EXPORTING AND INNOVATION PERFORMANCE: AN ANALYSIS OF THE SMALL, MICRO AND MEDIUM ENTERPRISE GROWTH INDEX (SME GROWTH INDEX) IN SOUTH AFRICA

by

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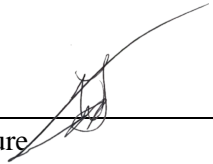Supervisor: MR. GARETH ROBERTS & PROF. NEIL RANKIN

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Abstract

After the fall of apartheid in 1994, the newly elected African National Congress (ANC) embarked on a journey to redress past injustices left behind by the previous regime. In order to tackle the economic, social and spatial disparities left behind by the previous administration, the ANC highlighted key areas within the South African economy that could be utilised to lessen the gap between members of the South African population. One of the key areas highlighted was that of the importance of small, micro and medium enterprises (SMMEs), and the need for these firms to be engaged within the export market.

This paper unpacks the inherent characteristics that may differ between exporting, and non-exporting SMMEs in the South African economy. Consequently, this paper also shows that there is a definite positive association between exporting behaviours and innovation behaviours within the SMME sector.

This paper utilises the SME Growth Index as its primary dataset. This dataset allows the paper to investigate the primary characteristics of South African SMME firms that are exporting versus those that are not. Furthermore, as the literature highlights, there is an important link between exporting and innovation behaviours. This dataset thus further allows the paper to illustrate that this link does hold within South Africa, and that there is a positive association between these behaviours.

The utilisation of logistic regressions allows this paper to show the strength of the link between innovation and exporting practices in South African SMMEs, but at no point is a mention of causality made, due to the inherent endogeneity and sample selection bias that is present in this study.

The paper concludes by showing that there is indeed a difference between South African exporting firms, and their non-exporting counterparts, thus illustrating that a "one-size-fits-all" policy plan to enhance exporting culture amongst SMMEs is not acceptable. Furthermore, the paper does establish a positive association between innovation and exporting behaviours amongst South African SMMEs, something which had not yet been done in the existing literature.

Contents

1. Introduction
1.1 Background

1994 saw a new dawn for South Africa; it was the era of democracy, an era that promised to be filled with new possibilities and opportunities for all South Africans. The newly elected African National Congress (ANC) was faced with many challenges that were created and left behind by the previous administration. Most notably, the need to redress past injustices of the Apartheid regime were seen as priorities, and the challenge of rectifying the economic, social, and spatial disparities of individuals within the economy become the first item on the ANC agenda. There are naturally many different aspects to how these disparities will hopefully be resolved, but the aspect that this paper will be dealing with is the ANC's realization and proclamation of the importance of small, micro and medium enterprises (SMMEs), and the need for firms of these types to be engaged in the export market.

After 20 years of policy changes, the main policy plan that is being utilized in 2014 is that of the National Development Plan (NDP). The NDP recognises the importance of small, micro and medium enterprises in South Africa as drivers of economic growth, and as absorbers of excess labour within South Africa. According to Abor and Quartey (2010), small businesses contribute approximately 57% to the South African GDP, and are responsible for approximately 61% of South African employment. These figures alone provide a clear indication that small businesses in South Africa have a massive impact on the South African economy. The NDP goes further to state that it envisages SMMEs participating in the export market; however, at present, South Africa's economy is not demonstrating widespread export potential (Rankin, 2013).

South African export markets are dominated by a small group of firms, and South African exporting is relatively more concentrated than it is among its peers. The World Bank has already illustrated that the top 1% of South African exporters account for almost 80% of exports by value (Cebeci, et al., 2012). This is a clear indication that the past and present policy interventions created by the South African government have not been as effective as desired. It is clear that the firms dominating the export market are large in nature, leaving the SMME sector floundering in their wake. If government is to truly create an effective policy intervention such that SMMEs can become more successful within the South African export market, then a greater understanding of the existing dynamics within the SMME export market is required.

It is evident that policy is not the only reason that SMMEs may not be operating within the South African export market – the notion of innovation also needs to be taken into account. Basile (2001), and Bernard & Jensen (2004) argue that firms with a tendency to innovate show a higher likelihood of engaging in exporting behaviour. Higon & Driffield (2011) further expand this argument by attempting to illustrate that there is a marked difference in exporting behaviours between firms that pursue product innovation, and those that pursue process innovation[1].

In order to understand the brackets that a particular SMME may fall into, it is important to be cognisant of the divisions as defined by the National Small Business Act. The Act classifies firms as either very small, small, micro or medium enterprises according to their level of annual turnover and/or the number of employees within the firm, as shown by the following table.

Table 1: The divisions among SMMEs as defined by the National Small Business Act

Enterprise Size	Number of Employees	Annual Turnover (in South African rands)	Gross Assets, Excluding Fixed Property
Medium	Fewer than 100 to 200. Industry dependent.	Less than R4 million to R50 million. Industry dependent.	Less than R2 million to R18 million. Industry dependent.
Small	Fewer than 50.	Less than R2 million to R25 million. Industry dependent.	Less than R2 million to R4.5 million. Industry dependent.
Very Small	Fewer than 10 to 20. Industry dependent.	Less than R200 000 to R500 000. Industry dependent.	Less than R150 000 to R500 000. Industry dependent.
Micro	Fewer than 5.	Less than R150 000.	Less than R100 000.

Source: The National Small Business Act 102 of 1996

Bearing in mind the afore mentioned divisions, it is important to ascertain what proportion of the South African business environment these divisions represent. The following table obtained from Wittenberg, Arrow and Kerr (2013), is based on figures gathered from the Quarterly Employment Survey of Statistics South Africa. The table shows the composition of the business sector in accordance with how many employees a firm had.

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[1] This paper will consider both product and process innovation. When the need to differentiate between the two arises, a clear distinction will be made. When the term "innovation" is used in isolation it is intended to encompass both product and process innovation.

Table 2: Composition of the business sector in accordance with the number of individuals employed

Size Category Proportions	Waves		
	Wave 1	Wave 6	Wave 21
1-19	0.395	0.324	0.295
20-49	0.207	0.201	0.207
50-99	0.150	0.171	0.176
100-249	0.141	0.161	0.171
250-499	0.055	0.074	0.078
500-999	0.027	0.037	0.038
1000-2499	0.014	0.019	0.022
2500-4999	0.006	0.007	0.008
5000+	0.005	0.006	0.005
Total	1	1	1

Source: Wittenberg, Arrow & Kerr (2013)

All the waves shown in the preceding table highlight the fact that firms employing 1-19 individuals[2] constitute the largest proportion of the business sector. A fundamental finding as these businesses would be classed within the "small" business paradigm, and as a result, these are the firms which should be given most focus when attempting to grow South African firm export culture.

This paper will begin by exploring the characteristics that make up exporting SMMEs in South Africa - comparing them to the characteristics of their non-exporting counterparts where possible. This paper will then go on to argue that firms which successfully innovate experience a higher likelihood of engaging in exporting behaviour. This is in accordance with the work carried out by Melitz and Redding (2012), whereby it is supposed that the choices made by a firm in terms of characteristics influences the productivity of a firm. These decisions in turn, are affected by the trading environment and the firm's trade participation. This induces a complementarity between choices regarding trade, and firm productivity – which Melitz and Redding (2012) argue is largely determined by a firm's decision about its product scope, innovation and technology adoption.

It is for this reason that it is essential to understand the characteristics that make up exporting SMMEs in South Africa (versus non-exporting firms), and consequently to understand

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[2] This size class represents micro and very small enterprises.

the link between exporting and innovation in South African SMMEs. Ultimately both of these objectives influence the productivity of a firm, and consequently the firm's impact on the South African economy.

1.2 Core Research Question

Does the presence of successful innovation in firms within the South African SMME sector show a positive association with the exporting behaviours of said firms?

1.3 Research Objectives

- Establish the characteristics that exporting South African SMMEs exhibit, and contrast them with non-exporting SMMEs where possible.
- Establish a positive association between successful innovation and increased exporting behaviour.

2. Literature Review
2.1 Exporting in South Africa – A look at the SMME exporting landscape

South Africa's output growth since 1960 has been rather disappointing; however, it is South Africa's export performance over this period that has proved even more dismal. Although exports have grown in absolute terms since 1960 (shown in Figure 1), exports per capita of 2013 are not much higher than they were in 1960 (shown in Figure 2). This export performance is extremely poor when compared internationally (Hausmann & Klinger, 2008) – especially considering the fact that South Africa ranks 62nd of 156 countries in terms of exports per capita (Government Department Bank of Puerto Rico, 2012).

Figure 1: Absolute Value of South African Export (Rands – Constant 2010 Prices)
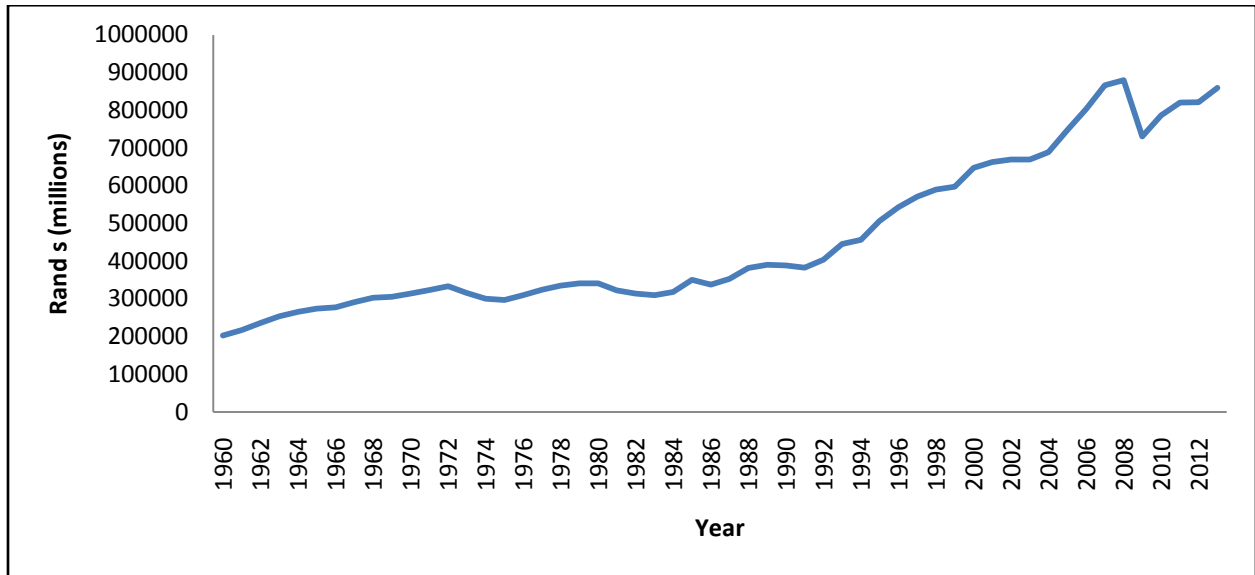
Source: Author's calculations using South African Reserve Bank statistics

Figure 2: Exports Per Capita (Rands - Constant 2010 Prices)
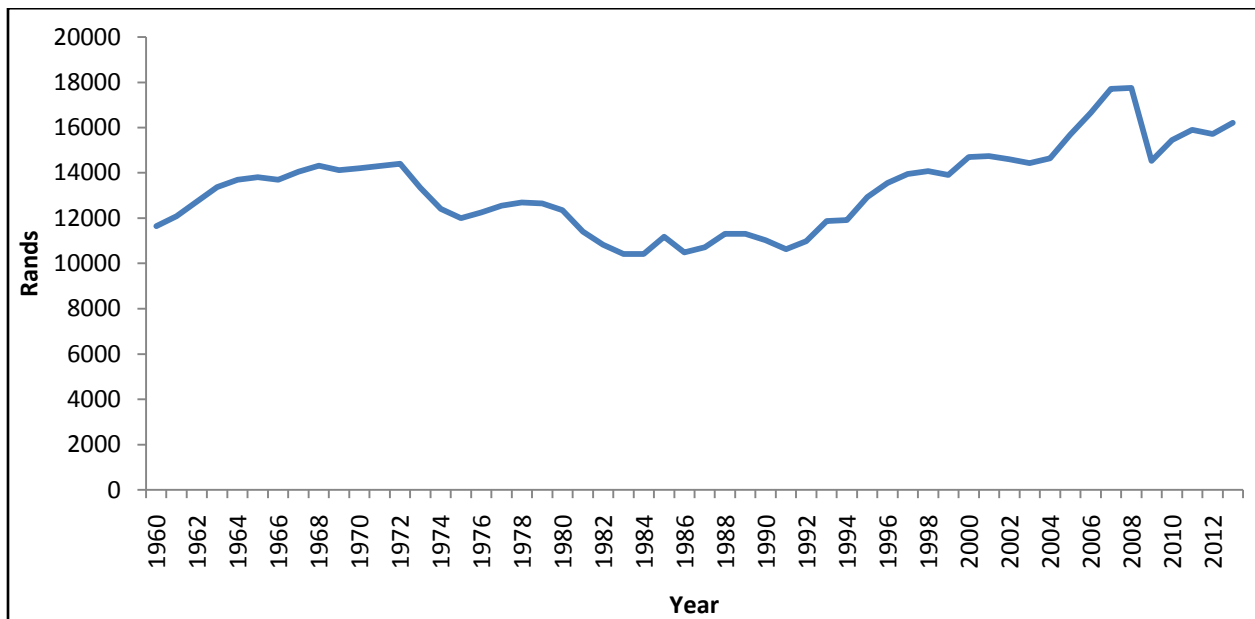
Source: Author's calculations using South African Reserve Bank statistics

It is possible that this weak export status of South Africa may be attributed to the country's status as a natural resource exporter, notwithstanding evidence that the "natural resource curse" isn't much of a curse after all (Ferranti et al., 2002). However, as Hausmann & Klinger (2008) stated, South Africa's export performance is low even among other natural resource exporters[3]. Furthermore, a principle reason behind this poor export performance has been the gradual decline of the mining sector in South Africa while dealing with a rising population. Mining faces a rather fixed endowment, and has not been able to keep up with the population growth of the country (Hausmann & Klinger, 2008).

Perhaps this poor performance is a legacy of apartheid-related sanctions (Hausmann & Klinger, 2008). During the 20 years since South Africa was liberated from the Apartheid regime, the country has seen many different policy plans being introduced to attempt to rectify the disparity within the country. A large degree of which have proved to be disappointing and unrealistic in their expectations (Edwards, et al., 2014). After 20 years of policy changes, the main policy plan that is being utilized in 2014 is that of the National Development Plan (NDP).

South Africa's National Development Plan aims to engage SMMEs within the export market and in doing so bolster the exports of the country consequently create a driving mechanism of job creation. However, exporting is a rare and specialised activity, and much of it is concentrated amongst a relatively small number of firms. There are definite potential gains to be made if a greater propensity to export is created amongst SMMEs, however, for this to happen, and more specifically, if some type of policy intervention is to be created to encourage exporting behaviour, it is important to understand the existing dynamics concerning exporting SMMEs in South Africa.

In order for South Africa to generate a larger export culture amongst SMMEs, an environment needs to be created whereby firms have the characteristics of exporters, especially the higher levels of productivity (Rankin, 2013). The SME growth index provides a unique data set to track how small and medium enterprises are faring in the global market to identify the challenges which these firms face.

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[3] Hausmann & Klinger (2008) measured South Africa's natural resource exporting against similar exports of Argentina, Canada, Australia, and Malaysia. It was concluded that these countries had grossly outperformed South Africa from 1960 onwards in terms of exports per capita.

Exporting and non-exporting firms are different in a number of ways. Wagner (2010) states that on average, exporters are larger[4], utilise more physical capital per employee, pay higher wages to each employee[5], have higher human capital, and are more highly involved in innovation practices. It is important to note that while these characteristics may arise, one must be very cautious not to infer a causal element here – it is very possible that exporting firms require all of the above characteristics, while it is equally likely that the above characteristics breed a firm with exporting capabilities. Wagner's (2010) results were based on data that was collected from German manufacturing firms.

When considering firms in the South African economy, Rankin (2013) reiterated the findings by Wagner (2010). South African SMMEs appear to exude higher levels of productivity, pay higher wages, and are more capital intensive (on average). In terms of total factor productivity (TFP), a measure of overall competitiveness, exporters perform better than non-exporters, particularly within the manufacturing sector of the South African economy.

The result of a higher TFP for exporting firms can also be seen within Spanish firms (Cassiman & Golovko, 2007), illustrating that the result is not only applicable to developing nations, but also to more developed nations.

Geography has long been cited as an important component in the exporting decisions of a firm. Distance from markets constitutes a sizeable component of overall trade costs (Anderson and Van Wincoop, 2004; Limao and Venables, 2001), which in turn affect the volume, type and range of products traded (Djankov et al, 2010). Standard gravity based models, for example, reveal that a one percent increase in bilateral distance reduces trade flows by between 0.5 and 1.5 percent, with this effect appearing to rise over time (Disdier and Head, 2008). Remoteness of markets also restricts participation by firms in global value chains (Edwards et al., 2014). Seeing as though South Africa is located at the southern tip of Africa, it is of considerable interest to explore which regions South African SMMEs are managing to export to, especially considering the considerable bilateral distance between South Africa and most of the trade regions available.

The preceding literature paints a fair picture as to what characteristics differ between exporting and non-exporting firms; however, what is lacking is still a degree of more finite detail. There is a clear gap in the existing literature to unpack numerous other factors that may

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[4] When measured by number of employees.
[5] This allows them to be considered as more human capital intensive than non-exporting firms.

differ between the exporting and non-exporting firms. We turn now to some literature that justifies the choices of the individual characteristic variables employed within this study.

The 1999 GJMC-World Bank SMME survey found that race was a predominant individual characteristic that helped to determine SMME growth, and consequently exporting behaviours. Given the post-apartheid society of current South Africa, many black individuals still struggle to obtain the correct financing, nor do they possess enough collateral to ensure banking assistance that could help engage growth and thus breed exporting (Chandra et al., 2001).

Age of an owner/manager can also be shown to be influential in the growth stakes of an SMME. Yet again bearing on the post-apartheid legacy, age is a massive determinant in the determination of the growth of a firm and consequently exporting (Blottnitz et al., 2002).

Lastly, utilising gender to explore the discrepancies between males and females operating within the SMME construct can prove fruitful when trying to ascribe which individual characteristics influence firm exporting (Ownership Characteristics of Classifiable U.S Exporting Firms, 2012).

As mentioned in the introduction of this paper, Melitz and Redding (2012) argue that the choices made by a firm in terms of characteristics influences the productivity of a firm. These decisions in turn, are affected by the trading environment and the firm's trade participation. Thus a complementarity between choices regarding trade, and firm productivity is introduced – which Melitz and Redding (2012) argue is largely determined by a firm's decision about its product scope, innovation and technology adoption.

This paper will now turn its attention to literature that is pertinent to the discussion on the relationship between exporting and innovation behaviours within SMMEs.

2.2 Literature Review: Exporting and Innovation

Due to market constraints, knowledge is a commodity that cannot be adequately traded; as a result, trading "innovation" is not necessarily viable. Hence, as a substitute, it is supposed that this "innovation" is instead spent domestically on goods that can be tangibly traded, and thus export markets are born (Cassiman & Martinez-Ros, 2007).

Vernon (1966) was one of the first researchers to propose a natural progression from innovation in a domestic market to exporting behaviours, and eventually to imports of the same product into the home market. Utilizing the product life cycle theory, Vernon (1966) argued that companies would be better off developing new products for relatively high income consumers that would have a labour saving effect on the production process as capital was more freely available. In the early stages of the product life cycle it is important to be close to the domestic market in case the need for making adjustment to the product characteristics should arise (Antras, 2005). Once a firm had utilized all of its domestic market power (granted by the innovation of a new product or process), the firm would start exporting to capitalize on the innovation in the foreign market as at this stage products are still highly differentiated. Finally, as the new product characteristics become more standardized and a dominant design emerges, firms become more focussed on efficiency and process innovation, rather than innovating new product design. According to this product life cycle theory, product (and later on, process) innovation are intimately linked to the decision of a firm to export.

In 1979, Paul Krugman published a paper regarding innovation and the transfer of technology in the world. It was proposed that there are two countries in a simple general equilibrium, the North, and the South. The North was a country that innovated, while the South was a non-innovating country. The North would therefore produce products which would be exported to the South. Overtime technology would diffuse and the South would adopt the same technology; due to the lag, the North would continuously innovate, create new products and export them to the South, while the South would produce old products which were imported by the North. Thus, it was shown that the country that innovates is more likely to be successful, enjoy a higher productivity, and greater share of the export market – the same theory can be applied to the firm level.

Hirsch and Bijaoui (1985) was one of the first empirical papers to try and measure the relationship between innovation and exporting behaviours. The paper measured the relationship

between research and development expenditure of Israeli firms, and their subsequent exporting behaviour. The paper concluded that firms that innovate gain a short, but certain monopoly on the product or process that has been innovated, thus allowing them to be price setters; whereas firms that are not innovating are price takers. Thus, an innovating firm is afforded the option of discriminating between foreign and domestic markets, while the non-innovating firm is not.

Basile (2001) expressed a similar result to that of Hirsch and Bijaoui (1985), by illustrating from a sample of Italian manufacturing firms, that firms which showed either process or product innovation were more likely to export. Bernard and Jensen (2004) showed that changing the SIC[6] code of a product, could significantly increase the probability of the product entering the export market.

Papers by Cassiman & Golovko (2006), and Cassiman & Martinez-Ros (2007) both show evidence that the link between innovation and exporting behaviour holds. The former paper reiterates the findings of Vernon (1966), while the latter paper attempted (unsuccessfully) to show that productivity is a greater proponent of export behaviour than innovation is. Melitz and Redding (2012) continues this argument by stating that firm productivity and exporting can evolve due to exogenous shocks, but also as an outcome of endogenous innovation or technology adoption decisions. Melitz and Redding (2012) further point out that specific dynamic models may capture the complementarity between firm production and trade; this basically states that the decision to export at one point in time is linked to other decisions regarding innovation or technology adoption at other points in time.

More recent empirical work has consistently found that exporters (relative to non-exporters) are significantly more likely to be associated with innovation practices and the adoption of new technologies. Verhoogen (2009) found that exporting Mexican firms are more likely to be ISO 9000 certified[7] than non-exporters; and Bustos (2011) showed that Argentinean exporting firms were more likely to spend more on new technologies (per worker), than non-exporting firms. Rankin and Schöer (2013) further illustrate that there is a link between export destination and product quality in South Africa – interpreting this another way allows us to state that in order for South African firms to adequately export into different regions, they must have a

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[6] Standard Industrial Classification code – these were altered to make the same product appear to be "newer".
[7] Verhoogeen (2009) utilised this as a proxy for the use of more advanced production techniques.

product of higher quality, this in essence implying that some form of product or process innovation must have taken place at the firm level.

The literature seems to concur that there is a defined link between innovation and exporting behaviours in firms. However, this has not yet been shown in a South African context. – all of the above studies were conducted in economies that are decidedly different from that of the South African economy, and it is therefore vital that these results can be shown to hold within a South African environment.

2.3 Importance and Benefits of the study

This paper will fill a vital gap in the existing literature. Firstly, by determining the characteristics that may differ between firms that export and those that do not (in a South African context) will allow policy intervention to be more accurate and effective. If this paper can indeed show that these two sets of firms possess different characteristics, it will no longer be sufficient to treat these heterogeneous groups of firms with a "one size fits all" policy plan.

Secondly, if this paper can successfully conclude an association between innovation and exporting behaviours in the South African context, it will have filled another vital gap within the existing literature. If this association can be positively shown it will also provide another avenue for policy exploration – up until this point policy has generally treated innovation and exporting as completely separate entities. If this is truly not the case, a more whole and encompassing policy plan may be required in order to successfully generate the exporting and innovation results hoped for by the South African government.

3. Hypothesis

This paper hypothesizes that there are different characteristics between South African SMMEs that export and those that do not.

This paper further hypothesises that there is a positive association between innovation and exporting behaviour.

4. Data and Methodology
4.1 Dataset, dataset limitations, and variables
4.1.1 Dataset

This paper will employ the "SME Growth Index" as its primary dataset. This dataset has a panel dimension[8] as it encompasses approximately 360 firms that have been tracked, and interviewed over a 3 year period (2011, 2012, and 2013). The dataset had three primary requirements for firms to meet before being considered eligible for inclusion:

1. The firm has been in operation for two years or more (this was not strictly adhered to).

2. The firms must employ between 10 and 49 employees (this was not strictly adhered to).

3. The firms had to form part of either the manufacturing sector, business services sector or tourism sector.

Utilizing the classification system proposed by the New Business Act, the SME Growth Index dataset is mostly comprised of firms falling into the micro, and small business classifications. These firms account for 88.35% of the entire sample, while the remaining 11.65% belong to the medium enterprise class. These percentages are approximately equal to the findings by Wittenberg, Arrow and Kerr (2013)[9], once the percentages were adjusted to exclude firms that were too large in terms of their employee base to be considered part of the SMME construct.

The dataset contains information on whether a firm exports or not; as well as basic demographic characteristics of the firms in question. Moreover, the dataset contains information regarding the innovation practices of the firms. Data exists to capture whether a firm did (or did not) innovate, whether the innovation was of the product or process variety, amidst other indicators.

4.1.2 Dataset Limitations

Firstly, the dataset being utilized can be considered small in comparison to other South African datasets pertaining to SMMEs, namely the FinScope and ICA datasets. However, this paper believes that while the SME Growth index dataset may be smaller than the afore mentioned datasets, it is more thorough in its surveying technique and provides a better basis of information in the long run. Any forms of analysis run on this dataset can only be done on firms that have

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[8] In raw form the dataset is represented by three separate waves; this paper constructed the panel dimension by matching firms across these waves according to a unique identification number that was assigned to each firm when they entered into the sample.

[9] Shown in table 2.

survived the period of 2011 to 2013. Unfortunately, the dataset did not collect the necessary information from firms that exited the market during this period. This is a clear indication of selection bias. However, previous studies by McPherson (1992) employed a Heckit model to examine this form of selection bias. The paper concluded that selection bias of this nature is insignificant.

It must also be noted that due to all the sampling restrictions imposed on the dataset, this particular dataset is not a representative sample. Consequently, we cannot generalize any results obtained within this paper to the South African SMME construct as a whole. However, if the results obtained by this study prove to be interesting and meaningful, there will be a potential for further research that can be more general to the SMME construct.

According to Cassiman & Martinez-Ros (2007), there is a possibility of heterogeneity in the panel data being ignored. Thus, this paper will employ a checking methodology suggested by Wooldridge (2005) in order to overcome this limitation.

4.1.3 Variables
4.1.3.1 Variables for descriptive analysis
As it was mentioned within the literature review on the exporting landscape of SMMEs, Chandra (2001) cites the importance of controlling for the gender, race and age of owners of a firm. Unfortunately, the SBP dataset does not contain data on the age of the firm owners, so this paper will not be able to control for age.

Following the work of Wagner (2010), and Rankin (2013), this paper will utilise turnover and total employment figures of each respective firm as a means of alluding to firm size, such that it can be ascertained whether or not larger firms within the SME Growth Index are more inclined toward exporting. Furthermore, Wagner (2010) also stated that exporting SMMEs tended to have higher levels of human capital – it is for this reason that this paper will include variables capturing whether or not the firm owner has undergone training, and whether or not the firm provides "on the job" training for employees.

While the literature may not have covered the remaining variables explicitly, the SBP dataset contains the necessary information to make these variables viable for analysis, and thus we can control for them. These variables can be described as follows:

Does the firm have BEE accreditation?: This variable captures whether or not a firm has BEE (Black economic empowerment) accreditation. This paper feels that this is a worthwhile variable to utilize as there are a large degree of incentive schemes within South Africa that hinge on whether or not a firm possesses BEE accreditation. One such scheme is that of the Export Marketing and Investment Assistance (EMIA) scheme, which is provided by South Africa's Department of Trade and Industry (DTI) specifically to help engage SMMEs with BEE accreditation in exporting (DTI, 2015).

Does the firm make use of government support initiatives?: This variable is utilized for a reason similar to the one above. Firms that are engaged in government support initiatives may be supplied with exporting incentives, or schemes to help bolster the exporting efficiency of said firm.

Does the firm have any direct competitors?: Exporting is often linked to the number of direct competitors that a firm has. By ascertaining whether or not a firm has direct competitors may shed vital light on the exporting situation within the South African SMME construct.

4.1.3.2 Variables for exporting versus innovation analysis

The dependent variable of interest to this section captures whether or not a firm exports. This is a binary variable that has been assigned a value of 0 for "no", and a value of 1 for "yes". Similarly, the independent variable utilised here captures whether or not a firm has developed any new products or services in the current year, or improved their production methods (i.e. whether or not the firm has innovated), this too is a binary variable with a value of 0 for "no", and 1 for "yes". Each of these variables has been measured across all three time periods under consideration.

4.2 Methodology
4.2.1 Methodologies for descriptive analysis of SMME exporting landscape

The paper will employ a descriptive approach to the data when focussing on the different characteristics that may arise between firms that export and those that do not – this method of analysis is consistent with that employed by both Wagner (2010) and Rankin (2013). The key focus of generating these results is simply to attempt to paint a picture of the possible differences that may exist between firms that export and those that do not – as well as fleshing out any inherent characteristics that exporting SMMEs may possess. Furthermore, this paper asserts that it is crucial to gain better understanding of the SMME exporting landscape before any adequate work may be undertaken, as the current understanding of said landscape is hazy at best.

This paper will also utilise labour productivity, average wages, capital per worker, and total factor productivity as measures of how exporting SMMEs fair in comparison to their non-exporting counterparts. The calculation of these measures is discussed below:

Labour productivity:

In order to calculate labour productivity this paper will utilise the ratio of total output (in Rands) to number of employees.

$$Labour\ Productivity = \frac{Total\ Output}{Number\ of\ employees}$$

The advantage of this method of calculation is that it provides ease of measurement and readability; however, it is also only a partial productivity measure and reflects the joint influence of a host of factors. This method can be easily misinterpreted as technical change, or as the productivity of the individuals in the workforce (OECD, 2001), but since labour productivity is merely used as a descriptive indicator in this paper, this calculation is perfectly acceptable.

Average wages:

This measure is self-explanatory and may be represented via the following formula:

$$Average\ wages = \frac{Total\ wage\ bill}{Number\ of\ employees}$$

Capital per worker:

This measure is also self-explanatory and may be represented via the following formula:

$$Capital\ per\ worker = \frac{Total\ capital\ of\ firm}{Number\ of\ employees}$$

Total factor productivity:

Total factor productivity is a measure of the overall effectiveness with which capital and labour are used in the production process (İmrohoroğlu & Tüzel, 2013).

It is assumed that production takes the form of a Cobb-Douglas production function:

$$Y_{it} = A_{it} K_{it}^{\beta_k} L_{it}^{\beta_l} M_{it}^{\beta_m} \tag{1}$$

where Y_{it} represents physical output of firm i in period t; K_{it}, L_{it} and M_{it} are inputs of capital, labour, and materials respectively. A_{it} is the Hicksian-neutral efficiency level of firm i in period t.

While Y_{it}, K_{it}, L_{it} and M_{it} are all observable (and measured by the SMME growth index), A_{it} is completely unobservable, as a result, the production function in (**1**) is linearised by taking the natural logs of each side of the function.

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \beta_m m_{it} + \varepsilon_{it} \tag{2}$$

where the lower-case representation refers to natural logarithms and

$$\ln(A_{it}) = \beta_0 + \varepsilon_{it} \tag{3}$$

While β_0 measures the mean efficiency level across firms and over time; ε_{it} is the time and producer-specific deviation from that mean, which can be further decomposed into an observable (or at least predictable) and unobservable component (Beveren, 2007). This results in the following equation:

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \beta_m m_{it} + \omega_{it} + u_{it}^q \qquad (4)$$

where ω_{it} represents firm level productivity[10] and u_{it}^q is an independent and identically distributed (i.i.d.) component, representing unexpected deviations from the mean due to measurement error, unexpected delays or other external circumstances (Beveren, 2007).

This paper will employ (4) and solve for ω_{it}. Thereafter, estimated productivity can be calculated as follows:

$$\hat{\omega}_{it} = y_{it} - \hat{\beta}_k k_{it} - \hat{\beta}_l l_{it} - \hat{\beta}_m m_{it} \qquad (5)$$

and productivity in levels can be obtained as the exponential of $\hat{\omega}_{it}$.

These TFP calculations will be done separately for exporters and non-exporters, and the results will be presented graphically for ease of interpretation.

4.2.2 Methodologies for export versus innovation analysis

To begin the analysis of exporting and innovation in South African SMMEs, this paper will begin with a logistic model, and then move onto the usage of a conditional logistic/fixed-effects logistic model.

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[10] The productivity term is identified through the assumption that ω_{it} is a state variable in the firm's decision problem (i.e. it is a determinant of both firm selection and input demand decisions), while u_{it}^q is either measurement error or a non-predictable productivity shock (Olley & Pakes, 1996).

Logistic model

In order to begin to understand the relationship between innovation and exporting in South African SMMEs, this paper will employ a logistic regression model to capture the effect of innovation on exporting behaviour.

Following specifications provided by Hirsch and Bijaoui (1985), and Kleinknecht and Verspagen (1990), this paper will utilise the 'decision to export' ($Export_{i,t}$) as the dependent variable, with lagged values of the 'decision to innovate' ($Innovate_{i,t-1}$, $Innovate_{i,t-2}$) and the 'decision to export' ($Export_{i,t-1}$) as independent variables[11].

Since the model specification proposed encompasses very few explanatory variables, the risk of omitted variable bias is particularly high (Mood, 2010). In order to overcome this and ensure reliable results, this paper will also employ a conditional logistic/fixed-effects logistic model.

Conditional Logistic / Fixed-effects Logistic Model

Within experimental research, unmeasured differences between subjects are often controlled for via random assignment to treatment and control groups. As is the case with most survey research, random assignment was not possible within the SME Growth Index. If one were to control for a variable it must be explicitly measured (Allison, 2009), yet again, due to the nature of the SME Growth Index, not all pertinent variables were adequately measured, leading to a situation where some degree of omitted variable bias may be present. In order to mitigate this, this paper will use the respondents as their own controls. Due to the fact that the dependent variable (exporting) in question is binary in nature, this paper will employ the conditional logistic/fixed-effects logistic method.

There are two primary conditions that must be met in order to employ this methodology, namely:

- "The dependent variable must be measured on at least two occasions for each individual", (Allison, 2009) - The SME Growth Index is a three year data panel, and thus each individual has had their responses recorded three times.

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[11] Kleinknecht and Verspagen (1990) argue that the decision to export can only be influenced by past decisions about innovation – thus there is no need to include $Innovate_{i,t}$ within the model specification.

- "The independent variable must change across time for some substantial portion of the individuals", (Allison, 2009) – this particular condition may prove problematic for the sample, however, Allison (2009) goes on further to state that while this condition must be adhered to, results can still prove to be substantial in spite of a large fraction of the sample showing no variation.

The fixed-effects logistic model can be written as:

$$\Pr(y_{it} = 1 \mid x_{it}) = F(\alpha_i + x_{it}\beta)$$

where F is the cumulative logistic distribution:

$$F(z) = \frac{\exp(z)}{1 + \exp(z)}$$

$i=1,2,…,n$ denotes the independent units (or groups) and $t=1,2,….,T_i$ denotes the observations for the ith unit (group).

Fitting this model by using a full maximum-likelihood approach leads to difficulties, however. When T_i is fixed, the maximum likelihood estimates for α_i and β are inconsistent (Andersen, 1970). This difficulty can be avoided by looking at the probability of $y_i=(y_{i1},…,y_iT_i)$ conditional on $\sum_{t=1}^{T_i} y_{it}$ (Chamberlain, 1980). This conditional probability does not involve α_i, so they are never estimated when the resulting conditional likelihood is used.

4.2.3 Methodology Limitations

In terms of methodology, this paper suffers from specific draw backs. Firstly, the case of endogeneity is omnipresent. There is a distinct possibility that the decision to export may be a function of innovation behaviours, subsequently; the decision to innovate may well be a function of the firm's decision to export. In order to deal with this, this paper will be talking about the

association/correlation between the two variables, and at no point will there be a discussion surrounding possible causation.

As stated in the previous methodology section, the concern over omitted variable bias is present when utilising a logistic regression. In order to overcome this and ensure reliable results, this paper will also employ a conditional logistic/fixed-effects logistic model to ensure accuracy of results.

When employing lagged dependent variables[12] (LDV) to provide robust estimates of the effects of independent variables, there is often concern within the literature that the use of these LDVs can produce negatively biased coefficient estimates, even if the LDV is part of the data generating process (Wilkins, 2012). However, Wilkins (2012) goes further to show that this may not actually be the case, and that the inclusion of additional lags leads to more accurate parameter estimations. While this paper cannot take an official standpoint on whether the previous literature or the work of Wilkens (2012) is correct, this paper can ensure that it protects itself from this bias under either circumstance. By employing a logistic regression which does include a lag of the dependent variable $Export_{i,t}$, and also employing a conditional logistic/fixed-effects logistic model (which by specification cannot contain a lag of the dependent variable), this paper ensures that this potential bias cannot affect the conclusions of this paper.

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[12] As stated within the logistic regression methodology, this paper employs the lag of $Export_{i,t}$.

5. Results

5.1 An overview of the South African SMME exporting landscape

The prevailing literature on exporting small, micro, and medium enterprises has painted a fair picture of what the landscape should hold. This section will explore whether or not the SME Growth Index reports similar findings, as well as unpack previously unexplored characteristics of said firms.

Of the complete sample considered, 32.77% of firms stated that they are indeed exporters, while 67.23% of respondents classed themselves as non-exporters – a result that is congruous with what should be expected. However, further unpacking of the characteristics of these exporters would add valuable benefit to the understanding of the SMME exporting landscape. As such, the following table provides a contrast between predetermined measurable characteristics of exporters versus non-exporters.

Table 3: Characteristics of exporters versus non-exporters in South Africa

Characteristics	Exporters	Non-exporters	Total
Owner Characteristics			
Race of owner:			
Black	3.57%	96.43%	100%
White	39.13%	60.87%	100%
Indian	22.22%	77.78%	100%
Coloured	14.29%	85.71%	100%
Asian	55.56%	44.44%	100%
Gender of owner:			
Male	39.65%	63.35%	100%
Female	19.05%	80.95%	100%
Owner Training			
Yes	23.88%	76.12%	100%
No	43.28%	56.72%	100%

Firm Characteristics

Total Employees of firm:

1-5 employees	14.29%	85.71%	100%
6-10 employees	17.86%	82.14%	100%
11-20 employees	32.20%	67.80%	100%
21-50 employees	45.24%	54.76%	100%
50+ employees	52.17%	47.83%	100%

Total Turnover of firm:

0-2 million	1.82%	98.18%	100%
2-10 million	26.58%	73.42%	100%
10-25 million	52.83%	47.17%	100%
25-50 million	66.67%	33.33%	100%
50+ million	38.89%	61.11%	100%

Does the firm provide "on the job training" for employees?

Yes	32.72%	67.28%	100%
No	32.88%	67.12%	100%

Does the firm have BEE accreditation?

Yes	36.36%	63.64%	100%
No	25.64%	74.36%	100%

Does the firm make use of government support initiatives?

Yes	13.95%	86.05%	100%
No	37.57%	62.43%	100%

Does the firm have any direct competitors?

Yes	33.33%	66.67%	100%
No	28.57%	71.43%	100%

By inspection of the preceding table many inferences can be drawn about the structure of the SMME exporting landscape. It is readily apparent that in terms of racial classification, a great proportion of firms run by Asian or white individuals tend to be exporters; with barely any proportion of the black owned firms actually engaging in exporting behaviour. While this result

is surprising and unsettling (especially after more than 20 years since South Africa's democratic reform), it is not incongruous with international literature. The 'Ownership Characteristics of Classifiable U.S Exporting Firms' survey (2012) reported similar results, with white and Asian owned firms once again dominating the export market. Another result reiterated by the 'Ownership Characteristics of Classifiable U.S Exporting Firms' survey (2012) is that of the exporting difference between male and female owned firms. As it can be seen in the preceding table, virtually double the amount of male owned firms were exporters, versus those firms that were owned by females.

It appears that firms that have higher total levels of employment, or higher total levels of turnover are more inclined to export. This reiterates the findings of Hausmann & Klinger (2008), Wagner (2010), and Rankin (2013). However, there is an apparent discontinuity when moving from turnover brackets of 'R25-50 million' to 'R50+ million'. Where one would expect higher levels of exporting at the 'R50+ million' level, it is instead seen that there is a sharp drop in the proportion of firms within this turnover bracket that do export[13]. In order to fully explore this and the rationale for it, a regression discontinuity could be employed – this will be considered for further work.

Wagner (2010) also stated the importance of human capital accumulation on the exporting behaviour of a firm. However, from these results it can be seen that this is a sentiment that is not echoed through the SME Growth Index. There appears to be no difference between the proportion of firms that export when considering whether or a not a firm provides "on-the-job" training. It seems counterintuitive, but the result that a greater proportion of firms with owner that had not undergone training were engaged in exporting, versus firms with owners that had undergone some form of training.

Unsurprisingly, a greater proportion of firms with BEE accreditation tended to be exporters, than those without accreditation. It is however very surprising that a greater proportion of firms who do not use government support incentives were engaged in exporting, versus those firms that had taken advantage of the incentives on offer.

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[13] It is plausible that the nature of the business may explain the reason behind the sharp drop. Certain firms falling within the 'business services' sector may record astronomically high turnovers, while not exporting their services; as a consequence, what may be seen here is an large number of firms falling within the high turnover bracket, yet not exporting due to the nature of the business. This is an area that should be considered for further research.

Lastly, a greater proportion of firms with direct competitors were engaged in exporting versus those firms which did not have direct competitors. This result makes intuitive sense, as exporting and the number of direct competitors a firm has share a positive correlation. The greater the area a firm is serving (in terms of geographical area), the more likely a firm is to encounter direct competitors for their products or services.

When delving deeper into descriptive analysis of the SME Growth Index, it becomes readily apparent that results can be drawn that are in-keeping with the existing literature. Figure 3 depicts the percentage differences between exporters and non-exporters for labour productivity, average wages, capital per worker, and total factor productivity.

Figure 3: Percentage differences between exporters and non-exporters
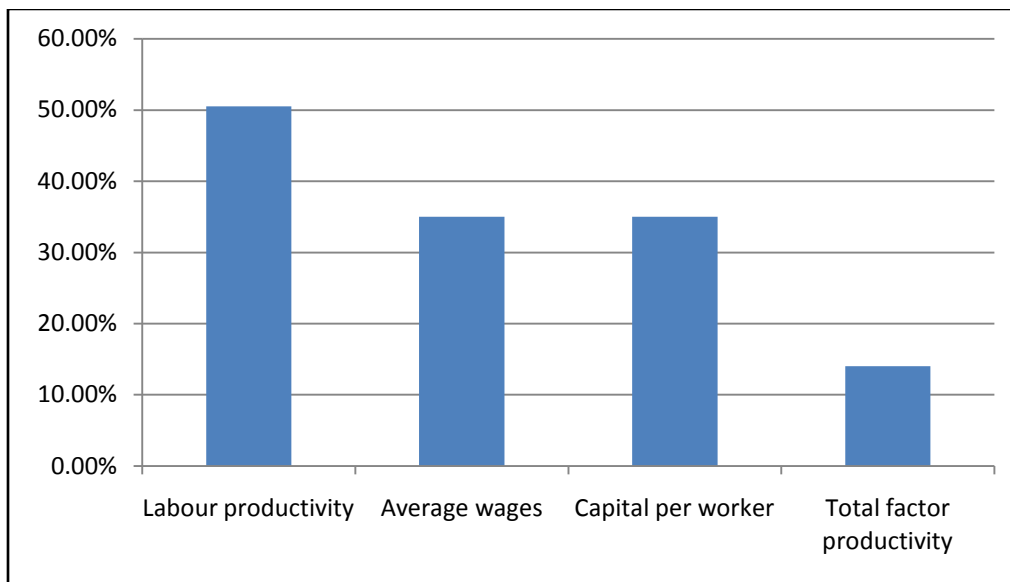
Source: Author's calculations using SME Growth Index Data

Exporters have higher labour productivity (50.5% higher), and on average, they pay higher wages (35% higher). Furthermore, exporting firms are also 35% more capital intensive than their non-exporting counterparts. In terms of total factor productivity (TFP), a measure of overall competitiveness, exporters perform better than non-exporters, exhibiting TFP levels which are 14% higher than non-exporters. These results once again reiterate the findings of Wagner (2010), and Rankin (2013).

These differences show the important role that competitiveness plays in the export market. Firms with higher levels of productivity are more likely to enter and be successful in the export market (Rankin, 2013). There is also evidence that participation in the export market makes firms even more productive through interactions with clients and exposure to more competition (Rankin, 2013).

When considering the export primary export destinations of the firms in question, it emerges that the South African Development Community (SADC[14]) is the most common destination for firms within the sample, sending approximately 60% of exports to countries within the region. Europe constitutes the second largest destination for exports (14.12%), with Africa beyond SADC coming in at third with 8.82%.

Figure 4: Proportion of exporters by export destination
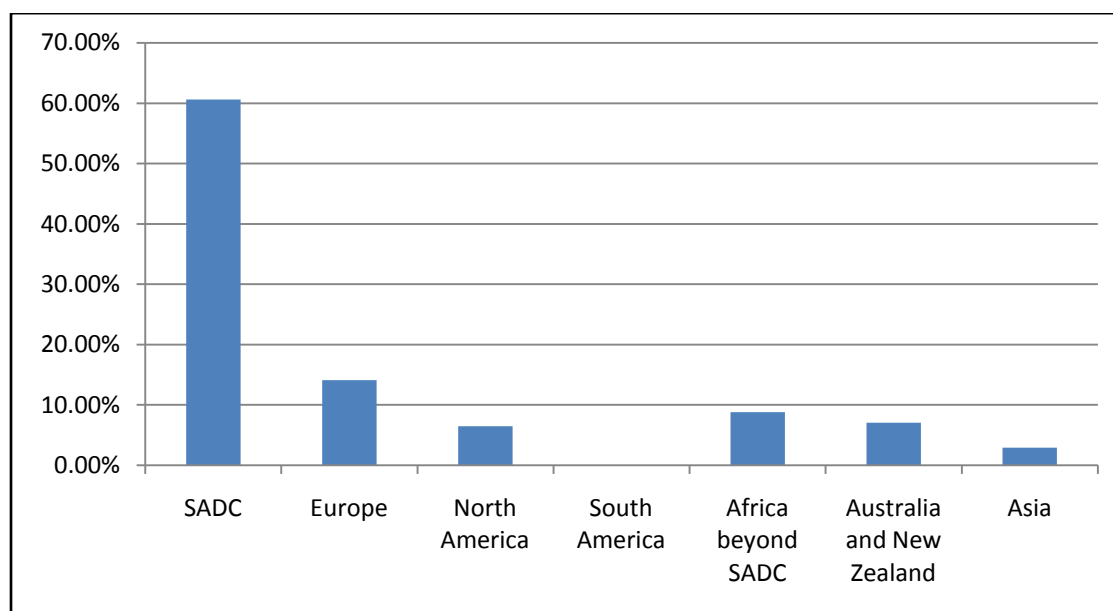
Source: Author's calculations using SME Growth Index Data

It is unsurprising that both the SADC region and the 'Africa beyond SADC' region fall within the top 3 export destinations. Africa inherently forms a natural expansion path for small, micro, and medium firms. The costs associated with entry into these regions are low, and many products

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[14] Members of the SADC include: Angola, Botswana, Democratic Republic of the Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.

do not require a large amount of modification. These countries are increasingly familiar, as Africa has opened up to foreign business over the past 20 years (Rankin, 2013). Furthermore, business contacts with South African firms already operating in such countries, as well as expanding entrepreneurship and growing moneyed middle class makes these attractive markets (Rankin, 2013).

According to Rankin (2013), in terms of policy, these are the types of SMME exporters that will create jobs. In order for this to become a greater reality, it would require policy which makes trading within the sub-region and continent easier. Better market integration and lower market fragmentation means that expanding the amount exported is easier since firms face lower costs of entry into each market - this is particularly important for the SADC region.

These findings also coincide with the work of Edwards et al. (2014), Disdier and Head (2008), and Djankov et al. (2010), whereby the bilateral distance from markets affects the propensity for export. South Africa is a large degree closer to countries within the SADC region, and thus it can be seen that a larger proportion of firms are exporting to countries within this region. Conversely, regions that are further away from South Africa seem to be importing less from South African firms.

Lastly, this is a paper that is concerned with both exporting and innovation behaviours in SMMEs in South Africa. For this reason this paper carried out 6 separate logistic regressions employing the 6 regions shows in Figure 4 as dependent variables[15]. Each region was treated as binary (assigned a value of "1" if a firm did export to that region, and "0" if the firm did not). This was regressed on the lag of the decision to innovate ($Innovate_{i,t-1}$). The results of these regressions are provided in Appendix A.

While the regressions as a whole were insignificant, as were the coefficients, the results still allude to an interesting story that should be considered for further research[16]. It appears that firms are less likely to pursue innovation when exporting to the SADC region, as it can be supposed that this is an outlet for the surplus production of South African firms. Furthermore, for firms to aim to export to regions such as Europe, or Australia and New Zealand, the log odds of innovation is far higher, indicating that these are more specialised markets requiring a degree of

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[15] The regions utilized were SADC, Europe, Asia, North America, Africa outside of SADC, and Australia & New Zealand (South America was excluded as there were no respondents to indicate that they exported to this region).
[16] Potentially with a more specialized dataset.

innovation in order for exporting to be a realistic probability – i.e. these regions require products of a higher quality. While not significant, these results do echo the findings of Rankin & Schöer (2013), whereby products of higher quality (i.e. products that have required some form of product or process innovation) are more likely to be exported to regions further away from South Africa.

Having ended this section by illustrating the link between export destination and innovation, this paper will now move on to show that there is a positive association between exporting behaviours within SMMEs and innovation practices.

5.2 Exporting and innovation

The preceding section of this paper has provided an analysis of the SMME exporting sector of South Africa; what this section will now do is attempt to show the hypothesised positive relationship between exporting and innovation behaviours within the same sector. As mentioned within the methodology of this paper, this section will employ a logistic, and a conditional logistic/fixed-effects logistic. The two primary variables that this section will focus on are that of "decision to export"[17], and "decision to innovate"[18].

To begin with, a correlation matrix between innovation and exporting has been provided for the years 2011 – 2013.

Table 4: Correlation matrix between exporting and innovation in the SME Growth Index

	Export (2011)	Export (2012)	Export (2013)
Innovate (2011)	0.0205	0.0612	0.1039
Innovate (2012)		0.1895	0.3256
Innovate (2013)			0.2299

It is immediately observable that there is a positive correlation between exporting and innovation within the SME Growth Index. Furthermore, it is readily apparent that this positive association seems to grow in strength as time passes. For instance, innovation that was carried out in 2012 has a 18.95% correlation with exporting of 2012, but that same innovation has a 32.56% correlation with exporting of the following year. While this method of analysis is informal, and

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[17] This will be referred to as $Export_{i,t}$ from this point forward.
[18] This will be referred to as $Innovate_{i,t}$ from this point forward.

non-robust, it already appears that results obtained from the SME Growth Index concur with findings of Hirsch and Bijaoui (1985), and Kleinknecht and Verspagen (1990). There is a positive correlation between exporting and innovation behaviours, especially for lagged values of innovation.

While this paper may have already shown a positive association between these two variables, it is not sufficient to leave the analysis there. For this reason two logistic regressions were completed. The first (1) utilizes $Export_{i,t}$ as the dependent variable, and a one period lag of both $Export_{i,t}$ and $Innovate_{i,t}$ as the explanatory variables. The second regression (2) is much the same as (1), but it also employs a second lag of $Innovate_{i,t}$ within the regression. The results of these regressions can be seen in Table 5, below.

Table 5: Results of logistic regressions

Dependent variable: $Export_{i,t}$

Independent variables	(1)	(2)
$Export_{i,t-1}$	3.102***	3.354***
	(0.290)	(0.489)
$Innovate_{i,t-1}$	0.981***	1.389**
	(0.285)	(0.493)
$Innovate_{i,t-2}$	-	0.548*
	-	(0.462)
Constant	-2.552***	-2.611***
	(0.284)	(0.507)
Prob>chi2	0.0000	0.0000
Pseudo R^2	0.3413	0.4098
LR chi2	169.76	87.47
N	371	155

Standard errors in parentheses
*p<0.05   **p<0.01   ***p<0.001

With a likelihood ratio chi-square of 169.51 and a p-value of 0.0001, regression (1) is statistically significant as whole, implying that it fits significantly better than a model with no predictors. Since both explanatory variables within this regression are binary in nature, the base level of these variables is consequently zero, which intrinsically means "did not export/did not innovate". Thus, when looking at the lagged expression of $Export_{i,t}$ it can be seen that switching from not exporting in the previous period (*t-1*), to having exported in the previous period increases the log odds of exporting in the current period (*t*) by 3.102, which is significant at the 1% level. This quite clearly implies that firms that did export in the previous period are more

likely to export in the current period than those that did not export. A similar result can be seen on the lagged value of $Innovate_{i,t}$ – whereby firms that did innovate in the previous period showed log odds values that were increased by 0.981 (also significant at the 1% level) than those firms that had not innovated. This too implies that firms that have innovated in the lagged period are more likely to export in the current period.

It can already be seen that there is a positive relationship between exporting innovation. Another result which is unsurprising is that of the relationship between current exports, and lagged exports. The relationship between these two variables is relatively strong, and this is a result that makes intuitive sense – once a firm has become an exporter, it is very likely that said firm will continue to export. The greatest hindrance to exporting seems to be the initial setup of the exporting portion of a business. Once a firm has managed to adequately set up its exporting division, it is likely that the firm will continue to export over time.

Regression **(2)** differs from regression **(1)** in the sense that the regression includes a second lag of $Innovate_{i,t}$. The regression is significant as a whole, and it can be seen that the coefficients on the one period lagged values of $Innovate_{i,t}$ and $Export_{i,t}$ can be interpreted in a similar fashion to regression **(1)**. By inclusion of a second lag of $Innovate_{i,t}$ it can be seen that firms that did innovate two time periods ago have an increased log odds of 0.584 of exporting in the current period. This shows that innovation does have a longer lasting effect on exporting behaviour than anticipated; while the effect may not be as large as innovation with a one period lag, there is a definite, significant effect of innovation on exporting even after two time lags.

While a logistic may provide an adequate description of the underlying story, the generation of the odds ratios that are synonymous with a logistic regression will provide even further clarity as to the impact that the explanatory variables have on exporting in the current period.

Table 6: Odds-ratios of logistic regressions

Dependent variable: Export$_{i,t}$

Independent variables	(1)	(2)
Export$_{i,t-1}$	22.241***	28.604***
	(6.460)	(13.989)
Innovate$_{i,t-1}$	2.667***	4.011**
	(0.759)	(1.978)
Innovate$_{i,t-2}$	-	1.730*
	-	(0.798)
Constant	0.078***	0.073***
	(0.022)	(0.037)

Analysis of the odd-ratios of the preceding regressions provides a much more succinct understanding of the story being told here. When looking at the odds-ratios that are pertinent to regression **(1)** it is apparent that the odds of exporting in the current period is 22.241 times larger if the firm exported in the previous period, when compared to firms that did not export in the previous period. Similarly, firms that had innovated in the previous period showed odds that were 2.667 times higher of exporting in the current period than firms that had not innovated in the previous time period. A similar analysis can be applied to the odds-ratios of regression **(2)**.

While these results are promising, and entirely congruous with the prevailing literature, it is important to note the aforementioned weaknesses of the preceding methodology. For this reason, this paper will now move on to a discussion of the results of the conditional logistic/fixed-effects logistic regression.

Table 7: Results of conditional logistic/fixed-effects logistic regression

Dependent variable: Export$_{i,t}$

Independent variables	Coefficient	Odds-ratio
Innovate$_{i,t-1}$	0.470*	1.613*
	(0.570)	
Prob>chi2	0.1146	
N	50	

Standard errors in parentheses
*p<0.05   **p<0.01   ***p<0.001

Following the methodology laid out in this paper for the conditional logistic/fixed-effects logistic regression, the preceding regression results were generated. Firstly, it must be noted that 339

observations were dropped due to either all positive or all negative outcomes. While this is not ideal, according to Allison (2009) these results can still prove to be of value.

The coefficient of the regression has been provided (the coefficient is positive and significant at the 5% level), along with its respective standard error for completeness, however, this portion of the analysis will focus on the interpretation of the odds-ratio.

If a firm switches from not innovating to innovating in period (*t-1*), then the odds of exporting in the current period (*t*) are 1.854 times higher. This is a result that is strikingly similar to that of the odds-ratio in regression **(1)** of the logistic regression.

When considering all the methodologies employed in this section, one clear-cut fact emerges; there is a definite, significant, positive association between exporting and innovation behaviours in the South African SMME landscape. The strength of this association is strong, and considerably robust; and ultimately important to the literature basis as such an analysis has not been carried out on South African SMMEs before. However, this is not the end of the story. Further work will have to be undertaken in order to unpack the relationship between exporting and innovation behaviours even further before adequate policy recommendation can be made – bearing this in mind, this paper can at least assert that there is no way that exporting and innovation can be treated as separate policy goals by the South African government going forward.

6. Conclusions

This paper aimed to unpack the inherent characteristics that may differ between exporting, and non-exporting SMMEs in the South African economy. Consequently, this paper also sought to show that there is a definite positive association between exporting behaviours and innovation behaviours within the SMME sector.

This paper managed to show, in accordance with the existing literature, that South African SMMEs that export are fundamentally different from those that do not. Exporting firms tend to be larger (in terms of both turnover and employment), have higher labour productivity, higher average wages and more capital per worker, and higher total factor productivity than their non-exporting counterparts. This is reason enough to encourage the South African government to no longer treat South African SMMEs with a "one size fits all" policy plan. If government truly wants to breed a greater culture of exporting amongst South African SMMEs, the heterogeneity between exporters and non-exporters must be fully taken into account.

When considering the export destinations that South African SMMEs pursue, it appears that countries that are closer to South Africa are the primary recipients of South African SMME exports. While the regressions were insignificant in this area, there does appear to be a positive association between the levels of innovation that is required to export to regions that require higher quality products. Regions such as SADC require very little innovation, but regions such as Europe, or Australia and New Zealand have more specialised markets, and thus innovation of products is key to ensuring market penetration.

This paper showed that there is indeed a positive association between exporting and innovation behaviours within the South African SMME sector – this is something that has not yet been shown within the South African context. This association was revealed and upheld through the results of a correlation matrix analysis, a logistic regression, and a conditional logistic/fixed-effect logistic regression. Thus, this paper can state with certainty that there is a positive association between exporting and innovation behaviours – however, this paper did not set out to prove any form of causation, as the risk of endogeneity within this area of research is too great. This should be an area considered for further work, because if the relationship between exporting

and innovation can be shown to be at all causal, this can provide substantial benefit to the existing literature, and existing policy worldwide.

The small, micro, and medium enterprise sector is vitally important to the South African economy. This paper attempted to fill a gap that it deems vital for the SMME construct to continue to flourish. SMMEs in South Africa are heavily under-researched and that should be an area of concern and focus for academics. In order to fully facilitate more research surrounding SMMEs in South Africa, and a better South African SMME dataset is required. If it were at all possible to combine the prominent datasets dealing with SMMEs in South Africa, the potential for further research could be limitless!

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Appendix A

Dependent Variable: Export Destination$_{it}$

	SADC		Europe		North America		Asia[19]		Africa Beyond SADC[20]		Australia & New Zealand	
	Coeff.	**O.R**	**Coeff.**	**O.R**	**Coeff.**	**O.R**	**Coeff.**	**O.R**	**Coeff.**	**O.R**	**Coeff.**	**O.R**
Innovate$_{i,t-1}$	-0.365	0.694	0.177	1.194	-4.700	0.625	0	1	0	1	0.198	1.219
	(1.184)	(0.822)	(0.720)	(0.860)	(0.892)	(0.558)					(0.842)	(1.026)
Constant	1.386	4.000	-1.299	0.273	-1.871	0.154	-2.341	0.096	-1.219	0.295	-1.872	0.154
	(1.118)	(4.472)	(0.651)	(0.178)	(0.760)	(0.117)	(0.468)	(0.045)	(0.316)	(0.093)	(0.760)	(0.117)
Prob>chi2	0.7515		0.8038		0.6084		-		-		0.8115	
Pseudo R^2	0.0023		0.0008		0.0057		0.0000		0.0000		0.0009	
LR chi2	0.10		0.06		0.26		0.00		0.00		0.06	
N	39		71		72		57		57		72	

Standard errors in parentheses
*p<0.05   **p<0.01   ***p<0.001

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[19] Innovate$_{i,t-1}$ predicts failure perfectly and was therefore omitted.
[20] Innovate$_{i,t-1}$ predicts failure perfectly and was therefore omitted.

Approval of Title Certificate

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Mr WT Flowerday
P O Box 11457
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09 January 2015
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PAG

Dear Mr Flowerday

Master of Economic Science: Approval of Title

We have pleasure in advising that your proposal entitled *Exporting and innovation performance: an analysis of the Small, Micro and Medium Enterprise growth index in South Africa* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Marike Bosman
Faculty Registrar
Faculty of Commerce, Law & Management

Ethical Clearance Certificate

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CLEARANCE CERTIFICATE   **PROTOCOL NUMBER**: CECON/1056

PROJECT: Exporting and innovation performance: an analysis of the small, micro and
                   medium enterprise growth index in South Africa.

INVESTIGATOR: Wayde Thomas Flowerday

STUDENT NUMBER: 358220

SCHOOL: SEBS

DATE CONSIDERED: 04 December 2014

DECISION OF THE ETHICS COMMITTEE: Approved

NOTE

Your ethics application has been approved because you are only using primary or/and secondary data
which does not involve human respondents.

Should you find it necessary for human participants to be involved at a later stage (e.g. in a survey,
interview, focus group etc.), please ensure that an ethics application is first submitted. Please note that
you may not collect data from human participants without first having obtained ethical clearance from the
SEBS Ethics Committee.

Unless otherwise specified this ethics clearance is valid for 1 year and may be renewed upon application.

DATE: 04/12/2014   **CHAIRPERSON: Jean-Marie Bancilhon**

cc: Supervisor:

Gareth Roberts

SCHOOL OF ECONOMIC
& BUSINESS SCIENCES