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ESG reporting and the institutional shareholder base: A quantitative study of listed companies on the Johannesburg Stock Exchange

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Ethics Clearance Number: CACCN/1153

Declaration

I hereby declare that this research is my own unaided work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the degree of Master of Commerce by Coursework and Research Report at the University of the Witwatersrand, Johannesburg.

This research has been carried out according to the ethical policies of the University of the Witwatersrand and has not been submitted elsewhere for the purpose of being awarded another degree or for examination purposes at any other university.



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15 August 2019

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Dedication

Ad maiorem Dei gloriam

Abstract

Previous research findings suggest that companies within developed markets which report on environmental, social and governance (ESG) issues attract a long term oriented institutional investor base. Against this background, the purpose of this study was to assess whether this relationship holds true within an emerging market context. Using cross-sectional time series data for 114 Johannesburg Stock Exchange (JSE) listed companies over the period 2012 to 2016, this study investigated whether the integration of ESG factors in investor decision making has resulted in investments being held into the long term by institutional investors and whether this relationship varies between different sectors of the JSE.

The results were based on a regression analysis which was performed employing data from the Thomson Reuters ASSET4 platform as a proxy for ESG reporting scores against institutional investor shareholdings. The results did not indicate a statistically meaningful relationship between ESG reporting and the long term oriented institutional investor base even at the industry level. The results did not appear to be consistent with similar studies in developed markets, partly as a consequence of the JSE comprising greater quasi institutional investors as compared to dedicated investors. The results suggest that institutional investor's commitment to the United Nations Principles for Responsible Investment (UN PRI) and Code for Responsible Investing in South Africa (CRISA) is yet to translate into investments in JSE companies being held long term. These findings motivate for further academic analysis of ESG-long term investor relationship, to policy setters the results call for greater consideration to be given to policy changes or industry guidance in order to ensure that the objectives as set out by the UN PRI and CRISA are achieved.

Keywords: ESG; Institutional investor; Investment decision; Long term investor; UN PRI

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List of abbreviations, acronyms and symbols

ANOVA	Analysis of Variance
CRISA	Code for Responsible Investing in South Africa
ESG	Environmental, Social and Governance
FEM	Fixed Effects Model
GRI	Global Reporting Initiative
IR	Integrated Reporting
<IR> Framework	Integrated Reporting Framework
JSE	Johannesburg Stock Exchange
KMO	Kaiser-Meyer-Olkin
OLS	Ordinary Least Squares
PCA	Principle Component Analysis
REM	Random Effects Model
RI	Responsible Investment
SAM	Sustainable Asset Management
SENS	Securities Exchange News Service
SRI	Socially Responsible Investment
UN PRI	United Nations Principles for Responsible Investment

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Chapter 1 – Introduction

1.1 Purpose of the research

The purpose of this research is to investigate to what extent the integration of ESG factors in investor decision making has resulted in investments in JSE listed companies being held into the long term by institutional investors and whether this varies between different sectors of the JSE.

1.2 Background to the study

The United Nations Principles of Responsible Investment (UN PRI) was introduced in 2006 and has paved the way to a refreshed approach to investment management (Amel-Zadeh & Serafeim, 2017; UN PRI, 2018). UN PRI seeks to encourage Responsible Investment (RI) through prompting investors to consider and to incorporate environmental, social and governance (ESG) factors into their investment decisions (UN PRI, 2018). According to Bourghelle, Jemel and Louche (2009) RI practices are driven by financial considerations compared to other investment practices. The intended outcomes of which being to ensure that investors are better able to manage risk and generate sustainable long term returns (Amel-Zadeh & Serafeim, 2017; UN PRI, 2018). To institutional investors the notion of RI has received heightened attention particularly from beneficiaries who require greater transparency as to their investments (Kotsantonis, Pinney & Serafeim, 2016).

Despite the UN PRI being a voluntary global framework, there has been a number of key initiatives in South Africa which have put increased pressure on institutional investors to demonstrate how they incorporate non-financial information into their investment decision making processes and strategies (Atkins & Maroun, 2014; Serafeim, 2015; Amel-Zadeh & Serafeim, 2017). These include amendments to Regulation 28 of the Pension Fund Act, the introduction of the Code for Responsible Investing in South Africa (CRISA) and King IV which require institutional investors to integrate issues of environmental, social and governance documented in company integrated reports into their investment decisions (Atkins & Maroun, 2014; IODSA, 2016).

The availability of non-financial information has been widespread for many years, given the various forms of corporate reporting which have been in existence from environmental to sustainability reporting and to what is now regarded as integrated reporting (Weber, 2014; Cohen, Holder-Webb & Zamora, 2015). With South Africa being recognized as the first country to mandatorily require JSE listed companies to produce an integrated report in 2011, ESG

reporting subsequently gained greater prominence (Serafeim, 2015; Baboukardos & Rimmel, 2016).

Van Zijl, Wöstmann and Maroun (2017) highlight that subsequent to the introduction of the Integrated Reporting Framework <IR> Framework, the extent of ESG disclosures in integrated reports has increased. Foundational work by Serafeim (2015) established that companies which practice integrated reporting attract a long term orientated investor base and fewer transient investors. Inspired by the aforementioned study, this research seeks to investigate how company ESG reporting has influenced the institutional investor base of JSE listed companies. This research will focus in particular on whether ESG reporting has led to companies attracting long term institutional investors as envisioned by the UN PRI and whether this varies between different sectors of the JSE.

The investment horizon of institutional investors will be determined with reference to a number of factors such as share ownership turnover and concentration. These factors have been previously applied in other studies such as Bushee (1998) and Serafeim (2015). This study will focus particularly on institutional investor holdings post 2012 and defines long term institutional investors as those investors with investment horizons spanning for more than one year to three years (Holm & Rikhardsson, 2008).

1.3 Research questions

This research will explore the following:

1. To what extent has the integration of ESG factors in investor decision making resulted in investments in JSE listed companies being held into the long term by institutional investors?
2. To what extent has ESG reporting resulted in the levels of long term institutional investors varying between different sectors of the JSE?

1.4 Significance of the study

RI practices are an emerging area of academic study (Serafeim, 2015). Prior research has focused mainly on aspects of responsible investment stemming from the agency problem, institutional investor fiduciary duties and financial performance (Sievänen, 2014). However, there is a dearth of research into the application of RI practices within an emerging market such as South Africa, particularly as it relates to asset ownership.

This study is particularly important given the sizeable assets under management held by institutional investors, as well as the growing number of companies subscribing to the UN PRI and supporting CRISA (EY, 2017; National Treasury, 2017). In addition, RI practices have been noted to contribute to the socio-economic development of the country (Eccles *et al*., 2008). This benefit is particularly important given the current political and economic climate of the country. Through the outcomes of this research, empirical evidence will be provided to policy makers as to whether the introduction of CRISA and UN PRI have encouraged investors to integrate ESG reporting into their decision making has yielded the expected outcomes or whether further action in the form of policy changes or industry specific guidance is required.

1.5 Practical benefits of the study

The outcomes of this research will contribute to the debate on the extent to which ESG reporting integration influences investor decisions across different sectors of the JSE. More importantly, this study aims to stimulate research interest of other scholars and academics on this topic, in order to amplify the debate within South Africa in this field and to foster a greater understanding of this topic.

1.6 Definition of terms

Term	Definition
Integrated Reporting	A form of corporate reporting that draws on different reporting strands and communicates the full range of factors that materially affect the ability of an organization to create value over time (IIRC, 2013).
Environmental, Social and Governance	Three factors which enable investors to measure the sustainability of investing in a company (Atkins & Maroun, 2014; Weber, 2014).
Institutional Investors	Investors typically holding large share portfolios in carefully selected companies on behalf of its members. Examples include pension funds and life insurance companies (Atkins & Maroun, 2014; Serafeim, 2015).
Agency Cost	An economic concept of the cost which arises as a result of management's conflict of interest to act in their own financial interest as opposed to in the best interest of shareholders (Jensen & Berg, 2012).
Information Asymmetry	The information gap which exists as a result of shareholders (principals) not being intricately involved in the day to day running of the company

	compared to management (agents) (Jensen & Berg, 2012; Van Zijl *et al*., 2017).

Table 1: Definition of terms

1.7 Research Methodology

Given the focus of this study in investigating the ESG reporting and the institutional investor base relationship, following a quantitative approach within a positivist paradigm will allow for an objective measure of this relationship (Leedy & Ormrod, 2015; Garcia, Mendes-Da-Silva, & Orsato 2017). The strength of a quantitative research approach will allow for the research problem to be analysed across a large sample of companies with greater levels of accuracy in order to yield unbiased results upon which a conclusion can be reached (Leedy & Ormrod, 2015; Sukamolson, 2007). This will be achieved through applying an updated regression model from the seminal work performed by Serafeim (2015). Furthermore, this study will apply both descriptive and inferential statistics given the significant benefits which both analysis will yield in understanding the cause and effect relationship between ESG reporting and the institutional investor base.

1.8 Assumptions

The research study assumes that institutional investors may freely make investment decisions. They are thus not constrained by any factors which may place a restriction on their investment holdings for any given company (Maug, 1998). Despite investors being assumed not to be constrained by liquidity considerations, at the same time the institution's liability structure through the products offered will be assumed to be long term focused as opposed to being undefined or short term in nature (Çelik & Isaksson, 2014). Furthermore, it will be assumed that institutional investors rely solely on ESG reporting to inform their investment decisions and that all investors seek to pursue long term investment opportunities and that their investment decisions are aligned to the Pension Fund Act Regulation 28 requirements and are in support of CRISA and UN PRI. Similarly, it will be assumed that all JSE companies seek to attract long term investors through integrating ESG issues into their business models and strategies and that they report comprehensively thereon in order to inform investor decision making adequately.

The types of institutional investor shareholdings will be analysed based on quantitative considerations such as portfolio turnover and average holding period. The methodology will not consider qualitative aspects which may otherwise influence the shareholding period or investment choice of institutional investors. For example, preference of certain institutional investors to specific sectors or particular companies. Furthermore, it will be assumed that

institutional investors are aware of the requirements of UN PRI and are signatories or in support thereof.

Given the quantitative approach which will be taken, it will be assumed that the assumptions for linear regression holds. This includes the assumptions that the relationship between ESG reporting and institutional shareholdings are linear, that there is no auto-correlation, little to no multicollinearity, the variables are multivariate normal and that homoscedasticity holds (Serafeim, 2015).

1.9 Limitations

This study uses proxies for ESG reporting in order to analyse the relationship which it has on institutional investor shareholdings. The study will not extend to using alternative measures of ESG scores from other databases such as Bloomberg in order to assess the variability and robustness of using Thomson Reuters ASSET4 ESG scores.

The research study will be limited to all companies listed on the JSE main board over the five year period commencing 2012 provided that ESG reporting scores can be obtained on Thomson Reuters ASSET4 similar to the approach followed by Baboukardos and Rimmel (2016). This study places reliance on the ASSET4 database as opposed to Bloomberg or other similar databases which provide company ESG results, and as a result a smaller sample than the original population will be used for purposes of this study (Tarmuji, Ruhanita & Tarmuji, 2016).

Given that this study follows a positivist research approach, Cavana, Delahaye and Sekaran (2001) and, Ismail and Zainuddin (2013) argue that the samples taken under this research paradigm do not necessarily reflect specific social groups and as a result the study cannot allow for generalisations or for separate cases to be understood. This limitation is particularly key in this study as the results cannot be generalised across all institutional investors groups given the fact that there are varied institutional ownership engagement models. As the approach is quantitative in nature, individual investment mandates will need to be reviewed. Given this, the study will not cut across the governance taxonomy of institutional investment ownership taxonomy as described by Çelik & Isaksson (2014) based on the following considerations:

- Purpose (profit or not for profit);
- Investment strategy (passive index, passive fundamental, active quantitative or active fundamental);
- Portfolio structure (concentrated or diversified);

- Fee structure (performance or non-performance based fees);
- Regulatory framework and
- Political or social objectives.

In addition to the above limitations, this study will only assess the shareholdings held by institutional investors as defined by CRISA. The study will not extend to those service providers of institutional investors such as asset and fund managers and consultants who may be acting under a defined mandate to carry out investment decisions and activities. Despite ultimate responsibility resting with institutional investors relating to compliance with CRISA, service providers may be acting under a number of mandates for one institutional investor. It will prove to be challenging in order to ascertain which mandates are applicable for which institutional investor in the absence of detailed insights into each institutional investor.

Another key delimitation of this study is the impact of the introduction of the tax-free savings accounts has had on assets under management of institutional investors will be ignored. Tax free savings accounts were introduced in March 2015 in order to encourage household savings (National Treasury, 2014). Direct investing in shares is prohibited based on the criteria of eligible products which individuals may choose to invest, share purchases are allowed through Exchange Traded Funds (ETF). While the impact of tax-free saving accounts on institutional investor's assets under management has not been formally studied through academic literature, this study will assume the impact to be negligible.

1.10 Ethical consideration

The proposal for this study was presented before the MCom Research Committee of the University of the Witwatersrand before the study began. Ethical clearance was obtained and an ethics clearance number of CACCN/1153 was assigned. This study only uses publicly available information from financial databases such as Osiris and Thomson Reuters ASSET4. The process followed to extract the data from these databases and the statistical tests performed will be discussed further as part of the methodology chapter, this is in order to ensure transparency of process followed. Throughout the process, the researcher exercised professional competence and due care to ensure that the quality of the research is maintained.

1.11 Summary

The first chapter sought to introduce the topic of ESG reporting and the important role it plays in the context of investor decisions. The chapter provided a brief overview of the background

to this study, the research questions, significance of the study, key definitions, research methodology, assumptions and key limitations of the study.

The remaining chapters of this research report will be structured as follows: Chapter two will provide an outline of the theoretical perspectives which underpin this topic, as well as a review of prior studies performed on this topic. Chapter three will set out the research design, population and sample determination as well as the data analysis method to be followed. Chapter four will analyse and discuss the results based on the statistical tests performed. The last chapter will present the conclusions which can be drawn from the results, limitations of this research and provide areas of further study.

Chapter 2 – Literature Review

2.1 Introduction

As stated in chapter one, this study will test the relationship between ESG reporting and the long term institutional investors shareholder base. While permutations of studies have been performed focusing on the link between investor reactions to various forms of non-financial reporting, an area which has been largely neglected by researchers has been the assessment of how various forms of non-financial reporting and how they seek to attract a long term supply of capital (Amel-Zadeh & Serafeim, 2017; Eccles, Serafeim, & Krzus, 2011; Serafeim, 2015). The introduction of UN PRI, CRISA and legislative requirements in the form of Regulation 28 changes has created the need for this area to be studied.

Studies into responsible investment practices within emerging markets are still in the embryotic stages with much critical research still needing to be performed (Sullivan & Biliouri, 2012). Where prior studies have been performed these have either taken the form of surveys which seek to assess investors' reactions to non-financial disclosures or based on market reaction studies (Milner & Chan, 1999). These studies have been noted to have a short term focus on the effects of non-financial reporting on investor decision making (De Klerk & De Villiers, 2012). Given the differences in research focus, methods and the results which prior studies may have yielded, a traditional literature review approach would not be suitable. Rather a structured literature review approach will be followed with the aim of identifying and evaluating current research underway (Engelbrecht, Yasseen & Omarjee, 2018).

According to Dumay, Bernardi, Guthrie & Demartini (2016) there are two key objectives when investigating an emerging research field such as responsible investing. The first is founded on the basis that for an emerging research area such as this there is no detailed and well-grounded understanding of the issue which has been presented by many scholars. As a result, it will be important to go back to the roots or first principles which seek to understand the why and how of responsible investing. Secondly, it will present an opportunity to assess future research opportunities which will further seek to understand the context and value relevance of Responsible Investing. It is against this backdrop that a review of prior literature around the topic will be discussed with the aim of contextualizing the research question for this study and develop a basis upon which empirical justification for this research area will be founded (Leedy & Ormod, 2013).

Given the focus of this research study on the effect of ESG reporting in influencing investor decision making, the literature review will begin in section 2.2 by defining ESG and the theoretical framework which underpins ESG reporting (section 2.3). The remainder of the chapter will discuss empirical literature around this topic, particularly as it relates to the benefits and drawbacks of ESG reporting integration. The chapter will conclude with a view of how the responsible investment journey in South Africa has evolved over time and how it compares to global standards.

2.2 ESG Defined

Over the past few years, investors have increasingly recognised that company financial performance does not give an indication of the sustainability of the company, which resulted in the focus shifting to non-financial reporting (Bourghelle *et al*., 2009; ACCA, 2013a). The reporting of non-financial performance included metrics which were broadly classified under three areas, environmental, social and governance performance. Examples of these metrics included the following: environmental (i.e. carbon emissions, water consumption, waste generation, etc.), social (i.e. employee, product, customer related, etc.), and governance (i.e. political lobbying, anticorruption, board diversity, etc.) data (Amel-Zadeh & Serafeim, 2017). Over time the reporting of non-financial performance evolved from being disclosed as part of annual reports to what is now known as integrated reports (Atkins & Maroun, 2014).

According to Jaclyn (2011) the demand for ESG reporting has also grown far and wide with many investors groups requiring the companies to disclose ESG performance. A number of initiatives have further supported the requests from investors which include the UN PRI, carbon disclosure project; Interfaith Centre on Corporate Responsibility, Investor Network on Climate Risk and Institutional Investor Group on Climate Change (CICA, 2010). All these initiatives highlight a growing move towards the investor community being ESG conscious (Yu, Guo & Luu, 2018). Perhaps the most influential of these initiatives has been the UN PRI, which has rapidly raised investor interest in ESG information, particularly given its ability to allow for comparability where traditional financial reporting standards may fall short (Amel-Zadeh & Serafeim, 2017).

2.3 Theoretical framework

There are many theoretical frameworks under which the disclosure of non-financial information in the form of ESG is based and the role which investors play in shaping the outcomes of non-financial information (Padia & Yasseen, 2011; Holt, Yasseen, & Padia, 2015; Phala, Yasseen, Padia, & Mohamed, 2019). These include, amongst others the agency, stakeholder and legitimacy theories. A common thread amongst all these theories highlights the growing

importance of ESG reporting in influencing investor confidence as to their understanding operations of a firm, the risks which it faces, management's response to these risks and the overall sustainability of the firm (Holm & Rikhardsson, 2008; Garcia *et al.,* 2017). Milne and Chan (1999) however argue that the theories appear to be overlapping and similar in many respects rather than competing.

2.3.1 Legitimacy theory

The legitimacy theory provides the theoretical perspective which explains and supports the notion that ESG reporting is key in attracting long term institutional investors. According to this theory, companies respond to pressure from stakeholders and as a result report transparently on ESG through increasing non-financial disclosures (Van Zijl *et al*., 2017). Lai, Melloni and Stacchezzini (2016) argue that the reporting of ESG issues is not related to strategic legitimation. Contrary to these views, Garcia *et al.* (2017) find that companies operating in sensitive industries, such as those which are exposed to societal and moral debates or receive political pressure over their operations, would disclose ESG information in order to preserve its reputation. The findings are consistent with Van Zijl *et al.* (2017) who established that companies operating in the financial services industry, also considered a sensitive industry, would focus on non-financial indicators as these are strategically relevant. Based on these views, it would appear that assessing the role of ESG information may need to be contextualised and may gain different appreciation amongst investors (Atkins and Maroun, 2015). While the legitimacy theory may not be key to the disclosure of ESG information the agency and stakeholder theories also need to be considered.

2.3.2 Agency theory

Jensen and Meckling (1976) found that the relationship between owners of a firm and management may be likened to a principal-agent relationship which gives rise to agency costs known as the agency theory. This is as result of agents not acting in the best interests of the principal. The agency theory states that ESG disclosure is conducted as principals require more information than what is contained in financial reports and other disclosures presented by a company (Holm & Rikhardsson, 2008). Through the agency theory lens, ESG reporting can be seen as mechanism by which investors are able to narrow the gap between separation of ownership and control and thereby reduce information asymmetries (Jensen & Meckling, 1976; Sievänen, 2014). Based on a critical review of literature, Al Jabri and Hla (2016) find that there exists an inconclusive relationship between the levels of voluntary disclosure and various ownership structures, for example ownership concentration, foreign, family, and governmental and director ownership. Juhmani (2013) however finds that large block shareholders, typically

the case of institutional investors, will influence the extent of disclosures performed in order to derive benefit.

2.3.3 Stakeholder Theory

RI like corporate social responsibility and the many other investing practices are driven by some form of consideration to socio-environmental impact which is underpinned by the stakeholder theory (Prado-Lorenzo, Gallego-Alvarez & Garcia-Sanchez, 2009). According to this theory, Garcia *et al.* (2017, pp.136) state that "the capacity of a firm to generate sustainable wealth is determined by its relationships with its various stakeholders." Applied to RI, this theory suggests that stakeholders are able to influence how a company operates and through the ESG results it produces this allows stakeholders to be able to demonstrate the application of RI principles and codes (Prado-Lorenzo *et al*., 2009). Kotsantonis *et al.* (2016) reiterate the importance of this theory for companies to manage closely. They state that "stakeholder investment can prove to be a source of competitive advantage and value that is increasingly being recognized by investors" (Kotsantonis *et al.,* 2016, p.11).

2.4 Role of ESG Information and disclosure frameworks/standards

Having established the theoretical foundations of ESG, the continuing role which it plays in shaping investment decisions is critical (Yu *et al.*, 2017). According to Amel-Zadeh and Serafeim (2017), ESG information provides insight on the risks which a company faces and not necessarily insight into its competitive position. As such, ESG information has become a key element of corporate reporting and needs to be forward looking in order to be relevant to investors. Venter, Stiglingh and Smit (2017) further highlight that ESG information plays a key role in ensuring that investor decisions are informed and that through this information it ensures that investors maintain the best interests of society and the environment in which the companies they invest operate. Corporate incidents such as the oil spill involving Shell have illustrated investor concerns over ESG matters and the actions which were subsequently taken (Yu *et al.,* 2017).

Currently, there are a wide number of frameworks and standards which are directed at ESG disclosures. The two most significant in terms of global reach and focus include the Integrated Reporting Framework and the Global Reporting Initiative (GRI) standards (CICA, 2010; Rensburg & Botha, 2014). These have provided a good starting point for considerations of what form ESG disclosures should take. Amel-Zadeh and Serafeim (2017) however argue that there is no set definition for what is to be considered material from an ESG perspective or important for certain sectors. The following sub sections will assess the mandatory and voluntary disclosure considerations of ESG and how they influence investor decisions:

2.4.1 GRI Standards

Introduced in 1997, the GRI standards underpin and provide structure to sustainability reporting across economic, environmental and social impacts, practices and policies (De Villiers, Rinaldi & Unerman, 2014). GRI follows a multi-stakeholder approach and thereby seeks to address various ESG reporting needs of each company stakeholder (Sridharan, 2018). Given the varied information needs of each stakeholder, GRI compliant reports have been noted to contain too many details on ESG, which may prove to be challenging for users to link the interconnectivity of each of the ESG impacts (De Villiers *et al*., 2014). Overall, GRI paved the way for future enhancements to corporate reporting which came in the form of integrated reporting (CICA, 2010).

2.4.2 Integrated Reporting Framework

With investors highlighting the limitations of annual reports in providing a holistic and succinct overview of ESG issues facing the company, integrated reporting was founded in 2010 as a new means of corporate reporting which sought to address this need specifically for providers of financial capital (Eccles, Serafeim & Krzus, 2011; Padia & Yasseen, 2011; Dumay *et al.,* 2016; Phala *et al.*, 2019; Sridharan, 2018). In the same year, South Africa mandatorily required all publically listed entities to adopt integrated reporting (Du Toit, Van Zyl, & Schütte, 2017). The Integrated Reporting Framework emerged in 2012 and sought to bring about structure and rigour in the manner in which integrated reports are prepared in order to provide a comprehensive understanding of the organisation's total performance and demonstrate how value has been created over time (Du Toit *et al*., 2017; Venter *et al.,* 2017).

Despite integrated reporting being mandatory, EY (2017) found that a majority of investors did not believe that companies adequately disclose their ESG risks. This view however does not bear a marked departure from earlier studies which assessed investors' reactions to integrated reporting. For instance, Maroun and Atkins (2015) found that institutional investors in South Africa regard integrated reports as rather lengthy and that the use of disclosure checklists detracted from integrated reports being able to clearly articulate key ESG issues to stakeholders.

2.5 ESG Analytics

Responsible investing is only enabled through being able to compare and analyse investments consistently and accurately across all ESG factors. De Graaf and Slager (2006) highlight that through incorporating ESG factors into asset pricing, investors are able to develop an investment strategy which will seek to realise positive alpha. According to Amel-Zadeh and Serafeim (2017), over 100 rating agencies such as Thomson Reuters and Morgan Stanley

Capital International (MSCI) began providing ESG data by 2016. These platforms currently provide an independent and objective view of company ESG disclosures by analysts and are receiving growing market interest (Lai *et al.,* 2016).

These rating agencies typically develop an internal scorecard to be able to assess the commitment by companies to ESG issues. The Thomson Reuters ASSET4 platform for instance, provides investment research information on key ESG factors which are material to the corporate performance of over 7,000 global companies (Thomson Reuters, 2018). The ESG pillars are assessed using over 500 data points, ratios and analytics inputs. An overall score is provided for each pillar and for the company as a whole as shown in figure 1 and an example of this scorecard is shown in Appendix A. The scores range from zero to 100 and reflect a company's transparency and effectiveness to each of the ESG pillars, with higher scores denoting good performance. ESG results from the Thomson Reuters ASSET4 platform in particular have been widely cited in prior studies assessing the impact of ESG investing given the frequency with which the information is updated, objectivity, comparability and, breadth and depth of ESG data coverage (Cheng, Ioannou & Serafeim, 2014; Serafeim, 2015).

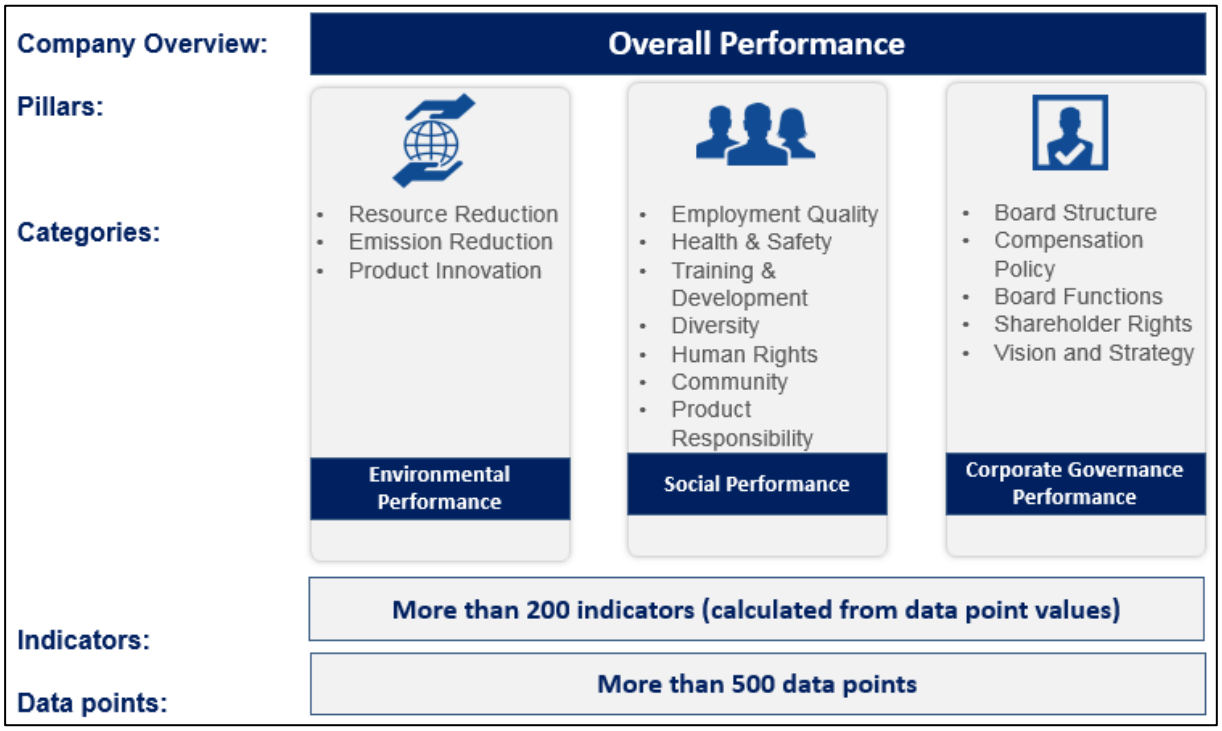


Figure 1: Determination of Thomson Reuters ASSET4 ESG Scores (Thomson Reuters, 2018)

Despite the ESG scores allowing for investors to quantitatively and comparatively assess company ESG performance, Quigley (2010) argues that the ESG scores carry significant sectoral biases, such as particular sectors being over-represented. Moreover, ESG data contain significant biases as it relates to common risk factors such as the dividend yield, beta, P/E ratio and earnings variability. For example, companies with high ESG scores tend to have lower betas and earnings variability. This is perhaps as a result of ESG factors having different financial materiality dependent on the type of sector (Amel-Zadeh & Serafeim, 2017). Quigley (2010) further argues that the ESG scores are not able to take into account the likelihood of single isolated events which have a negative effect on a company's rating as it relates to any of the ESG pillars. However, the author suggests that in order to effectively utilize ESG scores and be able to yield meaningful comparisons from the results, it is important that the ESG scores be controlled for sectoral biases by performing a sector by sector comparison (Garcia *et al.*, Quigley, 2010).

2.6 ESG Disclosure Gap

Empirical literature assessing the objectives and expected outcomes of the Integrated Reporting Framework and GRI standard has highlighted that there are gaps in terms of meeting stakeholder requirements (CICA, 2010). Milne and Chan (1999) highlight the important link between ESG disclosures and investor decision making. They state that where ESG information is quantifiable, this allows for a meaningful basis of assessing investment risk and return which in turn will influence decision making. As a result, more needs to be done in order to bridge the ESG disclosure gap between companies and investors. Through initiatives such as the Enhanced Analytics Initiatives (EAI), Bloomberg and other ESG analytics information, these initiatives have narrowed the ESG disclosure gap (Bourghelle *et al*., 2009; Jaclyn, 2011).

2.7 Institutional Investors

Institutional investors are defined as shareholders who hold or invest in equities of a company and have a fiduciary responsibility to beneficiaries as it relates to investment analysis, activities and returns (IODSA, 2011). Institutional investors typically hold large share portfolios in carefully selected companies. Examples of such investors include pension funds and life insurance companies (Atkins & Maroun, 2014). Al Jabri and Hla (2016) highlight that institutional investors are able to monitor management's discretionary behaviour more effectively through their influence given their significant shareholding. Furthermore, Al Jabri and Hla (2016) add that institutional investors are able to direct management's behaviour and encourage profitable strategies which are in alignment with their investment mandates.

On the other hand, Morck, Shleifer and Vishny (1988) highlight a concern that institutional investors tend to have an incentive to be entrenched in the inner workings of the company and not act to monitor management effectively. However, given the fiduciary responsibility of institutional investors, behavioural finance theory assumes that institutional investors are rational agents and that they seek to maximize returns (Bushee, 1998). Sultana, Zulkifli and Zainal (2018) argues that given that RI is a cross-over between traditional and behavioural finance theories, investors will equally look at the all ESG factors in seeking to maximize their long term investment returns.

Given the focus on ESG issues globally through the introduction of the UN PRI and CRISA in South Africa, this has required investors to reconsider how they allocate their capital. Sultana *et al.* (2018) state that considerations which go into ESG investing are a "cross-over between traditional finance theories and behavioral finance theories, because ESG issues have an impact on the long term investment return. Therefore, the consideration of environmental and social issues in investment decision can be due to economic preferences, social and environmental concerns, or both." (Sultana *et al*., 2018, p. 4).

For companies, institutional investors are an important class of shareholders which need to be managed particularly as it relates to the amount of information which the company needs to disclose. Al Jabri and Hla (2016) state that where significant institutional shareholding is held, this exposes the company to higher agency costs and as a result companies need to heighten voluntary disclosure. A study by Weber (2014) found that ownership status influences the frequency of ESG disclosures given accountability reasons.

2.8 United Nations Principles for Responsible Investment (UN PRI) Objectives

In 2006, the United Nationals PRI was launched with the support of over 100 of the world's largest institutional investors responsible for funds of over USD2 trillion (Serafeim, 2015). The purpose of the UN PRI was to create a framework which supported long term investment requiring investors to consider ESG issues as part of their decisions (UN PRI, 2018). Currently, the UN PRI has over 1800 signatories as at October 2017 (Yu *et al.*, 2017). At the time the UN PRI was launched, the principles were developed with a focus on the following:

- recognition that ESG issues are financially material;
- understanding that integrating these issues forms part of an investor's fiduciary duty to their clients and beneficiaries;
- concern about the impact of short-termism on company performance, investment returns and market behaviour;

- public policy requirements for investors to exercise their rights and responsibilities as owners;
- pressure from competitors seeking to differentiate themselves through responsible investment;
- ethical motivations of investors, clients and beneficiaries (UN PRI Association, 2016a, p.6).

2.8.1 Key principles for responsible investment

The UN PRI consists of six voluntary principles containing 35 possible actions which institutional investor may apply in order for their investments to be regarded as “responsible investments”. According to Eccles (2010) the principles underpinning UN PRI are broad in nature and do not provide an explicit ethical stance, rather they encourage co-operation from investors to putting the principles into effect. Eccles (2010) further highlights that while these are meant to be principles, they however take the form of principles focusing on process. The principles may also be seen to be aspirational to the current processes which investors are required to run which is evident in the manner in which the principles are stated. As shown in figure 2, principles one and two broadly state how the objectives of responsible investing can be met and provide clarity on how the first principle may be applied. The remainder of the principles in summary highlight the advocacy and reporting duties of investors in promoting responsible investment (Eccles, 2010).

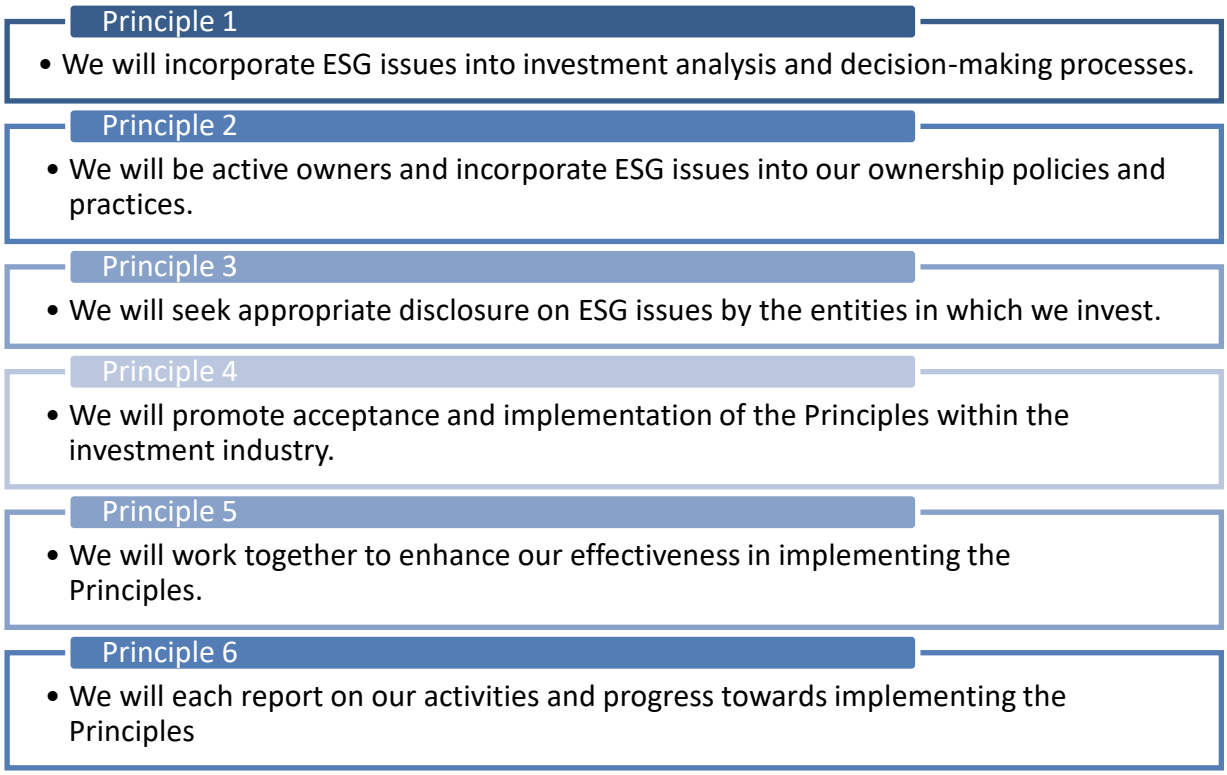


Figure 2: UN Principles for Responsible Investment (UN PRI Association, 2016a)

2.8.2 UN PRI adoption progress and key developments

Subsequent to the introduction of the UN PRI the number of institutional investor signatories increased exponentially. As at 2016 were about 1,400 signatories, responsible for over USD60 trillion in investments (Amel-Zadeh & Serafeim, 2017). This highlights the growing appreciation of ESG considerations within the investor community. Amel-Zadeh and Serafeim (2017) further add that amongst companies, there has been a marked change in approach with nearly 9,000 companies now issuing sustainability or integrated reports from only 20 companies in the early 1990s.

In 2016, the UN PRI in conjunction with the United National Environmental Programme Finance Initiative (UNEP FI) and the United Nations Global Compact released guidance on how to integrate ESG considerations in investment decision making. While the guidance focuses mainly on listed equities, it provides practical examples in the form of 51 case studies on how ESG integration may be achieved across various investment strategies (UN PRI Association, 2016b). The case studies provide insights into how ESG is being applied in mainstream investment processes and how ESG factors can be quantified within portfolios (UN PRI Association, 2016b).

2.8.3 Code of Responsible Investing in South Africa

Consistent with the UN PRI principles, South Africa formally put these principles into effect in 2012 through the CRISA (EY, 2013). The aim of adopting CRISA was to ensure that within South Africa that these principles like the King Code form part of the governance framework applicable to all role players (IoDSA, 2011). As a corollary to the introduction of CRISA, Atkins and Maroun (2014) found that CRISA propelled the integrated reporting agenda and resulted in there being a strong shift towards ESG issues in an attempt to understand company sustainability. In part this has also been driven by the fact that amendments to Regulation 28 of the Pension Funds Act No.24 of 1956 which propels investors to "any factor which may materially affect the sustainable long term performance of a fund's assets, including factors of an environmental, social and governance character' in their decision making" (EY, 2017, p. 4).

2.9 Responsible investment defined

Responsible investment is not a relatively new term to the investor community as its roots can be traced to as far back as 31 years ago wherein it was first purposed as ethical investment by Irvine (1987). At the time, ethical investment was defined as undertaking investment practices which avoided companies trading in immoral products or businesses lines such as alcohol, gambling or tobacco (Wen, 2009). In today's construct, responsible investment however refers to investment practices which encourage the integration of ESG issues as part of their investor decision making with the primary objective of ensuring higher risk-adjusted financial returns (Eccles & Viviers, 2011).

The lineage of this practice has evolved substantially over time and has been referred to under various forms, from ethical investment to socially responsible investment, sustainable investment and many others. Eccles and Viviers (2011) argue that these variations have emerged given the progressive and dynamic nature of these disciplines which has resulted in the current conceptual fuzziness of the concept.

The UN PRI (2018) however provides a contrary view which distinguishes responsible investment to Socially Responsible Investing (SRI). It outlines that the focus of SRI and ethical investment is in addressing a financial return need by ensuring that considerations of moral or ethical concerns are also upheld. Responsible investment, however has a sole objective of ensuring a financial return is achieved through incorporating ESG factors (Garcia *et al*., 2017). Another key difference between responsible investment and other approaches is that it applies a holistic approach by encouraging the consideration of all ESG information material to investment performance while other approaches only look at specific themes (UN PRI, 2018).

2.9.1 Responsible Investment Strategies

De Graaf and Slager (2006) argue that there are three broad groups of investments which integrate ESG issues, namely financially driven, ethically based and value driven as shown in Table 2 below. Under the financially driven strategy the main focus is on ensuring a risk return trade off with no ESG issues being incorporated into investment decision making. The second strategy, ethically based, highlights how an ethnically based strategy is underpinned by institutional investors' fiduciary duties, and how investment decision making consider social issues to a greater extent than environmental and governance issues. The last strategy, value ensuring, highlights how investment decisions are taken with consideration to all ESG issues. It further highlights that the aim of value ensuring strategy is to derive long term value. The value ensuring strategy appears to be more aligned to the objectives set out by the UN PRI (UN PRI, 2016a).

SRI Strategy Underlying	Underlying philosophy	Definition	Implementation strategies
Financially driven	Exploit market inefficiencies	Financial objectives are the main direct goals with social objectives as (non) binding restrictions	SRI Theme funds, Best-in-class strategies
Ethically based	Fiduciary duty in line with values of beneficiaries	Social objectives are the main direct goals, with financial objectives as non-binding restrictions	Ethical exclusion strategies, based on specific criteria of norms-based
Value ensuring	Market presence	Ensuring financial objectives in the long term is the main goal, with social objectives as (non)binding restrictions	Engagement with companies Integration of ESG risk in financial analysis

Table 2: Socially Responsible Investment Strategies (De Graaf & Slager, 2006, p 5)

2.9.2 Drivers of Responsible Investment

Despite responsible investment being driven through regulations or governance principles, Jansson and Biel (2014) found that responsible investing is driven by investor's beliefs around financial risks and benefits and is not necessarily driven by value ensuring objectives. Jansson and Biel (2014) explain that while investors may not see an immediate short term benefit from

applying responsible investment practices, the long term gains may be substantial. As a result, for the investor, this creates a niche market with fewer risks given that investments are made in fairly stable companies.

2.9.3 Strategies for implementing responsible investing

ESG integration per the UN PRI is defined as "the systematic and explicit inclusion of material ESG factors into investment analysis and investment decisions (UN PRI Association, 2016b, p. 12)." Compared to SRI which is carried out though corporate engagement or screening methods as strategies in order to achieve the objectives of SRI, the approaches for implementing RI are varied (Jansson & Biel, 2014). According to the UN PRI (2016b), the approach to achieving responsible investment may be carried out through three ESG incorporation practices, all of which may be run simultaneously. These include thematic investing, screening and ESG integration into investment analysis. As it relates to the latter, the UN PRI currently has guidance which provides practical examples on how RI can be implemented through various equity investment strategies applicable for both actively managed and passive portfolios (UN PRI Association, 2016b). These investment strategies include fundamental, quantitative, smart beta and, passive and enhanced passive approach, a summary of which is provided in table 3.

Investment Strategy	Aim of investment Strategy	Information required/used	Final outcome
Fundamental Strategy	Identify investment opportunities by using company data to make assumptions about future performance. These assumptions are based on qualitative and quantitative analysis of economic trends, the competitive environment, the market potential of a company's products and services, operational management and the quality of senior management.	Investment research and financial data from multiple sources, and often meet senior management teams.	Build or update company valuation models to assess a company's perceived intrinsic value and compare this to its current share price, thus identifying companies which may be over-valued and under-valued by the market. Alternatively, and in combination, use the relative valuation approach such as price-to earnings (PE) and return on invested capital (ROIC) – to its peers and/or the sector's average, to assess whether the company is relatively fairly valued, undervalued or overvalued.
Quantitative Strategy	Harness data, using mathematical models and statistical techniques to outperform their benchmarks.	Technical and/or fundamental data, both historical and forecast.	Computers can run the models and produce suggested Investment decisions. Systematic rules and portfolio construction techniques, along with integrated risk management tools, lead to portfolio weighting recommendations.
Smart Beta Strategies	Create a portfolio that has different characteristics and returns compared to a conventional index weighted by market-capitalisation.	Factor(s) other than market capitalisation – such as value, dividend yield, momentum,	By applying different weights, a portfolio is created that has different characteristics and returns compared to a conventional index weighted by market-capitalisation.

		growth, quality or volatility	
Passive and enhanced passive strategies	Passive investments seek to match the performance of a market or a section of a market by closely tracking the return of a capitalization weighted index. While enhanced passive, seek to match the performance of a capitalisation-weighted index.	Index and constituent weights	Passive investments that track an index will buy and sell stocks periodically to reflect the changes to the underlying index. Enhanced passive will either reduce the downside risk relative to a capitalisation-weighted index or beat its performance.

Table 3: Summary of investment strategy approaches (UN PRI, 2016b) adapted

Under the fundamental approach, investors seek information about the company and its future performance and use this to derive the company valuation. Ratio analysis may also be applied as part of the fundamental strategy. Increasingly, investors quantify and incorporate ESG factors into their valuation models (UN PRI, 2016b). The second investment strategy takes the form of a quantitative approach which involves building models and performing statistical analysis in order to achieve a return that exceeds certain benchmarks (UN PRI, 2016b). ESG information under the quantitative approach may easily be incorporated as part of this approach as ESG analytics are becoming widely available and the data is progressively becoming accurate and reliable (Serafeim, 2015; UN PRI, 2016b).

The third investment strategy is called smart beta investing which uses a mixed approach of both passive and active investment disciplines (UN PRI, 2016b). Under this approach, ESG factors and scores are used as weights in constructing a portfolio with the aim of achieving excess risk adjusted returns and enhance the risk profile of the overall portfolio. The last investment strategy follows a passive approach which requires for ESG factors to be incorporated in an attempt to reduce the ESG risk profile or exposure to a particular factor (UN PRI Association, 2016b). Overall the four techniques provide practical guidance on how ESG considerations can be incorporated into investment analysis and decision making.

2.9.4 Institutional investors and responsible investing

Garcia *et al*. (2017) mention that RI practices closely resonates with the demands of long term investors particularly institutional investors who carry fiduciary duties and are mandated to generate a long term returns for beneficiaries. De Graaf and Slager (2006) argue that institutional investors carry an extended fiduciary responsibility particularly in ensuring the functioning of financial markets together with government, regulators and market participants. They further state that the impact which institutional investors have on the overall wellbeing of the market is immense and that the credit crisis was just but one event which highlighted this.

Recognizing the impact which institutional shareholders have on companies, the UN PRI focuses not only on institutional investors but also applies to other role players across the investment value chain (Eccles, 2010). Similar to the UN PRI, CRISA also extends to service providers of institutional investors such as asset and fund managers as well as consultants (IODSA, 2011).

As part of a study conducted by Ernst and Young (2017) it was found that there was a growing number of institutional investors and service providers who are proactively applying responsible investing principles despite CRISA disclosure guidelines only being in effect for less than two years (IODSA, 2013). The study further went on to highlight that a majority of the surveyed institutional investors and service providers are PRI signatories.

2.9.5 Implementation challenges of responsible investing

Globally, there is a strong appreciation for the role which responsible investing plays in promoting sustainability issues (UN PRI, 2016a). However, Eccles and Kastrapeli (2018) highlight three traditional and commonly perceived barriers to implementing responsible investing which suggest concern over the erosion of financial returns. The first is taken from the view that in order to incorporate ESG factors into investment decisions, financial returns need to be traded off. Secondly, given the perceived loss of financial returns, investors are more likely to exclude incorporating ESG factors into their investment decisions as it may be contrary to their fiduciary duty. Lastly, investor's focus on the short term performance of asset price performance and do not fully appreciate the positive long term effects of responsible investing. Despite these challenges, there is a growing body of research evidence which is demystifying the potential myths and perceptions that responsible investment does not adversely affect financial returns rather, that it contributes to corporate financial performance and improvements in share price performance (Kotsantonis *et al.*, 2016)

Within emerging markets, Sullivan and Biliouri (2012) argue that there are inherent risks which are more pronounced to these markets when compared to developed markets and impede on progress to promote sustainability issues. These issues include institutional and governance weaknesses, corruption and social inequality which presents a threat to investors in order for them to practice responsible investing. They present five key themes which shed light on the specific challenges which are typically encountered. The first challenge relates to investors needing to take more of an active role over governance issues facing companies. This is in order to ensure that correct policies are in place over financial, social and environmental aspects especially where these are needing improvement (Sullivan & Biliouri, 2012). Through taking an interventionist approach, investors are consequently taken away from their roles of providing pure oversight to companies.

The second challenge highlights the need for investors to consider ESG issues from a broader social, political and legal perspective and to factor this into their analysis (Sullivan & Biliouri, 2012). Specifically, investors need to consider the risks which disruptions as a result of political, social or legal issues present. Given the volatile nature of emerging markets, integrating this risk may prove to be challenging. In the same breadth, Sullivan and Biliouri (2012) highlight a forth issue which investors face in the event of financial stability concerns and means of being able to exit investments. Lastly, Sullivan and Biliouri (2012) mention that the demand for investing in emerging market equity markets is not unlimited and that investors are typically cautious by ensuring that they invest only in less risky securities. This is as a result of the limited size of equity markets and challenges as it relates to corporate disclosures and institutional structures.

Within South Africa, the uptake of responsible investments is characterised by unique challenges which are articulated in the 2013 CRISA Committee and EY report into responsible investment practices:

> As CRISA is a voluntary code, conditions need to be in place to allow market forces to encourage self-regulation. A more standardized approach to disclosure might be required to improve the comparability and measurability of data, thus allowing market forces to drive accountability (IoDSA, 2013, p. 13).

Their results highlight the gap in terms of guidance which is required in order to achieve a standardized approach by investors, as varied interpretations of responsible investment is currently held. This consequently acts as an impediment towards South African investors' progress in working towards a collective goal and this makes it even more challenging for South Africa to be compared on a global scale with its counterparts.

2.10 Role of ESG Integration Model

Across all investment strategies, the UN PRI has formalized an ESG integration model which comprises of four stages and may be applied market-wide by asset owners, investment managers and sell-side brokers (UN PRI, 2016b). The purpose of the ESG integration model is to set out various activities which investors will need to perform in order to ensure that ESG considerations are systemically incorporated into their investment activities. The model comprises of the qualitative and quantitative analysis, investment decision and active ownership assessment.

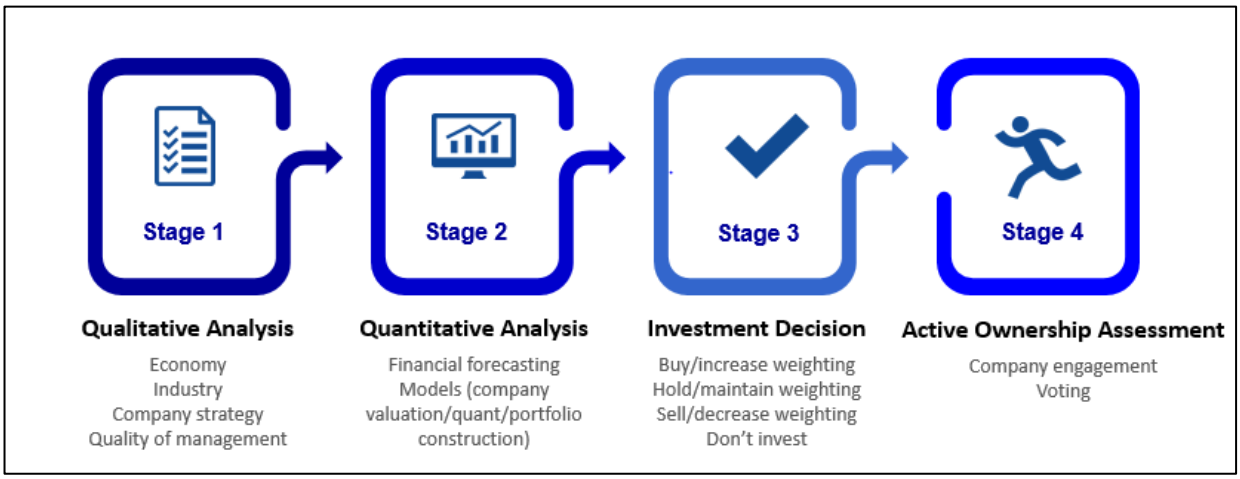


Figure 3: ESG integration model (UN PRI, 2016b, p. 13)

Under the qualitative analysis stage one, investors are required to obtain all pertinent information about the company and identify key or material factors which may impact on the sustainability of the company. Sources of information which investors may rely on include company reports such as the integrated report and other corporate reports as well as

information from investment research companies such as Bloomberg. The second stage of the analysis process requires investors to assess material financial factors and revise any previous forecasts and/or valuation models accordingly (UN PRI, 2016b). At this juncture, investors are required to incorporate ESG factors into their quantitative analysis based on any of their selected investment strategies, including fundamental, quantitative, smart beta and, passive and enhanced passive approaches.

Stage three of the integration model requires investors to combine the results of stages one and two and to determine the most appropriate investment decision of whether to either increase, decrease or hold their current shareholding weighting. The fourth stage of the integration model requires investors to carry out active ownership assessment of the holdings, either through engagement with company management or informed voting. The outcomes of this process should be used to feed into future investment analysis and thereby inform future investment decisions (UN PRI, 2016b).

2.11 Industry Selection and Responsible Investment

Responsible investment practices encompass a number of key considerations and as a result are largely data intensive relying on accurate corporate reporting. The process of selecting which companies to invest in is rigorous, unlike socially responsible investment which outright eliminates certain companies belonging to certain industries such as the tobacco industry (Wen, 2009). According to Blank, Sgambati and Truelson (2016) through ESG investing, investors are now able to focus on which companies within industries to select. This allows them to look at how the company operates rather than just what the company produces. Highlighting the impact of negative and positive externalities arising from company activities on investors, Knauer and Serafeim (2014) found that these have an effect on the value creation process and thereby affect the company's ability to attract long term investors.

2.12 ESG Disclosure and Economic Sector Performance

Given that RI encourages investors to base their investment decisions with ESG considerations in mind and not screen companies dependent on the industry or sector which it belongs, it would be expected that all companies have an equal chance of being selected (UN PRI, 2018). Amel-Zadeh and Serafeim (2017) argue that the contrary applies, in fact, investors are likely to use ESG ratings as a negative screen should the ESG ratings be low, rather than using it as a positive screen which should be integrated into share price valuations. Garcia *et al*. (2017) found that companies which operate in sensitive industries or those that have a major socio-environmental impact produce better ESG performance. Cheng *et al.* (2014) further found that there is a positive relation between ESG and the ability of the firm to obtain capital. Perhaps another consideration to bear in mind is that ESG disclosures are not

consistent from sector to sector, given that larger companies or those belonging to industries which receive greater public scrutiny are likely to have higher ESG ratings (Peiró-Signes, Segarra-Oña, Mondéjar-Jiménez & Vargas-Vargas, 2013).

2.13 Financial impact of ESG disclosures

Through ESG reporting management is able to communicate to stakeholders how risks which may otherwise impact operations are being addressed. These disclosures have been found to be beneficial for stakeholders as they reduce agency costs and information asymmetries given increased transparency (Cheng *et al*., 2014; Garcia *et al*., 2017; Zhou, Simnett & Green, 2017). As it relates to the company, high quality ESG disclosures have also been evidenced to produce better economic results in the form of higher revenue and cash flow figures (Peiró-Signes *et al*., 2013).

Bushee and Noe (2000) in their landmark study titled "*Corporate Disclosure Practices, Institutional Investors, and Stock Return Volatility*" found that corporate disclosure practices positively impact on the firm's institutional investor base and the volatility of the share price. Through regression analysis, they observed that firms which have higher disclosure practices attract institutional investors who are characterized as displaying longer investment holding periods and low portfolio turnover. As a result, the volatility of the share price of the firm reduces.

Zhou *et al*. (2017) document that ESG disclosures are value relevant to the capital market as they were noted to have improved analysts' earnings forecast errors as a result of ESG disclosures being used as inputs to valuations. Cheng *et al*. (2014) also found that companies with superior corporate social responsibility practices and initiatives encourage stakeholder engagement which leads to reduced capital constraints. They further argued that stakeholder engagement encourages management to adopt a long term focused approach. These findings highlight that ESG disclosures are increasingly being used to manage investment risk (Friede, Busch & Bassen, 2015). Barth, Cahan, Chen and Venter (2017) further found that ESG disclosures positively impact on firm value as evidenced by increased liquidity and expected future cash flows. The findings of Barth *et al.* (2017) highlight the relevance which ESG disclosures have in affecting investor decisions.

Yu *et al. (2018)* found that ESG disclosures to be value relevant, firm value was observed to increase as measured by Tobin's Q, particularly when ESG disclosures are transparently presented. Other factors such as firm size, lower shareholdings by management or institutional

investors, better current ratio metrics and higher research and development commitments were also observed to have a positive impact on firm value (Yu *et al*., 2018).

Perhaps the most summative empirical paper presented on the financial impact of ESG disclosure by Friede *et al*. (2015) which highlights that in over 2000 studies there was roughly a 90% non-negative stable relationship between corporate financial performance and ESG criteria over time. Interestingly, the study finds that in emerging markets the opportunity for ESG outperformance is higher compared to developed markets. However, the study finds that non-equity asset classes such as bonds and real estate present significant positive company performance when ESG considerations are applied compared to equity asset classes. While these results present good insights into ESG reporting and company performance relationship. The findings appear to provide evidence contrary to more recent studies on this topic. Perhaps the study by Friede *et al*. (2015) needs to be interpreted as a point in time study, for which the results may be skewed, given that the sample may not have been representative of more recent studies performed on this topic. This is attributed to the lengthy academic literature publication period.

2.14 Responsible Investment in South Africa

South African institutional investors held a total of R7 971bn retail assets under management as at December, 31st 2016 (National Treasury, 2017). Of these assets, R3 242bn is invested in JSE listed equities representing approximately 41% of the total assets under management (National Treasury, 2017). Given the significant shareholding which institutional investors hold in JSE companies there exists room for RI to be applied.

The uptake of RI practices in South Africa has largely been driven as a result of regulations (IoDSA, 2011). The earliest example of this was evidenced by Kumar, Lamb and Wokutch (2002) who found that the abolishment of sanctions in South Africa in 1993 resulted in an increase in corporate financial and share price performance. This was explained from the perspective of institutional investors needing to apply the “prudent man rule,” which says that institutional investors’ actions should reflect those of a prudent man who seeks to protect the return and capital of an investment (Kumar *et al.*, 2002).

In addition, Eccles *et al*. (2008) found that there are a number of other drivers, barriers and enablers which have an influence on RI in South Africa. Key barriers included fiduciary responsibility, the lack of demand for RI and short-termism by investment professional groups and pension funds. Subsequent to 2008, there has been a significant shift in terms of these barriers. IoDSA (2013) identified that through the CRISA public disclosures, these have acted as a means of ensuring adequate uptake of RI practices. This has been driven by the fact that the CRISA code requires an “apply or explain” RI disclosure approach as opposed to a RI

asset allocation approach which reinforces the notion that RI is about ensuring accountability across the value chain rather than being prescriptive in terms of the outcomes (Eccles *et al*., 2008; IoDSA, 2013)

The availability, quality and cost of ESG information was regarded as the single most important barrier to RI based on the sampled surveyed pension funds (Eccles *et al*., 2008). At the time the survey was conducted, triple bottom line reporting had only started gaining momentum and RI research agencies and consultancies had not begun converting ESG data into useful information to enable RI (Eccles *et al*, 2008). In response to this shortcoming, a number of platforms from which stakeholders could obtain ESG data have gained momentum. In South Africa these include Thomson Reuters Asset4 and Bloomberg amongst others. These avenues have attracted gained confidence amongst academic practitioners and have been applied widely in studies such as Lai *et al.,* (2016).

In summary the theoretical and empirical literature around ESG reporting presents a strong case for investors to actively consider ESG factors in their investment decisions. However a growing body of empirical literature outlines a number of challenges which impede on the integration of ESG disclosures in investor decision making processes.

2.15 Research Question Development

Through the review of theoretical arguments and empirical findings into the relationship between ESG reporting and the institutional investor base varied outcomes emerge. Despite the strong evidence in developed markets confirming this relationship, differences in market dynamics create uncertainty as to whether the ESG-long term institutional investor relationship may indeed hold true in an emerging market. In a sense, this study is an exploratory investigation into the adoption of UN PRI and CRISA across the JSE through assessing whether the outcomes thereof have been met through the ESG-long term institutional investor relationship. Secondly the study will aim to highlight whether this relationship holds across the different sectors of the JSE. The outcomes of this study, it is hoped will shape future policy development in order to support the achievement of the UN PRI objectives.

2.16 Summary

This chapter provided an overview of the theoretical perspectives underpinning this research topic of the study. The chapter discussed the results of prior studies undertaken around ESG reporting and the links to investor clientele. While many of the results highlight the growing value which ESG reporting plays in providing greater insight into company sustainability, there exists room for further research. Particularly in developing and emerging economies into how ESG reporting impacts share price and company financial performance and how investors consume this information in order to inform their investment decisions. As a result, this study

will address the question of whether JSE institutional investors integrate ESG reporting into their investment decisions and whether this relationship varies between different sectors of the JSE.

Chapter 3 – Methodology

3.1 Introduction

The purpose of this study is to investigate whether the integration of ESG reporting in investor decision making has resulted in JSE listed companies attracting long term institutional investors and whether this relationship varies between different sectors of the JSE. In this chapter, the research methodology followed for this study will be discussed. The chapter will cover the research approach followed by Bushee (1998) and Serafeim (2015), as well as some useful additions which have been made to ensure that the methodology is appropriate for the South African context.

The chapter contains eleven key sections. Section 3.1 introduced the chapter outline while section 3.2 to 3.4 set out the research philosophy, approach and design. Section 3.5 and 3.6 explain the population and sample determination of the study, while section 3.7 discusses the sources from which the data to be employed for this study will be obtained and how the data will be managed throughout the research process. Sections 3.8 and 3.9 will discuss how the regression model for the study was developed, as well as set the key variables underpinning the model. Section 3.10 will discuss data analysis, specifically setting out the statistical tests which will be conducted and associated software requirements. Lastly, Section 3.11 will discuss potential threats to ensuring validity and reliability and how these concerns will be addressed by the study.

3.2 Research Philosophy

According to Kuhn[1] (as cited in Smith, 2017) research in the field of accounting focuses on finding solutions to problems based on accepted beliefs, values, assumptions and techniques and thus relies greatly on existing research. As it relates to accounting research, three research philosophies exist, these include the positivist, interpretive and critical approaches. (Smith, 2017). Under the positivist approach, Sultana *et al.* (2018) state that this research approach seeks to test law-like regularities through empirical datasets by following a quantitative approach. Whereas the interpretive and critical approaches broadly apply a qualitative and subjective understanding of a research topic through focusing on insights and judgements of subjects, in some instances the results may not be generalized to the entire population (Ismail & Zainuddin, 2013; Smith, 2017).

In selecting the research philosophy, the aim of the research study was considered as well as the advantages and disadvantages of each research philosophy approach. Given the aims of studying the cause and effect relationship between ESG reporting and institutional investor

[1] Efforts were made by the researcher to obtain the original article.

behaviour, this study will need to rely on statistical tests in order to derive results. The positivist approach was deemed to best reflect the aims of this study. Ismail and Zainuddin (2013) note that this approach has historically been an unchallenged paradigm of accounting research given four key benefits: 1) It incorporates large samples allowing for generalisation of results to the entire population; 2) Applies sophisticated statistical tests which allow for reliable empirical evidence to be derived; 3) A positivist approach allows for the research to be replicated in a different context; 4) The researcher remains independent and the results are not subject to any bias.

This research philosophy does contain a number of drawbacks. According to Cavana *et al.* (2001) as cited in Smith (2017) the positivist research approach has four disadvantages namely: 1) The approach is superficial as it seeks to limit the amount of human interactions to numbers; 2) It assumes common thoughts and feelings are shared by people involved; 3) It masks the subjective response or involvement of the researcher given the use of statistical tests; and 4) Generalisations cannot be applied to specific groups given that the statistical samples are considered homogeneous.

3.3 Research approach

Smith (2017) states that the research approach to be followed may be based on quantitative or qualitative methods and that both are deemed to be acceptable provided that the most appropriate method is chosen. Given the focus of this study which is to investigate the cause and effect relationship between ESG reporting and the institutional investor base, a quantitative approach is thus the best approach as it will allow for an objective measure of this relationship (Leedy & Ormrod, 2015; Garcia *et al*., 2017). Compared to a qualitative approach, the quantitative approach does not have the drawbacks of data completeness gaps or concerns around the data analysis process being subject to bias by the researcher (Smith, 2017). The strength of a quantitative research approach will furthermore allow for the research problem to be analysed across a large sample of companies with greater levels of accuracy in order to yield unbiased results upon which a conclusion can be based (Sukamolson, 2007; Leedy & Ormrod, 2015).

According to Leedy and Ormrod (2015), statistics in a quantitative study play an important role of describing key characteristics of the data to the researcher and allowing the researcher to draw inferences from data, referred to as descriptive and inferential statistics respectively. Descriptive statistics provides insight into the data being studied through analysis techniques such as measures of association, proportions and cross tabulations. However, the results of this analysis cannot be generalized as it is specific to that population (Smith, 2017). Inferential statistics involves complex analysis techniques which allows the researcher to derive

conclusions as to whether there are statistically significant differences and/or relationships between the data being analysed (Leedy & Ormond, 2015). This study will apply both descriptive and inferential statistics given the significant benefits which both methods will yield in understanding the cause and effect relationship between ESG reporting and the institutional investor base.

3.4 Research design

This study is inspired by the seminal work of Serafeim (2015) who investigated the relationship between integrated reporting and the shareholder base of companies, based on a sample of 1,114 US listed companies over the period 2002 to 2010. Regression models have also been applied widely in prior studies such as Baboukardos and Rimmel (2016) and Garcia *et al.* (2017), particularly given their strong predictive power. Through applying a regression model, Serafeim (2015) found that companies which practice non-financial reporting attract a long term orientated shareholder base, with fewer investors holding shares for making quick gains from share price movements. The study contributed significantly to the body of knowledge on the impact of non-financial reporting on the composition of company shareholder base.

Given the similarities between the intended outcomes of ESG reporting particularly as it relates to contributing to long term value for shareholders, the approach to be followed for this study will be based on a replication study of the work by Serafeim (2015). According to Lindsay and Ehrenberg (1993), replication studies help shed light on the permutations of conditions under which certain findings hold true. Through replicating the work by Serafeim (2015), this study will provide insights into the application of RI practices within an emerging market such as South Africa, particularly as it relates to asset ownership.

3.5 Population

Given the objective of this research in seeking to determine the extent of the relationship between ESG reporting and institutional investor shareholdings for South African JSE listed companies, the population of companies tested as part of this research is based on active JSE listed companies from 1 January 2008 to 31 December 2017.

3.6 Sampling

While it is desirable to sample the entire population in order to enhance the representativeness and usefulness of the research findings, there are however cost-benefit implications which need to be borne in mind (Smith, 2017). As it relates to this study, the researcher considered it important to ensure that the sample is representative in order to achieve the research objectives. However, given data quality gaps in the form of missing or unusable data for some companies, judgment needed to be applied in the sampling process. As a result, a purposive sampling method was followed. According to Etikan, Musa and Alkassim (2016) this sampling

methodology ensures that the sample items reflect the attributes which will allow the researcher to achieving the purpose of the study. For this study, given the data quality concerns, judgement was applied to ensure that a homogenous sample was derived and that all sampled companies could be compared like-for-like. The following subsections set out the basis of determining the sample period and sample size.

3.7 Sample Period

The starting point for the sample period was all companies which have ESG reporting scores on Thomson Reuters ASSET4 for the ten year period beginning 2008. Based on the extract from Thomson Reuters ASSET4, a total number of 840 companies were identified over the nine year period as illustrated in Figure 3.1 below.

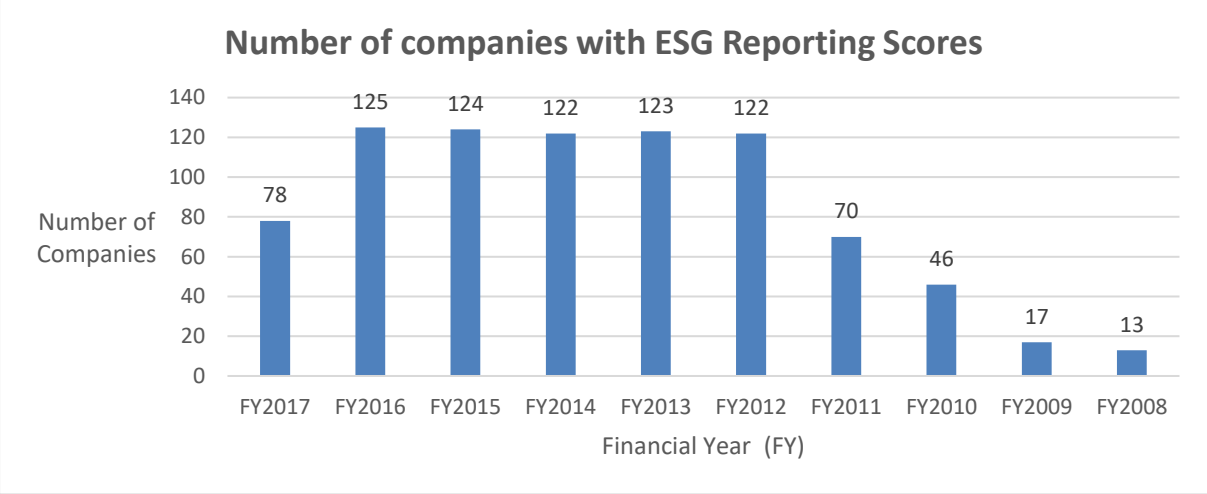


Figure 4: Companies with ESG Reporting scores

From the graph above, it is clearly evident that the ESG reporting scores for the period 2008 to 2011 were only beginning to be reported by Thomson Reuters, given the fairly low number of companies with ESG scores. From 2012 to 2016, the ESG reporting scores began to plateau, with Thomson Reuters consistently providing ESG scores. While a slight decline in ESG reporting scores was noted in 2017 this was attributed to the fact that at the time the ESG reporting scores were extracted for purposes of this study, many companies had not yet concluded their 2017 financial year, nor had they issued their integrated reports. As the integrated reports are a key input into Thomson Reuters' assessment of ESG scores, the rationale was deemed acceptable.

On the basis of the number of companies reporting ESG scores, the period 2012 to 2016 formed the sample period. In fact, 2012 may be argued as the best period to commence this study as it coincides with the period in which the <IR> Framework was introduced. Through the introduction of the <IR> Framework this provided much clearer guiding principles and

content elements for integrated reports (IIRC, 2013). It also explained the key core concepts needing to be contained therein. Furthermore, in 2012 CRISA was introduced. Despite the actual CRISA reporting and effective date being 1 February 2012, it was not until 2013 when meaningful disclosures on CRISA compliance were noted.

3.7.1 Sample size

As this study aimed to analyse the relationship between ESG reporting and the institutional investor landscape over a consistent period, it was important to select a list of companies for which ESG scores had been reported over the five year period. In determining the actual number of sample companies, an analysis was performed to exclude companies based on two criteria, namely where these companies were either newly listed companies on the JSE or their ESG reporting scores were not available as yet on ASSET4. From this analysis, 120 companies were identified as not falling into this category for each of the five years. This meant that over the five year period 600 observations would be studied, reflecting 71% of the original population.

In addition to the 120 companies identified, a check was performed in order to identify companies for which trading had been suspended or for which any form of adverse corporate event may otherwise affect the liquidity of the company shares. According to Amihud and Mendelson (2012) the liquidity of a share will affect investor's required returns for holding the share and as a result may either incentivize or discourage investors. A listing of all companies with notices of terminations and suspensions instituted by the company or the JSE were extracted from INET BFA Expert (previously known as McGregor BFA) database. This database provides historical and fundamental information on South African and international listed and unlisted companies.

Sector	Total Number of Companies	% Representation
Financials	30	26%
Industrials	24	21%
Basic Materials	23	20%
Consumer Services	17	15%
Consumer Goods	9	8%
Health Care	4	4%
Technology	4	4%
Telecommunications	3	3%
Total	**114**	**100%**

Table 4: Final sample by industry

From the analysis carried out as set out above, the final sample of companies was determined to be 114 (per year), representing 8 sectors. The sector classification was based on the Industrial Classification Benchmark (ICB) which is a global industry classification taxonomy performed by FTSE Russell. The final sample comprised mainly of companies in the following sector: financial (26%), industrials (21%), basic materials (20%) and consumer services (15%). The final sample was deemed to be representative of the population from which it was drawn. A complete list of the companies sampled is included in Appendix B.

3.8 Sources of data, data collection and management

Given the quantitative nature of this study, the data was extracted from Thomson Reuters ASSET4, McGregor iNet BFA and Osiris was maintained on Microsoft Excel as the application best allowed for the high volume data to be maintained. The Microsoft Excel workbook was saved electronically in an online cloud folder and backed up on the local storage drive of the researcher's computer.

Following the identification of data sources, the next step in the process was to identify methods of managing the data collected. Smith (2017) defines the data management process as one that ensures that the data is maintained accurately, and an audit trail is created in the event that one or other of the inputs needs to be checked against the data sources from which they were extracted. Through the data management process the following key questions are addressed: 1) Where missing data values are identified, what checks are in place to identify these and how are they addressed 2) To prevent data entry errors, what checks will be put in place in order to identify and validate these errors 3) How is version control of master data carried out (Smith, 2017).

The excel workbook contained two tabs, the first titled "financial data" and the second titled "shareholding". The financial data tab contained the control variables data. These variables were extracted from the Osiris database. In order to ensure accuracy of the data, checks were put in place to identify cells containing missing data values, throughout the data analysis process spot checks were carried out in order to ensure that no finger errors occurred. Where missing data values were identified, McGregor iNet BFA was used to supplement missing data values. The "financial data" tab also contained the ESG Reporting scores extracted from Thomson Reuters ASSET4. Given that the ESG reporting scores may not exceed 100%, using excel conditional formatting functionality, this enabled the researcher to check for values greater than 100%. No values were identified as having exceeded 100%. The second tab called "shareholding" contained a detailed share register of each JSE company. During the

extraction process of the JSE company shareholder registers care was taken to ensure that all companies selected as per the sampling process followed were transferred to the workbook.

3.9 Regression model development: Comparison to Serafeim (2015) model

Serafeim (2015) applied an ordinary least squares regression model with accounting and market variables as controls. Based on the study, ESG data from Thomson Reuters ASSET4 was obtained for the period 2002 to 2010. Institutional investor's shareholdings were obtained from the Thomson Reuters Institutional Holdings database. The following control variables were applied in the regression model:

- Board composition: This variable considered whether the board is either classified or staggered;
- Board decision making: This variable determined whether the board decisions require a supermajority vote or not;
- Quantitative Disclosure: This variable determined the number of quantitative sustainability metrics disclosed by the company;
- GRI Guidelines: This variable considered whether a company issues a sustainability report in line with GRI guidelines;
- Accounting and market data: These variables consisted of sales, leverage ratio, earnings yield, book-to-market, dividend yield, past one year sales growth, equity beta, share price return volatility, past one year share price return. These control variables were included by taking the natural logarithm of the accounting and market data.

Given the differences in the conditions under which the Serafeim (2015) seminal work was performed the study and the objectives of the current study under focus a similar methodology will be applied with four adaptations.

- Serafeim (2015) applied control variables which consider whether the board is classified or staggered and whether a supermajority vote is required to pass decisions. These were not applicable for this study given the current King IV requirements that the board be staggered (IoDSA, 2016).
- Control variables which focused on whether supermajority votes are required for passing decisions were applied in the Serafeim (2015) model, however based on current voting requirements according to the Companies Act, require decisions to be passed on a simple majority (Companies Act 71 of 2008). As a result this variable was not considered applicable.
- Serafeim (2015) also controlled for the percentage of quantitative sustainability metrics disclosed by a company. This variable was found to be insignificant as part of the Serafeim

(2015) study as the number of metrics which a company discloses alone were found not to influence the investor base. For purposes of this study, this variable was not considered.

- Lastly, whether companies issue a separate sustainability report which follows GRI guidelines while included in the Serafeim (2015) model, this will be excluded for purposes of this study. Serafeim (2015) had included this variable in order to be able to make inferences about the relationship between integrated reporting and the institutional investor base which would otherwise not be explainable by separate company sustainability data. Given the study under focus, the aim is not to assess ESG information disclosed based on integrated reports rather through the Thomson Reuters ASSET4 reporting scores which would independently assess ESG disclosure consistently and comparatively across the JSE.

Based on the considerations above, the regression equations which were developed in order to analyse the research questions are provided below:

Research question 1: The extent to which ESG reporting has resulted in long term institutional investors for JSE listed companies.

$$LT\ Investor_{f,t} = \beta_0 + \beta_1 ESG_{f,t} + \beta_2 SALES\ GRO_{f,t} + \beta_3 LEV_RAT_{f,t} + \beta_4 EAR_YIE_{f,t} + \beta_5 BOOK_MAR_{f,t} + \beta_6 DIV_YIE_{f,t} + \beta_7 EQT_BETA_{f,t} + \beta_8 SHAR_PRICV_{f,t} + \beta_9 TOT_ASSETS_{f,t} + \beta_{10}\mathrm{SHAR_RET}_{f,t} + \propto_t$$

Research question 2: The extent to which ESG reporting has resulted in the levels of long term institutional investors varying between different sectors of the JSE?

$$LT\ Investor_{f,t} = \beta_0 + \beta_1 ESG_{f,t} + \beta_2 SALES\ GRO_{f,t} + \beta_3 LEV_RAT_{f,t} + \beta_4 EAR_YIE_{f,t} + \beta_5 BOOK_MAR_{f,t} + \beta_6 DIV_YIE_{f,t} + \beta_7 EQT_BETA_{f,t} + \beta_8 SHAR_PRICV_{f,t} + \beta_9 INDUST_{f,t} + \beta_{10} TOT_ASSETS_{f,t} + \beta_{11}\mathrm{SHAR_RET}_{f,t} + \propto_t$$

Where:

ESG is the ESG reporting score of the company per Thomson Reuters ASSET4

$LT_Investor_t$ represents the percentage of shares held by long term investors (i.e dedicated less transient investors) determined using factor and cluster analysis

t represents time in years

f represents company/firm

β_0 is constant term (intercept of the regression line)

β_1, $\beta_{2.....}$, β_{10} are the regression coefficients for the control variables using end of year values and are described below:

SALES_GRO	= Sales Growth represents the one year sales growth.
LEV_RAT	= Leverage Ratio represents the ratio of total debt over total assets.
EAR_YIE	= Earnings Yield represents the earnings per share over the share price.
BOOK_MAR	= Book-to-market Ratio represents the book to market value.
DIV_YIE	= Dividend Yield represents the dividend as a percentage of the closing share price.
EQT_BETA	= Equity Beta represents the equity beta estimated using the Capital Asset Pricing Model.
SHAR_PRICV	= Share Price Volatility measures the share price return volatility over the past year.
SHAR_RET	= Share Price Return represents the growth in the value of the share over the past year.
INDUST	= Industry sector represents a categorical variable for each of the 8 industry sectors.
TOT_ASSETS	= Total Assets represents the natural logarithm of total assets
$\propto$	= Represents the error term. This variable captures all other factors which influence $LT_Investor_t$ other than the control variables.

3.10 Regression model variables

The following sub-sections provide an overview of each of the dependent, independent and control variables applied in the regression equations.

3.10.1 Independent Variable: ESG Reporting Proxy

According to Smith (2017), variables can be measured directly, or should this not be possible, a close substitute variable known as a proxy may be applied. This study aims to investigate the association between ESG reporting and the institutional shareholder base of companies. In the context of this study, ESG reporting needs to reflect the transparency of each company

in disclosing ESG issues to investors. Of importance to this study is for this variable to be consistently measured to allow for comparison between companies. In the absence of an objective and directly observable variable being known to the researcher, a proxy was used as a result.

Consistent with the approach followed by Ioannou and Serafeim (2012), Cheng *et al.* (2014), Serafeim (2015) and Venter *et al.* (2017), this study used the results of the Thomson Reuters ASSET4 database as a proxy for the levels of ESG reporting. Based on publicly available information such as company integrated reports, company website disclosures and Securities Exchange News Service (SENS) announcements, Thomson Reuters ASSET4 transforms ESG pillars into quantitative metrics to enable analysis. A score of between zero and 100 is assigned to each ESG pillar and an overall score is given to the company based on its corporate performance (Thomson Reuters, 2018).

The results of ASSET4 reflect a quantitative best measure of integrated thinking and ESG reporting (Thomson Reuters, 2018). Given the growing demand for an objective view of ESG reporting by institutional investors, this research relied substantially on information from the Thomson Reuters database. Thomson Reuters ASSET4 system was accessed through the Thomson Reuters Eikon platform.

Despite other platforms such as Bloomberg and FTSE Russell being capable of providing ESG reporting scores, the Thomson Reuters ASSET4 system was deemed more appropriate given the following: (1) ESG reporting scores are updated every second week and thereby reflect a timely view of ESG data; (2) Each data point goes through a rigid quality control process (Thomson Reuters, 2018).

The data collected for the ESG reporting proxy was not subject to further manipulation to allow for the testing of the research questions because the variable is expressed in percentage form and can easily be applied in either of the regression equation. This ensured that the measurement instruments remain valid and reliable (Leedy & Ormrod, 2015). This variable is denoted as ESG in the regression equation.

3.10.2 Independent variable: Industry Sector

The second research question proposed for this study will assess to what extent ESG reporting has resulted in the levels of long term institutional investors varying between different sectors of the JSE. This research question is important in the context of the broader objective of the research problem in light of the findings of Garcia *et al.* (2017) who found that companies in

sensitive industries operating within BRICS[2] countries produce superior ESG results. This variable is denoted as INDUST in the regression equation relating to research problem two. The variable will take on a categorical variable for each of the eight industry sectors identified. Consistent with earlier studies, the industry sectors are based on the Industry Classification Benchmark (ICB), which is a global industry classification taxonomy performed by FTSE Russell (Garcia *et al.*, 2017; Baboukardos & Rimmel, 2016).

3.10.3 Other control variables

The introduction of control variables in a regression model impose conditional relationships to the studies where causality is assessed (Smith, 2017). Based on the work of Bushee and Noe (2000), the impact of corporate disclosure practices on the composition of a firm's institutional investor base was found to be impacted by several control variables which relate to a firm's size. These variables were also used by Serafeim (2015) and include the leverage ratio, earning yield, book-to-market ratio, dividend yield, equity beta, share price volatility, past one year sales growth and share price return. These variables have also been included in many earlier studies and their theoretical foundations is underpinned in the studies such as Juhmani (2013), Lai *et al* (2016) and Garcia *et al.* (2017).

3.10.4 Dependent variable: Institutional Investor Shareholding

The primary objective of ESG reporting is aimed at informing the decisions of the providers of financial capital (Amel-Zadeh & Serafeim, 2017). Given the aims of this study in investigating whether company shareholding is impacted by the level of ESG reporting, the institutional investor shareholding variable measures the percentage of shares held by dedicated, quasi and transient investors. For this study, the focus was on institutional investor's shareholding levels, given that the proportion of their shareholdings in JSE listed companies tends to be significantly higher compared to individual investors (Serafeim, 2015). Atkins and Maroun (2014) highlight that institutional investors have significant power to influence corporate reporting practices of companies. Furthermore, through the revised Regulation 28 to the Pension Funds Act and CRISA there has been calls for institutional investors to incorporate ESG issues into their investment decision making (Atkins & Maroun, 2014).

3.10.4.1 Classification of institutional investors

The analysis of the institutional investor shareholdings was based on the classification by the landmark study by Bushee (1998) who identified three categories of institutional investors, namely transient, dedicated, and quasi-index. Bushee (1998) describes the types of institutional investors as follows:

[2] BRICS refers to the five emerging market countries comprising Brazil, Russia, China, India and South Africa.

> Transient institutions have the highest turnover and highest use of momentum strategies, along with relatively high diversification. Dedicated Institutions have high concentration, low turnover, and almost no trading sensitivity to current earnings. Quasi-indexers exhibit high diversification and low turnover, consistent with index-type, buy and hold behavior (Bushee, 1998, p.326).

Transient investors typically hold shares for less than 12 months, while dedicated investors hold shares for a period longer than 12 months. For purposes of this study, assessing the levels of long term institutional investors will be determined through calculating the difference in the percentage shareholding of between dedicated investors who exhibit stable holdings in companies versus those of transient investors (Bushee 1998). The quasi investor shareholdings were not used as these investors typically display passive buy-and-hold behavior which is contrary to the objectives of the UN PRI which requires investors to actively integrate ESG considerations into their decision making (Bushee & Noe, 2000). The data to inform the institutional investor shareholding base as well as the control variables were extracted from the Osiris database which is also known as Bureau van Dijk and was accessed through the University of the Witwatersrand library webpage. The Osiris database contains worldwide historical and fundamental information on listed and unlisted companies.

For the data collected on institutional shareholdings, this was subject to standardization in order for the variables to have zero mean and unit variance (Aljandali, 2017). Following this step, it will allow for institutional investors to be categorized as dedicated, transient or quasi based on factor and cluster analysis aligned to past investment behaviour (Bushee, 1998). Based on the shareholding data extracted, nine variables were calculated which sought to capture institutional investor past investment behaviour with each variable calculated over a 5 year period. A description of each variable is provided below, applied consistently with the definition set out by Bushee (1998):

Portfolio Concentration calculates the average percentage of each institution investor's total investment in each company where a portfolio is held.

$$Portfolio\ Concentration\ (CONC) = \frac{\sum w_{kt}}{NSTK_t}$$

Average percentage holding calculates the average size of an institutional investor's ownership position where a portfolio is held.

$$Average\ percentage\ holding\ (APH) = \frac{\sum w_{kt}\ PH_{kt}}{\sum w_{kt}}$$

Percentage held in large blocks calculates the institutional investor's shareholding where the shares held exceed 5% for a particular company.

$$Percentage\ held\ in\ large\ blocks\ (LBPH) = \frac{\sum w_{kt}\ LB_{kt}}{\sum w_{kt}}$$

Herfindahl measure of concentration is a measure of concentration determined through taking the squared percentage of institutional investor's ownership in each portfolio firm.

$$Herfindahl\ measure\ of\ concentration\ (HERF) = In(\sum {PH_{kt}}^2)$$

Stability of holdings calculates for each institutional investor the percentage of total equity invested in each company provided that the shareholding is held continuously for a period of two years.

$$Stability\ of\ holdings\ (perfecentage\ held\ for\ two\ years)(STAB) = \frac{\sum w_{kt}\ LT_{kt}}{\sum w_{kt}}$$

Portfolio turnover calculates the absolute change in institutional investor's holdings over a year, scaled by the change in total equity of the institutional investor.

$$Portfolio\ turnover\ (PT) = \frac{\sum|\Delta w_{kt}|}{\sum w_{kt} + \sum w_{k,t-1}}$$

Trading sensitivity to current earnings calculates the variability of changes in the institutional investor's holdings in a company over a year and the company's changes in earnings announced in that year.

$$Trading\ sensitivity\ to\ current\ earnings\ (CETS1) = \frac{\sum \Delta W_{kt} RWE_{kt}}{\sum|\Delta W_{kt}|}$$

Average earnings change of firms bought compared to firms sold calculates difference between the average earnings change of companies where institutional investors increased their holdings and the average earnings change of companies where institutional investors reduced their holdings.

$$Average\ earnings\ change\ of\ firms\ bought\ vs. firms\ sold\ (CETS2)$$
$$= Avg.(RWE_{kt}|\Delta W_{kt} > 0) - Avg.(RWE_{kt}|\Delta W_{kt} < 0)$$

Change in holdings in firms with positive earnings compared to firms with negative earnings calculates the difference in the total change between firms with positive earnings to those with negative earnings.

$$Change\ in\ holdings\ in\ firms\ with\ positive\ earnings\ vs.\ firms\ with\ negative\ earnings\ (CETS3)$$
$$= \frac{(\sum \Delta W_{kt} | RWE_{kt} > 0) - ((\sum \Delta W_{kt} | RWE_{kt} < 0)}{\sum |\Delta W_{kt}|}$$

Where:

$\boldsymbol{NSTK_t}$ = number of shares owned by company at the end of the year t

W_{kt} = portfolio weight (shares held times share price) in company k at end of the year

ΔW_{kt} = $w_{kt} - w_{kt-t}$

PH_{kt} = percentage of total shares in firm k held by institutional investor at the end of year t

LB_{kt} = 1 if $PH_{kt} > 0.05$, 0 otherwise

LT_{kt} = 1 if institutional investor held company k continuously for two years, 0 otherwise

RWE_{kt} = seasonal random walk change in yearly earnings per share of company k for year t (deflated by sales for year t-1)

3.11 Data Analysis

The data analysis process formed an important part of this study as it sets out stepwise the statistical tests which were performed in order to address the research questions (Smith, 2017). In this study two data sets were used. The first data set comprised the detailed shareholder registers of each of the 114 sampled companies. This data was subject to standardization as discussed in section 3.10, based on the cluster and factor analysis methodology developed by Bushee (1998). From this analysis, based on the institutional investor's past behaviour it was determined whether their shareholding may be classified as dedicated, transient or quasi. The second dataset comprised the accounting and market variables including the ESG reporting scores obtained from Thomson Reuters. Combined, the two datasets will be used to carry out the regression analysis which will address the two

research questions identified. The statistical analysis to be performed will be carried out through IBM® SPSS® Statistics Version 25.0[3].

3.11.1 Descriptive statistics

According to Isotalo (2001) descriptive statistics serve to provide a method by which information is summarised and organised. This takes the form of measures such as the average, mean, variation, maximum and minimum values. Descriptive statistics are useful and yield a better understanding of the sample prior to any further statistical tests such as those used for data reduction, segmentation and inferential statistics, that are performed (Isotalo, 2001). The results of descriptive statistics however cannot be generalised to the entire population. Given the two datasets which will be used as part of this study, it will be important to compute descriptive statistics in order to understand the attributes of the information and identify underlying patterns in the data.

3.11.2 Classification of institutional investor shareholding

3.11.2.1 Application of factor analysis

The seminal study by Bushee (1998) applied factor and cluster analysis against institutional investor shareholding data in order to ascertain investor behaviour patterns and portfolio characteristics. Other empirical studies such as Bushee and Noe (2000) which focused on investor behaviour have leveraged off the factor and cluster analysis methodology and has been found to be sound. With factor analysis, Bushee (1998), reduced the dimensionality of a set of nine variables (as described in Section 3.10) into three latent factors, namely portfolio turnover, block size and momentum.

The portfolio turnover factor (PTURN) captures the institutional investor's rate of portfolio turnover (Bushee, 1998; Bushee & Noe, 2000). The portfolio turnover factor will be high where the level of trading is high measured continuously over two years. The block size (BLOCK) measures the institutional investor's share of investment in its portfolio of companies. As a result where the BLOCK factor is high it indicates that the institutional investor's shareholding is larger, the converse would apply where the BLOCK factor is smaller. Lastly, the momentum factor (MOMEN) measures trading sensitivity relative to current earnings news. Where the momentum factor is high it indicates an increasing shareholding where current earnings news are positive. Similarly, a lower value will correspond with a decrease in investment holding where earnings news is negative.

[3] IBM SPSS Statistics is a global statistical software used to understand data, analyze trends, forecast and plan to validate assumptions and drive accurate conclusions (https://www.ibm.com)

3.11.2.2 Analysis of correlation between factors

Given the dimensionality of the data of the nine variables described in Section 3.10, it will be important to standardize these variables and then apply Principle Component Analysis (PCA) which will examine the patterns of correlations between the variables (Aljandali, 2017). Bushee (2001) further adds that through PCA it will be easy to identify those few factors which account for the highest variance between the variables. While other methods of performing factor analysis exist through Exploratory Factor Analysis (EFA) or Confirmatory Factor Analysis (CFA) which compared to PCA do not require specialized software as in the case of CFA or a deeper understanding of the constructs underpinning the variables as under the EFA approach (Cohen *et al.*, 2015). Bushee (1998) further adds that PCA is most appropriate when the study is of an exploratory nature and the analysis follows the same.

In order to assess whether there are indications of possible latent constructs (factors) present in the data, a Pearson correlation matrix will be developed. This will highlight whether the BLOCK, PTURN and MOMEN factors are present in the data. The aim of the Pearson correlation coefficient provides insight into the following: 1) The direction of any relationship whether positive or negative; 2) It highlights multicollinearity concerns through quantifying the strength of association between the explanatory variables (Smith, 2017) The Pearson correlation coefficient will take on the value from -1, indicating that there is a perfect negative linear relationship between the variable while a value of +1 will indicate a perfect positive linear relationship. A value of 0 will highlight that no relationship exists between the variables. The Pearson correlation has been applied widely in empirical studies which assess whether a relationship exists between two variables such as (Bushed, 2001; Cheng *et al.,* 2014; Serafeim, 2015)

3.11.2.3 Measures of sampling adequacy and reliability

Additional statistical analysis in the form of the Kaiser-Meyer-Olkin (KMO), Bartlett's test of sphericity and Cronbach's Alpha Coefficient will be performed in order to identify whether we can draw valid conclusions from the relationships among the nine variables prior to performing the factor analysis (Smith, 2017). The KMO and Cronbach's Alpha are important as they are good measures of sampling adequacy and reliability respectively as they allow for one to determine factorability of variables (Prado-Lorenzo *et al*., 2009). The KMO measure of sampling adequacy test highlights specifically whether the variables are enough to predict each factor, ideally the KMO statistic should be greater or equal to 0.6 (Aljandali, 2017).

Bartlett's test of sphericity is the next key test which will need to be run in order to determine whether the correlation matrix is an identity matrix, that is, does the Pearson correlation matrix highlight leading diagonal elements of one and off diagonal elements of zero (Aljandali, 2017).

Where this is evident, it may indicate that there are no inter-correlations which may point to other underlying factors being present. Generally, Bartlett's test of sphericity with a significance (*p*-value) of less than 0.05 would indicate that there is no identity matrix and that it is possible to proceed with factor analysis (Aljandali, 2017).

Lastly, Cronbach's Alpha Coefficient would be used to measure internal consistency particularly of the three latent explanatory factors identified by Bushee (1998) which are being measured through the nine variables discussed in Section 3.9.3. Hair, Black, Babin and Anderson (2006) argue that generally Cronbach's Alpha may be 0.7 as a lower limit, however for exploratory studies such as the one in focus, this may decrease to 0.6. This statistic is useful in assessing whether the uncovered latent constructs demonstrate good internal consistency after performing Principle Component Analysis (PCA).

3.11.2.4 Application of cluster analysis

The final step to determining the classifying institutional investor's shareholding as either transient, quasi or dedicated is performing the cluster analysis. Through performing this analysis, institutions with similar behavioural patterns and portfolio composition will be grouped together (Bushee, 1998). Based on the three cluster groups identified, the outputs of the BLOCK, PTURN and MOMEN factors will be used to inform which cluster each institutional shareholder belongs to. The clusters will be determined through applying the *k*-means clustering procedure on IBM® SPSS® Statistics Version 25.0.

The *k*-means cluster analysis method, requires that the number of clusters (three latent constructs) be determined upfront. For this study three clusters (*k*) have been identified being Quasi, Transient and Dedicated through PCA. The *k*-means clusters will be determined through an iterative process based on proximity as described by Norušis (2011)

> The action in the algorithm centers around finding the k-means. You start out with an initial set of means and classify cases based on their distances to the centers. Next, you compute the cluster means again, using the cases that are assigned to the cluster; then, you reclassify all cases based on the new set of means. You keep repeating this step until cluster means don't change much between successive steps. Finally, you calculate the means of the clusters once again and assign the cases to their permanent clusters (Norušis, 2011, p. 389).

Based on the outcomes of the k-means cluster analysis it will be important to assess whether the investors have been assigned to the correct clusters. For institutional investors to be clustered as transient, the PTURN and MOMEN factors will need to be high relative to the overall mean. This is as a result of institutions in this cluster displaying high trading sensitivity

to current earnings news and as a result it follows that their trading activity will be high. Bushee (2001) adds that transient institutions tend to favour smaller companies. Conversely, for institutional investor to be regarded as dedicated, they need to have a low PTURN factor and an average or near zero MOMEN factor, such institutional investors tend to favour smaller firms (Bushee, 1998; Bushee, 2001). Investors under this category typically are highly concentrated to particular shares and display no sensitivity to current earnings changes or news. The final cluster, Quasi, considers those investors which display index type investment behaviour, with their shareholdings typically displaying buy and hold strategies with preference to larger companies (Bushee, 2001). For these investors, the MOMEN, PTURN and BLOCK factors are expected to be low.

In order to ascertain whether the mean differences among the three clustering variables, namely PTURN, MOMEN AND BLOCK as determined through PCA, are significant the Kruskal-Wallis H test will need to be performed. This is in order to validate the solution that is demonstrating clear separation between the different cluster groups. An alternative to performing the non-parametric Kruskal-Wallis H test would be the parametric one-way analysis of variance (ANOVA) test. The null hypothesis for the Kruskal-Wallis H test would state that there are no overall mean differences among the three cluster groups and when the null hypothesis is rejected this may indicate that the clustering variables are different in some respect (Aljandali, 2017).

Given the high number of institutional investors across the 114 companies sampled and across the five year sample period, it will be important to aggregate the types of institutional investors across each of the years. As a result, for every company there will be 5 records of each institutional investor type representing the years from 2012 to 2016. In total, there will be 570 records (5 records x 114 companies) of each dedicated, quasi and transient investors.

Once the shareholding has been aggregated as discussed above, it will be important to determine the value of long term shareholding, this will be calculated by taking the difference between shareholders classified as dedicated and those classified as transient. Descriptive statistics will be performed on this data to identify summary statistics such as mean, median, variance, minimum, maximum, range, skewness and kurtosis. These will yield an understanding as to the JSE long term institutional shareholding data for the period 2012 to 2016.

3.11.2.5 Tests of normality

Further to the descriptive statistics it will be important to perform tests of normality. In order for the regression model to be successful in terms of measuring the ESG-Long term investor relationship it will be important for the explanatory variables to be normally distributed (Smith,

2017). While various tests of normality exist such as the Kolmogorov-Smirnov and the Shapiro-Wilk tests, this study will only focus on the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov test is preferred because in addition to controlling for central tendency, it also controls for aspects such as skewness, kurtosis, scatter and other aspects of the distribution (Jensen & Berg, 2012). Furthermore, histograms and the Quantile–Quantile plots will be assessed in order to validate the results of Kolmogorov-Smirnov and the Shapiro-Wilk tests (Marcia, Maroun, & Callaghan, 2015).

3.11.3 Regression Analysis: Research question one

This study into the causal relationship of the ESG-long term investor is meant to be exploratory given that it is the first of its kind to be performed within South African. The study will employ the statistical method of Ordinary Least Squares (OLS) as the regression model, consistent with the approach followed by Cheng *et al.* (2014), Serafeim (2015), Baboukardos and Rimmel (2016) and Venter *et al.* (2017). In order to carry out the analysis based on the OLS method, there are three key assumptions which will need to hold in order to make appropriate conclusions from this statistical model. This will entail the following: 1) Assessing the correlation coefficient between the independent variables; 2) ascertaining whether the explanatory variables are independent of residuals and that there is no evidence of heteroscedasticity of the explanatory variables; 3) the error variances are random (Smith, 2017).

In addition to the OLS regression procedure which will be employed, the ESG-long term investor relationship will also be investigated by way of the balanced Fixed Effects Model (FEM) and Random Effects Model (REM) consistent with the approach followed by Garcia et al. (2017) and Serafeim (2015). Given the exploratory nature of this study and with the aim of this study being to determine whether the ESG-long term investor relationship exists, deriving a model which fits the data that is simple and easily interpretable will be important (Aljandali, 2017). The aim of the FEM model is to analyse the impact of only the selected variables over the 2012 to 2016 period by controlling for any bias which may be caused by the DVs and IVs (Serafeim, 2015). Under the Random Effects Model (REM), this method will control for individual company heterogeneity, which will ensure that the random error term is disaggregated into two components: the individual company effect and the aggregated effect which varies from company to company and between each year (Frias-Aceituno, Rodríguez-Ariza & Garcia-Sánchez, 2014).

3.11.3.1 Pearson Correlation

Pearson correlations for the variables included in the regression model will be run. This will highlight whether a positive or negative relationship between ESG reporting and long term

investors exists (Smith, 2017) The correlations will indicate the strength of the relationship indicated by the size of the correlation coefficient and this will identify those variables which are likely to be good explanatory variables (Leedy & Ormrod, 2015). Smith (2017) further adds that through the results of the univariate correlations, these will highlight potential multicollinearity problems between competing explanatory variables.

3.11.3.2 Model summary, ANOVA and coefficients

Part of the multiple regression analysis process is the generation of the model summary, ANOVA and assessment of regression coefficients. Based on the results of the model summary, it will be determined how much of the variance in the dependent variable can be explained by the various explanatory variables. This will be represented by the R-Square value. The Adjusted R-Square value will indicate the goodness of fit of the model by reducing the R-square value by taking into consideration the number of explanatory variables (Smith, 2017). The standard error in the model summary table will reflect the standard deviation of the long term shareholder dependent observed values about the regression line (Aljandali, 2017).

The one-way Analysis of Variance (ANOVA) will be applied given that the data from this study is assumed to be drawn from a normally distributed population. The ANOVA will indicate whether some (or all) of the regression coefficients are statistically significant. The regression coefficients will be estimated both in standardardized and unstandardized form, as part of this analysis the standard error of the regression coefficients will capture the regression coefficient sampling variability and the t-statistic will measure the statistical significance of each of the regression coefficients (Smith, 2017). Lastly, collinearity statistics for each of the variables will be determined. While the Pearsonian correlations computed earlier may suffice, computing the Variance Inflation Factors (VIF) for each regression coefficient will add rigor in terms of the analysis of whether there are potential multicollinearity concerns. Aljandali (2017) and Sultana *et al.* (2018) highlight the importance of assessing multicollinearity as this may result in the size effect of the independent variables being inflated. According to Kennedy (as cited in Bushee and Noe, 2000), the VIF score needs to be below 10 as any value above this benchmark may indicate multicollinearity concerns.

3.11.4 Research questions 2: Analysis of institutional shareholdings by sector

In addition to testing research question one based on the total sample, a regression model repeated for each industry of the JSE, with industry being applied as a categorical variable in the regression equation. This will address the second research question. The telecommunications industry will be selected as the baseline industry given that is a cyclical/sensitive industry and it will provide insights of whether there are differences between sensitive and non-sensitive industries on the JSE (Garcia *et al*., 2017).

3.12 Assumptions

In order to proceed with the Ordinary Least Squares regression model, the assumptions for the OLS model will be deemed to hold true (Smith, 2017). This is particularly important in the case of the latent variables dealing with institutional investor behaviour classification. Given the challenges in measuring institutional investor directly, it will be important to assume that these variables are measured without error (Smith, 2017)

3.13 Validity and reliability

Validity and reliability are two important considerations to ensuring that the trustworthiness of the statistical results. As part of this research steps were taken to improve the measurements, each will be discussed in order to demonstrate how this was carried out.

3.13.1 Validity

Smith (2017) describes validity as the degree of measure of whether the research meets its objectives. Validity is decomposed into construct, internal and external validity. Construct validity, also called measurement validity refers to how the constructs which are being measured are represented in the study and whether the study accurately captures the measurement of the problem (Smith, 2017). The constructs were considered to be accurate measures of what they purported to convey for example, reliable measurement of the variables was achieved through the data extracted from Osiris and where abstract constructs were identified proxies were used as in the case of the ESG reporting scores.

The second component of validity is internal validity of the study which is defined as “the extent to which its design and the data it yields allow the researcher to draw accurate conclusions about cause-and-effect and other relationships within the data” (Leedy & Ormrod, 2015, p.103). Given the research objectives of this study in investigating whether the integration of environmental, social and governance (ESG) factors in investor decision making has resulted in JSE companies attracting long term institutional investors, the outcomes will give an indication of whether there is a causal relationship between ESG reporting and long term investors.

The final aspect when assessing validity is in determining whether the results may be applied to other time periods or datasets, this is known as external validity or generalisability (Smith, 2017). As discussed in section 3.7, the sample of companies used for this study was considered to be representative of the population of all companies listed on the JSE. As a result, the outcomes of this study may be generalised to all companies listed on the JSE. The results however may not be generalised to those companies not listed on the JSE as there may be external influences which may skew the results should they be applied to a different

stock exchange. For example, this may include specific legislation which require investors to integrate other forms of reporting as part of their investment decisions.

3.13.2 Reliability

According to Leedy and Ormond (2015) reliability relates to the consistency of the measurement instrument in providing the same result. This is referred to as equivalent form reliability and may be decomposed into internal and external reliability. The data employed in this study was taken from Osiris and Thomson Reuters ASSET4 which are regarded as two reliable sources of data. As the data is from a secondary source, the risk of human error is minimized. Despite the data needing to go through standardization, care was taken to minimize error and process data in an objective manner as discussed in section 3.8

While the study uses proxies from the Thomson Reuters ASSET4 database, earlier research conducted by Serafeim (2015) replicated the study using an alternative measure of ESG reporting scores from the Sustainable Asset Management (SAM) database. It was found that the results were robust and that the conclusions reached on ASSET4 data are not specific to this database. As a result, this study should be capable of being performed within a different context using similar data sources and data analysis procedures. This will ensure external reliability of the results. In order to ensure internal reliability of the statistical results in the form of Cronbach's Alpha, information criteria and Kruskal Wallis tests will be performed.

3.14 Multicollinearity and heteroscedasticity

In applying the regression model, there is a risk that there may be strong correlation among the explanatory variables referred to as multicollinearity (Smith, 2017). As a result, the effect sizes may be inflated by the independent variables (Sultana *et al*., 2018). In addition, there is also a heteroscedasticity concern which may arise as a result of the standard deviations of variables monitored over time being non-constant (Smith, 2017).

As part of the analysis, a number of statistical tests will be applied in order to identify and minimize the impact which these problems present. The first being the PCA which will assess patterns of correlations among the variables to be used for the factor analysis. Followed by Pearson correlation coefficients which assessed the relationship between the variables for the factor analysis and was also applied for the variables used for the regression analysis. Lastly, the Fixed Effects Model (FEM) and Random Effects Model (REM) will be applied for individual company heterogeneity effects.

3.15 Summary

This chapter presented the methodology of the study, it outlined the research philosophy, approach and design. From this discussion, it was determined that the study would be

exploratory and quantitative in nature and would follow a positivist research philosophy paradigm. The remainder of the chapter discussed the regression model variables and discussed the data analysis process which will form the basis of chapter four. Finally, the chapter concluded by discussing the assumptions and validity and reliability considerations of the study. The next chapter will present the results of the regression outputs and discuss the findings of the study.

Chapter 4 – Research findings, analysis and discussion

4.1 Introduction

This chapter sets out the results of the statistical tests performed. The chapter will follow the structure of the methodology which was discussed as part of the previous chapter. Given the exploratory nature of this study, the research findings and analysis will be discussed with reference to the results and findings of other studies which have been performed on this topic. This will ensure that the merits of this study's findings are appropriate and adequately supported.

4.2 Analysis: Classification of institutional investors

4.2.1 Latent variable analysis

Based on the data collected for the institutional investor shareholdings, this was transformed into nine proxy variables in order to allow for factor and cluster analysis to be performed. The aim of this process was to create a latent explanatory variable to be used in the regression equation which captures institutional investors past behaviour over the sample period for the 114 sampled companies.

In total, 8101 records were created for each of the institutional investor shareholding records CONC, APH, LBPH, HERF, STAB, PT, CETS1, CETS2 and CETS3. These were standardized given the dimensionality of the data. Standardized variables which were more than 4 standard deviations away from the mean were disregarded because of the potential impact these may have on the least squares regression line (Aljandali, 2017). While the outliers were not examined in detail given the limited scope of this study, this exercise may be worthwhile to be performed as it may add another dimension to the study. However, principally, given that it is assumed that the population from which this data is drawn is normally distributed, there should not be significant outliers. Through excluding these outliers this reduced the number of records to 8037 which were then used to conduct the factor analysis.

In Table 5 below, the results of the Pearson correlations amongst the nine variables are presented. Consistent with Bushee (1998) results, the variables appear to be highly correlated amongst each other and demonstrated a number of coefficients of 0.3 and above. This was especially noted for CONC, APH, LBPH, HERF and STAB. Although the overall Pearson correlation matrix could be considered factorable, the inadequate MSAs for PT (.240), CETS1 (.479), CETS2 (.384) and CETS3 (.475), this may be a possible indication of only one viable latent factor being present in the data

	CONC	APH	LBPH	HERF	STAB	PT	CETS1	CETS2	CETS3
Portfolio Concentration (CONC)	1								
Average Percentage Holding Variable (APH)	.346**	1							
Percentage held in large blocks (LBPH)	.955**	.321**	1						
Herfindahl measure of concentration (HERF)	.879**	.262**	.907**	1					
Stability of holdings (STAB)	.932**	.338**	.872**	.750**	1				
Portfolio Turnover (PT)	.118**	.040**	.081**	.079**	.052**	1			
Trading sensitivity to current earnings (CETS1)	0.008	-0.008	0.005	0.001	0.020	.065**	1		
Average earnings change of firms bought vs firms sold (CETS2)	0.015	0.009	0.002	0.003	.024*	-.057**	.034**	1	
Change in holdings in firms with positive earnings vs. firms with negative earnings (CETS3)	.031**	-.050**	.030**	0.013	0.020	0.014	.310**	0.002	1

Table 5: Pearson Correlation Coefficients among the nine variables

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

N=8037, Listwise

In light of the correlation results, factorability of the variables was investigated and based on the Kaiser-Meyer Olkin measure of sampling adequacy, a value of 0.774 was obtained as shown in table 6. Ideally, the KMO statistic should be greater or equal to 0.6 (Aljandali, 2017). This result indicates that the variables are enough to predict at least one factor. Furthermore, the Bartlett's test of sphericity reached statistical significance, p<.001. This means that the correlation matrix is not an identify matrix and that correlations between the variables are all not zero. This provides confirmation that it is possible to proceed with factor analysis.

Kaiser-Meyer-Olkin Adequacy.	Measure of Sampling	.774
Bartlett's Test of Sphericity	Approx. Chi-Square	53865.158
	df	36
	Sig.	.000

Table 6: KMO and Bartlett's Test

4.2.2 Application of factor analysis: Results

Table 7 shows the communalities of the nine standardized variables, which represent the "proportion of the variance in each variable that is explained by all the factors derived thus far" (Aljandali, 2017, p. 100). The communalities for each variable were noted to be quite high, above 0.500 or 50% with some being as high as over 0.967 or 96.7% as in the case of the portfolio concentration variable. These values are an indication that the variables contribute adequately to the factor solution. However, with the exception of the APH variable which had a communality of 0.200 or 20%, this may indicate that the factor solution may be problematic.

	Initial	Extraction
Portfolio Concentration (CONC)	1.000	0.967
Average Percentage Holding Variable (APH)	1.000	0.200
Percentage held in large blocks (LBPH)	1.000	0.943
Herfindahl measure of concentration (HERF)	1.000	0.835
Stability of holdings (STAB)	1.000	0.862
Trading sensitivity to current earnings (CETS1)	1.000	0.647
Average earnings change of firms bought vs firms sold (CETS2)	1.000	0.590
Change in holdings in firms with positive earnings vs. firms with negative earnings (CETS3)	1.000	0.636

Portfolio Turnover (PT)	1.000	0.503

Table 7: Communalities of the nine standardised items (Principle Component Analysis)

Orthogonal Varimax rotation method with Kaiser Normalization was employed in order to avoid correlation among the latent constructs due to orthogonal rotation considering factors to be at right angles and thus ensures that factors are independent of each other (Aljandali, 2017). Earlier studies such as Jansson, Biel, Andersson, and Gärling (2011) successfully applied this method after identifying that oblique rotation did not identify any correlation between extracted factors. Table 8 shows that the first five variables loaded on the first factor with CONC, LBPH, STAB and HERF displaying strong loadings in excess of 0.900 consistent with the high correlation coefficients reported earlier. The remaining four variables loaded on the second and third factor. The loading of CETS2 was negative at 0.759 and only loaded on factor 3.

	Component		
	1	2	3
Portfolio Concentration (CONC)	**.982**		
Percentage held in large blocks (LBPH)	**.970**		
Stability of holdings (STAB)	**.928**		
Herfindahl measure of concentration (HERF)	**.913**		
Average Percentage Holding Variable (APH)	**.435**		
Trading sensitivity to current earnings (CETS1)		**.804**	
Change in holdings in firms with positive earnings vs. firms with negative earnings (CETS3)		**.797**	
Average earnings change of firms bought vs firms sold (CETS2)			**-.759**
Portfolio Turnover (PT)			**.692**

Table 8: Rotated Component Matrix: Principal Component Analysis with Varimax rotation

As compared to the Bushee (1998) rotated component matrix results, it was noted that four variables loaded on the first factor compared to the results of this study whereby 5 variables loaded. Specifically, the STAB variable loads on the first factor instead of loading together with PT on another factor. CETS2 loads with the PT variable on a different factor compared to the Bushee (1998) results while CETS1 and CETS 3 load together on the second factor.

Based on these results, it appears that the first factor should represent the BLOCK factor given the high loadings of the CONC, LBPH, STAB and APH variables indicating that the institutional investor shareholdings is larger. The second factor represents MOMEN given the high loading

of the trading sensitivity to current earnings variable (CETS1). The last factor PTURN captures the institutional investor's rate of portfolio turnover and is represented by the portfolio turnover (PT) variable. The results of the reliability statistics for the extracted factors highlight that Cronbach's Alpha for all dimensions is 0.730 and that of factor 1 is 0.876, which are above the required upper limit of 0.6 for exploratory studies as mentioned by Hair *et al.* (2006). However, Cronbach's Alpha for MOMEN is 0.095 and (0.121) for PTURN are both considerably below the upper limit which may indicate potential measurement error and indicate that the two factors are not viable given the lack of internal consistency.

Based on the outcomes of the total variance explained by the exploratory factor analysis, it was confirmed that three factors account for about 68.7% of the variation in the data and that the remainder variation of 31.3% is not explained by the variables which are part of the three extracted factors. The Eigenvalues of the three factors were all noted to be at least above one which indicate a good linear discriminant function and this gives an indication that the factors will be useful (Aljandali, 2017).

Subscale	Description	N of Items	Cronbach's Alpha
BLOCK	CONC, LBPH, HERF, APH	4	0.903
MOMEN	CETS1, CETS2, CETS3	3	0.250
PTURN	PT, STAB	2	0.072
Overall	**All dimensions**	**9**	**0.730**

Table 9: Reliability statistics for the three extracted components

In order to assess the improvement on the reliability statistics for the three components it was decided to assume Bushee (1998)'s subscales for BLOCK, PTURN and MOMEN for this data and to classify each of the variables as shown above in table 9. This resulted in the overall Cronbach's Alpha statistic remaining the same. Slight improvements were noted on the BLOCK factor from 0.876 to 0.903, while notable improvements were noted for the MOMEN factor which increased to 0.250 while the PTURN factor reflected a positive value of 0.072 from a negative value of 0.121.

4.2.3 Application of cluster analysis: Results

Based on the results of the factor analysis as discussed above, this was then used to perform the clustering[4] (Bushee, 2001). Each of the 8037 unique institutional investor records were grouped into three different clusters based on *k*-means cluster analysis. As part of the analysis it was deemed important not to have disparate group sizes, given that the *k*-means clustering method is highly sensitive to outliers and influential values (Norušis, 2011). Removing those resulted in a total of 214 institutional investor records being dropped, reducing the sample size to 7823 records.

The outcome of applying the *k*-means cluster analysis[5] is shown in Table 10 wherein the individual cluster means were compared to the overall group mean of zero. Based on this, Table 11 resulted in 2836 (36.3%) institutional investor shareholders falling into the Quasi cluster which is denoted by the low BLOCK factor (-1.04331) and relatively low PTURN (0.17464) and low MOMEN factors (-0.12028). Institutional investors falling into this cluster display typical buy-and-hold investment strategies. In order to achieve this, their portfolios would be highly diversified, which is consistent with the observed result of the BLOCK factor. Institutional investors classified as Dedicated amounted to 2802 (35.8%), evidenced by the high BLOCK factor (0.38695) and low PTURN factor (-0.90807) and low MOMEN factor (-0.18574). Lastly, Transient investors account for 27.9% or 2185 in total. Investors in this cluster tend to have invested for the short term and have high portfolio turnover (PTURN =0.90570), low MOMEN factor (-0.10530). While the BLOCK factor for Transient investors is the second highest (BLOCK =0.84751) and not relatively low as required by Bushee (1998), this slight deviation may be interpreted as being the result of investors purchasing large blocks of shares in order to realise short term gains.

	Cluster			Overall
	Quasi	Transient	Dedicated	Mean
Bushee's BLOCK factor	-1.04331	.84751	.38695	0
Bushee's PTURN factor	.17464	.90570	-.90807	0
Bushee's MOMEN factor	-.12028	-.10530	-.18574	0

Table 10: Final Cluster Centres

[4] The factors obtained from the study data were used as scales as defined by Bushee (1999) and Bushee (2001).
[5] The factor values were used in their standardized form in performing the *k*-means cluster analysis.

Type of shareholder	Frequency	Percent	Valid Percent	Cumulative Percent
Quasi	2836	36.3	36.3	36.3
Transient	2185	27.9	27.9	64.2
Dedicated	2802	35.8	35.8	100.0
Total	**7823**	**100.0**	**100.0**	

Table 11: Distribution of cases in the cluster groups

4.2.4 Application of cluster analysis: Kruskal-Wallis H test

The null hypothesis of assuming that the means of the different groups are equal was tested by the Kruskal-Wallis H test. The results of the Kruskal-Wallis H test showed in table 13 below revealed highly significant mean differences among the three clustering variables for each of the three shareholding groups. The BLOCK factor was the most statistically significant different (χ^2 (2) =5531.349, p<.001), followed by the PTURN factor (χ^2 (2) =4630.381, p<.001) and the MOMEN factor (χ^2 (2) =1165.037, p<.001). The null hypothesis is rejected based on these results and the alternative hypothesis is accepted. It can be concluded that the mean differences among the three clustering variables for each of the three shareholding groups are statistically significantly different from each other and that the clusters are not homogenous.

	Type of shareholder	N	Mean Rank
BLOCK factor	Quasi	2836	1456.20
	Transient	2185	5899.06
	Dedicated	2802	4848.09
	Total	**7823**	
PTURN factor	Quasi	2836	4332.70
	Transient	2185	6087.16
	Dedicated	2802	1790.00
	Total	**7823**	
MOMEN factor	Quasi	2836	4481.50
	Transient	2185	4661.29
	Dedicated	2802	2751.29
	Total	**7823**	

Table 12: Mean Ranks

	BLOCK factor	PTURN factor	MOMEN factor
Kruskal-Wallis H [a,b]	5531.349	4630.381	1165.037
Df	2	2	2
Asymp. Sig.	.000	.000	.000

a. Kruskal Wallis Test

b. Grouping Variable: Type of shareholder

Table 13: Kruskal-Wallis H Test Statistics

4.2.5 Aggregation of institutional investor shareholding

The results of the cluster analysis as discussed in the previous section was used to determine the total shareholding per cluster for each company. The dataset for each company contains 5 records representing the years from 2012 to 2016. In total, there will be 570 records relating to the 3 clusters for each of the 114 sampled companies spread across the 5 year sample period. Of importance from this data was the determination of the long term institutional investor shareholding which is defined as the difference between shares held by dedicated versus transient investors (Serafeim, 2015). Analysis of the long term institutional investor shareholding revealed that none of the companies had zero differences

Based on the descriptive statistics as shown in table 14 below, the mean long term institutional investor shareholding was 4.62%, while the 5% trimmed mean is 4.30% and median is 3.20%. This indicates that on average the difference between dedicated and transient investors will not be higher than 5% on average. Given that the median is lower than the mean and that the trimmed mean is between the mean and median this may indicate that the distribution has a positive skew. This is confirmed by the positive skewness statistic of 0.511 (SE=0.102) and kurtosis of 2.495 (SE= 0.204). The maximum and minimum long term institutional investor shareholding were 57.88% and (45.42)% respectively, resulting in a range of 103.31%. The variance is high at 147.17 and standard deviation is 12.13, indicating great variability in the long term institutional investor shareholdings.

			Statistic	Std. Error
Difference between total percentage shares held by Dedicated and Transient shareholders	Mean		4.6248	.50814
	95% Confidence Interval for Mean	Lower Bound	3.6267	
		Upper Bound	5.6228	
	5% Trimmed Mean		4.3048	
	Median		3.2050	
	Variance		147.177	
	Std. Deviation		12.13167	

	Minimum	-45.43	
	Maximum	57.88	
	Range	103.31	
	Interquartile Range	12.54	
	Skewness	.511	.102
	Kurtosis	2.495	.204

Table 14: Descriptive Statistics: Long term institutional shareholding

The kurtosis and skewness statistics did not confirm whether the distributions may follow normal univariate distribution given that the reported statistics were outside the acceptable range of -2 and +2 (Buallay, 2018). In order to test normality, the Kolmogorov–Smirnov and Shapiro–Wilk tests were applied. The null hypothesis for the Kolmogorov–Smirnov test states that the data is normally distributed, while the Shapiro–Wilk test null hypothesis that the sample is drawn from a normally distributed population (Aljandali, 2017). The null hypothesis is rejected under both tests if the significance level is $p < 0.05$. Based on the results, although both the Kolmogorov–Smirnov (χ^2 (570) = 0.067, p<.05) and Shapiro–Wilk (χ^2 (570) = 0.961, p<.05) tests of normality confirm deviation from normality. However figures 5 to 7 showing the histogram, Quantile-Quantile (Q-Q) as well as the box and whisker plots indicate that the deviation from normality which is not gross. In conclusion, this indicates that long term institutional investor shareholding may be applied as the dependent variable in the regression equation.

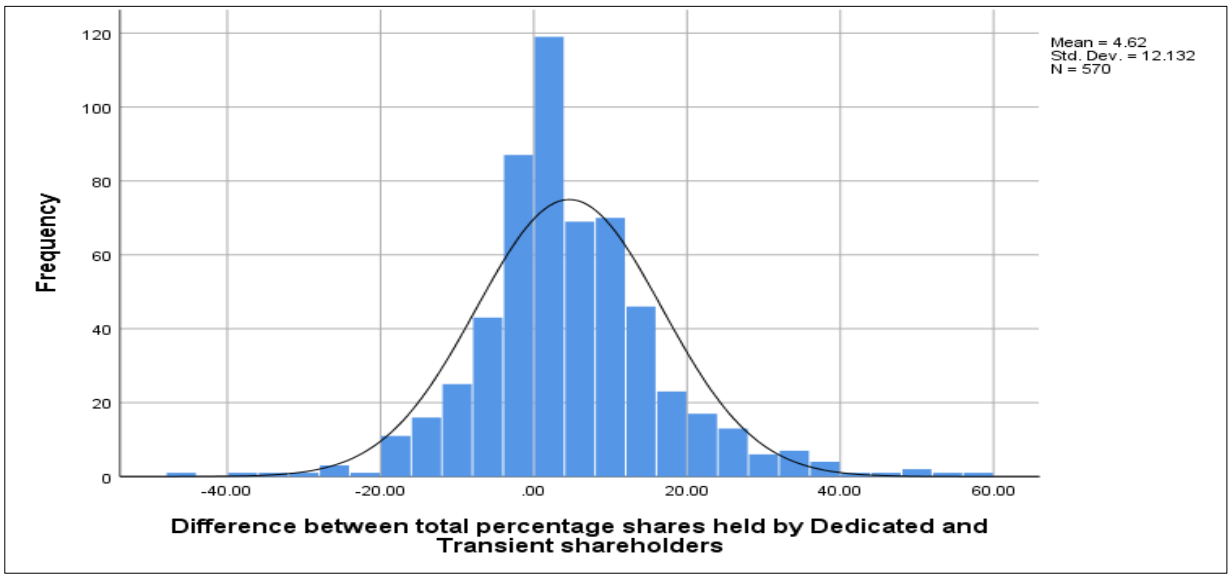


Figure 5: Histogram - Long term institutional investor shareholding

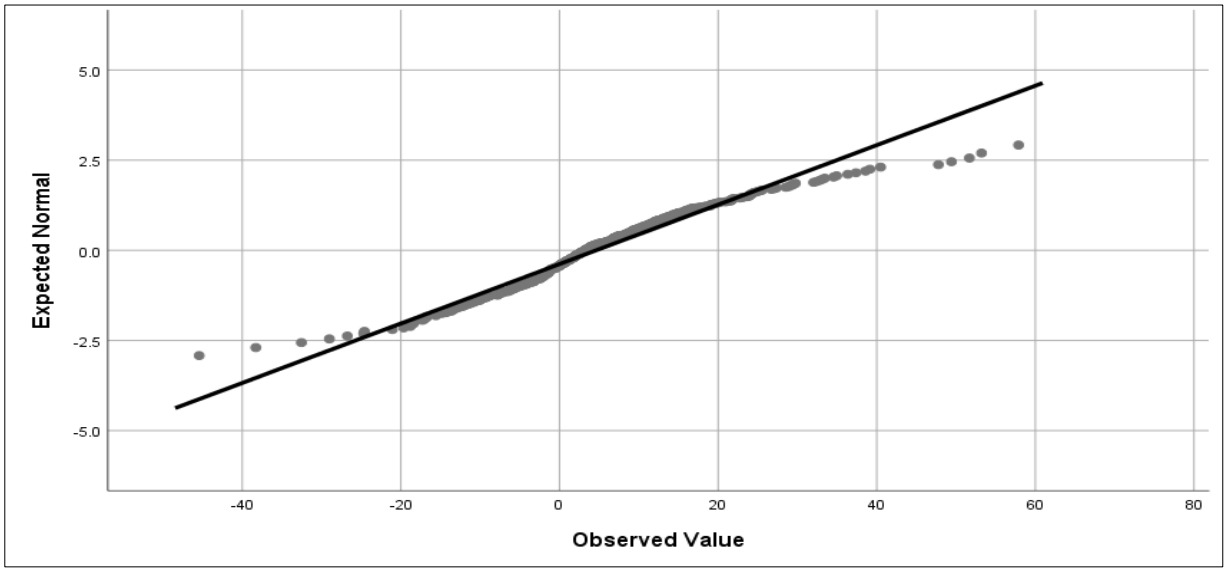


Figure 6: Normal Quantile-Quantile (Q-Q) Plot – Long term institutional investor shareholding

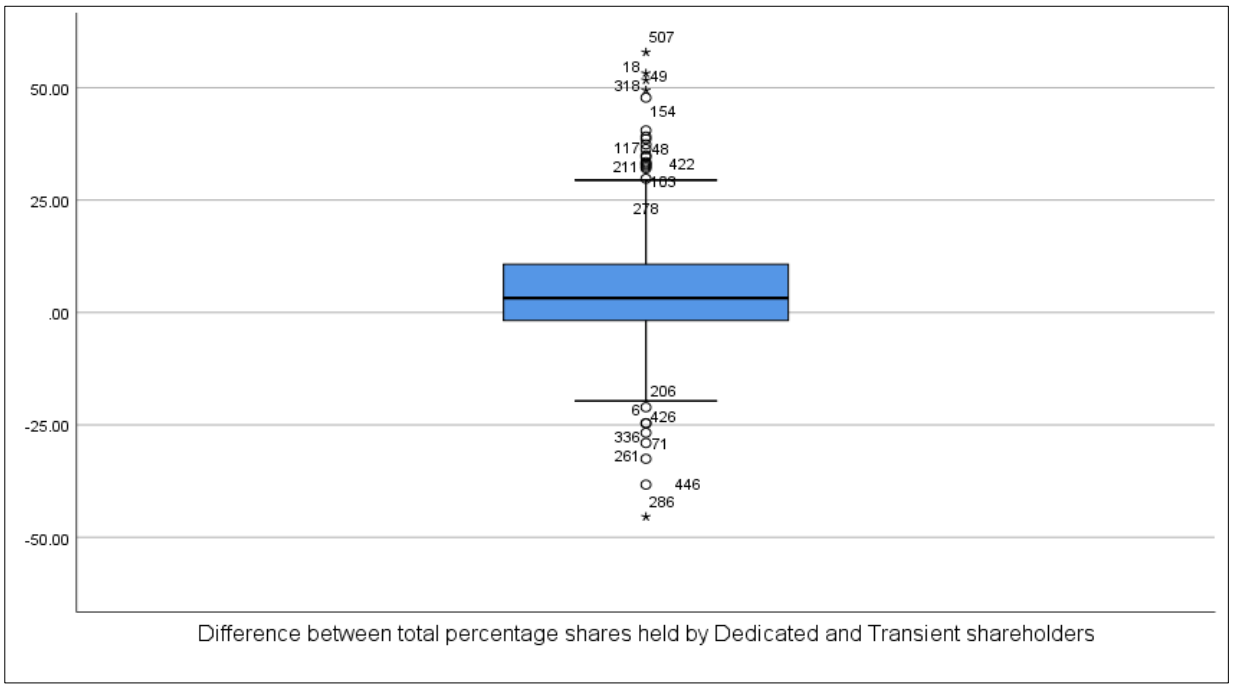


Figure 7: Box and whisker plot - Long term institutional investor shareholding

4.2.6 Regression Analysis Results: Research Question One

4.2.6.1 Descriptive statistics

Prior to determining the descriptive statistics, all records we treated as independent as this ignored the within subject variation across each of the years. Table 15 presents the mean, standard deviation which collectively form part of the descriptive statistics results for all the records. From this table, the mean ESG score is 54.12% with a standard deviation of 15.56%, highlighting moderate variation in the reported ESG scores. This was confirmed by the results of the mean ESG scores for each year and industry sector shown in table 16. Over the 5 year period, the mean ESG scores appear to have increased gradually with the standard deviation appearing constant at around 15 to 16%. The mean value compares favourably with the Serafeim (2015) results which reported a mean score of 53.57%. However, the standard deviation of 28.48 is slightly different, which may be attributed to the larger sample of companies applied in the Serafeim (2015) study of 5 726 compared to 114 in this study. However, when compared to the trend observed by Garcia *et al.* (2017), the mean ESG scores for SA do not continue to reflect a declining trend as previously observed over the period 2010 to 2012. Similar to Serafeim (2015), differences may be attributed to sample sizes as Garcia *et al.* (2017) employed a much larger sample.

As it relates to the financial variables, the Share Price Return, Price-Earnings Ratio, Financial Leverage and Growth in net turnover all appear to have significantly high standard deviations compared to other variables. Given that different measurement scales are used, it is difficult to compare their standard deviations. However, the results of the coefficient of variation presented in table 15 which was determined by standardizing the relationship between the standard deviation and the mean shows that only the ESG score, equity price volatility, equity beta and total assets have significantly lower coefficients of variation.

	Mean	Std. Deviation	Coefficient of variation (CV)	N
Difference between total percentage shares held by Dedicated and Transient shareholders	4.6248	12.13167	2.62317722	570
ESG:	54.12772	15.56151	0.28749605	570
SHAR_RET	18.84%	51.85%	2.75160753	570
SHAR_PRICV	0.344076	0.166138	0.48285179	570
EQT_BETA	0.538307	0.331337	0.61551736	570
TOT_ASSETS	4.2547	0.63593	0.1494653	570
EAR_YIE	8.7828	399.726	45.5123696	570
DIV_YIE	2.246122	5.439492	2.42172598	570
BOOK_MAR	0.8630949	1.0361	1.20044737	570
LEV_RAT	69.4148	169.4576	2.4412317	570
SALES_GRO	17.2903	131.8118	7.62345188	570

Table 15: Descriptive Statistics: DV and IVs

Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
Basic Materials	65.04	65.34	64.10	65.76	65.98
Consumer Goods	54.88	51.97	51.85	51.10	48.86
Consumer Services	56.82	56.03	55.06	51.78	51.54
Financials	51.64	50.72	48.41	48.67	48.50
Health Care	64.17	64.25	57.18	59.60	56.79
Industrials	50.06	49.34	47.07	45.46	47.37
Technology	53.90	53.81	50.81	52.66	51.86
Telecommunications	63.93	63.19	65.54	65.87	64.63
Average ESG Score	**55.88**	**55.18**	**53.40**	**53.07**	**53.10**
Standard Deviation	**15.61**	**15.24**	**15.36**	**15.71**	**15.94**

Table 16: Mean and Standard Deviation of ESG scores

4.2.6.2 Pearson Correlation Matrix Results

The results of the Pearson Correlation Matrix are shown in table 17. The results show that there are no correlations of 0.3 and above between the Dependent Variable (DV) and any of the Independent Variables (IV). Interestingly however, is the positive correlation coefficient between ESG and the long term institutional shareholding. This confirms that while a statistically meaningful relationship may not exist between the IVs and DV, a positive relationship between the two may be expected.

The effects of the IVs are not significant, with the exception of the two IVs, namely share price return and share price volatility which have significant correlations with the DV, albeit very small. Correlations however are observed to be significant between three sets of IVs, namely ESG and the log of total assets, Book to Market Value and Share Price Volatility, and Equity beta and the log of total assets. Equity beta, total assets and dividend yield highlight negative correlation to the DV, though insignificant. In summary, ESG is not correlated with the levels of long term investor shareholding which leads to the conclusion that ESG reporting does not influence investors to invest for the long term. Put differently, the difference in the percentage of shares held by dedicated versus transient is not correlated to the ESG scores. The results are not consistent with those of Serafeim (2015). However, according to Smith (2017) despite the correlation coefficients being observed as being near zero, it does not necessarily mean that no relationship exists, rather that there is no meaningful linear relationship between the dependent and independent variables.

	Diff Total % Shares	ESG	SHAR_RET	SHAR_PRICV	EQT_BETA	TOT_ASSETS	EAR_YIE	DIV_YIE	BOOK_MAR	LEV_RAT	SALES_GRO:
Difference between total percentage shares held by Dedicated and Transient shareholders	1										
ESG	0.030	1									
SHAR_RET	.162**	.181**	1								
SHAR_PRICV	.159**	0.004	.233**	1							
EQT_BETA	-0.071	.297**	-.099*	-.196**	1						
TOT_ASSETS	-0.033	.345**	-0.008	-.205**	.595**	1					
EAR_YIE	0.036	0.047	0.032	0.014	0.012	0.036	1				
DIV_YIE	-0.016	0.027	-0.016	.152**	.175**	.170**	0.003	1			
BOOK_MAR	0.012	-.088*	.104*	.434**	-.274**	-.116**	-0.014	-.093*	1		
LEV_RAT	0.018	0.023	-.092*	.158**	-0.050	0.001	-0.016	0.054	0.000	1	
SALES_GRO	0.011	-.095*	0.029	0.031	0.000	-0.015	-0.012	-0.012	0.022	-0.013	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 17: Pearson Correlation

4.2.6.3 ANOVA results

The ANOVA results shown in table 19 indicate that the model is significant (F(10) = 3.038, p<0.01). However, the correlation co-efficient (R) shown in table 18 is 0.227 indicating that there is no correlation between the long term institutional investment and the independent variables. The model only explains 3.5% of the variation in the data as shown by the adjusted R-square statistic. Thus, the model will generally not perform well as a prediction model. However, what can be gleaned from the model is what effect the individual IVs have on the DV. Only the share price return and share price volatility are significant in this model, with the share price volatility variable having the strongest effect (Beta = 0.170) as shown in table 20. The VIF scores reported for all variables are below 2.0, with the highest VIF score reported for Equity beta. According to Kennedy (as cited in Bushee and Noe, 2000) and Aljandali (2017), given that the VIF scores are below 10, this indicates that there are no multicollinearity concerns and that this is unlikely to influence the results.

Model[b]	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.227[a]	.052	.035	11.92008

a. Predictors: (Constant), SALES_GRO: Growth in net turnover (%), EQT_BETA: Equity Beta, EAR_YIE: Price Earnings Ratio %, LEV_RAT: Financial leverage at book (%), SHAR_RET: Share Price Return (%), DIV_YIE: Dividend yield (%) - close, BOOK_MAR: Book value /Price - Close, ESG: ESG Score (%), SHAR_PRICV: Equity price volatility, TOT_ASSETS: Log of Total Assets ZARm

b. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders

Table 18: Model summary results

		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4316.523	10	431.652	3.038	.001[b]
	Residual	79427.373	559	142.088		

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders

b. Predictors: (Constant), SALES_GRO: Growth in net turnover (%), EQT_BETA: Equity Beta, EAR_YIE: Price Earnings Ratio %, LEV_RAT: Financial leverage at book (%), SHAR_RET: Share Price Return (%), DIV_YIE: Dividend yield (%) - close, BOOK_MAR: Book value /Price - Close, ESG: ESG Score (%), SHAR_PRICV: Equity price volatility, TOT_ASSETS: Log of Total Assets ZARm

Table 19: ANOVA results

Model[a]	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
Constant	-1.006	4.171		-.241	.810		
ESG	.005	.036	.007	.148	.883	.808	1.238
SHAR_RET	.029	.010	.123	2.793	.005	.875	1.142
SHAR_PRICV	12.436	3.675	.170	3.384	.001	.670	1.493
EQT_BETA	-2.479	1.985	-.068	-1.249	.212	.577	1.732
TOT_ASSETS	.702	1.034	.037	.680	.497	.578	1.730
EAR_YIE	.001	.001	.028	.676	.500	.995	1.005
DIV_YIE	-.097	.097	-.043	-.997	.319	.893	1.120
BOOK_MAR	-1.083	.563	-.092	-1.925	.055	.735	1.360
LEV_RAT	9.004E-5	.003	.001	.030	.976	.941	1.062
SALES_GRO	.001	.004	.005	.132	.895	.986	1.014

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders

Table 20: Coefficients

4.2.6.4 OLS Regression Conclusion

The results from the OLS regression, together with the lack of correlations between the DV and IVs indicate that model specification needs to be carefully considered and that the within subject variation over the 5 years of data may need to be taken into consideration. As a result

other approaches which will allow to estimate the ESG-long term institutional investor relationship will need to be applied (Garcia *et al.,* 2017). The next section will take into account that there are multiple observations for each company and that a panel approach may be appropriate.

4.2.7 Balanced (Fixed) Panel Dataset

The data available to test the research questions is balanced given that each company in the data is observed the same number of times. Furthermore, the panel is fixed since the same set of companies is observed for the duration of the study, that is, from 2012 to 2016 (Garcia *et al.*, 2017). A panel approach comprising of the random effects model and fixed effects model was deemed appropriate to be applied consistent with similar studies exploring the ESG reporting relationship against an independent variable (Bushee & Noe, 2000; Yu *et al*., 2018; Garcia *et al.*, 2017). This will be carried out through employing the Linear Mixed Models procedure in IBM® SPSS® Statistics 25.0 due to the versatility for specifying different designs such as FEM and REM.

4.2.7.1 Linear Mixed Model – Random Coefficient

Based on a graphical analysis of the total percentage shareholding held by long term investors (dedicated less transient shareholding) for each company over the 5 year period, it was observed that it is not possible to use a single regression line in order to describe the behaviour of every company. As a result the random coefficient model was deemed appropriate to be applied. Based on the options on IBM® SPSS® Statistics 25.0 the possible linear random coefficient models are random intercepts, random slopes, and random intercepts and slopes. For purposes of this study the random intercepts and random slopes will be assessed.

4.2.7.1.1 Intercept only model (Baseline model)

The intercept only model was created as the baseline model which included no explanatory variables. The information criteria generated for this model was used to see whether subsequent models improve the model fit. This was assessed by comparing the information criteria statistics with subsequent models. The information criteria are measured by the five statistics namely, the Log likelihood, Akaike Akaike's Information Criterion (AIC), Hurvich and Tsai's Criterion (AICC), Hurvich and Tsai's Criterion (AICC), Bozdogan's Criterion (CAIC) and Schwarz's Bayesian Criterion (BIC). The information criteria are presented in the smallest is better form, meaning that in subsequent models when the information criteria are noted to decrease it can be assumed that the change in the model specification has improved the model (Aljandali, 2017)

-2 Log Likelihood	4378.744
Akaike's Information Criterion (AIC)	4384.744
Hurvich and Tsai's Criterion (AICC)	4384.786
Bozdogan's Criterion (CAIC)	4400.781
Schwarz's Bayesian Criterion (BIC)	4397.781

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 21: Baseline model - Information criteria

Based on the Alkaike, Hurvich and Tsai, Bozdogan and Schawrz's information criterion and likelihood ratio generated for the intercept only model without random intercepts as shown in table 21 above, it is observed that the results produce a significant model. The information criteria are displayed in smaller-is better form. The intercept is highly significant as can be seen in the Type III Tests of Fixed Effects table 22 with the reported F-statistic of F(144)=36.237, p=0.000. The intercept, that is, the unweighted grand mean of long term institutional investor percentage for all companies is 4.625, with a t-test statistic of 6.020 is presented in table 23. This assumes that all companies have the same (fixed) intercept (mean).

Source[a]	Numerator df	Denominator df	F	Sig.
Intercept	1	114	36.237	.000

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 22: Baseline model - Type III Tests of Fixed Effects

						95%e Confidence Interval	
Parameter	Estimate	Std. Error	df	t	Sig.	Lower Bound	Upper Bound
Intercept[a]	4.624789	.768269	114	6.020	.000	3.102855	6.146724

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 23: Baseline model - Estimates of Fixed Effects

4.2.7.1.2 Random Effects

Table 22 below presents the results of the random effects which control for unobserved heterogeneity. The intercept showing the dependent variable is statistically significant at

Z=5.259. This means that the explanatory variables for the model do have an effect in the model and that removing the variables would impact on the model fit. The variance of each company mean for the long term investors around the grand mean of the long term investor's percentage is 47.379%, which is noted to be quite high. The variance within groups, that is, between different companies when compared against the grand mean for all years in that company is 99.540%. As a result the intraclass correlation is 33% (47.378992 / 47.378992 + 99.540124). This means that the variability in the total percentage differences of long term investor shareholding is associated with differences between companies. Given the high variance noted within groups, the repeated measure model was explored as another alternative to fitting the model.

						95% Confidence Interval	
Parameter[a]		Estimate	Std. Error	Wald Z	Sig.	Lower Bound	Upper Bound
Residual		99.540124	6.592206	15.100	.000	87.423055	113.336652
Intercept	Variance	47.378992	9.009376	5.259	.000	32.638121	68.777514

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 24: Random effects - Estimates of Covariance Parameters

4.2.7.2 Linear Mixed Model – Repeated Measures Model

4.2.7.2.1 Baseline Repeated Measures Model

A baseline model was created for the repeated measures model which used only the year as a fixed factor. This was in order to determine whether the year is significant in the model and whether there is enough variance within each company in the values recorded over the years. An appropriate covariance structure was selected in order to be able to compare the same model using another covariance structure with the aim of assessing whether the model fit improved.

The baseline results for the repeated measures model information criteria are shown in table 25. The results of the information criteria will be used as a baseline for comparison to other models. The results further show as presented in table 26 that the year is significant in the model ($F(456)=43.456$, $p<0.05$);

-2 Log Likelihood[a]	4231.480
Akaike's Information Criterion (AIC)	4245.480
Hurvich and Tsai's Criterion (AICC)	4245.679
Bozdogan's Criterion (CAIC)	4282.899
Schwarz's Bayesian Criterion (BIC)	4275.899

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 25: Baseline repeated measures model - Information Criteria

Source[a]	Numerator df	Denominator df	F	Sig.
Intercept	1	114	36.237	.000
Year	4	456.000	43.456	.000

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 26: Baseline repeated measures model - Type III Tests of Fixed Effects

Table 27 shows the results of the fixed effects for the baseline repeated measures model using the 2016 year as a reference variable. The estimated intercept represents the mean value of the reference category (2016) and the other year estimates are interpreted relative to this value. Based on the results, it shows that where the year changes from 2016 to 2015, the effect this will have on the DV is that it will increase by 9.38. Overtime and relative to the most recent year (2016), it shows that the long term institutional investor shareholding has been increasing, over the period 2012 to 2014 given the reported means of 0.769, 7.642 and 10.176 over this period. However, a gradual negative change in the long term institutional investor shareholding has been observed from the period 2015 to 2016 with reported mean values of 6.959 and (2.421) respectively in each of the years.

Parameter[a]	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	-2.421404	1.046890	332.102	-2.313	.021	-4.480776	-.362031
2012	3.190000	1.124436	456	2.837	.005	.980282	5.399718
2013	10.063421	1.124436	456	8.950	.000	7.853703	12.273139
2014	12.597632	1.124436	456	11.204	.000	10.387913	14.807350
2015	9.379912	1.124436	456	8.342	.000	7.170194	11.589631
2016	0[b]	0	.	.	.	.	.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

b. This parameter is set to zero because it is redundant.

Table 27: Baseline repeated measures model - Estimates of Fixed Effects

Year[a]	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
2012	.769	1.047	332.102	-1.291	2.828
2013	7.642	1.047	332.102	5.583	9.701
2014	10.176	1.047	332.102	8.117	12.236
2015	6.959	1.047	332.102	4.899	9.018
2016	-2.421	1.047	332.102	-4.481	-.362

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 28: Baseline repeated measures model - Year

4.2.7.2.2 Adjusted Baseline Repeated Measures Model

Based on the adjusted baseline repeated measures model to allow for heterogeneous variance, the -2 log likelihood (4137.77) for this new model appears to be smaller compared to the -2 log likelihood (4231.48) baseline repeated measures model, as shown in table 29. In addition, there appears to be an improvement of the information criteria across all AIC, AICC, CAIC and BIC criterion. Thus, the new model results in a better fit than the previous baseline repeated measured model and as a result this model is deemed appropriate[6] and will be used as the covariance structure in subsequent models will also have other explanatory variables.

[6] High correlations in the estimates of the covariance parameters table were noted.

-2 Log Likelihood[a]	4137.767
Akaike's Information Criterion (AIC)	4159.767
Hurvich and Tsai's Criterion (AICC)	4160.240
Bozdogan's Criterion (CAIC)	4218.569
Schwarz's Bayesian Criterion (BIC)	4207.569

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 29: Adjusted baseline repeated measures model - Information Criteria

Source[a]	Numerator df	Denominator df	F	Sig.
Intercept	1	127.913	37.977	.000
Year	4	230.659	38.602	.000

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 30: Adjusted baseline repeated measures model - Type III Tests of Fixed Effects

						95% Confidence Interval	
Parameter[a]	Estimate	Std. Error	df	t	Sig.	Lower Bound	Upper Bound
Intercept	-2.421404	1.265632	125.158	-1.913	.058	-4.926216	.083409
2012	3.190000	1.368470	201.422	2.331	.021	.491636	5.888364
2013	10.063421	1.424964	256.291	7.062	.000	7.257291	12.869551
2014	12.597632	1.379249	268.692	9.134	.000	9.882122	15.313141
2015	9.379912	1.083097	192.599	8.660	.000	7.243657	11.516167
2016	0[b]	0	.	.	.	.	.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

b. This parameter is set to zero because it is redundant.

Table 31: Adjusted baseline repeated measures model - Estimates of fixed effects

Parameter[a]		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Repeated Measures	[Year=2012]	55.103907	6.845434	8.050	.000	43.195603	70.295130
	[Year=2013]	105.816433	13.130676	8.059	.000	82.971358	134.951599
	[Year=2014]	148.820864	19.060180	7.808	.000	115.783449	191.285109
	[Year=2015]	138.855337	17.715583	7.838	.000	108.134360	178.304144
	[Year=2016]	182.608074	23.083685	7.911	.000	142.534062	233.949051
	ARH1 rho	.589471	.035427	16.639	.000	.515686	.654577

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 32: Adjusted baseline repeated measures model - Estimates of covariance parameters

4.2.7.2.3 Adjusted Baseline Repeated Measures Model with Explanatory Variables

Through using the adjusted baseline repeated measures model discussed in the previous section, explanatory variables were added to the model as fixed effects, it appears that there is a small improvement in terms of the model fit based on the results of table 33. This is an indication that the IV do not contribute more to the model than the time (year) factor alone. This is shown by the change in the -2 log likelihood from 4137.767 to 4112.551, as well as marginal changes across two of the information criteria namely, AIC (4159.767 to 4153.551), AICC (4160.240 to 4156.237) and marginal deterioration of the CAIC (4218.569 to 4266.80) and BIC (4207.569 to 4245.809) information criterion.

-2 Log Likelihood[a]	4112.551
Akaike's Information Criterion (AIC)	4154.551
Hurvich and Tsai's Criterion (AICC)	4156.237
Bozdogan's Criterion (CAIC)	4266.809
Schwarz's Bayesian Criterion (BIC)	4245.809

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 33: Adjusted Baseline Repeated Measures Model - Information criteria

Table 34 presents the results of the Type III Tests of Fixed Effects. The results indicate that there are five regression coefficients which are statistically significant, namely Year ($F(224.157)=41.124$, $p<0.05$); Share Price Return ($F(152.506)=5.067$, $p<0.05$); Equity Price

Volatility (F(185.534)=8.065, p<0.05), Dividend Yield (F(359.788)=2.273, p<0.05) and Book value price close (F(451.771)=6.864), p<0.05).

Source[a]	Numerator df	Denominator df	F	Sig.
Intercept	1	158.660	.007	.932
Year	4	224.157	41.124	.000
SHAR_RET	1	152.506	5.067	.026
SHAR_PRICV	1	185.534	8.065	.005
EQT_BETA	1	157.537	2.468	.118
TOT_ASSETS	1	167.106	.261	.610
EAR_YIE	1	143.270	.170	.681
DIV_YIE	1	359.788	2.273	.132
BOOK_MAR	1	451.771	6.864	.009
LEV_RAT	1	252.949	.207	.649
SALES_GRO	1	202.492	.099	.754
ESG	1	240.282	.039	.844

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 34: Adjusted Baseline Repeated Measures Model - Type III tests of fixed effects

4.2.7.2.4 Estimation Results: Research Question One

Based on the adjusted baseline repeated measures model, the fixed effects presented in table 35 show that the Share Price Return (t=2.251, p= 0.026); Equity Price Volatility (t= 2.840, p = 0.005) and Book-to-Price (t= -2.620, p= 0.009) are significant predictors in the model.

						95% Confidence Interval	
Parameter[a]	Estimate	Std. Error	df	t	Sig.	Lower Bound	Upper Bound
Intercept	-6.664455	5.008422	168.936	-1.331	.185	-16.551610	3.222701
[Year=2012]	3.016501	1.321796	208.410	2.282	.023	.410697	5.622305
[Year=2013]	10.064867	1.371600	254.993	7.338	.000	7.363759	12.765974
[Year=2014]	12.614623	1.355549	274.766	9.306	.000	9.946041	15.283205
[Year=2015]	9.679526	1.066183	200.780	9.079	.000	7.577173	11.781880
[Year=2016]	0[b]	0	.	.	.	.	.
SHAR_RET	.027694	.012303	152.506	2.251	.026	.003389	.051999

SHAR_PRICV	11.708477	4.122835	185.534	2.840	.005	3.574813	19.842140
EQT_BETA	-3.623334	2.306556	157.537	-1.571	.118	-8.179097	.932429
TOT_ASSETS	.619486	1.211914	167.106	.511	.610	-1.773149	3.012121
EAR_YIE	-.000258	.000626	143.270	-.412	.681	-.001495	.000979
DIV_YIE	-.139362	.092427	359.788	-1.508	.132	-.321127	.042402
BOOK_MAR	-1.403681	.535775	451.771	-2.620	.009	-2.456601	-.350760
LEV_RAT	.001504	.003303	252.949	.455	.649	-.005001	.008010
SALES_GRO	-.000838	.002668	202.492	-.314	.754	-.006100	.004423
ESG	.007673	.039054	240.282	.196	.844	-.069259	.084606

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

b. This parameter is set to zero because it is redundant.

Table 35: Adjusted Baseline Repeated Measures Model - Estimates of fixed effects

4.2.7.2.5 Adjusted Baseline Repeated Measures Model with Explanatory Variables

	4112.551
Akaike's Information Criterion (AIC)	4154.551
Hurvich and Tsai's Criterion (AICC)	4156.237
Bozdogan's Criterion (CAIC)	4266.809
Schwarz's Bayesian Criterion (BIC)	4245.809

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 36: Adjusted Baseline Repeated Measures Model - Information criteria

4.2.7.2.6 Estimation Results: Research Question Two

Based on the adjusted baseline repeated measures model, forward stepwise regression procedure was employed, and the industry was added to the model. Industry was added as a categorical variable. Noticeable improvements were observed based on the information criteria as show in table 37. The log likelihood is positive which indicated a perfect fit of the model (Log likelihood = 4101.488). As it relates to the other information criteria, given that they are displayed in the smaller is better form, improvements in terms of the AIC, AICC, CAIC and BIC were noted when compared to the adjusted baseline repeated measures model with explanatory variables. Based on these results, it follows that the model may be used and will allow for the results to be interpretable (Aljandali, 2017).

-2 Log Likelihood[a]	4101.488
Akaike's Information Criterion (AIC)	4157.488
Hurvich and Tsai's Criterion (AICC)	4160.490
Bozdogan's Criterion (CAIC)	4307.166
Schwarz's Bayesian Criterion (BIC)	4279.166

The information criteria are displayed in smaller-is-better form.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 37: Adjusted Baseline Repeated Measures Model - Information Criteria

Table 38 shows the results of the Type III Tests of Fixed effects. Based on the table, Equity Price Volatility (F(185.272) =7, p =0.09), Equity Beta (F(158.397) =5.871, p=0.17), Book to Price (F(462.442)= 6.650, p=0.010) and Year (F(219.409) =40.885, p=0.000) each have a significant effect on the long term institutional investor shareholding. The results are consistent with the output for research question one discussed above. The rest of the variables do not appear to have a significant effect at an alpha level of 0.05 and as a result inferences cannot be drawn.

Source[a]	Numerator df	Denominator df	F	Sig.
Intercept	1	169.246	.499	.481
SHAR_RET	1	151.289	.546	.461
SHAR_PRICV	1	185.272	7.000	.009
EQT_BETA	1	158.397	5.871	.017
TOT_ASSETS	1	183.610	3.096	.080
EAR_YIE	1	142.710	.308	.580
DIV_YIE	1	355.327	1.897	.169
BOOK_MAR	1	462.443	6.650	.010
LEV_RAT	1	245.993	.288	.592
SALES_GRO	1	198.362	.096	.757
ESG	1	268.810	1.001	.318
Year	4	219.409	40.885	.000
Industry Classification	7	154.988	1.635	.129

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

Table 38: Adjusted Baseline Repeated Measures Model - Type III tests of fixed effects

The telecommunications industry was selected as the baseline by IBM® SPSS® Statistics 25.0 given that alphabetically it ranked as the last of the eight industries in this study. The estimates of fixed effects presented in Table 38, show the Equity Price Volatility (t=2.646, p=0.009), Equity Beta (t=-2.424, p=0.017) and Book-to-Price (t=-2.579, p=0.010) variables being significant as explanatory variables in the model.

The eight industry variables all do not appear to have explanatory power in the model at a 5%, as the lowest reported t-test is Basic Materials (t = 1.152, p= 0.251). Based on this result it can be concluded that industry does not have a significant association with the level of long term institutional investor holdings. As a result, there are no differences between sensitive and non-sensitive industries. This observation is not consistent with the findings of Serafeim (2015) or Garcia *et al*. (2017) in supporting the notion that ESG scores vary for companies belonging to industries regarded as sensitive or non-sensitive. Based on the results of the estimates of fixed effects it can be concluded that long term institutional shareholdings do not vary across sectors.

						95% Confidence Interval	
Parameter[a]	Estimate	Std. Error	df	t	Sig.	Lower Bound	Upper Bound
Intercept	-12.031516	7.283507	170.161	-1.652	.100	-26.409183	2.346150
SHAR_RET	.009966	.013487	151.289	.739	.461	-.016682	.036613
SHAR_PRICV	11.367737	4.296507	185.272	2.646	.009	2.891369	19.844104
EQT_BETA	-5.999852	2.476148	158.397	-2.423	.017	-10.890377	-1.109327
TOT_ASSETS	2.674910	1.520334	183.610	1.759	.080	-.324660	5.674481
EAR_YIE	-.000348	.000626	142.710	-.555	.580	-.001586	.000890
DIV_YIE	-.125760	.091312	355.327	-1.377	.169	-.305340	.053821
BOOK_MAR	-1.402708	.543960	462.443	-2.579	.010	-2.471648	-.333768
LEV_RAT	.001760	.003279	245.993	.537	.592	-.004698	.008217
SALES_GRO	-.000824	.002658	198.362	-.310	.757	-.006065	.004417
ESG	-.042411	.042394	268.810	-1.000	.318	-.125878	.041057
[Year=2012]	3.253526	1.306616	207.067	2.490	.014	.677551	5.829502
[Year=2013]	10.192293	1.359962	253.369	7.495	.000	7.514023	12.870564
[Year=2014]	12.650147	1.340432	268.334	9.437	.000	10.011046	15.289248
[Year=2015]	9.699182	1.063099	201.253	9.123	.000	7.602941	11.795424
[Year=2016]	0[b]	0	.	.	.	.	.

Basic Materials	4.616767	4.007382	151.065	1.152	.251	-3.300987	12.534522
Consumer Goods	-.196219	4.281957	151.803	-.046	.964	-8.656142	8.263705
Consumer Services	3.516946	4.099550	153.742	.858	.392	-4.581775	11.615666
Financials	-1.017810	3.810306	151.130	-.267	.790	-8.546156	6.510535
Health Care	-.941386	4.793618	151.060	-.196	.845	-10.412580	8.529809
Industrials	-1.464403	3.926421	151.112	-.373	.710	-9.222174	6.293368
Technology	2.841994	4.928382	152.052	.577	.565	-6.894954	12.578941
Telecommunications	0[b]	0	.	.	.	.	.

a. Dependent Variable: Difference between total percentage shares held by Dedicated and Transient shareholders.

b. This parameter is set to zero because it is redundant.

Table 39: Adjusted Baseline Repeated Measures Model - Estimates of fixed effects

4.3 Comparison to prior studies

Collectively, the results in this report do not appear to highlight a meaningful relationship between ESG reporting and the long term institutional investor shareholding given the low correlation observed of 0.030. The results do not compare meaningfully with the observations of Serafeim (2015), even after applying an adjusted repeated measures model to allow for heterogeneous variances, as the independent variables did not appear meaningful in the estimates of fixed effects. Despite there being a host of possible reasons why this may be the case, perhaps an overarching reason to consider is the fact that the effects of the ESG-long term institutional investor levels may be context specific (De Klerk & De Villiers, 2012). While great care was taken to replicate the Serafeim (2015) model, through varying one or more of the variables of the original model this may have had an impact on the results. However, in mitigation had these variables not been altered, the study would not be directed to the South African context (Lindsay & Ehrenberg, 1993).

4.4 Chapter Summary

This chapter presented the findings and analysis of the research study. The chapter explicated the results of the factor and cluster analysis and derived the long term institutional investor shareholding dependent variable. A correlation analysis was performed between the long term institutional investor shareholding dependent variable and various independent variables in order to ascertain whether a relationship exists between the variances. Given the limitation of being able to ascertain the ESG-investor relationship using a single regression line, the linear mixed model and repeated measures models were applied in order to ascertain which model would best fit the data and would be substantially interpretable (Smith, 2017). The repeated measure model was adjusted to allow for heterogeneous variances and was selected as the most suitable model against which the research questions were tested. Overall the results indicated that there is no meaningful relationship between ESG reporting scores and the long

term institutional investor shareholding levels on the JSE. Furthermore, from the results of the second research question it can be concluded that industry does not have a significant association with the level of long term institutional investor holdings.

Chapter 5 – Conclusion and Recommendations

5.1 Introduction

This chapter presents a summary of the conclusions and recommendations of the research report. Section 5.2 provides an outline of the research objectives and section 5.3 discusses the key results of the research. Sections 5.4 and 5.5 provide the limitations encountered in undertaking this study, as well as recommendations for future studies, while section 5.5 outlines whether the research objectives have been met.

5.2 Research Objectives

The purpose of this study was to investigate whether the integration of ESG factors in investment decisions have resulted in JSE companies attracting long term institutional investors. The study was based on the seminal work performed by Serafeim (2015) who found that ESG reporting attracts a long term focused institutional investor base. Inspired by the aforementioned study, two key research questions were proposed for this study, firstly to what extent has ESG reporting resulted in JSE listed companies attracting long term institutional investors and to what extent has ESG reporting resulted in the levels of long term institutional investor varying between different sectors of the JSE.

5.3 Discussion of key results

Through the factor analysis results it was observed that the variables applied in performing the factor analysis were highly correlated with correlation coefficients of 0.3 and above being noted amongst the variables, consistent with the results of Bushee (1998). Based on the results of the Kaiser-Meyer Olkin measure of sampling adequacy (0.774) and the Bartlett's test of sphericity (χ^2 (36) =53865.158, p<.001), the variables were noted to be statistically significant and that they were sufficient to predict at least one factor. Subsequently, three factors were determined namely BLOCK, PTURN and MOMEN. These factors all reported statistically significant Cronbach's Alpha values. This indicated that valid conclusions may be drawn from the relationship between the nine variables prior to performing the cluster analysis.

Based on the results of the *k*-means cluster analysis, three investor clusters were determined namely Dedicated, Quasi and Transient. The results of the Kruskal-Wallis H test were found to be statistically significant. This indicated that the mean differences among the three clustering variables for each of the three shareholding groups are statistically significantly different from each other and that the clusters are not homogenous. The Quasi investor cluster accounted for 36.3% of all institutional shareholders, followed by the Dedicated investor cluster at 35.8% and lasting Transient investor cluster at 27.9%. Following an aggregation of the

clusters, the long term institutional investor shareholding was determined to be 4.62%. This highlighted that institutional investor's commitment to the UN PRI and CRISA has not yet translated into shares being held in the long term as investment horizons do not reflect the same (ACCA, 2013b).

The results of the Pearson Correlation between the long term institutional investor shareholding and the explanatory variables indicated that there is no statistically meaningful relationship between long term investor shareholding and any of the explanatory variables including ESG reporting. The results showed that there are no correlations of 0.3 and above between the Dependent Variables (DV) and any of the Independent Variables (IV). Based on the results of the ANOVA, the model was noted to be significant ($F(10) = 3.038$, $p<0.01$), however the model only explained 5% of the variation based on the R-square statistic. These results were not supportive of the findings by Holm and Rikhardsson (2008), and Serafeim (2015). Furthermore, the model did not perform well as a prediction model.

The results from the OLS regression, together with the lack of correlations between the DV and IVs indicated that model specification needed to be carefully considered and that the within subject variation over the 5 years of data may need to be taken into account. A linear mixed model approach was followed which resulted in an adjusted repeated measures model being applied following the fixed and random effects models not being of good fit. The repeated measure model was adjusted to allow for heterogeneous variances and was selected as the most suitable model against which the research questions were tested. The results of the type III tests of fixed effects and estimates of fixed effects did not indicate a statistically significant result of the ESG score, as only equity price volatility, equity beta and the book-to-price variables were statistically significant. Even when including industry in the equation as a variable, this did not prove to be statistically significant. This led to the conclusion that there is no statistically significant relationship between ESG reporting scores and the level of long term institutional investment.

Despite earlier studies such as EY (2013) having indicated a growing interest from investors to integrate ESG factors into their investment decision making and notwithstanding the barriers to RI which Eccles *et al.* (2008) have identified, the findings of this report suggest that the outcomes of RI have not been fully realized. The results further give an indication of the weaknesses of the various theoretical frameworks underpinning the ESG-long term investor relationship from a quantitative perspective. As a result, further academic analysis of the ESG-long term investor relationship may be required. To policy setters, the results call for greater consideration to be given to policy changes for further industry guidance and monitoring

techniques through assurance providers in order to ensure that the objectives as set out by the UN PRI and CRISA are achieved.

5.4 Limitations of the study

While great effort has been taken to ensure reliability of the results presented in this research report, the study is not without any limitations. The limitations however create scope for future in-depth studies to be performed in order to elevate our understanding into this research topic. The study focused on companies listed on the South African bourse, the Johannesburg Stock Exchange and did not extend to any other bourses. As part of the result analysis, no comparisons were performed against other emerging market countries. As a result, the outputs of this research may not be generalized to other countries.

5.5 Recommendations for future studies

As part of future studies into this topic, it would be interesting to assess whether the conclusions reached in this study hold true for other emerging market countries. In addition, further studies can assess whether the ESG reporting and institutional investor relationship holds true for other investment classes, for example fixed income investment instruments. Furthermore, it would be interesting to assess whether this relationship varies with different types of investment strategies, for example, fundamental, quantitative, smart beta, passive and enhanced passive approach.

The study employed ESG data from the Thomson Reuters ASSET4 platform. Given that similar other companies also provide ESG data it would be interesting to test whether the results are consistent when using ESG data from other platforms, particularly whether there is a difference in terms of the strength of the ESG-long term investor relationship. This would further validate the robustness of the ESG reporting results taken from Thomson Reuters ASSET4 and may give an indication of whether these results hold for other ESG data platforms. Furthermore, given that the overall ESG score were used as the independent for the regressions, further studies may need to assess which of the three environment, social and governance factors has a greater influence in terms of institutional shareholdings and whether these factors differ between sectors of the JSE.

Another suggestion for future studies is to incorporate additional variables in order to perform the factor and cluster analysis and not only limit this method to variables which have already been tested in earlier studies. In addition, a number of other regression variables can be explored in order to assess the correlations which these variables may have on the ESG-long term investor relationship.

5.6 Conclusion of the study

The study has successfully applied literature and statistical analysis tools to achieve its objectives of assessing whether ESG factors are being incorporated by institutional investors into their investment decision making processes to result in shares in JSE listed companies being held into the long term. Furthermore, the study has also provided a view of whether the ESG - institutional investor relationship varies across different sectors of the JSE.

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Appendix A: ESG Criteria

Score	Definition
Resource Use Score	The Resource Use Score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.
Emissions Score	The Emission Reduction Score measures a company's commitment and effectiveness towards reducing environmental emission in the production and operational processes.
Innovation Score	The Innovation Score reflects a company's capacity to reduce the environmental costs and burdens for its customers, and thereby creating new market opportunities through new environmental technologies and processes or eco-designed products.
Workforce Score	The Workforce Score measures a company's effectiveness towards job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce.
Human Rights Score	The Human rights category score measures a company's effectiveness towards respecting the fundamental human rights conventions.
Community Score	The Community Score measures the company's commitment towards being a good citizen, protecting public health and respecting business ethics.
Product Responsibility Score	The Product Responsibility Score reflects a company's capacity to produce quality goods and services integrating the customer's health and safety, integrity and data privacy.
Management Score	The Management Score measures a company's commitment and effectiveness towards following best practice corporate governance principles.
Shareholders Score	The Shareholders Score measures a company's effectiveness towards equal treatment of shareholders and the use of anti-takeover devices.
CSR Strategy Score	The CSR Strategy Score reflects a company's practices to communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes.

Source: Thomson Reuters ESG Scores

Appendix B: Sample of companies selected and ESG scores

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
1	ACL	ARCELORMITTAL SOUTH AFRICA LTD	Basic Materials	58.47	67.90	64.33	59.52	77.80
2	ADH	ADVTECH LIMITED	Consumer Services	31.93	35.22	38.03	40.74	46.25
3	ADR	ADCORP HOLDINGS LIMITED	Industrials	47.95	44.63	43.35	38.70	48.45
4	AEG	AVENG LIMITED	Industrials	62.17	50.61	51.16	50.77	58.02
5	AEL	ALLIED ELECTRONICS CORPORATION LTD	Technology	56.97	62.33	57.76	61.17	62.59
6	AFE	AECI LIMITED	Basic Materials	52.78	58.13	54.18	57.62	58.27
7	AFX	AFRICAN OXYGEN LIMITED	Basic Materials	66.00	58.74	67.42	64.67	47.36
8	AIP	ADCOCK INGRAM HOLDINGS LIMITED	Health Care	38.29	41.70	39.81	49.01	43.10
9	AMS	ANGLO AMERICAN PLATINUM LIMITED	Basic Materials	83.33	78.23	80.56	77.22	75.91
10	ANG	ANGLOGOLD ASHANTI LIMITED	Basic Materials	77.93	71.60	68.55	72.43	84.00
11	APN	ASPEN PHARMACARE HOLDINGS LIMITED	Health Care	58.40	59.04	55.57	57.30	52.25
12	ARI	AFRICAN RAINBOW MINERALS LIMITED	Basic Materials	58.97	67.17	68.12	65.48	71.72
13	ARL	ASTRAL FOODS LIMITED	Consumer Goods	49.97	50.57	52.41	47.03	43.36
14	ASR	ASSORE LIMITED	Basic Materials	30.64	32.30	36.00	27.53	30.58

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
15	AVI	AVI LIMITED	Consumer Goods	65.52	66.55	65.89	69.18	65.69
16	AVV	ALVIVA HOLDINGS LIMITED	Technology	33.65	36.23	28.11	34.50	35.08
17	BAW	BARLOWORLD LIMITED	Industrials	77.91	82.93	76.09	74.20	70.62
18	BEL	BELL EQUIPMENT LIMITED	Industrials	44.77	44.00	35.96	37.08	29.25
19	BGA	BARCLAYS AFRICA GROUP LIMITED	Financials	74.85	72.58	58.09	60.13	68.59
20	BRT	BRIMSTONE INVESTMENT CORP LTD	Financials	40.82	42.71	39.97	47.08	45.31
21	BSR	BASIL READ HOLDINGS LIMITED	Industrials	30.34	39.07	34.05	22.81	27.08
22	BVT	THE BIDVEST GROUP LIMITED	Industrials	57.81	51.05	53.61	58.96	63.23
23	CLH	CITY LODGE HOTELS LIMITED	Consumer Services	53.19	54.10	56.16	54.25	54.05
24	CLR	CLOVER INDUSTRIES LIMITED	Consumer Goods	41.86	39.13	39.83	41.84	44.18
25	CLS	CLICKS GROUP LIMITED	Consumer Services	65.32	64.42	63.55	48.35	47.34
26	CML	CORONATION FUND MANAGERS LIMITED	Financials	61.17	61.02	59.11	46.00	42.28
27	CPI	CAPITEC BANK HOLDINGS LIMITED	Financials	12.95	57.22	39.38	52.31	55.19
28	CSB	CASHBUILD LIMITED	Consumer Services	57.96	59.41	51.21	43.76	45.77

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
29	DAW	DISTRIBUTION AND WAREHOUSING NETWORK LIMITED	Industrials	68.07	62.14	68.83	62.86	52.89
30	DRD	DRDGOLD LIMITED	Basic Materials	64.55	57.08	63.87	54.55	56.19
31	DSY	DISCOVERY LTD	Financials	48.41	52.37	48.54	51.87	44.91
32	DTC	DATATEC LIMITED	Technology	66.33	65.68	64.44	62.05	60.90
33	EMI	EMIRA PROPERTY FUND LIMITED	Financials	35.49	36.77	34.83	36.62	37.90
34	EOH	EOH HOLDINGS LIMITED	Technology	58.65	51.02	52.94	52.91	48.88
35	EXG	EXTRACT GROUP LIMITED	Industrials	52.04	50.78	44.77	50.65	45.25
36	EXX	EXXARO RESOURCES LIMITED	Basic Materials	62.17	64.84	60.95	63.98	66.61
37	FBR	FAMOUS BRANDS LIMITED	Consumer Services	42.80	43.75	32.31	32.49	31.34
38	FSR	FIRSTRAND LIMITED	Financials	52.57	49.93	63.32	69.96	64.97
39	GFI	GOLD FIELDS LIMITED	Basic Materials	69.23	72.03	69.97	73.87	62.33
40	GND	GRINDROD LIMITED	Industrials	50.23	43.98	44.66	51.75	57.37
41	GPL	GRAND PARADE INVESTMENTS LIMITED	Financials	35.99	36.75	41.19	37.79	32.04
42	GRT	GROWTHPOINT PROPERTIES LIMITED	Financials	68.76	68.28	69.89	60.35	71.62
43	HAR	HARMONY GOLD MINING COMPANY LTD	Basic Materials	67.20	71.06	64.94	67.96	65.76

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
44	HCI	HOSKEN CONSOLIDATED INVESTMENTS LTD	Financials	46.72	50.20	46.22	53.43	46.20
45	HDC	HUDACO INDUSTRIES LIMITED	Industrials	62.82	64.09	41.24	39.14	46.35
46	HLM	HULAMIN LIMITED	Basic Materials	61.38	55.92	54.83	53.08	47.67
47	HPB	HOSPITALITY PROPERTY FUND LIMITED	Financials	47.13	53.32	48.14	45.26	43.67
48	HYP	HYPROP INVESTMENTS LIMITED	Financials	59.55	56.86	52.58	48.54	50.74
49	IMP	IMPALA PLATINUM HOLDINGS LIMITED	Basic Materials	76.65	74.52	74.27	78.38	79.01
50	INL	INVESTEC LIMITED	Financials	85.03	84.17	83.37	73.49	72.70
51	IPL	IMPERIAL HOLDINGS LIMITED	Industrials	65.47	55.02	60.89	60.71	61.53
52	IVT	INVICTA HOLDINGS LIMITED	Industrials	18.69	16.85	16.69	19.57	17.34
53	JSE	JSE LTD	Financials	60.95	56.50	56.61	61.50	59.91
54	KAP	KAP INDUSTRIAL HOLDINGS LIMITED	Industrials	44.77	47.73	43.97	42.67	45.05
55	KIO	KUMBA IRON ORE LIMITED	Basic Materials	81.16	84.67	85.54	87.18	86.16
56	LBH	LIBERTY HOLDINGS LTD	Financials	60.54	54.68	55.49	50.04	62.28
57	LEW	LEWIS GROUP LIMITED	Consumer Services	49.63	48.39	52.83	46.18	42.84
58	LHC	LIFE HEALTHCARE GROUP HOLDINGS LTD	Health Care	82.56	77.73	62.32	62.61	64.06

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
59	MND	MONDI LTD.	Basic Materials	81.33	81.95	76.63	80.92	73.44
60	MPT	MPACT LIMITED	Industrials	67.28	63.80	66.46	55.83	57.43
61	MRF	MERAFE RESOURCES LIMITED	Basic Materials	55.52	64.56	56.46	70.42	74.71
62	MRP	MR PRICE GROUP LIMITED	Consumer Services	53.22	47.88	49.70	50.15	49.09
63	MSM	MASSMART HOLDINGS LIMITED	Consumer Services	65.52	67.74	64.56	62.41	62.15
64	MTA	METAIR INVESTMENTS LIMITED	Consumer Goods	47.29	34.07	32.77	38.86	36.59
65	MTN	MTN GROUP LIMITED	Telecommunications	60.31	58.64	69.80	71.15	71.46
66	MUR	MURRAY & ROBERTS HOLDINGS LIMITED	Industrials	61.98	65.21	59.30	47.08	54.58
67	NED	NEDBANK GROUP LIMITED	Financials	83.26	85.39	83.88	84.63	85.93
68	NHM	NORTHAM PLATINUM LIMITED	Basic Materials	64.91	63.78	55.10	66.92	68.71
69	NPK	NAMPAK LIMITED	Industrials	62.12	59.21	65.12	60.81	64.06
70	NPN	NASPERS LIMITED	Consumer Services	48.39	42.99	50.70	45.72	45.03
71	NTC	NETCARE LIMITED	Health Care	77.44	78.51	71.03	69.48	67.75

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
72	OCE	OCEANA GROUP LIMITED	Consumer Goods	64.49	67.15	68.01	63.94	61.68
73	OCT	OCTODEC INVESTMENTS LTD	Financials	43.40	42.53	45.36	36.29	36.55
74	OMN	OMNIA HOLDINGS LIMITED	Basic Materials	71.04	68.72	58.92	56.15	59.14
75	PFG	PIONEER FOOD GROUP LIMITED	Consumer Goods	48.32	38.78	38.19	42.29	41.52
76	PGR	PEREGRINE HOLDINGS LIMITED	Financials	55.76	52.01	50.12	45.84	48.24
77	PIK	PICK N PAY STORES LIMITED	Consumer Services	60.99	64.98	56.00	52.53	56.90
78	PPC	PPC LIMITED	Industrials	40.14	52.83	54.58	51.24	47.91
79	PSG	PSG GROUP LIMITED	Financials	30.86	23.89	19.69	19.54	15.60
80	RBP	ROYAL BAFOKENG PLATINUM LIMITED	Basic Materials	69.37	61.05	64.92	71.71	71.87
81	RBX	RAUBEX GROUP LIMITED	Industrials	43.29	28.72	21.09	27.23	29.19
82	RCL	RCL FOODS LIMITED	Consumer Goods	53.75	53.90	51.90	49.50	43.94
83	RDF	REDEFINE PROPERTIES LIMITED	Financials	55.42	53.88	44.67	53.02	55.14
84	REB	REBOSIS PROPERTY FUND LIMITED	Financials	36.87	38.54	36.90	34.16	30.32
85	REM	REMGRO LIMITED	Industrials	36.96	39.07	40.16	27.20	33.52
86	RES	RESILIENT REIT LIMITED	Financials	38.51	31.42	34.95	23.85	25.32
87	RLO	REUNERT LIMITED	Industrials	54.17	60.78	58.79	64.16	71.71
88	RMH	RMB HOLDINGS LIMITED	Financials	31.92	25.61	34.18	39.22	37.98

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
89	SAC	SA CORPORATE REAL ESTATE FUND	Financials	44.02	38.62	25.50	28.98	30.14
90	SAP	SAPPI LIMITED	Basic Materials	83.94	87.25	84.78	84.61	77.53
91	SBK	STANDARD BANK GROUP LIMITED	Financials	80.30	80.96	71.05	79.41	78.35
92	SHP	SHOPRITE HOLDINGS LIMITED	Consumer Services	37.32	41.07	35.24	44.62	44.22
93	SLM	SANLAM LTD	Financials	63.43	56.76	57.13	65.72	62.59
94	SNT	SANTAM LTD	Financials	78.85	66.41	63.49	63.33	67.31
95	SOL	SASOL LIMITED	Basic Materials	73.52	73.90	69.17	76.24	75.74
96	SPG	SUPER GROUP LIMITED	Industrials	45.97	46.10	36.99	40.43	42.74
97	SPP	THE SPAR GROUP LIMITED	Consumer Services	64.06	58.38	61.98	45.94	46.29
98	SSK	STEFANUTTI STOCKS HOLDINGS LIMITED	Industrials	48.32	43.67	34.55	26.92	33.03
99	SUI	SUN INTERNATIONAL LIMITED	Consumer Services	70.84	68.89	62.21	60.31	58.89
100	SUR	SPUR CORPORATION LIMITED	Consumer Services	66.17	54.61	51.44	44.52	40.89
101	TBS	TIGER BRANDS LIMITED	Consumer Goods	60.13	53.53	54.47	45.71	42.97

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
102	TCP	TRANSACTION CAPITAL LIMITED	Financials	46.23	40.73	32.18	34.25	29.82
103	TFG	FOSCHINI GROUP LIMITED (THE)	Consumer Services	61.36	63.07	65.85	64.93	61.87
104	TKG	TELKOM SA SOC LIMITED	Telecommunications	64.12	60.83	60.88	60.30	57.56
105	TON	TONGAAT HULETT LIMITED	Consumer Goods	62.61	64.00	63.19	61.52	59.84
106	TRE	TRENCOR LIMITED	Industrials	18.42	31.02	27.20	27.56	30.70
107	TRU	TRUWORTHS INTERNATIONAL LIMITED	Consumer Services	60.06	62.45	62.74	63.47	61.69
108	UCP	UNICORN CAPITAL PARTNERS LIMITED	Basic Materials	38.12	46.84	56.44	62.89	63.27
109	VKE	VUKILE PROPERTY FUND LTD	Financials	50.33	34.96	40.90	41.70	39.38
110	VOD	VODACOM GROUP LTD	Telecommunications	67.37	70.11	65.95	66.15	64.87
111	WBO	WILSON BAYLY HOLMES - OVCON LIMITED	Industrials	39.77	40.96	50.20	52.67	49.49
112	WEZ	WESIZWE PLATINUM LIMITED	Basic Materials	47.79	40.50	38.30	39.13	43.70
113	WHL	WOOLWORTHS HOLDINGS LIMITED	Consumer Services	77.25	75.11	81.50	79.92	81.54

	JSE Code	Company Name	Industry Sector Classification	ESG Score 2016 (%)	ESG Score 2015 (%)	ESG Score 2014 (%)	ESG Score 2013 (%)	ESG Score 2012 (%)
114	ZED	ZEDER INVESTMENTS LIMITED	Financials	19.03	16.57	15.63	15.67	14.12