%	30.3%
3	Argentina	6 251	17.7%	16.6%
4	Ukraine	5 555	12.1%	47.2%
5	France	3 807	5.8%	6.4%
6	India	1 837	3.9%	53.6%
7	Romania	1 229	2.4%	54.7%
8	South Africa	741	2.2%	21.0%
9	Russian Federation	696	1.9%	103.8%
10	Hungary	590	1.8%	18.8%
11	Bulgaria	557	1.6%	39.1%
12	Canada	488	1.5%	29.7%
13	Paraguay	477	1.5%	28.7%
14	Germany	464	0.8%	7.9%
15	Poland	249	0.8%	0.0%
16	Mexico	249	0.6%	48.5%
17	Serbia	203	0.5%	0.0%
18	Thailand	159	0.4%	11.7%
19	Netherlands	135	0.4%	34.1%
20	Austria	124	0.4%	15.0%
	Others	120	3.2%	-1.8%

Source: International Trade Center (2014)

Global maize imports and South Africa's presence in major markets

In considering the world's largest importers of maize, Japan and South Korea are the leading import markets, both constituting more than 20% of the world's value of maize imports. Overall, the top 20 major import markets account for 75% of the global total maize imports in 2013. On average, the top 20 largest maize importing countries consume 72% between 2001 and 2013. China, USA and Vietnam are the three countries within the top 20 that have shown significant growth over the 10 year period between 2004 and 2013, exhibiting growth of between 43% and 157%. Venezuela and Iran have shown no growth over the same period, while Japan, Korea, Taiwan, Germany and the United Kingdom (UK) have shown modest growth of below 10% (see Table 2).

Table 2: Ranking of the 20 largest maize importers in the world in 2013

Rank	Country	Value of imports of country *i* (US$ mil)	Value of SA's exports to country *i* (US$ mil)	SA's market share in country *i* (%)	Share of country *i* to world total (%)	Growth rate of country *i* imports (2004-2013)
1	Japan	4739	196.2	4.1%	13.9%	7.8%
2	Korea	2673	27.1	1.0%	7.8%	8.9%
3	Mexico	2013	96.0	4.8%	5.9%	15.8%
4	Egypt	1982	0.2	0.0%	5.8%	20.2%
5	Spain	1551	0.0	0.0%	4.5%	12.3%
6	Netherlands	1216	0.0	0.0%	3.6%	13.5%
7	Taiwan	1189	84.7	7.1%	3.5%	7.3%
8	Italy	1125	18.4	1.6%	3.3%	17.7%

9	Colombia	997	0.0	0.0%	2.9%	13.9%
10	Iran	948	0.0	0.0%	2.8%	0.0%
11	USA	938	0.0	0.0%	2.7%	43.0%
12	China	931	0.4	0.0%	2.7%	156.5%
13	Indonesia	914	0.4	0.0%	2.7%	31.0%
14	Algeria	892	0.0	0.0%	2.6%	14.4%
15	Venezuela	784	0.0	0.0%	2.3%	0.0%
16	Viet Nam	606	0.0	0.0%	1.8%	49.2%
17	Germany	590	0.0	0.0%	1.7%	9.3%
18	UK	588	1.0	0.2%	1.7%	5.6%
19	Saudi Arabia	570	0.0	0.0%	1.7%	16.8%
20	Malaysia	513	0.3	0.1%	1.5%	18.6%
	Others	838	271	-	24.6%	15.9%

Source: International Trade Center (2014)

In 2013, South Africa exported to six of the top 20 major importers of maize, and these include Japan, Korea, Mexico, Taiwan, Italy and the UK (ITC, 2014). As shown in table 1, South Africa's market share in these countries is as follows: Japan (4.1%); Korea (1%); Mexico (4.8%); Taiwan (7.1%); Italy (1.6%) and UK (0.2%). These four countries, altogether, take up 61% of South Africa's total maize exports. A look at South Africa's export markets shows that, outside of these four major markets, South Africa exports 33% of its maize within the Southern African Development Community (SADC) countries (i.e. Zimbabwe, Mozambique, Angola, Madagascar and all the states in the Southern African Customs Union (SACU). The remaining 6% of maize exports is destined for other markets such as Switzerland, United Arab Emirates (UAE), Thailand, Côte d'Ivoire, Cameroon and Ghana (ITC, 2014).

Table 3: Ranking of South Africa's top 20 maize export markets in 2013

Rank	Country	SA exports to country *i* (US$ mil)	Share of country *i* in SA exports (%)	Country I imports from the world (US$ mil)	Market share of SA in country *i* (%)
1	Japan	196.2	28.2%	4738.6	4%
2	Mexico	96.0	13.8%	2012.7	5%
3	Taiwan	84.7	12.2%	1188.6	7%
4	Zimbabwe	73.9	10.6%	107.8	69%
5	Namibia	53.6	7.7%	53.4	100%
6	Botswana	45.3	6.5%	47.7	95%
7	Korea	27.1	3.9%	2673.5	1%
8	Switzerland	23.5	3.4%	36.8	64%
9	Swaziland	21.0	3.0%	21.0	100%
10	Italy	18.4	2.6%	1125.1	2%
11	Mozambique	17.0	2.4%	17.0	100%
12	Lesotho	16.7	2.4%	16.7	100%
13	UAE	5.1	0.7%	135.5	4%
14	Thailand	3.4	0.5%	29.4	11%
15	Côte d'Ivoire	2.5	0.4%	2.9	84%
16	Angola	2.2	0.3%	12.9	17%
17	Madagascar	1.2	0.2%	3.0	41%

18	UK	1.0	0.1%	588.4	0.2%
19	Cameroon	0.8	0.1%	5.0	17%
20	Ghana	0.8	0.1%	1.5	50%
	Total	690.2	28%	12817.2	+

Source: International Trade Center (2014)

In total, South Africa has been exporting its maize to 45 different countries over the period 2001 and 2013, with some countries being more consistent importers of South African maize than others. The SACU and SADC countries feature more prominently each year, while countries such as Sweden, Kuwait, Mauritania, Turkey, Benin, Seychelles and Thailand, among others, appear sporadically in particularly years (ITC, 2014). This is also typically the case for larger export markets such as Korea and Japan.

Another key observation made from the data is that South Africa's export market structure is highly concentrated. In other words, a significantly large share of South Africa's maize exports only go to a few countries. Over the 13 year period between 2001 and 2013, South Africa's top three markets have accounted for an average of 78% of the country's total maize exports. The top five have averaged 88% while the top 10 have averaged 97% of total maize exports over the same period (ITC, 2014; See Figure 2). Consistent throughout that period is the fact that South Africa's entire maize exports are taken up by 20 countries, in any given year.

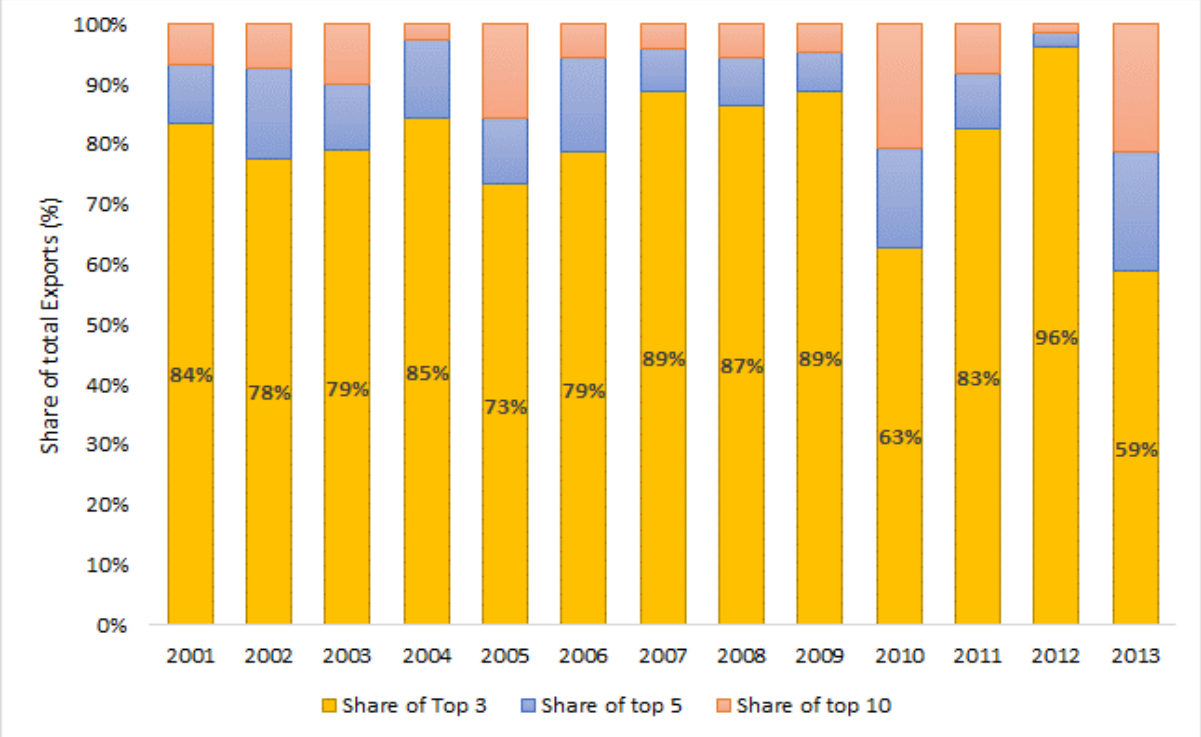


Figure 2: Trends in the concentration of South Africa's market structure (2001-2013)
Source: International Trade Center (2014)

In 2013, the percentage share of the top three, five and ten countries has dipped in particular years, namely 2005, 2010 and 2013. The drop in the share of the major markets in South Africa's total exports was perhaps due to the opening up of new markets, an occurrence that is sporadic and random. The long term trend, nonetheless, suggests declining levels of

concentration over time, suggesting that overall, South Africa is exporting its maize to more countries than it used to.

The export intensity of South African maize exports

Given the high concentration of South Africa's maize exports, we further seek to explore if there is a bias against South African maize in its own markets. We determine export bias through the export intensity index. Per definition, the export intensity index for South African exports to its markets is calculated by dividing the proportion of exports to country *i* in exports to the world by the proportion of country *i* imports from the world, once country *i* imports from South Africa have been excluded. The export intensity index is outlined as follows (Li, 2010):

$$x_{ij} = \frac{\left(\frac{X_{ij}}{X_i}\right)}{\left(\frac{M_j}{M_w - M_i}\right)} \qquad \text{Equation 1}$$

Where X_{ij} represents South Africa's exports to country *i*; X_i is South Africa's total exports; M_w is total imports from the world; M_i is country *i* total imports; and M_j South Africa's total imports. If x_{ij} is greater (less) than 1, then South African exports to country *i* are greater (less) than the proportion of country *i* imports to the rest of the world. This can be interpreted in two ways. Either, country *i* importers are biased towards trade with South Africa or country *i* consumers have a preference for South African maize. If $x_{ij} = 1$, then there is no geographical bias in trade. Figure 3 displays the trade intensity index to South Africa's top 20 export destinations for maize in 2013.

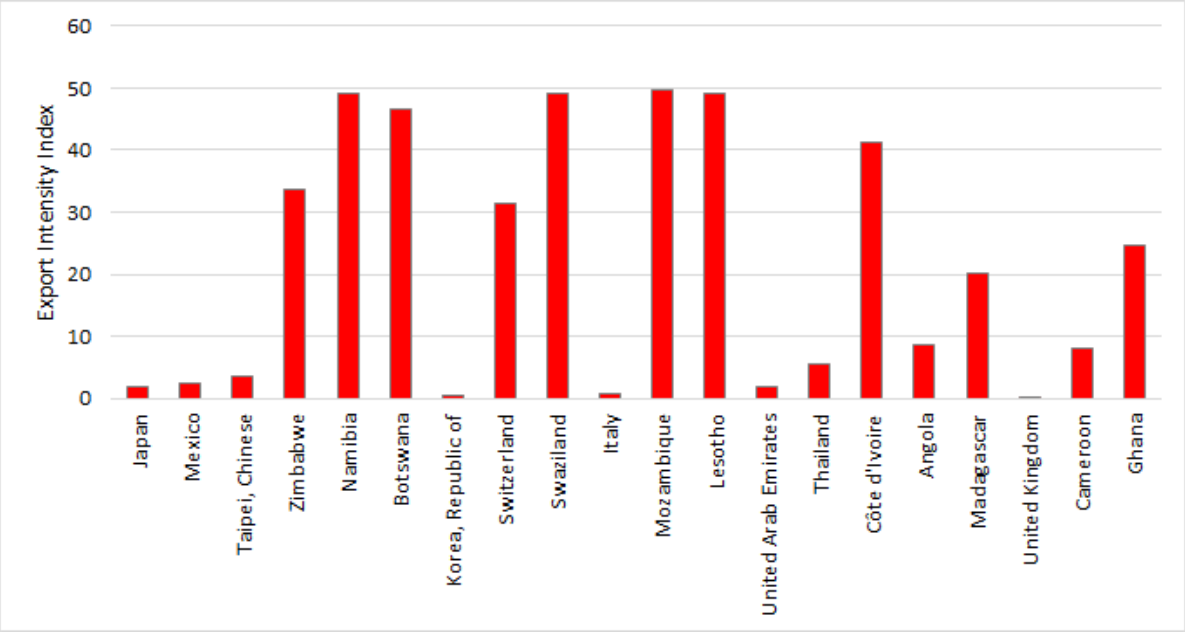


Figure 3: South Africa's export intensity indices for maize (2013)

Source: International Trade Centre (2014)

The results of the export intensity index calculations reveal that there is a bias for South African maize in all markets except the United Kingdom (UK), Italy and Korea. Eleven out of the twenty markets are African countries that are geographically closer to South Africa, and it is therefore reasonable to conclude that the export bias or preference for South African maize is also partly influenced by the proximity of South Africa to the markets in the region. This result underscores the importance of African markets.

The significance of identifying South Africa's strategic maize export markets

In 2011/12, South Africa exported 2.4 million tonnes on the back of a drought season in the USA. However, exports declined in the 2012/13 season to 1.8 million tonnes (GSA, 2014). In 2013/14 exports increased to 2 million tonnes owing to increased demand from Zimbabwe[3] (the largest importer of South African white maize that year) this is expected to increase considerably to 1.9 million tonnes due to a good harvest (GSA, 2014). With South Africa maintaining high levels of surpluses which are sustained by increasing output, its exports are threatened by the changing context of global markets. Overall, the form and substance of changes in global markets is characterised by (though not restricted to) three key factors. Firstly, the reality of global price volatility as well as unstable exchange rates, which affect South Africa's propensity to export at any given point in time (GSA, 2014).

Secondly, the effect of tariff and non-tariff measures (NTMs), particularly the restrictions related to genetically modified (GM) maize as a global phenomenon that is now becoming a key obstacle to penetrating key markets, especially in Africa (Kamau & Karin, 2013). Thirdly, the increasing costs of production that is generally affecting South Africa's global competitiveness (BFAP, 2014). The foregoing necessitates a need to continuously re-assess export markets and identify strategic countries to diversify and expand South Africa's export options. Given the foregoing, three critical questions are in order: (1) Which of South Africa's maize markets are high growth markets (2) What is South Africa's market share in these countries? (3) What is the market potential for South Africa's maize exports in such countries? These empirical questions are what guides the analysis of this paper. Moreover, these three questions fundamentally define markets that are of strategic value (i.e. markets in which maize demand is high and where South Africa can increase its maize exports). We therefore define strategic markets as countries with a relatively large demand for maize, in which South Africa can potentially grow its maize exports.

In identifying countries that align to this definition, we use a growth share matrix (Henderson, 1979). A growth-share matrix is a quadrangular complex that, in this case, identifies and ranks

[3] Zimbabwe imported 190 870 tonnes, which is 25% of South Africa's total maize exports (GSA, 2014)

South Africa's maize markets on the basis of their relative market share and growth rate as shown in Figure 3.

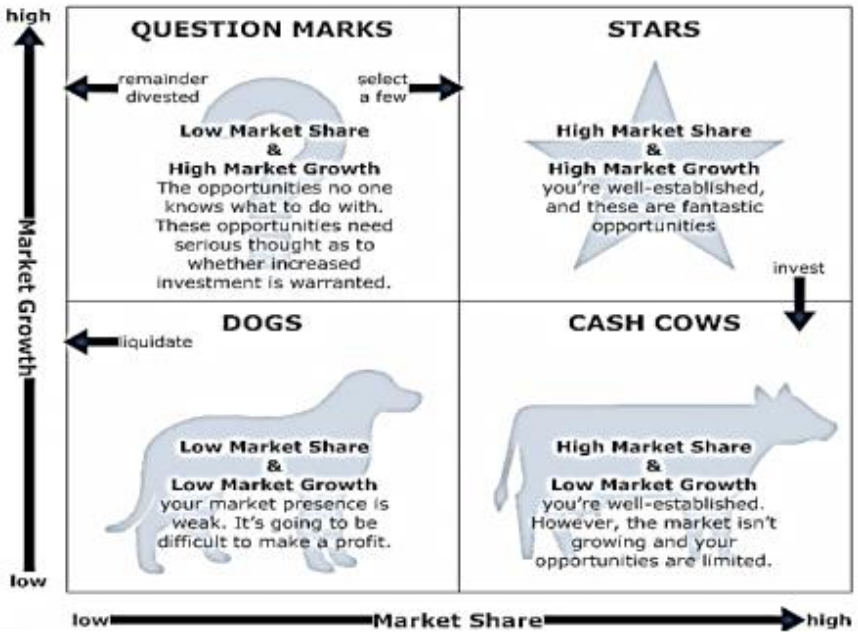


Figure 3: The growth-share matrix
Source: Henderson (1979)

The usefulness of this analytical tool lies in its conceptual simplicity, allowing for a fairly straightforward classification of markets in accordance to four categories as follows (Henderson, 1979).

High growth-low share markets (question marks): These are markets whose demand for South Africa's maize is growing *faster* than South Africa's exports to the rest of the world on the one hand; while simultaneously, the share of South Africa maize exports destined to that particular country is *lower* than South Africa's share of total world exports, on the other. Country markets located in this category need to be studied carefully to determine whether more export promotion efforts are beneficial.

High growth-high share markets (stars): These are markets whose demand for South Africa's maize is growing *faster* than South Africa's maize exports to the rest of the world; while the share of South Africa maize exports destined to that particular country is *higher* than South Africa's share of total world exports. South Africa's export presence in such countries is well-established and these countries represent great opportunities for further investment in expanding exports.

Low growth-high share markets (cash cows): These are markets whose demand for South Africa's maize is growing *slower* than South Africa's maize exports to the rest of the world; and the share of South Africa maize exports destined to that particular country is *higher* than South Africa's share of total world exports. Though South Africa's export presence in such countries is well established, the opportunities for further growth are limited due to low growth.

Low growth-low share markets (dogs): These are markets whose demand for South Africa's maize is growing *slower* than South Africa's maize exports to the rest of the world; and the share of South Africa maize exports destined to that particular country is

lower than South Africa's share of total world exports. South Africa's export presence in such countries is weak and these markets should be de-prioritised for strategic export expansion.

Classifying South Africa's maize export markets using the growth-share criteria

Growth – Share analysis of South Africa's major markets

In keeping with the aforementioned market categories defined in the export growth-share matrix, we argue that priority markets are those that exhibit high growth-high share, high growth-low share, and low growth-high share features. These are markets that are situated in the *stars*, *question marks* and *cash cow* quadrants of the growth share matrix, respectively. Figure 4 and Figure 5 present the growth share matrix for South Africa's export markets and major global maize importers, respectively. The bubble sizes for each country reflects the overall size of the maize market in each growth share matrix.

For the purposes of the paper, we define high growth markets as those countries whose import growth of South African maize are above South Africa's maize exports to the world of 21%. Similarly, high share countries are those markets whose share in South African maize exports is above South Africa's share with the rest of the world – which is 2.2%. Following this criteria, 20 of South Africa's top export markets were defined as follows:

High growth – high share markets: These include Madagascar and Cameroon, which were found to be markets opportunities that represent great opportunities for growth. However, there is a need for some careful consideration on how South Africa increases future maize exports. Worth noting is that Madagascar and Cameroon are countries which consider maize as a secondary staple, with cassava, yam, plantains and rice (among others) as the primary staples (Goufo, 2008).

Low growth – high share markets: These include Japan, Mexico, Taiwan, Zimbabwe, Namibia, Botswana, Switzerland, Swaziland, Angola, Ghana, Mozambique and Lesotho, UAE, Thailand, Côte d'Ivoire. These are markets in which South Africa is well-established but whose capacity for further growth is now limited. This is due to the fact that, for African markets, South Africa already exports a considerable level of exports to those countries to the extent of filling at least 41% of their import demand. For non-African markets, growth is probably restricted by competing imports that are mostly from the USA, India, Argentina, Pakistan and Brazil (ITC, 2014).

Low growth – low share markets: These include Korea, UK and Italy. South Africa's market presence in these countries is weak. These countries, though major global importers of maize, are not importing significantly from South Africa, but rather import most of their maize from European countries (i.e. France, Ukraine, Bulgaria, Poland and Russia), as well as Argentina, Canada and Brazil. Out of South Africa's top 20 export destinations, Korea, UK and Italy are non-strategic markets. It should also be noted that these markets have a ban on GMO maize, which might be a barrier for most of South Africa's maize exports (Goufo, 2008).

Among South Africa's major export markets, there are no *high growth – low share markets*. While this specific result is of little empirical value, the broader concern emerging from the overall growth share analysis done here is the need for South Africa to expand its reach to new markets. This is necessitated by the fact that, there is little

scope for export growth in those markets in which South Africa is well-established. South Africa would therefore need to further develop new export markets, while preserving its traditional ones. The general challenge in developing markets is South Africa's lack of consistency in maize exports to certain high demand countries outside of SACU and SADC (ITC, 2014). This lack of consistency is primarily attributed to uneven surplus levels which, in certain years, preclude South Africa's regular participation in larger import markets (GSA, 2014).

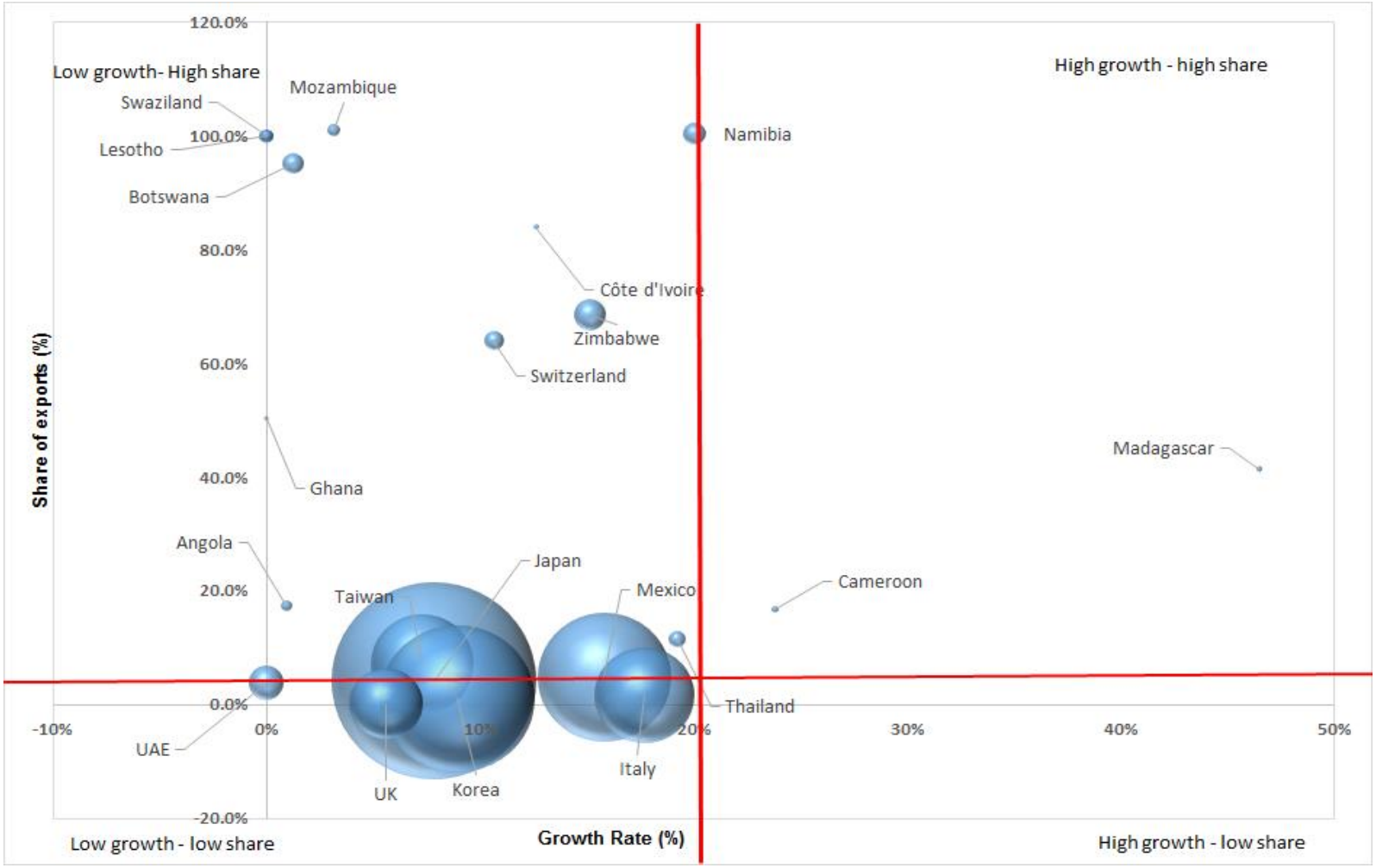


Figure 4: Growth Share matrix for South Africa's major export markets (2014)
Source: International Trade Centre (2014)

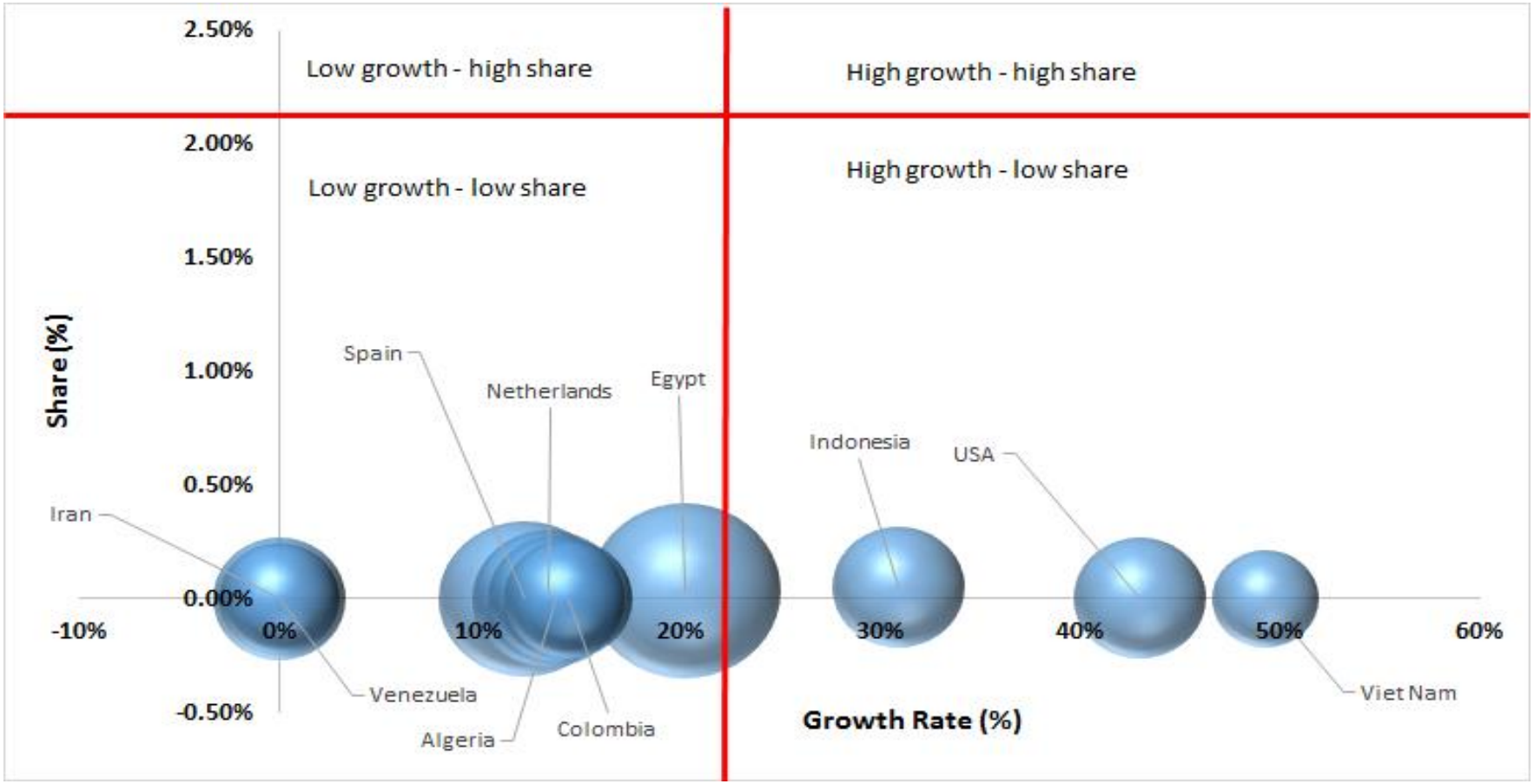


Figure 5: Growth Share matrix for major global import markets (2014)
Source: International Trade Centre (2014)

Growth – Share analysis of major global import markets

Given that South Africa exports 60% of its total value exports to four of the major global import markets, we analyse the scope for South Africa to expand its exports to other larger markets such as Spain, Iran, Venezuela, Algeria, Colombia, Egypt, Vietnam, Indonesia, USA and Netherlands (ITC, 2014). Important to note is that South Africa's market presence in all of the aforementioned countries is generally weak. Apart from Iran, Venezuela, Colombia, Indonesia and Netherlands; South Africa's weak presence in major markets is partly explained by the ban of GMO maize in larger maize importing countries (Goufo, 2008).

Out of the ten countries outlined in Figure 5, seven are *low growth – low share* markets (i.e. Spain, Iran, Venezuela, Algeria, Colombia, Egypt and Netherlands). These are countries where accessing and growing South Africa's market presence will be more difficult due to limited growth potential. Three countries (i.e. Vietnam, Indonesia and USA) are *high growth – low share* markets, implying that they are markets which represent great opportunities for expansion, and South Africa should seriously consider these countries in the future.

It is interesting to explore where Vietnam, Indonesia and USA source their imports from. In this regard, three observations were made from the ITC (2014) data, and these are as follows: Firstly, Indonesia largely imports from India, Brazil, Argentina, USA and Paraguay. Secondly, Vietnam imports from India, Argentina, Brazil, Pakistan and Cambodia. Thirdly, USA mostly imports from Canada, Brazil, Argentina, Uruguay and Paraguay. The countries that feature prominently are Brazil, Argentina, India and the USA, and they represent South Africa's strongest competition. Therefore, South Africa would have to become more competitive than Argentina, Brazil and India if it is to consider effectively penetrating the Vietnam, Indonesia and USA markets.

South Africa export potential for maize

Given the identified strategic markets for South Africa's maize exports, we extend the growth-share analysis through a look at the export potential South Africa has in the identified countries. To measure the residual opportunity that exists in strategic markets, we apply the concept of potential supply capacity by measuring the unexploited capacity for South Africa to export to a strategic market. Put differently, we seek to identify what South Africa could potentially export to the each of the identified strategic markets, constrained either by total export supply or import demand. This, per definition, is referred to as the indicative trade potential (ITP) which can is calculated as follows (Kapuya *et al*, 2014; Helmers and Pasteels, 2005):

$$ITP_{ijk} = \min\left(X_{ik}, X_{jk}\right) - X_{ij} \qquad \text{Equation 2}$$

Where $X_{ik} = \sum_{j=1}^{J} X_{jik}$ and $X_{jk} = \sum_{i=1}^{I} X_{ijk}$; and where X_{ik} is the sum of South Africa's maize exports to the world; X_{jk} is the sum of maize imports from the world by a strategic market and X_{ij} are South Africa's maize exports to the strategic market. The ITP essentially serves to show the size of the import market that is yet to be fully explored, and serves as a guide towards markets that offer substantial trade benefit for South African maize exports. However, a strong underlying assumption made in calculating the ITP is that the importing country perfectly absorbs all imports from South Africa, which therefore essentially makes the ITP value theoretic and indicative (Helmers and Pasteels, 2005). Despite this weakness, the ITP is, nevertheless, useful in ranking markets.

Another important measure that is used in this analysis is the Relative Indicative Trade Potential (RITP). The RITP expresses the ITP values in relative terms (i.e. as a percentage of South African maize exports to the world). The RITP lies between zero and one; with a value of zero indicating that South African maize exporters strongly depend on the importing country's economy; with the opposite being true (Helmers and Pasteels, 2005). Table 4 shows the trade potential of South Africa's major export markets.

Results from Table 4 show that Japan, Mexico, Korea, Taiwan, Thailand, Italy, Angola, Switzerland, Zimbabwe, UAE and the UK have a high potential for South Africa's maize exports, with relatively large markets that could be considered for export expansion. In contrast, the SACU countries (Botswana, Lesotho, Namibia, and Swaziland), Côte d'Ivoire, Madagascar, Ghana, Cameroon are low potential markets with relatively small markets.

Table 4: Trade potential for South Africa's in its maize export markets

Rank	Country	Indicative Trade Potential	Relative Indicative Trade Potential	Overall Assessment
1	Japan	499 772	0.72	High potential, large market
2	Mexico	599 951	0.86	High potential, large market
3	Taiwan	611 268	0.88	High potential, large market
4	Zimbabwe	33 897	0.05	High potential, large market
5	Namibia	(180)	0.00	Low potential, small market
6	Botswana	2 322	0.00	Low potential, small market
7	Korea	668 857	0.96	High potential, large market
8	Switzerland	13 243	0.02	Low potential, small market
9	Swaziland	-	0.00	Low potential, small market
10	Italy	677 528	0.97	High potential, large market
11	Mozambique	(168)	0.00	Low potential, small market
12	Lesotho	-	0.00	Low potential, small market
13	UAE	130 398	0.19	High potential, large market
14	Thailand	26 042	0.04	High potential, large market
15	Côte d'Ivoire	470	0.00	Low potential, small market
16	Angola	10 650	0.02	High potential, large market
17	Madagascar	1 756	0.00	Low potential, small market

18	UK	587 422	0.84	High potential, large market
19	Cameroon	4 157	0.01	Low potential, small market
20	Ghana	745	0.00	Low potential, small market

Source: International Trade Center (2014)

The RITP reveals that South Africa's maize exports are not dependent on Japan, Korea, Mexico, Taiwan, Italy and the UK economies. However, South Africa's maize exports are strongly dependant on African markets, particularly its traditional SACU and SADC trading partners. This is partly explained by the geographic proximity of South Africa to its regional markets, as well as its trading agreements through Customs Union and the Free Trade Area (FTA).

South Africa has an even higher potential to export to large global maize importers such as Egypt, Spain, Netherlands, Colombia, Iran, USA, China, Indonesia, Algeria, Venezuela, Viet Nam, Germany, United Kingdom, Saudi Arabia and Malaysia (see Table 1). However, South Africa's presence in these markets is either very weak (i.e. the UK China, Indonesia and Malaysia) or virtually non-existent (i.e. Iran, Spain, Netherlands, Colombia, Algeria, Germany, Saudi Arabia and Malaysia). The key question then is why South Africa is not exporting to these markets. A cursory analysis reveals that these major markets typically import from the largest maize exporters, namely the USA, Brazil, Argentina, Ukraine, France, India, Romania, Russian and Hungary. If South Africa is to penetrate its exports into these major markets, it again needs to be more globally competitive.

Global competitiveness of South African maize exports

In prior discussions, the analysis came to the fundamental conclusion that South African maize exports are growing at a fairly rapid pace, and this growth is above the world growth rate. The picture set by South Africa's market structure suggests that the country's maize exports are highly concentrated among the top 3 markets in most years, with the intermittent drops in the share of the top 3 being due to occasional droughts, depleted stocks and lower exports in specific years. The ITP analysis indicated that there is high unexploited trade potential in the world's largest markets, with South Africa having exhausted its export potential to the smaller regional markets. Is South Africa able to capture the un-utilised potential in the major markets? Is South African competitive enough to expand its exports in these markets? These questions evoke the need to further explore the concept of comparative advantage and competitiveness to establish South Africa's position relative to the world.

South Africa's revealed comparative advantage within the global context

According to the theory of comparative advantage, a country possesses comparative advantage if it can produce a good more efficiently (at a lower opportunity cost) than it can produce other goods (Salvator, 2011). It is in this theory that the argument of specialisation of production is founded. The pre-supposition emerging out of comparative advantage

theory is that welfare gains can be derived from increased consumption that comes as a result of the surplus to purchase imports.

Comparative advantage is more of a theoretical notion as it explains the "normative" rather that the "positive" outcome, which is more amply captured by the concept of competitiveness. Distortions in global trade necessitate a focus on the latter, although we shall use comparative advantage theory to methodically build the South African picture within the global setting. South Africa's revealed comparative advantage (RCA) in a maize is shown in Table 5, with the term 'revealed', in this case taken to mean that maize's share in the South Africa's export basket is larger than the share of the commodity's trade in the world total. Otherwise stated, the RCA measures how significant to South Africa's maize exports are relative to world trade. Mathematically, RCA's can be calculated by using the following formula (Balassa & Noland, 1988):

$$RCA_{ik} = \frac{\left(\frac{X_{jk}}{\sum_{k} X_{j}}\right)}{\left(\frac{\sum_{i} X_{ik}}{\sum_{i}\sum_{k} X_{ik}}\right)} \qquad \text{Equation 3}$$

Where X_{ik} represents the maize exports of country i in maize; and X_{jk} is the value of exports of South Africa; $\sum_{k} X_{j}$ and $\sum_{i} X_{ik}$ represents South Africa's total exports and country i exports, respectively; and $\sum_{i}\sum_{k} X_{ik}$ is the total world exports. The results for this calculation are reported in Table 5, and show the RCA index values for the years from 2001 to 2013 for the top 10 global maize exporters, including South Africa. If the RCA is greater than one, then South Africa possesses a revealed comparative advantage in maize. The higher the value, the more efficient South Africa is in the production of maize.

Table 5: Trade potential for South Africa's in its maize export markets

	USA	Brazil	Argentina	Ukraine	France	India	Romania	RSA	Russia	Hungary
2001	4.24	5.74	24.66	1.58	1.92	0.17	0.17	1.94	0.00	2.97
2002	4.62	2.80	22.91	1.63	2.20	0.13	0.89	2.33	0.00	3.49
2003	4.47	3.40	27.32	3.02	1.98	0.23	0.46	2.16	0.01	2.47
2004	5.09	4.30	24.27	3.64	1.86	1.15	1.12	1.49	0.01	2.84
2005	4.76	0.76	29.76	6.91	2.33	0.54	1.43	4.42	0.02	3.33
2006	6.07	2.94	22.89	4.02	1.85	0.67	0.68	2.13	0.03	3.63
2007	5.26	7.23	24.22	2.11	1.30	1.26	1.15	0.15	0.02	6.39
2008	5.75	3.68	26.93	5.44	1.62	2.57	1.60	3.50	0.04	4.29
2009	5.25	5.15	16.67	15.76	1.79	1.79	4.55	4.72	0.39	5.23
2010	5.26	7.34	30.44	10.19	1.75	1.58	5.87	2.52	0.07	4.99
2011	5.24	5.78	29.59	16.18	1.82	2.00	5.82	4.52	0.17	4.99
2012	3.15	11.27	30.04	29.19	1.62	1.99	5.36	2.15	0.56	5.43
2013	2.17	13.60	38.21	31.68	1.71	1.92	5.93	3.85	0.59	2.71

Source: International Trade Center (2014)

The results on the table show that South Africa has a comparative advantage in maize, and the country is at par with some of the largest exporters in the world such as Hungary, France and India. Argentina, Ukraine and Brazil have very strong comparative advantage in maize, as well as Romania and USA. Russia does not have a comparative advantage, even though it is a major global exporter.

Competitiveness of South Africa's maize sector at farm level

Under scenarios of trade distorting subsidies, such as those in the European Union (EU), USA, India and Russia, among others, the comparative advantage theory fails to hold; as reflected by the inconsistency of high export countries that have no comparative advantage (Bahta, 2004). Competitiveness, in this instance, becomes a more suitable indicator of determining South Africa's ability to participate in global markets.

In unpacking the competitiveness of major global maize exporters, we draw from the Agribenchmark (2014) data which is used by the Bureau for Food and Agricultural Policy (BFAP). Agribenchmark is a farm level network which compares global agricultural enterprises in all continents, in specific countries across the world. In this paper, we use the Agribenchmark data to compare of South African maize production costs against some of its global competitors namely, USA, Ukraine, Argentina and Brazil, as shown in Figure 6.

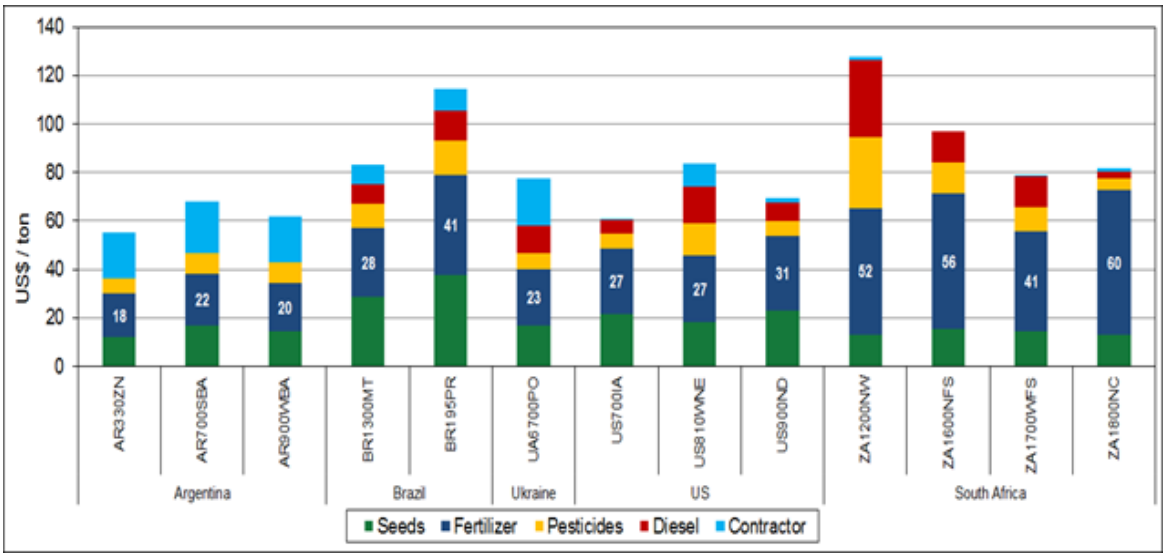


Figure 6: Farm input cost comparison of major global maize producers (2014)
Source: Agribenchmark (2014) in BFAP (2014)

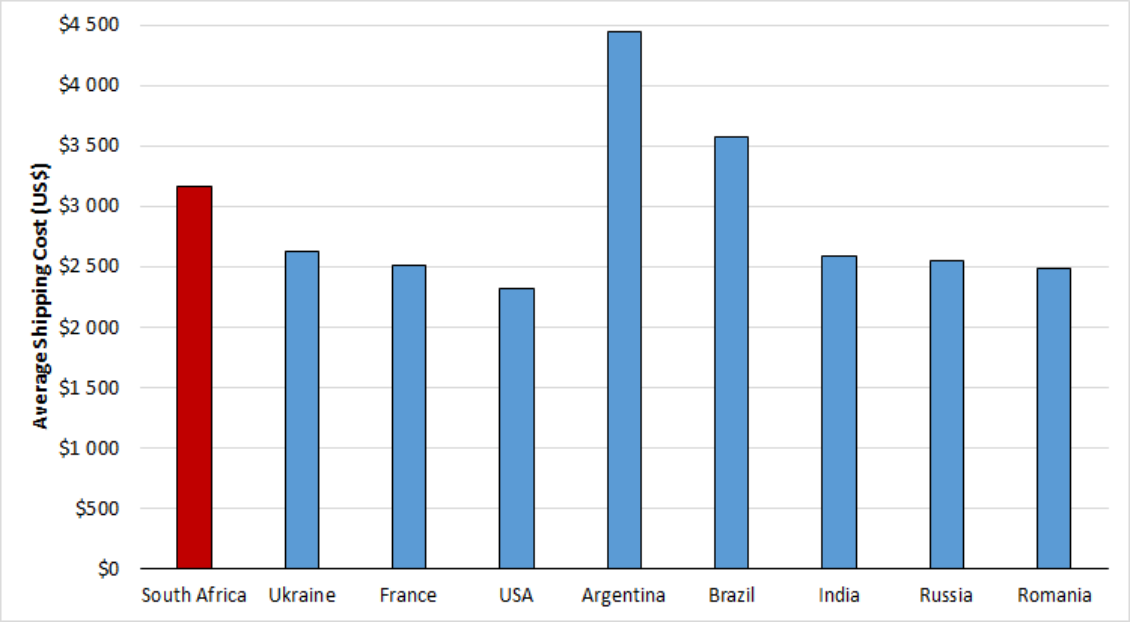
Each bar is coded to represent a typical farm in the respective countries. Figure 5 shows that Argentina and the United States produce a ton of maize more cheaply, compared to Brazil, the Ukraine and South Africa. Amongst all selected countries, South Africa (and Brazil) are relatively high cost countries, requiring more input costs to produce a ton of maize. Furthermore, Brazil and South African farmers pay more for fertilizers. In a South African typical farm in the North West province, seeds are significantly more expensive

compared to all the other countries. Similarly, a South African typical farm in the Northern Cape incurs higher fertilizer costs than all the other countries. Moreover, diesel was also found to be more costly in South African farms compared to other countries (US, Argentina, the Ukraine and Brazil). According to GSA (2014) approximately 75% of South African fertilizers are imported, and the costs are aggravated by the weak Rand. Likewise with pesticide, approximately 98% of South African agro-chemicals are imported (GSA, 2014). Overall, South African (and Brazilian) farmers establish maize at higher costs than the United States, Argentina and the Ukraine; owing to high fertilizer and pesticides costs (BFAP, 2014). This makes South Africa less globally competitive than the other world maize producers.

7.1 Competitiveness of South Africa's logistics

Logistical Costs

Normatively, deep-sea exports are in the form of (bagged/staked) dry-bulk rather than containerised freight. As an exception, containerised shipment was witnessed during the 2007/08 food price crisis period[4]. Although a comparative analysis of logistics costs of dry bulk is ideal, data constraints across all major exporters and importers made only containerised grain freight comparisons permissible. Figure 7 shows the ocean freight cost of a 40-foot full container load of cereal and grain products from South Africa as well as other major global maize exporters to South Africa's strategic export destinations (i.e. Japan, Mexico, Taiwan and Thailand). Argentina has the highest average freight rates ($4 438.27) to South Africa's top export destinations (see Figure 7). From Figure 6 it is evident that the USA has the cheapest average ocean freight costs to South Africa's top export destinations (US$2 316.27), followed by Romania (US$2 489.83) and France (US$2 510.33).



[4] Personal communication with Jannie De Villier, CEO of GrainSA

Figure 7: Comparison of average cereal and grain shipping costs of competitors to South Africa's strategic markets (2014)
Source: World Freight Rates (2014)

South Africa has the third highest shipping costs to export cereal and grain (US$3 164.33) after Argentina ($4 438.27) and Brazil ($3 575.21). According to the TRADE Research Niche Area (2013), these high prices are probably associated with South Africa's weak bargaining power with shipping lines to the respective destinations, due to lower volumes of exports compared to South Africa's peer countries. Nonetheless, South Africa's international shipping costs to growing maize markets in Asia are competitive in comparison to Brazil and Argentina. Therefore, overall, the rate of international shipping costs seem to be restrictive to South Africa's maize trade competitiveness.

Logistics Efficiency

In assessing South Africa's logistics efficiency, the paper makes use of the World Bank's (2014) Logistics Performance Index (LPI). The LPI overall score reflects perceptions of a country's logistics based on efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time (World Bank, 2014). The LPI indices and rankings are shown in Table A3 (in the appendix) and Table 6, respectively.

Table 6: Logistics Performance Index Rankings of South Africa and major competitors

	LPI rank	Customs	Infra-structure	International shipments	Logistics competence	Tracking & tracing	Time-liness
United States	9	16	5	26	7	2	14
France	13	18	13	7	15	12	13
Hungary	33	48	40	32	37	15	20
South Africa	34	42	38	25	24	41	33
Romania	40	59	64	36	43	34	27
India	54	65	58	44	52	57	51
Argentina	60	85	63	64	62	53	55
Ukraine	61	69	71	67	72	45	52
Brazil	65	94	54	81	50	62	61
Russia	90	133	77	102	80	79	84

Source: World Bank (2014)

Table 6 shows that South Africa has the fourth highest LPI score among major maize exporting countries, and this means that, together with the United States, France and Hungary, South Africa has the highest overall quality of trade and transport-related infrastructure (see LPI rank). Thus, South Africa's logistics are comparatively more efficient than all the other industrialising countries (i.e. India, Argentina, Brazil and Russia). South Africa ranks third with regard to the customs clearance processes among its major competitors (see Customs). South Africa ranks fifth with respect to the frequency with which shipments reach the consignee within the scheduled or expected time (see Timeliness).With regard to the ease of arranging competitively priced shipments (see international shipments) South Africa ranks second, and ranks third on the competence and

quality of logistics services (see logistics competence). Therefore, border logistics do not present a limiting factor for South Africa's maize trade competitiveness.

A tariff and non-tariff barrier analysis of South Africa's strategic and potentially strategic maize markets

Given South Africa's comparative advantage and global competitiveness, the paper attempts to establish the country's market access in both its own strategic markets (in which South Africa has a strong market presence) as well as major global markets (where South Africa has either a weak or no market presence). Moreover, a comparative analysis of South Africa's market access against that of its major competitors is also a factor that is important to understand. Major global producers of maize such as Argentina, Brazil, Ukraine, USA, India, France, Romania, Russia and Hungary were identified as South Africa's key competitors in global markets.

Market access in South Africa's strategic markets

In Table 6, we compare South Africa's tariffs for maize in strategic markets (namely Japan, Mexico, Taiwan, UAE, Thailand and Zimbabwe) against those of South Africa's main competitors. South Africa's market share in these countries is as follows: 68.5% in Zimbabwe, 11.4% in Thailand, 7.1% in Taiwan, 4.8% in Mexico, 4.1% in Japan and 3.7% in the UAE. South Africa faces the highest tariffs in Thailand (46.5%) and enjoys the lowest tariffs in Japan, Zimbabwe, Taiwan and the UAE (0%).

Table 6: Tariffs faced by major global exporters in South Africa's strategic markets

		Major exporters							
		RSA	EU	Argentina	Ukraine	Brazil	USA	India	Russia
Strategic markets	Japan	0.0	0.5	0.5	0.5	0.5	0.5	0.0	0.5
	Mexico	4.4	0.0	0.0	4.4	0.0	0.0	4.4	4.4
	Taiwan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	UAE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Thailand	46.5	46.5	46.5	46.5	46.5	46.5	0.0	46.5
	Zimbabwe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: WTO/TRAINS (2014)

* With specific reference to France, Romania and Hungary, who are among the top 10 global maize exporters

South Africa's main competitors face more or less similar tariffs in these markets. India, as an exception, enjoys more favourable tariffs than South Africa (and the rest of the major exporters), and this is primarily due to the fact that India has Free Trade Agreements (FTA) with Japan, UAE and Thailand (see Table 7). With better access to the Mexican market is the USA, whose geographical proximity as well as the North Atlantic Free Trade Area (NAFTA) affords it a unique advantage. Similarly, South Africa's locational contiguity as well as the SADC Free Trade Area (FTA) provides a selective advantage for the Zimbabwe market – and this explains why South Africa has a high market share in Zimbabwe.

Table 7: Trade agreements major global exporters in South Africa's strategic markets

		Major exporters							
		RSA	EU*	Argentina	Ukraine	Brazil	USA	India	Russia
Strategic markets	Japan	GSP[a]	-	-	-	-	-	FTA	-
	Mexico		FTA[c]	PTA		PTA	FTA[d]	-	-
	Taiwan	-	-	-	-	-	-	-	-
	UAE	-	-	-	-	-	-	FTA	-
	Thailand	-	-	-	-	-	-	FTA	-
	Zimbabwe	FTA[b]	-	-	-	-	GSP	-	-

Source: WTO/TRAINS (2014)

* With specific reference to France, Romania and Hungary, who are among the top 10 global maize exporters

[a] Japan's Generalized System of Preferences (GSP) scheme

[b] Southern African Development Community (SADC) Free Trade Area (FTA)

[c] Mexico-EU agreement

[d] North Atlantic Free Trade Area (NAFTA)

With the exception of Zimbabwe, all of South Africa's strategic markets are Northern Hemisphere countries. This means that for South Africa to effectively compete and grow its overseas strategic markets, a greater emphasis on reducing the production and logistics cost would be imperative in overcoming the distance-cost factor and improving competitiveness.

Market access in potentially strategic markets

Identified as potentially strategic markets are major importing countries such as Columbia, Iran, USA, Indonesia, China, Venezuela, Saudi Arabia, Malaysia and Vietnam. These are countries that have large markets, and in which South Africa has a high export potential, but obtaining little or no market presence (see Table A1). South Africa's market share in China and Indonesia is 0.04%, respectively; while that in Malaysia is 0.05%. The rest of the major markets of potential strategic value show that South Africa's market share is 0%.

Tariff data shows that South Africa faces relatively similar tariff levels as its major competitors (see Table 8). However, India's and Vietnam, as well as the USA and Columbia have FTAs and this explains why there is high volumes of maize trade between the respective countries (see Table 9).

Table 8: Tariffs faced by major global exporters in potentially strategic markets

		Major exporters							
		RSA	EU*	Argentina	Ukraine	Brazil	USA	India	Russia
Potentially strategic	Columbia	18.3	18.3	18.3	18.3	18.3	0.0	18.3	18.3
	Iran	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	USA**	-	-	-	-	-	-	-	-
	Indonesia	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	China	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	Venezuela	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Saudi Arabia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Malaysia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Vietnam	17.5	17.5	17.5	17.5	17.5	17.5	0.0	17.5

Sources: WTO/TRAINS (2014); Chizari (2013)

* With specific reference to France, Romania and Hungary, who are among the top 10 global maize exporters

**The USA charges an Ad Valorem tariff of between [0.05 cents/kg] and [0.25 cents/kg]

Table 9: Trade agreements major global exporters in South Africa's strategic markets

		Major exporters							
		RSA	EU*	Argentina	Ukraine	Brazil	USA	India	Russia
Potentially strategic markets	Columbia	-	-	-	-	-	FTA		-
	Iran	-	-	-	-	-	-	-	-
	USA	AGOA	-	-	-	-	-	-	-
	Indonesia	-	-	-	-	-	-	-	-
	China	-	-	-	-	-	-	-	-
	Venezuela	FTA	-	FTA	-	FTA	-	-	-
	Saudi Arabia	-	-	-	-	-	-	-	-
	Malaysia	-	-	-	-	-	-	FTA	-
	Vietnam	-	-	-	-	-	-	FTA	-

Source: WTO/TRAINS (2014)

* With specific reference to France, Romania and Hungary, who are among the top 10 global maize exporters

Why has South Africa not established itself in major global importing markets given that its competitors face relatively the same tariff levels in these markets? In the case of Venezuela and Columbia, the main suppliers of maize are Brazil, Argentina, USA, (Paraguay, Mexico, Uruguay and Ecuador)[5] ; and this is likely due to global competitiveness as well as locational advantage. In 2012, Vietnam imported 71.1% of its maize from India, with 16.2% coming from Argentina, followed by Brazil with 3.6% (ITC, 2014). India's large market share in Vietnam is most likely due to the geographic proximity, and more importantly, the FTA. Meanwhile, in 2013, China imported 90.9% of its maize from the USA, with Ukraine supplying 3.3% and Argentina 2.0%. In the Chinese context, the significance of the USA's exports could be explained by the cost competitiveness, as shown by the Agribenchmark (2014) and World Freight Rates (2014) results, previously discussed. As such, the possible reasons that South Africa's presence is weak or absent in the major markets could be due to cost-competitiveness, and to some extent, the absence of trade agreements as well as the geo-locational disadvantage.

Non-Tariff Barriers: Genetically Modified (GM) maize issues

In addition to the aforementioned constraints restricting South Africa's penetration of markets (i.e. competitiveness, trade agreements and geo-location disadvantage), South

[5] In 2013, Brazil's market share in Columbia is 56.7% of Columbia's, with Argentina 23.6%, USA 17.7% and Paraguay 1.9% (ITC, 2014). In Venezuela, the USA's market share is 45.2%, Argentina 25.7%, Mexico 14.3%, Brazil 8.1%, Uruguay 4.3% and Ecuador 1.9%.

Africa faces an important non-tariff barrier in the form of non-GM regulation in specific markets. These include Egypt, Spain, Netherlands, Italy, Algeria and the UK (see Table 10 and A2). Approximately 85% of South Africa's maize is GM (Maize Trust, 2014). This implies that most of South Africa's maize is excluded from markets that prohibit GM maize.

Table 10: Countries that have a ban on GM crops

Continent	Country/State/Countries	Comments
The Americas	USA (California), Brazil and Paraguay	While the United States still largely allows for the growth and import of GMO foods and does not demand food labelling, South American countries such as Brazil and Paraguay have restrictions on GMO foods.
Africa	Algeria and Egypt	Both have laws restricting GMO foods. In Algeria, both the planting and distribution of GMO foods is illegal, while in Egypt, GMO foods must be approved before they can be distributed
Asia	Thailand, China, and Japan	All have laws limiting GMO foods. Thailand has banned imported GMOs as early as 2001, while the rest of the countries have had more recent bans
Europe	Norway, Austria, Germany, UK, Spain, Italy, Greece, France, Luxembourg and Portugal	All have put in place GMO restrictions. France made an important step in the no-GMO movement by specifically defining exactly what "GMO-free" means when it comes to food labelling. Ireland has banned all growing and cultivating of GMO foods and the European Union "a governing coalition of European countries" has considered a Europe-wide banning of GMO foods.
Middle East	Saudi Arabia	It has banned the growing of GMO foods and the importing of GMO wheat.

Source: Kamua and Karin (2013)

The aspect of GM regulation is an important caveat in considering the capacity of South Africa to establish and grow markets in potentially strategic countries such as China, Saudi Arabia, Algeria and Egypt; as well as markets in the EU. In Thailand, where South Africa already has a market presence, a strategic position is necessary to understand the legislation that governs GM imports in order to sustainably grow the market share in the short to medium term. A considerable portion of South Africa's key markets, nonetheless, accepts GM maize. Figure 6 displays a map of where GM crops are generally embraced.

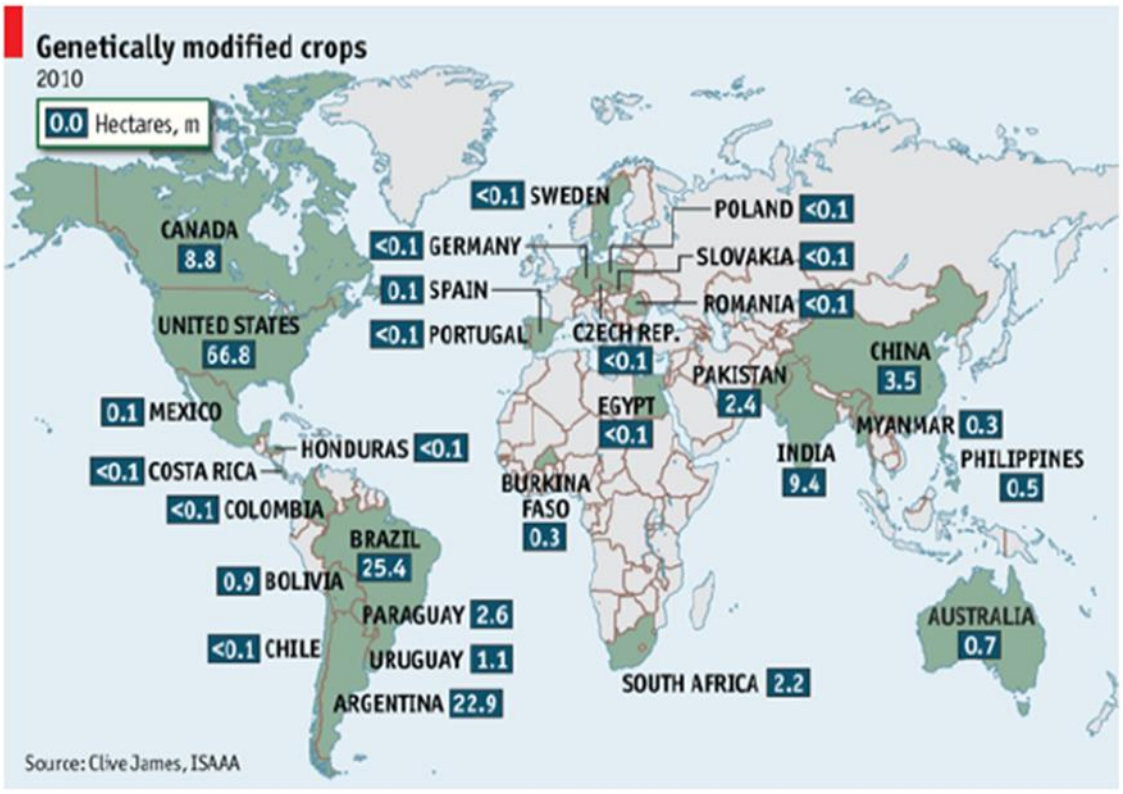


Figure 6: Countries which accept GM crops
Source: Kamau and Karin (2013)

Summary and conclusion

Apart from its traditional market within SACU and SADC, South Africa's maize exports are generally irregular and inconsistent. This lack of consistency is primarily attributed to uneven surplus levels which, in certain years, preclude South Africa's regular participation in larger import markets. South Africa exports to four of the major global import markets, which in 2013, accounted for 61% of the country's total maize exports.

We therefore identify strategic markets in which South Africa has a high trade potential with the vision of defining the basis for a longer term sustainable export market development strategy. We found that South Africa's maize exports are growing faster than the world's annual average growth, and that these exports are concentrated among a few countries. These two features underline the need to expand South Africa's export presence beyond its traditional markets. Identified as high potential strategic markets is Japan, Mexico, Taiwan, United Arab Emirates, Thailand and Zimbabwe. These are markets that South Africa should prioritise on developing in the short to medium term.

Although Madagascar and Cameroon were found to be strategic markets with high levels of growth and also markets in which South Africa establishes a higher market share, they were nonetheless small, and possessing low export potential. They are, therefore, markets that should be de-prioritised when considering long term export market development.

Italy, Korea and the UK, though being large markets with a high export potential, they were found to be low growth – low share markets, and therefore not considered as being of strategic value. The export intensity index revealed that these markets have a bias against

South African maize exports, with Brazil, Argentina, USA, Romania, and Ukraine being the main suppliers of maize to these countries.

Among these major global exporters, South Africa was found to be a relatively high cost producer of maize, with imported fertilisers, pesticides and fuel accounting for a major part of the costs. This means that South Africa is less competitive, at farm level, when compared to countries such as Argentina, Ukraine and the USA. Moreover, South African, shipping costs are fairly expensive, being the third highest after Argentina and Brazil. Nonetheless, South Africa's supply chain logistics are among the most efficient compared to its major competitors.

In terms of market access, South Africa faces relatively similar tariff levels compared to its global competitors. India enjoys preferential market access in several major markets due to its FTAs with Mexico, UAE, Thailand, Malaysia and Vietnam. With regards to non-tariff barriers, South Africa faces restrictions in markets such Thailand, Saudi Arabia and within the European Union countries (i.e. Italy, UK and Spain).

Given the foregoing, South Africa's weak presence in major maize importing markets can be attributed to a general lack of market development initiatives (i.e. export promotion and bilateral trade agreements), as well as high production and logistical costs. This in essence means that, for South Africa to establish and/or grow its markets, particularly in large import markets, the country has to improve its global competitiveness and seek preferential market access arrangements. We therefore recommend a sectoral maize strategy which incorporates these elements, with a view of re-positioning South Africa in the global market.

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Appendix A

Table A1: South Africa's export potential for major global maize import markets

Country	RSA's market share in country *i*	Indicative Trade Potential	Relative Indicative Trade Potential	Overall Assessment
Taiwan	7.12%	611 268	0.88	High potential, large market
Colombia	0.00%	695 942	1.00	High potential, large market
Iran	0.00%	695 942	1.00	High potential, large market
USA	0.00%	695 941	1.00	High potential, large market
China	0.04%	695 586	1.00	High potential, large market
Indonesia	0.04%	695 583	1.00	High potential, large market
Venezuela	0.00%	695 942	1.00	High potential, large market
Viet Nam	0.00%	605 575	0.87	High potential, large market
Malaysia	0.05%	512 596	0.74	High potential, large market

Source: International Trade Center (2014)

Table A2: South Africa's export potential for major global maize import markets where there are GM restrictions

Country	RSA's market share in country *i*	Indicative Trade Potential	Relative Indicative Trade Potential	Overall Assessment
Egypt	0.01%	695 702	1.00	High potential, large market
Spain	0.00%	695 942	1.00	High potential, large market
Netherlands	0.00%	695 942	1.00	High potential, large market
Italy	1.64%	677 528	0.97	High potential, large market
Algeria	0.00%	695 942	1.00	High potential, large market
UK	0.16%	587 422	0.84	High potential, large market

Source: International Trade Center (2014)

Table A3: Logistics Performance Index of South Africa and major competitors

	LPI rank	Customs	Infra-structure	International shipments	Logistics competence	Tracking & tracing	Time-liness
United States	2.99	2.55	2.83	2.96	2.93	3.15	3.49
France	2.94	2.48	2.93	2.80	3.05	3.03	3.39
Hungary	2.98	2.69	2.65	2.95	2.84	3.20	3.51
South Africa	3.92	3.73	4.18	3.45	3.97	4.14	4.14
Romania	3.43	3.11	3.20	3.45	3.62	3.30	3.88
India	2.69	2.20	2.59	2.64	2.74	2.85	3.14
Argentina	3.08	2.72	2.88	3.20	3.03	3.11	3.51
Ukraine	3.46	2.97	3.18	3.40	3.33	3.82	4.06
Brazil	3.85	3.65	3.98	3.68	3.75	3.89	4.17
Russia	3.26	2.83	2.77	3.32	3.20	3.39	4.00

Source: World Bank (2014)

The index ranges from 1 to 5, with a higher score representing better performance. Data are from Logistics Performance Index surveys conducted by the World Bank in partnership with academic and international institutions and private companies and individuals engaged in international logistics. Respondents evaluate six core dimensions (see columns) on a scale from 1 (worst) to 5 (best).