EFFECT OF BOARD CHARACTERISTICS ON THE SUSTAINABILITY PERFORMANCE OF SELECTED JSE LISTED COMPANIES IN SOUTH AFRICA

by

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DEDICATION

I dedicate this dissertation to my father Mr SF Nakeng, my brother Mr PV Nakeng and my late mother Mrs LV Nakeng.

DECLARATION

I declare that "**Effect of board characteristics on the sustainability performance of selected JSE listed companies in South Africa**" is my own work and all sources that were used or quoted have been indicated and acknowledged by complete references and this work has not been submitted before in any other institution.

Full names …… Date ……

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SUMMARY

This study examines the effect of board characteristics on environmental and social sustainability performance. Companies' sustainability performance is affected by many factors such as board composition of companies, lack of knowledge, policies and resources of companies, competition from other companies and market trends. The King IV Code of Corporate Governance recommends that the governing body should comprise a balance of diversity being race and gender and independence. Moreover, the Code states that the board of directors of companies should have a balance of both independent members and non-independent members who should act in the best interest of the companies. The study used a quantitative approach, and secondary data from Johannesburg Stock Exchange (JSE), Socially Responsible Index (SRI) listed banking and retail companies for 11 years from 2007-2017. The study tests the relationship between board characteristics (the number of females on board of directors); firm size (market capitalisation); board independence; and environmental (energy usage) and social (skills development expenditure) sustainability of JSE SRI listed firms. Results show that there is a negative and insignificant relationship between females on board and energy usage. A positive and a significant relationship between energy usage and board independence a positive and an insignificant relationship between firm size (market capitalisation) and energy usage. There is also a positive but an insignificant relationship between skills development expenditure and female board members and a positive and significant relationship between skills development expenditure and board independence and a positive and an insignificant relationship between skills development and firm size (market capitalisation). The study suggests that for companies improve their sustainable business practices; they should consider increasing the number of

females on their board since they have a positive influence on sustainability performance.

Keywords: corporate governance; environmental sustainability performance; social sustainability performance; energy usage; skills development expenditure.

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CHAPTER ONE: GENERAL INTRODUCTION

1 INTRODUCTION

There can be several factors, which affects the sustainability performance of companies, and companies need to notice the influences of their operations on their sustainability (Shao, Taisch & Mier, 2017). However, the involvement of the board of directors is what helps the sustainability of the companies to improve each financial year (Castro, Galán & Casanueva, 2016). It has been found that management, which is sustainable in either large companies or small companies, can maintain its company through operating projects and activities of the companies (Arnold, 2015). The gender balance of the board of directors or the top management supports the performance of the companies and to balance gender in the board of directors (McGuinness, Vieito & Wang, 2017). The board of directors should comprise a balanced diversity of both genders as most companies' lack females on in their board of directors to have a going concern also the balance of board independence (Nadeem, Zaman & Saleem, 2017). The composition of the board of directors can involve different individuals by age, race and gender but they all contribute differently to the sustainability performance of their firms (Zhang, Zhu & Ding, 2013).

Sustainability and gender have been a notable issue in the corporate world, and this can be on how do both males and females give their impact on the sustainability of companies. The balance of power of both females and males on the board of directors perform efficiently in their companies cannot be ignored (Meinzen-Dick, Kovarik & Quisumbing, 2014). It is the board of directors who are responsible for operations of the companies. Also, companies' performance can be measured by its board of

directors with the independent directors monitoring board's operations and decisions (Fuente, García-Sánchez & Lozano, 2017).

Environmental sustainability is usually affected by many components such as how a company facilitates its operations and how the operations are conducted and not necessarily by the board diversity. However, the issue of not having enough females on board is the one that is often not mentioned as a component that affects companies' sustainability performance (Bateman, Blanco & Sheffi, 2017). Environmental sustainability relates to different facets such as recycling, reusing and others features that can be measured through their usage or through investments that can be linked to its environmental sustainability (Meng, Lou, Peng & Prybutok, 2017). There are insinuations that female board members sometimes influence decision-making relating to companies' sustainability performances (Leiber, Peck & Beaudry-Cyr, 2016). As more female members join the board of companies, it tends to increase the values of the board (Brunzell & Liljeblom, 2014). As such, companies need to implement their management practices to facilitate the execution of more sustainability projects which enhances company's sustainability performance (Gadenne, Mia, Sands, Winata & Hooi, 2012). Hence, this study seeks to examine whether corporate sustainability performance is enhanced by having more female members on companies' boards.

1.1 Research problem

In recent times, corporate sustainability performance has been amplified due to the impact of companies' activities on both society and environment. The challenge of focusing exclusively on financial returns by companies' management while striving to be socially and environmentally responsible is daunting. Moreover, the characteristics

of those entrusted with corporate governance is crucial to achieving a balance between satisfying the craving for a higher return to shareholders and meeting the needs of the different stakeholders. As such, it is expedient to examine how the different characteristics of the board of directors can influence improved sustainability performance. According to Meinzen-Dick *et al*. (2014) it has been found that it is not gender that affects the sustainability performances of companies however both corporeal and incorporeal does affect the sustainability performances of companies. However, gender has more effect on the environmental sustainability based on an empirical test which was performed, and it reveals that gender is significant (Kassinis, Panayiotou Dimou & Katsifaraki, 2016). Rae, Sands and Gadenne (2015) found that human capital can boost the environmental performance of companies as they work hard towards improving their sustainability. Companies' strategy can be changed or transformed to be able to better the performance of both environmental and social performance of companies (Ezzi & Jarboui, 2016). According to Bukair and Rahman (2015), the performance of banking industries is not influenced by the gender or race of the board of directors but by the chief executive officer's (CEO) age and the CEO's duality which has a positive impact on the performance of most companies. Most banking and retail companies do not really have much to do with projects involving the energy efficiency as they do not spend much on it (Clancy, Curtis & O'Gallachóir, 2017). In the banking industry, the projects they engage in is to enhance their social performances to promote their social agenda as required by regulations and are not done voluntarily (Tantawi & Youssef, 2012). Other studies have shown that companies with large number of members on the board of directors perform better in terms of their environmental sustainability performance (Kassinis *et al*., 2016).

The divisions and operating structures in companies that affect the sustainability performances according to how they are operated (Keeble, Topiol & Berkeley, 2003). It is the projects which the companies engage in which affects the sustainability performance of the companies (Searcy, Karapetrovic & McCartney 2005). Preston and McLafferty (2016) using the regression analysis, found that most companies' board of directors do not have equality of the race however in the lower management which reports to the main board of directors' race equality is maintained. According to Altonji and Blank (1999), there are amendments which were implemented to the companies' policies regarding the equity of both race and gender to avoid discrimination and unfair treatments of both upper-level management and lower level management this was done through a regression model on several companies. A survey by Vick and Fontanella (2017) reveal that educational qualifications affect the sustainability performance of the companies regardless of gender and race and this was done by a survey of a period of five years and Wald tests have been used for this study

The study of Wilson, Arokiam, Belaidi and Ladbrook (2016) mentioned that energy usage is affected by ways in which companies which utilise or manage their energy by their allocation to department regardless of the firm size. According to Hopenhayn (2016), firm size of companies is influenced by the developments which are implemented by companies whether environmental or not. The study of Ortas, Álvarez and Zubeltzu (2017) suggests that board independence of the board of directors of companies affect the environmental and social performance of companies through environmental prevention and community well-being. Naseem, Xiaoming, Riaz and Rehman (2017) suggest that the board members who are independent on the board of directors play a significant role to the company's financial performance due to the neutralisation of power among the board of directors. When measuring sustainability

both the social and environmental aspects are considered to affect the financial growth of firms in the long-term as it helps improve sustainability performance (Jang, Zheng & Bosselman, 2017). In contrast, Evangelista, Colicchia and Creazza, (2017) focused on environmental sustainability in the logistics industry and suggests that board of directors should embrace environmental sustainability for the sake of economic benefits to sustainability performance. The size of companies as well as the growth of companies affects the cost of capital of companies and not the sustainability performance of companies (Al-Dhamari, Ismail & Izah, 2014).

However, little studies have been carried out on the board characteristics (number of females on board, board independence and firm size) on the sustainability performance (skills development expenditure and energy usage) of selected companies in the SRI. Hence, this research will contribute to the existing studies by attempting to bridge the gap in this area by analysing the board characteristics on the sustainability performances, of selected companies in the SRI and it will focus on environmental sustainability on energy usage.

1.2 Aim

This study aims to determine whether board characteristics influence environmental and social sustainability performance among JSE SRI banking and retail companies.

1.2.1 Research objectives

The following are the research objectives considered for this study;

- To determine the relationship between the number of female members on board of directors and environmental sustainability performance (energy usage) among JSE SRI banking and retail companies.
- To determine the relationship between firm size (market capitalisation) and environmental sustainability performance (energy usage) among JSE SRI banking and retail companies.
- To determine the relationship between independence of the board and environmental sustainability performance (energy usage) among JSE SRI banking and retail companies.
- To determine the relationship between the number of female members on board of directors and social sustainability performance (skills development expenditure) among JSE SRI banking and retail companies.
- To determine the relationship between independence of the board and social sustainability performance (skills development expenditure) among JSE SRI banking and retail companies.
- To determine the relationship between firm size (market capitalisation) and social sustainability performance (skills development) in selected banking and retail companies listed on the JSE SRI companies.

The above research objectives will assist determine the effect of board characteristics and environmental and social sustainability performance. The research hypotheses are stated in the next section.

1.2.2 Research hypotheses

The following are the research hypotheses considered for these study;

$H_{1:}$ There is no relationship between the number of female members on board and environmental sustainability (energy usage) among JSE SRI banking and retail companies.

$H_{2:}$ There is no relationship between firm size (market capitalisation) and environmental sustainability performance (energy usage) among JSE SRI banking and retail companies.

$H_{3:}$ There is no relationship between independence of the board and environmental sustainability performance (energy usage) among JSE SRI banking and retail companies.

$H_{4:}$ There is no relationship between the number of female on board and social sustainability performance (skills development expenditure) among JSE SRI banking and retail companies.

$H_{5:}$ There is no relationship between independence of the board and social sustainability performance (skills development expenditure) among JSE SRI banking and retail companies.

$H_{6:}$ There is no relationship between firm size (market capitalisation) and social sustainability performance (skills development) among JSE SRI banking and retail companies.

The above research hypotheses will be used to identify the relationship between board characteristics and environmental and social sustainability performance. The next section discusses the research methodology.

1.3 Research methodology

The correlation research design was adopted to address the research problem raised in this study. The study made use of the quantitative method to respond to the research hypotheses. The panel data analysis was used in this study to respond to the research hypotheses quantitatively. The population of this study is the banking and retail companies listed on the JSE SRI with a sample of 28 companies. The companies sampled were based on their characters.

The data of the companies was collected from the integrated annual reports and through IRESS database for 11 years (2007-2017). The data is believed to be reliable and valid because it is available to the public from the companies' websites and that the integrated annual reports are audited before publication, and the JSE information complies with governed frameworks.

1.4 Limitation of the study

The study is limited to a sample of 28 of banking and retail companies listed on the JSE SRI in South Africa. However, this study does not include those banking and retail companies that were not part of the JSE SRI listed companies operating in South Africa to arrive at the generalisation of the result. The study used the quantitative approach and the multiple linear regression to the data collected from a sample of 28 companies for 11 years. Other researchers can find different results by using different a mixed method approach and other variables that are not used in this study.

1.4 Significance of the study

The significance of the study is discussed in the following four ways:

1.4.1 Academia

This study examines the relationship between corporate governance structure and sustainability performance in the South African context. This study could add to the existing literature on corporate governance structure and sustainability performance. This study did not use all corporate structure variables and all sustainability performance variables, so it opens room for future studies to research in its area.

1.4.2 Industry

The results from this study encourage companies to pay more attention to their corporate governance structure to ensure compliance with King IV and sustainability performance activities to ensure whether the approach and monitoring used for sustainability performance are beneficial to the companies.

1.4.3 Society

The society will benefit from this study by understanding the corporate governance structure discussed in this study and the way in which it will boost the environmental and social performance of companies which means the society will understand the impact of corporate governance structure on sustainability performance.

1.5 Definition of terms

Corporate governance: is a technique or practice of rules by which the company is controlled (Institute of Directors in Southern Africa, 2016).

Corporate governance structure: is the principles of responsibilities among different stakeholders in companies and it includes a set of rules for decision making (Abdullah, Ismail & Nachum, 2016).

Energy usage: it is the amount of energy consumed (Cho, 2016).

Skills development expenditure: it is the amount of money spent on skills development Cansoy (2017).

Return on assets: it represents the ratio of how the profit of companies are earned through its usage of total assets (Harjoto, Laksmana & Lee, 2015).

1.6 Structure of the study

The study is outlined as follow:

Chapter One

This chapter introduced the study by how the researcher conducted the study. It started with an introduction to the background of the research problem which led to the research statement the aim of the study together with the research hypotheses, and research objectives were discussed in this chapter. It focused on the significance of the study and the structure of the study.

Chapter Two

This chapter comprises of the literature review for this study where the theoretical framework was discussed by three theories namely agency theory, legitimacy theory and the stakeholder theory. Followed by the legislative pronouncements and King IV

which is followed by subtopics which analyse the corporate structure and sustainability performance.

Chapter Three

This chapter consists of the appropriateness of research method and research design, data collection method and the data analysis.

Chapter Four

This chapter addressed the discussion, presentation and interpretation of the findings of the study.

Chapter Five

This chapter presents the summary, recommendation and conclusions of this study.

1.7 Summary of the chapter

This chapter outlined the background of the study, research hypotheses and objectives and research methodology. It further provides the limitation and significant of the study, the definition of terms and the structure of the study. The next chapter will outline the literature review of the study.

CHAPTER TWO: LITERATURE REVIEW

2. Introduction

Chapter One provided the overall background to the study and identified the research gap. This chapter reviews existing literature which was determined by the researcher. The chapter provided an overview of the theoretical framework, legislative pronouncements, the King IV Code of Corporate Governance and identified related literature. In Section 2.1, the theoretical framework (stakeholder, legitimacy and agency theories) were discussed; Section 2.2 legislative pronouncements on gender and labour were discussed; Section 2.3 King IV Code of Corporate Governance was discussed, and the reviewed literature was discussed and lastly the summary of the chapter is presented.

2.1 Theoretical framework

This section discusses relevant theories related to this study.

2.1.1 Stakeholder theory

The stakeholder theory can be defined as the theory, which is suitable to be used in sustainability studies (Rivera, Muñoz & Moneva, 2017). Stakeholders are identified as a group of people who can affect companies' decisions and performances (Hummel & Schlick, 2016). In their study, Hummel and Schlick (2016) found a negative relationship between sustainability performance and the type of sustainability projects undertaken by the board of directors.

According to Hummel and Schlick (2016), stakeholders are categorised into shareholders, customers, suppliers and the communities. Ortas *et al*. (2017) suggest

that the stakeholder theory encourages the board of directors to appoint an independent board of directors because they give companies opportunity to explore other strategical policies which enables them to meet customers and other stakeholders' needs. The board of directors should through their activities meet the needs of their surrounding communities through charitable and skills development projects (Yakovleva, 2017). Also, shareholders should encourage the board of directors to implement community projects to improve their sustainability performance (Green & Homroy, 2015). Female board members should get more involved with social sustainability projects as they find it easier to reach out to the communities and customers to improve company's sustainability performance (Alazzani, Hassanein & Aljanadi, 2017). The board of directors are well positioned to set yearly company goals by including sustainable values to improve the company's overall performance (Al-Shaer & Zaman, 2016). Moreover, shareholders as stakeholders may affect a company's sustainability performance depending on how they set up their corporate strategy to improve annual sustainability performances (Mahadeo, Oogarah-Hanuman & Soobaroyen, 2011). Establishing a good relationship with stakeholders would help improve company's performance (Ranängen, 2017). As such, the stakeholder theory suggests that companies can achieve better relationships with its stakeholders through their environmental projects (Arayssi, Dah & Jizi, 2016). Consequently, to have a positive engagement with stakeholders, companies should follow the guidelines for avoiding disputes to avoid ruining the reputation of the company (Ranängen, 2017). Furthermore, the stakeholder theory argues that the appointment of an independent board of directors will assist companies' sustainability performance as they are more sensitive to the needs and expectations of the diverse stakeholders through the effective monitoring of social cohesion (Ortas *et al*., 2017). Hence,

regarding issues of the sustainability performance of companies, the board of directors need to consider the interests of the stakeholders to improve performances of companies (Ranängen, 2017). The board of directors need to set that ethical behaviour that translates the company's mission, vision and strategy to achieve its social and environmental agenda (Hafsi & Turgut, 2013). This is necessary because the stakeholders are the most affected by the decisions of the company (de Gooyert, Rouwette, van Kranenburg & Freeman, 2017).

It is difficult to agree on decisions about sustainability initiatives with most of independent board members because of conflict of interest and preferences (Liao, Luo & Tang, 2015). Also, the stakeholder theory affirms that companies are social institutions which have a fiduciary duty to its stakeholders including taking care of the environment (Tauringana, Radicic, Kirkpatrick & Konadu, 2017). As such, board members regardless of whether they are independent or not have a duty to make decisions on energy usage plans which are beneficial to the firm either with much firm size or not and other stakeholders who will be consistent for the improvement of environmental performance (Liao *et al*., 2015). It is plausible that by recognising, acknowledging and harnessing the board independence and gender diversities within the board, companies will be able to meet the diverse needs of its stakeholders.

The above section discussed the stakeholder theory and the following section is the discussion of the legitimacy theory.

2.1.2 Legitimacy theory

The legitimacy theory is an assumption that a company's actions are socially desirable based societal values (Suchman, 1995: 574). Hummel and Schlick (2016) suggest

that the legitimacy theory can be applied by companies to be conducting their activities sustainably. As such, companies seeking to legitimise their operations need to have an understanding board of directors who have the desire to harmonise the different needs of the different stakeholders (Deegan, 2014). Moreover, the board of directors should be prepared to deal with any threats of legitimacy by developing strategies to ensure that the company's operations are performed sustainably especially by given prominent roles to women members (Fernando & Lawrence, 2014). If a company's legitimacy threatens any of its stakeholders, its sustainability performance may be at risk, hence, the board need to quickly resolve the issue to avoid an adverse effect on its financial performance (Deegan, 2014; Hummel & Schlick, 2016).

The expectations of the customer as stakeholders should be met satisfactorily as this will help improve its expectation within the larger society (Fernando & Lawrence, 2014). Indeed, it is possible for the company to legitimise itself through sustainability projects that meet the needs of its stakeholders and avoid reputation risk (Hummel & Schlick, 2016). In giving due recognition to the issue of the increasing number of females in board composition, the expectations of the communities can be met as they exhibit different cultural values which help members to pick up stakeholders' expectations instantly (Fernando & Lawrence, 2014).

In maintaining its legitimacy, companies can continue to improve its sustainability performances and gain more community support (Mahadeo *et al*., 2011). In this regard, Rezaee (2016) believes that by seeking legitimacy a company can improve its processes to engage in activities which will boost its sustainability performance. Improved environmental sustainability performance can be boosted by how the

company's environmental vision, strategy and responsibilities are effectively managed during execution of projects (Hummel & Schlick, 2016).

The board of directors of companies need to implement projects which will maximise the company's sustainability performance thereby enhancing its legitimacy (Hummel & Schlick, 2016). Environmental projects and community engagements activities such as skills development and disclosure of sustainability improves companies' legitimacy and sustainability performance (Fernando & Lawrence, 2014). In most companies the independent board of directors' claims that the actions towards duties and responsibilities do not have any effect on energy usage plans which negatively affect the environmental performance of companies (Liao *et al*., 2015). Moreover, by having more females in the board composition will help to boost the companies' legitimacy which will benefit both the company and other stakeholders (Zhang, 2012). Legitimacy theory suggests that companies that engage in social projects which involve the society make the board of directors or management of companies more focused on how those projects will assist the companies' social sustainability performance and reputation to the society by following societal norms (Waluyo, 2017). Therefore, a company need to engage in those activities which boosts its legitimacy, particularly about its sustainability performance.

The above section discussed the legitimacy theory and the next section is the discussion of the agency theory.

2.1.3 Agency theory

The agency theory involves the agent represented by the board of director and principal represented by the shareholder whereby the shareholder encourages the

board of director to act in their best interest (Bhuiyan & Hooks, 2016). The agency theory proposes that the board of directors of companies with an independent board of directors tend to be hard-working directors who protect their reputations (Zhang, 2012). Moreover, agency theory suggests that board of directors of companies' performance in the best interest of the companies and prevents the conflicts of interest that might arise (De Villiers, Naiker & Van Staden, 2011). The agency theory involves those concerns which the board of directors' encounter while performing their responsibilities in companies whereas the shareholders of companies expect them to act in the best interest of the companies (Zhang, 2012).

The disputes between the independent board of directors and the executive board of directors can create opportunities for others to be in positions where they get to benefit themselves and not the companies or shareholders interest (Bhuiyan & Hooks, 2016). The increasing number of females on boards increases the monitoring and strategic ways which resolve disputes among the board of directors (Arayssi *et al*., 2016). Such opportunities might be mitigated by strategies which might involve the strategies set for achieving the objectives of the environmental performance of companies which lacks integrity among the board of directors (Bhuiyan & Hooks, 2016). The agency theory suggests the disputes between the shareholders and board of directors as the corporate governance mechanisms which often reduces the asymmetric information between the board of directors and shareholders (Abad, Lucas-Pérez, Minguez-Vera & Yagüe, 2017).

Kılıç and Kuzey (2016) suggest that the board of directors of companies can fulfil their responsibilities of controlling and monitoring other departments of their companies when the sustainability objectives of companies are fulfilled. The agency theory

suggests that the board of directors are the internal control safeguards for the sake of the best interest of the companies (Zhang, 2012). Additionally, the agency theory suggests that having an almost equal board of directors and independent board of directors helps the sustainability performance of companies as they are efficient in monitoring the profits (Mori & Towo, 2017). The agency theory encourages both the board of directors and shareholders to try to have good relations which will help to maximise the shareholder's interest (Bhuiyan & Hooks, 2016). The agency theory helps the shareholders of companies to be able to know the link between firm size and gender distribution of board of directors whether the board operates effectively or not (Mori & Towo, 2017). The agency theory suggests that the board of directors and independent board of directors' diversity whether racial or gender or with expertise improves the monitoring roles of companies and boosts the sustainability performance of companies as they share different perspectives of decision making (Mori & Towo, 2017). The agency theory is applicable in this study because it is used to explain the relationship between the managers and the shareholders.

The above section discussed the agency theory and the next section is the discussion of legislative pronouncement on labour.

2.2 Legislative pronouncements on labour

The South African Constitution (South Africa 1996) supports the statutory laws, provides for the structure of organisations, and the bill of rights. The Constitution states that everyone is equal before the law and has the right to equal protection and benefit under the law. Equality includes the full enjoyment of all the rights and privileges. The constitution states that the 'State' shall not unfairly discriminate directly or indirectly against anyone on any ground including race, gender and sex. Furthermore, the

Constitution states that everyone has the right to choose their trade, occupation or profession freely and have a right to fair labour practices (Republic of South Africa, 1996). This study evaluates the level of board independence and number of females in companies and how it affects the sustainability performances of companies and whether equality is promoted in companies or it is ignored and how equality is managed in companies.

The Constitution mentioned above is relevant to the study as it motivates and encourages the South African public to respect each other and to treat each other fairly. However, for companies to embrace and imbibe the tenets of the Constitution, the Institute of Directors of Southern Africa through the King Code of Corporate Governance have prepared some guidelines to assist companies' management in complying with the requirement of the Constitution especially on gender and race in the workplace.

The section above discussed the legislative pronouncements, and the following section will discuss the King IV Code of Corporate Governance.

2.3 King IV Code of Corporate Governance

Corporate governance is a set of principles by which companies are managed. These principles promote effective and ethical leadership by the management of companies (Institute of Directors in Southern Africa, 2016). Under leadership by the corporate governing body which is the board of directors, the governing body should comprise of a balance of diversity being race and gender and independence (Institute of Directors in Southern Africa (IOD), 2016). Also, the board of directors should promote diversity of age, skills, gender and race, in all its operations and departments for

purposes of better decision-making and effective governance (Institute of Directors in Southern Africa, 2016). There should be a disclosure of age, skills, race, gender, qualifications of board composition in the integrated annual statements of companies (Institute of Directors in Southern Africa, 2016).

The board of directors of companies should have a balance of both independent members and non-independent members whom should act in the best interest of the companies (Institute of Directors in Southern Africa, 2016). The balance of both independent and non-independent board of directors helps the company fulfil its responsibilities and be efficient (Institute of Directors in Southern Africa, 2016). Most companies with most males in the board compositions try to involve females in the board compositions as it is a requirement to have gender diversity by principles of governance but fail to consider their opinions on decision-making situations (Abad *et al.,* 2017). Moreover, companies that have white chief executive officers and some minority board of directors promote the corporate governance which is how many companies complies with the corporate governance (Cook & Glass, 2015). Some companies fail to disclose the board compositions on race, age and gender which are required by corporate governance (Krawiec, Conley & Broome, 2014). The diversity in the board composition regarding gender and board independence shows compliance of corporate governance which improves the sustainability performance of companies for long-term success (Adams, 2015).

The board of directors of companies are assessed upon being elected by to know whether there will be any conflicts of interest before they are considered as independent members of the board (Institute of Directors in Southern Africa, 2016).

King IV gives guidance on how to apply certain principles to companies based on their sizes and resources in all industries when executing their activities (Institute of Directors in Southern Africa, 2016). The King IV stated that the board of directors are responsible for social and ethical committees are to oversee and report on ethics and sustainable development (Institute of Directors in Southern Africa, 2016). Additionally, the governing body should ensure that the evaluation of the entity's performance should help to improve sustainability performance. The board of directors need to manage the company's environmental and social commitment to show their sustainable responsibility.

The following section discusses the related literature on the number of females on board and environmental sustainability performance.

2.4 Number of females on board and environmental sustainability performance (energy usage)

In this study, the environmental performance of the companies is examined, and this can be done by measuring the energy usage as the element of environmental sustainability. When companies set policies for the ways of saving energy the board of directors tend to have differences according to their gender, where females take sides with females, and males take sides with males (Fraune, 2016). The females and males in the board of directors should have agreements of what to do when dealing with ways of energy usage regarding how the business they operate works and the building the where it is suited is and how it will affect the performance of the company (Sun & Hong, 2017). About environmental sustainability females on the board of directors of companies find it easier to make decisions of how to uplift the

environmental sustainability and are likely to add more value on such energy usage decisions (Liao *et al*., 2015).

Having a diverse board regarding gender where there are more females on board opens doors of networking and engagement with their different talents which improve the financial performance and environmental sustainability of companies (Ali, Ng & Kulik, 2014). However, Delfgaauw, Dur, Sol and Verbeke (2013) found that in a competitive situation in companies where there is a balance of females and males in the board composition, then the environmental sustainability performances of such companies get to improve yearly. Additionally, with the gender balance on the board composition of the companies, it is likely that they perform better than those companies with an imbalance board composition (McGuinness *et al*., 2017). Hence, having gender diversity in the board structure promotes corporate governance in companies which has a positive impact on the environmental performance of companies which attract more investors (Stuebs Jr & Sun, 2014).

Companies that have more gender diversity on the board are more involved in the sustainability performance of the companies (Hansen, Conroy, Toppinen, Bull, Kutnar & Panwar, 2016). The involvement of females on boards of many companies have a significant effect on the growth of environmental sustainability performance of companies (Kassinis *et al*., 2016). By using the regression model, Hansen *et al.* (2016) found that there is a weak relationship between sustainability performance and gender diversity. Females on boards enhance the companies' environmental sustainability performance through their communication mechanisms among other stakeholders and their participation on boards (Arayssi *et al*., 2016).

After applying regression model that there is no impact on the performance of the bank which makes the board of directors perform bad or good (Bukair & Rahman, 2015). Additionally, where the board of directors are diverse in banks, they tend to outperform others and impress the stakeholders (Ferri, Kalmi & Kerola, 2015). As such, customers' satisfaction is an aspect which dominates the banking industries sustainability performance and overall companies' performance (Bakar, Clemes & Bicknell, 2017). However, businesses such as the retail and banking industries do not use much energy compared to others (Clancy *et al*., 2017). Sustainability performance is vital to the stakeholders such as shareholders, as the board of directors to make better investment decision-making which will help to benefit the company's income (Rezaee, 2016). Yakovleva (2017) suggests that the company's board of directors should weigh or assess the companies' projects and performances in a technique which will be sustainable for the future companies.

Most companies are starting to opt for energy conservation as part of their environmental sustainability element as it improves their environmental performances which are mostly proposed by males rather than females as they prefer energy savings (Holley & Lecavalier, 2017). The benefits of energy usage plans include the cost saving incurred by companies and resources are not to be wasted, and females in the board of directors fail to assist with suggesting ways to save energy (Maistry & Annegarn, 2016). Females on board of directors prefer to use other alternatives that will save energy and boost the environmental performance of companies which sometimes have suggestions of using solar energy for lights (Ding, Wang, Chen, Xu & Li, 2014).

Some gender diverse board of directors believe that by disclosing the energy usage in the financial statements, it will help to have a way of consuming energy which will help improve the sustainability of companies (Orland, Ram, Lang, Houser, Kling & Coccia, 2014). Energy savings can be achieved through investment in renewable energy that are not harmful to the environment at large which most females in the board of directors of banking sectors prefer (Holley & Lecavalier, 2017). A few companies with a diverse gender in the board are starting to employ energy usage strategies for their companies which is cost-effective to financial performances of the companies and help the society (Pollard, 2016). There should be new ways of energy usage which should be explored as most companies use only specific methods rather than considering others which are brought up by male representatives rather than female representatives (Orland *et al*., 2014).

Energy usage can also be in other industries not only mining, but the building, retail, manufacturing and others as all companies consume energy and not many gender diverse boards of such companies find it beneficial for their environmental performance (Vincelas, Ghislain & Robert, 2017). Energy usage plans help to reduce the rate of heat which is transmitted to companies which helps with the reduction of consumption of energy and supported by many females on the boards as it improves the environmental performance of the companies (Nematchoua, Ricciardi, Reiter, & Yvon, 2017). Most gender diverse board of directors' debate that there should be strategic planning which helps the components to overcome their energy usage plans, and it will be helpful (Sanchis & Zuriaga, 2016). Companies with more females on boards perform better regarding financial performance and are collaborative towards environmental sustainability performance as they respond well to environmental issues (Kassinis *et al*., 2016).

Precautions should be taken on energy usage like pasting of posters to remind the employees of energy savings' guidelines. Moreover, female board members often emphasise on how efficient and expedient it is to reduce energy usage expenditure through energy savings (Azizi, Wilkinson & Fassman, 2015). When looking at the environmental sustainability of a gender diverse board of directors of companies should take advantage using energy consumption as a way of boosting their environmental performance status also by, willing to expand and do other projects which will help performances of the companies' sustainability (Pollard, 2016).

Energy usage reports by retail companies explain how the board of directors have utilised this element to conduct their projects and females in the boards prefer this to show their improvements (Coma, Pérez, de Gracia, Burés, Urrestarazu, & Cabeza, 2017). Additionally, a gender diverse companies such as the banking and retail companies regarding energy usage, the size of their companies' buildings matter for energy conservation (Clancy *et al*., 2017). Energy usage plans to females and males sometimes bring disputes as it is approached differently, and this affects the performance of companies as they do not have a consistent method to save energy (Tjørring, 2016). Companies with more females in the board of directors prefer to use policies implemented by companies in such instances when male board members make decisions based on the best interest of the companies (Al-Shaer & Zaman, 2016). In many companies' board of directors with a different gender composition regarding energy departments which should come up with alternatives of saving energy consumed by companies mostly males participate more on such other than females (Tjørring, 2016).

Females in the board of directors of companies tend to be more engaged in sustainability projects and working with other stakeholders to have a better perspective of energy usage and other environmental sustainability aspects (Al-Shaer & Zaman, 2016). Gender-diverse companies that have renewable energy systems they can be able to have energy savings through that and that will increase the level of the companies' environmental performance simultaneously increasing the sustainability performance of companies (Cucchiella, D'Adamo, Gastaldi, Koh & Rosa, 2017).

There is a positive influence of energy usage plans by gender of the board of directors with more females in the board representation, and it boosts the environmental performance of companies (Liao *et al*., 2015). Gender of the board of directors influences the environmental sustainability of companies as they have different views on energy usage and the decision making of which ones to use (Al-Shaer & Zaman, 2016). Hence companies should align their strategy to what the act of the energy department in South Africa implemented. Rao and Tilt (2016) assert that the presence of females on the board of directors tends to have a positive attitude towards the environmental performances of the company. Many members of the board in many companies have little knowledge on improving their environmental performances. However, that could be resolved by having diversity in board composition where both males and females need to be balanced (Jang *et al*., 2017). By allowing more females on boards of directors of companies allow the board of directors of companies to improve decision making towards sustainability projects (Kassinis *et al.*, 2016). There is increased recognition of the aspects of environmental sustainability which includes energy savings even though to other board of directors it is still complicated especially females (Holley & Lecavalier, 2017).

Most females on the board participate much better in decisions regarding environmental sustainability of the company; however, the males on the board hold the power cap, which means they have the final say in the decisions (Post, Rahman & McQuillen, 2015). Moreover, companies' ethics should guide the board of directors on how they approach the environmental issues, which affects the environmental performances of companies (Bhuiyan & Hooks, 2016). Most of them prefer the use of renewable energy alliances which has positive effects on female board members on the environmental performances of companies (Post *et al*., 2015). An enhanced environmental performance of companies could save costs for the companies which can increase turnovers and enhance the firm performance (Yu & Ramanathan, 2016).

There is an indication that the presence of female board members does not significantly improve the environmental sustainability of companies (Kyaw, Olugbode & Petracci, 2017). Female board members are fragile and prefer getting involved the social projects of the companies rather than the environmental projects of the company (McGuinness *et al*., 2017). Many boards of directors of companies are devising ways to govern their environmental sustainability aspects because female board members are disturbed by the risks involved while the male members are focused on growing their sustainability reputation (Holley & Lecavalier, 2017). The board of directors in line with company strategy need to devise a way of monitoring their environmental projects to improve their environmental performance (Blass, da Costa, de Lina & Borges, 2017). The females on board encourage other board members to obey the policies set by their companies which boost the environmental sustainability performance by not having environmental offences (Tauringana *et al*., 2017).

Blass *et al*. (2017) have suggested that managing directors of companies need to have information on the environmental issues they present to the board of directors to improve environmental performance. The board of directors are to make it obligatory for the company to disclose all aspects of its environmental sustainability in the annual financial statements for improved environmental performance reputation (Li, Zhao, Sun & Yin, 2017). Most females support the sustainability principles which are established by the company's board of directors, and that uplifts the performance of companies as they get things accomplished (Nadeem *et al*., 2017). There is a need to maintain the diversity of the board of directors of banks regarding race or gender which shall help to accomplish better performance (Ferri *et al*., 2015). The sustainability performance of companies can be enhanced by the way in which the organisation culture is maintained which accommodates the way in which the board of directors interact with the employees or stakeholders and how committed they are in doing their work (Sanda & Kuada, 2016). However, sustainability projects which companies engage in are highly likely to be linked to the companies' duties tend to increase both the environmental and social performances of companies (Husted & de Sousa-Filho, 2017). Board gender diversity on the board composition brings good benefits for the companies' performances as it increases the economic level and does not tamper with the values of the stakeholders (Gordini & Rancati, 2017). The existence of a highly diverse board structure regarding gender uplift the performance of companies by their level of creativity and innovation towards the decision making and problem-solving issues relating to the firm performance or sustainability of the company (Gordini & Rancati, 2017).

The following section discusses the firm size on environmental sustainability performance.

2.5 Firm size on environmental sustainability performance (energy usage)

Through community engagement, most large companies use opportunities to express diverse opinions based on their differences that will enhance company's environmental and social performance (Wehman, Chan, Ditchman & Kang, 2014; Wright, Wright, Diener, Rafferty & Sampson 2017). Firm size affects environmental performance of companies in such a way that the large companies tend to have more attention from the stakeholders compared to the small companies (Mensah, 2014). Some industries such as manufacturing and retail utilise energy more than others depending on their firm size whether it is big or small buildings (Cho, 2016).

The firm size of many companies such as the banking and retail companies consume more energy which is mostly by the building which it operates in, the bigger it is, the more energy is consumed (Safa, Safa, Allen, Shahi & Haas, 2017). The energy usage in most banking companies is mostly from how they work with technology daily and sizes of their firms and how much energy is needed to operate the appliances in companies (Cho, 2016). Most companies need to evaluate their firm sizes for energy usage strategies at the start of their yearly operations to improve environmental performance (Safa *et al*., 2017). With performance measurements, there should be a consideration of the firm size for the market power through which the board of directors are coming across and sometimes affects the environmental sustainability (Solakoglu & Demir, 2016).

The board of directors of most companies consider firm size when constructing their energy usage strategies which improve the environmental performance of companies and boost firm performance (Azizi *et al*., 2015). Energy usage of most commercial businesses can be improved when the board of directors of companies include

monitoring to their energy usage plans to boost environmental performance of companies (Safa *et al*., 2017). Companies consider firm size when strategising guidelines for energy usage in banking and retail companies by using friendly technology which does not consume much energy (Azizi *et al*., 2015). Some companies do not find the firm size to be influencing energy usage, but the monitoring guidelines which are used towards energy usage are the ones influencing it (Azizi *et al*., 2015).

The size of the firms contributes to energy usage due to what they acquire per annum to facilitate the operations of the companies and the amount of energy required by the facilities (Lera & Sornette, 2017). The size of the firms has no influence matter on energy usage of some companies. However, the sector or industry of the companies consumes energy according to their capacity of machines which are being operated and how energy is allocated to the companies' departments (Madhani, 2016). Most companies from different industries have ways for energy usage with their firm sizes. However, the companies' developments which sometimes occur during the year tend to change their energy consumption plans (Zawawi, Wahab & Al Mamun, 2017).

Regardless of the sizes of the companies, management should have a way to service the facilities which the companies use to enable them to have better energy usage strategies (Zawawi *et al*., 2017). When companies strategise about energy usage on large firms, they should consider the environmental performance of companies on how that will positively or negatively affect the company's performance (Lei, Tian, Huang & He, 2017). Notwithstanding its size, a company need to develop approaches to reduce the costs of energy usages for improved company's performance (Zawawi *et al*.,

2017). Most large firms tend to spend more energy due to their firm sizes while trying to improve their companies' performances (Lei *et al*., 2017).

The following section discusses the board independence on environmental sustainability performance.

2.6 Board independence on environmental sustainability performance (energy usage)

Board of directors are responsible for directing the companies' activities and are known for making decisions which are suitable for the company (Rao & Tilt, 2016). As such, most companies whose board are male-dominated are executive directors who are not independent but prefer to be involved in the environmental sustainability projects which the companies are involved in (Abad *et al.,* 2017). The independent board of directors of companies participate more on environmental sustainability projects such as the ones involving energy and climate changes (Dixon-Fowler, Ellstrand & Johnson, 2017). The board of directors including the independent board of directors should understand all aspects of economic, social and environmental sustainability to develop better efforts to improve its performances (Yakovleva, 2017).

Most companies that are performing better regarding environmental sustainability have females on the board compositions. However, these females tend to be independent as they want to satisfy the stakeholders (Post *et al*., 2015). In some companies, the independent board of directors are seemed not contribute much on sustainability issues of the companies (Vallascas, Mollah & Keasey, 2017). Companies that have the majority of the independent board of directors participate

more in the community, and environmental aspects of companies improve their social and environmental sustainability performance annually (Ortas *et al*.,2017).

Most retail and banking companies are likely to use more energy on electricity. Therefore, the involvement of the board of directors together with the independent board of directors tend to have ways to minimise energy usage (Safa *et al*., 2017). There has been a high number of independent board of directors in the banking industries which increases the performance of companies by their decision-making tools towards social, economic and environmental sustainability (Vallascas *et al*., 2017). The independent board of directors are effective in making decisions about the sustainability projects of the companies by providing ways and risks of energy usage tasks (Benkraiem, Hamrouni, Lakhal & Toumi, 2017). The board of directors of companies which includes the independent board of directors' work well together to strategise ways of energy usage methods that are beneficial to the companies' environmental performance (Liao *et al.,* 2015). Board members need to understand what the customers of the company are interested and channel their environmental projects to satisfy the diverse stakeholders (Mensah, 2014). The board members should consider having environmental programs to improve the companies' environmental performances and allow the independent board members to participate in decision making of environmental programs (Mensah, 2014).

The conduct of most independent members of the board can influence sustainability actions like energy usage savings (Vallascas *et al*., 2017). Some companies' attempt to have a balanced board with significant independent members because it would assist to satisfy their clients or customers' needs and reduce other concerns regarding their environmental sustainability performance (Harjoto *et al.,* 2015). To achieve a well

environmental performance companies should consider addressing the environmental concerns of that arise when faced with problems on planning and decision making and allow the independent board of directors to raise such concerns (Dixon-Fowler *et al*., 2017). The independent board of directors of companies should through their evaluation tactics manage environmental practices that companies engage in (De Villiers *et al*., 2011).

The following section discusses the related literature on the number of females on board and social sustainability performance.

2.7 Number of females on board on social sustainability performance (skills development expenditure)

Board of directors of many retail companies with majority females on board has enhanced the skills of individuals that participated in these skills development programs helping to improve the economic performance of the companies (Apunda, de Klerk & Ogina, 2017). Through the observations of the board of directors of companies' skills development can be promoted through racial, gender and age diversity to engage the services of talented and skilful employees to improve overall company's performance (Cansoy, 2017). The social performance of companies which is in the sustainability of most companies are influenced by the board of directors of companies which has board diversity regarding age and gender (Boulouta, 2013; Hafsi & Turgut, 2013; Zhang *et al*., 2013; Buse, Bernstein & Bilimoria, 2016). Most companies have a constant number of males and females on the board of directors, and if a male resigns from the board, it is replaced by a male same to female regardless of how the sustainability of the company is performing (Tinsley Wade, Main & O'Reilly, 2017). Additionally, having a few numbers of females on the board structure

can enhance the strategic views of the companies and the way in which issues involving social performances are handled (Zhang, 2012).

Moreover, the board of directors of companies need to have a contribution which will help the solid performances of companies (Green & Homroy, 2015). From using the correlation analysis based on selected Malaysian firms which are included in the Capital Market Development Fund-Bursa Research Scheme (CBRS), Alazzani *et al.* (2017) found that social performance is significantly associated with the presence of female directors. According to Mori and Towo (2017), in increasing the profits of banking companies, there should be a more diverse board of directors as this will help them over learning from each other's experiences, skills and knowledge. The presence of females on boards increase the companies', risk-taking on social sustainability performance projects and investments (Arayssi *et al.*, 2016). Most females on boards have a good educational background which allows them to be good risk takers upon the social sustainability projects of companies (Tauringana *et al*., 2017). Additionally, having large boards improves companies' performances as they get to interact with diverse people and they learn different techniques to tackle the problems faced by companies (Mori and Towo, 2017).

Ortas *et al*. (2017) suggest that the higher the number of independent board of directors the higher the social sustainability performance of companies. Female members on board are more cooperative and engage well in social sustainability projects as they find it easier to share information with other stakeholders (Kassinis *et al*., 2016). Fewer participation levels of females on boards influence the social performance of companies as their inputs are well established (Arayssi *et al.*, 2016).

There are policies, which should be formulated, and which should encourage increment of females on board of directors of companies to help with the performances and position of companies and its ability to be sustained (Al-Shaer & Zaman, 2016). As such, the board of directors with mixed gender and at least a higher number of females perform better, and their companies are profitable, and their returns are higher for the shareholders over some time (Khan & Vieito, 2013). Again, Tate and Yang (2015) observe that board composition of companies which has gender diversity and has a female as chief operation officer of such then those companies perform better. Alazzani *et al*. (2017) claim that the composition of the board of directors with most female members is more involved in social activities which enhance social performance rather than environmental activities thus lowering the environmental performance of companies. However, Boulouta (2013) found that female members of the board of directors of companies are more concerned about detected risks which are discovered on environmental projects that companies conduct because they are socially sensitive. Additionally, there has been a high number of increasing women representation on board of directors, this is being disclosed in their company reports, and the performances of such companies seem to be improving (Rao & Tilt, 2016).

The presence of females in the board committee of companies enhances the performance of the companies as they have been in much more competition levels to get into the board composition (Amore & Garofalo, 2016). A diversified board of directors regarding gender have an effective way of conducting their duties and increases the company's performance as well as the sustainability performance together with the competency of the company (Horak & Cui, 2017). Having most female members as the board of directors enhances the social sustainability performance of companies' as they adhere to the governance of companies and are

concerned about the level of performances in social projects of companies (Hafsi & Turgut, 2013).

The presence of females in the board composition helps to motivate the females who are in organisations of those companies to want to be part of the board directors (Ali *et al*., 2014). Females on the board compositions have different ways in which they handle issues, and the difference is brought by the cultures which they know and have been brought up by (Alazzani *et al.,* 2017). Most females on the board structure are in positions of chief executive officers and chairpersons of the board (McGuinness *et al*., 2017). If females enter the company's board of structure by numbers, they decrease the way in which they are treated in board structure and the social sustainability performance of companies (Bugeja, Matolcsy & Spiropoulos, 2012). There is a need to increase the number of females on the board positions of companies as most companies still lack females on the board of directors' seats (Ibrahim & Hanefah, 2016). Companies with females on board tend to have better returns on equity than the ones which do not have females in their board of directors' seats which improves the company's performance (Horak & Cui, 2017). Skills development as the social performance of companies is essential for youths with disabilities because it enables them to apply and engage in personal skills development programs to help them employable (Wehman *et al*., 2014).

It is essential for companies to have employees with diverse skills because it will help in their future growth and development (Mehrabani & Mohamad, 2015). Azzoz and Khamees (2016) claim that female board members are interested in being part of the board of directors which have guidelines of how to facilitate environmental sustainability projects of companies, unlike males who focuses on returns. However,

a study to determine whether females promote sustainability reveals that companies that are distinguished by gender perform better than the ones who are working towards achieving their strategies reasonably (Glass, Cook & Ingersoll, 2015). Moreover, companies with at least majority of females in the board tend to perform better regarding social performance and the financial performance and not very well in the environmental performance (McGuinness *et al*., 2017).

A diverse board composition is suitable for companies as it creates better ways for the board of directors to interact with other stakeholders which grows social performance of the companies (Zhang, 2012). The concerns about the social performances of companies do not get decreased by having more females as board members but it improves it by their capabilities (Harjoto *et al.*, 2015). As the board of directors get to be involved in social activities through its diversities, it makes them responsible citizens as they involve the communities to be part of their activities or projects (Perera & Hewege, 2016). Social sustainability can involve many activities which would assist the performance of the companies to improve their sustainability performance. However, it is the board of directors who decide which one is suitable for the company at any point in time (Sierra, Pellicer & Yepes, 2017). Additionally, the activities of corporate social responsibilities can also improve the performance of companies as its change is associated with the level of growth of return on revenue and income itself (Yilmaz, 2016). The social performance of companies is uplifted by long-term projects that enhance the social developments of the companies (Sierra *et al.,* 2017). To some companies, social performance depends on how the companies are affected by the corporate social responsibilities activities (Yilmaz, 2016). Corporate social performance is much higher in the countries which tends to orientate cultures and have a high income in many companies (Cai, Pan & Statman, 2016). Moreover, cultural

values of the companies and how the corporate social responsibility is conducted influence the social performance of companies (Shi, Veenstra & Lee-Chin, 2017).

The following sections discuss the related literature on board independence and social sustainability.

2.8 Board independence social on sustainability performance (skills development expenditure)

In most retail companies and banking sectors with a majority of the independent board of directors, the skills development programmes or training are specifically designed for the employees to enhance their skills to increase the performance of the companies (Esteban-Sanchez, de la Cuesta-Gonzalez & Paredes-Gazquez, 2017). The social performance of companies should be a priority to the board of directors as they are the ones who take decisions on investments whether in the short or long term to improve the performances of companies (Xu, Wang & Liu, 2017). The board of directors of companies whether male or female need to be fully engaged with the companies' performances through sound contribution during decision making on social sustainability projects which will improve the company's value and enhance its performance (Reguera-Alvarado & Bravo, 2017). Looking at the banking industries' board compositions with gender diversity, the males in those boards are not performing well when compared to the female members, but where the competition among them is high, then males are leading (Amore & Garofalo, 2016).

The presence of female members of the board is known to uplift the company's environmental sustainability performance through their contributions to decisions especially the independent candidates on the board (Post *et al*., 2015). Some

independent board of directors fail to contribute to sustainability issues of the companies as they lack the knowledge of other factors of sustainability factors (Vallascas *et al*., 2017). Companies need to have strategies in place to deal with the projects which leads to improve their social sustainability performances and avoid risky social projects (Perera & Hewege, 2016). However, company's board of directors need to involve the independent directors to demonstrate sound corporate governance to improve the social performance of companies (Wang & Sarkis, 2017). Additionally, the board of directors of companies should have an approach in place for its social sustainability activities which will enhance the firms' performance and its reputation (Esteban-Sanchez *et al*., 2017).

Most independent board of directors of companies who are women tend to be active on projects of the companies by monitoring them such as skills development programs offered by the companies (Benkraiem *et al*., 2017). The independent board of directors of companies participate more on social projects of the companies which include the skills development programs which help improve the companies' sustainability performance (Deschênes, Rojas, Boubacar, Prud'homme & Ouedraogo, 2015).
Companies should have an independent board of directors who know about finance as this would help with the allocations of expenditures of skills development and boosting the social performance of companies (Minton, Taillard & Williamson, 2014). The social performance of companies depends to a large extent on the calibre of the board members who are in charge and how they conduct their duties when implementing social projects of the companies (Isaksson & Woodside, 2016). Moreover, the board of directors should ensure that the sustainability of the company is promoted through its social projects (Yilmaz, 2016). It is important for companies to engage with the community for their social sustainability performance.

The board members need to realise that the social performance of companies can be improved by satisfying the other stakeholders who are affected by their operations (Doloi, 2012). In this regard, the banking industries have been found to perform better regarding their social sustainability because their board of directors are found to be having a balanced number of independent directors and often engages with its employees on social projects (Esteban-Sanchez *et al*., 2017). However, stakeholders can benefit from the social performance of companies that whose board members consist of at least majority of independent directors through sound decision making (Zhang, 2012).

The social performance of companies is mostly enhanced by the employees and not by the board of directors in the banking sector (Esteban-Sanchez *et al*., 2017). However, bank employees perform well in social sustainability if they comply with corporate governance and have good relationships with the stakeholders (Esteban-Sanchez *et al*., 2017). It is vital that the banks engage with the society so that they can be able to know which projects might be able to enhance their social performance (Esteban-Sanchez *et al*., 2017). It is important for companies to have skills development programs especially the ones that help with managing projects that they engage in so that independent members of the company can feel free to interact and improve communication and performance (Wang & Cook, 2016). If such projects fail to enhance the social performance companies, then the board of directors need to justify what to do next to uplift the company' social sustainability (Tantawi & Youssef, 2012). However, there is little communication between the companies' board of directors and the employees who are required to be involved in the social projects of most banking companies leading to a decline in the sustainability performance (Tantawi & Youssef, 2012).

Even though those companies with a board of directors of majority independent directors that lack financial educational background tend to be more interested in skills development programs offered by the companies to groom individuals simultaneously improving the social performance of companies (Darmadi, 2013). However, the board of directors must do it in line with the vision and mission of their companies (Eizenberg & Jabareen, 2017). The board of directors should consider having a program of skills development for the social development activities of its host community (Bittencourt, Brunstein, Martins, Desidério & Sobrinho, 2016). Some company projects within the communities or the environment should be aimed at improving the living conditions of individuals, and by doing so, they enrich the skills of individuals, who are involved in such projects (Sierra *et al*., 2017). For other companies to improve their social performance, it should create more delegations which turn to create more work and creates job opportunities, which helps with the skills development (Yilmaz, 2016).

The following section discusses the related literature on firm size and social performance.

2.9 Firm size on social sustainability performance (skills development expenditure)

Some companies find it easier to operate by outsourcing sustainability projects as the sizes of their firms are small which cannot lead to enhancing the social and environmental performance of companies but decrease them as the money is to flow out instead of having it saved and increasing companies' performance (Husted & de Sousa-Filho, 2017). The larger companies such as banks tend to be involved in risky strategies which help the financial performance including the social performance of companies (Hopenhayn, 2016). Large companies have strategies that deal with social

sustainability projects which improve those companies' performance (Schreck & Raithel, 2015). Social sustainability is rarein smaller companies because most do not engage in projects of social sustainability such as skills development programs due to lack funds which occur mostly on smaller companies (Al-Dhamari *et al*., 2014). Better performance of social sustainability by large companies is by how their administration departments are facilitated because they can easily interact and there is the availability of resources rather than small companies (Schreck & Raithel, 2015). Larger companies have financial slack which assists them to engage in social projects which may arise due to opportunities that come from the involvements with the society (Crisostomo, Freire & Parente, 2014).

In some industries, the social sustainability performance of companies outperforms others due to their sizes of the companies (Schreck & Raithel, 2015). Smaller companies tend to engage easier in social projects than larger companies as they take time to engage with the company (Minguela-Rata, Fernández-Menéndez & Fossas-Olalla, 2014). Al-Dhamari *et al*., (2014) suggest that the sizes of companies' equity have an impact on the companies' equity rather than the social sustainability of companies. Companies which have a large company firm size can perform better on social on social sustainability performance due to their sustainability availability of resources (Schreck & Raithel, 2015). Additionally, larger companies tend to generate information better than small companies which make them perform better on social performance (Waluyo, 2017). Al-Dhamari *et al.* (2014) suggest that larger companies do not account for social sustainability performance because of the lack of social assessment on how it is supposed to be accounted. However, companies no matter their sizes they need to monitor and care for social sustainability for going concern purposes (Waluyo, 2017). Smaller companies are mostly faced with limited resources,

and they tend to face more opportunity costs that lead to sacrifices upon social projects engagements (Schreck & Raithel, 2015). The motives for engaging in social projects to improve companies' social sustainability performance are the same for large and small companies (Crisostomo *et al.,* 2014).

The following section discusses the summary of the chapter.

2.10 Summary of the chapter

From the reviewed literature it can be indicated that there is no study which focuses on evaluating board characteristics and environmental and social sustainability performance of selected companies in the JSE SRI specifically on social performance focusing on skills development expenditure and environmental performance focusing on energy usage in both the banking and retail industries in South Africa.

The chapter discussed theoretical frameworks which are legitimacy, agency and stakeholder theories. The stakeholder theory encourages the board of directors of companies to carry out their duties in the best interests of the companies regardless of their independence or gender; they are to work ethically to meet the needs of other stakeholders. The legitimacy theory advocates that the sustainability performance of companies will assist the various stakeholders to see how the board of directors are conducting themselves to improve company's sustainability performance through sustainable business practices for positive impact. Lastly, with the agency theory, it revealed that the board of directors of companies whether independent or with gender diversity and whatever the size of companies they need to work well together with other shareholders to improve the performance of companies.

The chapter also reviewed energy usage and skills development where it is acceptable that the companies are acknowledging the way in which the society is involved in their projects. Moreover, it is plausible that the banking and retail sectors' sustainability performance is improving yearly due to their energy usage and skills developments projects as with energy is not consumed much and skills development are sometimes based on grooming individuals who are going to help grow the companies' sustainability performances.

The chapter further discussed the gender and independent of corporate boards and the firm size of companies. It indicated the role of directors towards the sustainability performance of companies and how they affect it and sustainability performance and social and environmental performance. However, it suggests that member of females on boards and gender equality should be considered for board seats, while it also that board independence in the board seats is in line with the code of corporate governance.

On the other hand, there are benefits which were discussed of having a balance of independent and non-independent board of directors and its effect on environmental and social sustainability performance. It can be beneficial as they can easily communicate with the society and be able to solve problems from different perspectives and detect risks which the companies are coming across.

The chapter also discussed the firm size on energy usage which found that most companies' size affects the energy usage of companies and most of them have strategies in place which helps with the energy usage to improve the environmental performance of companies. The independence of the board of directors may affect a company's energy usage and skills development expenditure as most independent

directors, fail to express their opinions on such decisions while others tend to work well together with the executive board of directors.

The next chapter will describe the overall research methodology and strategy of the study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter reviewed and discussed the theoretical frameworks which guide this study namely; the stakeholder theory, agency theory and legitimacy theory, followed by the discussion of King IV and legislative pronouncements on race, gender and labour lastly a discussion of the previously existing literature on board characteristics and sustainability performances.

This chapter outlines the overall methodology used in this study as follows: in Section 3.2, the justification for research design and appropriateness was discussed; in Section 3.3, the research method was discussed; in Section 3.4, the research population was discussed; in Section 3.5, the sample size and sampling approach was discussed; Section 3.6 discussed the reliability and validity of the study data; in Section 3.7, the ethical consideration was discussed; Section 3.8 defined the operational definitions of variables; in Section 3.9, data collection approach was discussed; Section 3.10 discussed the materials and instruments; Section 3.11 discussed the data analysis approach; and summary of the chapter was presented on the last section.

3.2 Research design and method appropriateness

The study adopted the correlational research design which can be defined as a research design which is investigating the effect of an issue or relationship of one variable to the other variable (Gow, Larcker, & Reiss, 2016). By using the correlational research design, the effect of board characteristics on sustainability performance is analysed to address the problem statement raised in this study. The research design

can be defined as the way in which the researcher is going to analyse data and to collect data which will be used to explain or to emphasise the objectives of the research (Creswell, 2013). There are different types of research design paradigms, but the major two commonly used in the business journals are, positivist and anti-positivist. Caesar (2012) defined positive paradigm as an approach that upholds a definite view of social scientists as analysts or interpreters of any subject matter, the positive paradigm is the one to be used by the researcher in this study. The study adopted the positivist paradigm as the findings are statistically analysed. The section above discussed the research design and method appropriateness for this study, below the research method is discussed.

3.3 Research Method

In this study the quantitative approach was adopted to answer the research hypothesis posed. Research method is a logical way of solving problems by different procedures and algorithms (Kamaruddin & Abeysekera, 2013).

3.3.1 Quantitative approach

The suitable design or approach for this study is the quantitative approach. This can be defined as a technique whereby the researcher uses mathematical data to analyse the problem (Kinchin, Hay & Adams, 2000). This study determined the effect of board characteristics on environmental and social sustainability performance among JSE SRI banking and retail companies. By using the quantitative research approach (multiple linear regression analysis) the researcher could test whether there are correlations among the variables. The quantitative research approach was used to investigate how diversity perceptive affect the board members' inclusion in the

corporates (Bernstein & Bilimoria 2013). In their study Bernstein and Bilimoria (2013) used the following variables: individual inclusion experiences (dependent) and the diversity motivation (independent) which covers discrimination, legitimacy and learning perceptive, they found that there is a significant positive effect between the two variables.

The above review encouraged the researcher to adopt the quantitative method because the data to be analysed will be in numbers. For the skills development expenditure and energy usage were measured in Rands and the proxies of the board characteristics for this study were measured in numbers.

3.4 Research population

According to Coale, Demeny and Vaughan (2013), a population is defined as all objects and elements that meet the sample criteria in a field of study. Therefore, companies in the banking and retail sectors that are listed on the Johannesburg Stock Exchange (JSE) were chosen as the population for this study. The researcher made use of these sectors as the population using their integrated annual financial statements and sustainability reports, which are valid and can be obtained easily through their websites and the IRESS Database, which are available to the public. The retail and banking sectors have been chosen among other sectors because of their high level of energy consumption. Moreover, the JSE is a reliable source of both financial and non-financial data due to its status.

3.5 Sampling and sample size

In this study, a sample of companies from the population mentioned above was used for this analysis. There are many types of sampling which random sampling are

judgemental, stratified and purposive. According to Kozłowski (2015), sample technique is the way of selecting a random sample of elements, which are categorised according to what the research population is based. The purposive sampling in this study is used to select the banking and retail companies listed on the JSE SRI index because of the reputation of these companies regarding their sustainability reports. This study used the purposive, and it can be defined as the sampling method in which the researcher will use their perception to select the suitable sample for the study (Patton, 2002). The companies sampled in this study are drawn from the JSE SRI index, and there are currently 77 constituents on the JSE SRI index of which 28 of them fall under banking, and retail industries, the researcher chose the industries because of their high energy usage and social influence on job creation.

The 28 banking and retail companies listed on the JSE SRI are as follow:

- ADH
- BGA
- CHP
- CLS
- CMH
- COH
- CPI
- CSB
- FSR
- HIL
- IPL
- ITE

- LEW
- MRP
- MSM
- NCS
- NED
- PIK
- RMH
- SBK
- SFN
- SHP
- SPG
- SPP
- TFG
- TRU
- VMK
- WHL

The abbreviation of the companies was used to hide their full identity.

3.6 Data collection

This study will make use of the secondary data collection method which is referred to as the method of which the data that was collected before by other researchers or someone else for the purpose other than the current one at study (Han, Powell, Slater & Quinn, 2012). Secondary data collection method is made up of preceding progress reports, library journals, internet and other documentation. In this study, financial data

and quantitative data will be obtained from the annual integrated reports for the twenty-eight (28) companies which are collected from the company's website through IRESS.

The time-period to be used in this study is from 2007-2017. The researcher chose this period because the information to be obtained is recent, and this will allow the data to be analysed in detail, as they are required to disclose their social and environmental sustainability performances.

Data collection can be referred to as the process of gathering and obtaining the information that is identified in the objectives and that answers the research questions (Kozłowski, 2015). The different types of data collected for this study are explained below.

3.6.1 Financial data

The financial data used in this study included the energy usage, market capitalisation and the skills development expenditure which were measured in Rand although other studies used financial data presented in Euros and Dollars which are different currencies. Due to the type of data used, the foreign currencies were converted to South African Rand using spot rates at the date the data was collected. The information was obtained from the IRESS website.

3.6.2 Non-financial data

The non-financial data of this study consist of corporate governance information which was obtained from the integrated financial reports and sustainability reports from the IRESS and individual company's website respectively. The study employed three (3) main variables from the board characteristics as recommended by the King IV to

include number of females on board, firm size and board independence. The variables are as follows:

- Board independence= Number of non-executive directors divided by the whole board of directors
- Females= Number of females on the board members

Control variables

In this study, there are three (3) control variables which are as follows:

Return on Assets (ROA)= Net income/Total Assets

Net profit= Net profit margin

Sales volume= Sales growth annually (see section 3.7.1.1, 3.7.1.2 and 3.7.1.3 for justification of these variables).

3.6.3 Materials and instruments

Materials and instruments used in this study were from the companies' integrated annual reports and sustainability reports from the JSE SRI and companies' websites for the period between 2007-2017.

3.7 Data analysis

The data analysis is the way in which the information from the data collected get to be inspected and the ones which are useful get to be used in the conclusion of the study or the decisions to be taken by the researcher based on the outcomes of the analysis (Creswell 2013). For all companies used in this study panel data analysis was used.

According to Niazi and Hassan (2016), panel data analysis is a statistical method used in cross-sectional data analysis. By using the panel data analysis which uses both the random effects and fixed effects, there is control for unobserved company level heterogeneities and the Hausman test is applied to identify whether individual effects are random or fixed effects. The study applied the panel data analysis through the Stata software.

Multiple linear regression analysis

Multiple linear regression analysis is used to model the relationship between two or more explanatory variables statistically (Amirat, Ziani & Messadi, 2016). Multiple linear regression analysis is applied to analyse the data of this study which was used to describe the nature of relationships between variables in this study which are dependent and independent variables. By using the regression analysis in this study, the researcher could know the effects of the relationship between board characteristics and environmental and social sustainability performance.

The following variables were used in this study: the board characteristics were independent variables, and environmental and social sustainability performance were dependent variables. In their study Lahouel, Peretti, and Autissier (2014) used the regression analysis. Below is the regression method used:

$Y = \alpha_{it} + \beta_{it}$

Where:

$$ENUSAGE_{it} = \alpha_{it} + \beta FemBoard_{it1} + \beta BoardIndepen_{it2} + \beta FirmSz_{it3} + \beta SalesGro_{it4} + \beta ROA_{it5} + \varepsilon$$

$$SKILLDEV_{it} = \alpha_{it} + \beta FemBoard_{it1} + \beta BoardIndepen_{it2} + \beta FirmSz_{it3} + \beta SalesGro_{it4} + \beta Netpro_{it5} + \varepsilon$$

Where:

ENUSAGE$_{it}$=Energy Usage, $\beta FemBoard_{it1}$ = Number of females on the board, $\beta BoardIndepen_{it2}$= proportion of non-executive board of directors, $\beta FirmSz_{it3}$= Firm Size (Market Capitalisation), $\beta SalesGro_{it4}$= sales growth, βROA_{it5}= Return on Asset, αi=intercept, β= gradient/slope, ε=error

SKILLDEV$_{it}$=Skills Development expenditure, $\beta FemBoard_{it1}$ = Number of females on the board, $\beta BoardIndepen_{it2}$= proportion of non-executive board of directors, $\beta FirmSz_{it3}$= Firm Size (Market Capitalisation), $\beta SalesGro_{it4}$= sales growth, $\beta Netpro_{it5}$= net profit, αi=intercept, β= gradient/slope, ε=error.

Hypothesis:

$H_{1:}$ There is no relationship between the number of female on board and environmental sustainability performance (energy usage) among JSE SRI banking and retail companies.

$H_{2:}$ There is no relationship between firm size (market capitalisation) and environmental sustainability performance (energy usage) among JSE SRI banking and retail companies.

$H_{3:}$ There is no relationship between independence of the board and environmental sustainability performance (energy usage) among JSE SRI banking and retail companies.

$H_{4:}$ There is no relationship between the number of female on board and social sustainability performance (skills development expenditure) among JSE SRI banking and retail companies.

$H_{5:}$ There is no relationship between independence of the board and social sustainability performance (skills development expenditure) among JSE SRI banking and retail companies.

$H_{6:}$ There is no relationship between firm size (market capitalisation) and social sustainability performance (skills development) among JSE SRI banking and retail companies.

The following section of the study discusses the research variables.

3.7.1 Research variables

The following section discusses the research variables of this study, the dependent variables, independent variables and control variables.

3.7.1.1 Dependent variables

In this study, skills development expenditure and energy usage were used as dependent variables.

Skills development expenditure

Skills development expenditure can be defined as the amount of money which companies spend on skills development programs which they offer to individuals as learning programs (Sung & Ashton, 2014). The skills development funds were used as it shows the amount that companies spend on skills development which reflects the social sustainability performance of the companies. Moreover, it shows companies' engagement and commitment to the society as it helps to boost companies'

sustainability image while helping to enhance the skills of community members participating in their skills development programs.

Other studies have used this variable in their studies such as Cansoy (2017) and Mehrabani and Mohamad (2015). This study made use of the skills development expenditure as a proxy for the social performance as it is used to improve the individuals' self-employment skills and to boost the sustainability performance of companies.

The following is the discussion of the dependent variable of the study which is the energy usage.

Energy usage

The energy usage of companies is used as the amount that shows how much the companies consume per annum with their energy usage techniques and the way in which energy required for services is used and reduced for other services to be used (Cho, 2016). The energy usage is used as a proxy for environmental performance which uplifts the sustainability performance of companies. Energy usage is the objective to decrease the energy used in companies with a motive to improve the companies' environmental performance and boosts the companies' sustainability performance.

Other studies such as Cho (2016) and Safa *et al*. (2017) used the energy usage as the variables in their studies. The energy usage amount of the companies indicates how much the company spends on energy and whether that is in-line with the company's strategy of environmental performance that helps companies to realise the

wastage that occurs yearly and encourage for improvement of such to boost the sustainability performance of the companies.

The following section is the discussion of the independent variables of this study.

3.7.1. 2 Independent variables

The number of females on board, firm size, and independence of the board are the board characteristics representing the independent variables in this study.

The following is the discussion of the independent variable number of females on the board.

Number of females on board

King IV states that companies should promote gender equality for the board of directors and the employees too as it will assist them to resolve issues of the companies by bringing in their different inputs to the decision makings. The gender of the board of directors will be determined and used to answer the research questions of the study.

Other researchers have used this variable in their studies such as Ali *et al*. (2014) and Harjoto *et al*. (2015). The gender distribution of the board of directors helps with unique views of the board and uplifts the board's ability for decision-making and great strategies for the best interest of the companies.

The following is the discussion of firm size as an independent variable of the study.

Firm size

The size of firms tends to affect the companies' energy usage and skills development. The researcher opted for firm size as energy is being consumed in companies by the service offered and daily duties performed by the companies. Other researchers have used this variable in their studies such as Darmadi (2013) and Zawawi *et al*. (2017).

The following is the discussion of the independence of the board as the independent variable of the study.

Independence of the board

King IV recommends that the board of directors of companies should consist of an independent board of directors who are to act in the best interest of the companies to avoid conflicts of interest. The independent directors are required to be independent to the extent where they can perform their responsibility.

Various researchers have used this as a variable in their studies such as Minton *et al.* (2014) and Vallascas *et al*. (2017). The researcher chose this because the sustainability of companies needs to have effective boards whom discharge their duties effectively and avoid biases for the companies to perform well and do well in sustainability performance.

Below is the discussion of control variables in this study.

3.7.1.3 Control variables

The analysis of the effect of the board characteristics and environmental and social sustainability performance does not justify the results of this study on its own. The control variables of this study are discussed below which are the return on assets, sales volume and net profit.

Return on Assets

Return on assets is used as an element of financial performance since it gives other stakeholders of the information of whether management as the board of directors is effective or not in companies. According to Harjoto *et al*. (2015) sales were used as a control variable because of the projects or activities which are involved in the social and environmental performance of the companies as they consume many resources.

The following is the discussion of sales growth as a control variable of this study.

Sales growth

In this study, the sales growth percentage is employed as a control variable which indicates financial performance. As the board of directors are involved in this study, when they make better decisions on the sustainability of companies then the sales of the company will grow and improves the financial performance of companies.

Harjoto *et al*. (2015) used it as a control variable in their study and found that sales and the board of directors have a positive significance on the performance of the companies.

Below is the discussion of net profit margin as a control variable of the study.

Net profit margin

The decisions of the board of directors' involvements in the companies' projects tend to affect the net profit margin of companies based on whether their decisions are at the best interests of the companies or for their benefit. When the individuals in the skills development expenditure perform well then, the customers of the companies get

pleased which increases the net profit margin of companies which makes them regularly come to the companies.

Other studies have used the net profit margins of companies as a variable in their studies such as Ali *et al*. (2014) and Lei *et al*. (2017).

The section below is the discussion of the reliability and validity of the method used for the data analysis of this study.

3.8 Validity and reliability

This section explains issues relating to reliability and validity of the study.

3.8.1 Validity

In this study, validity was achieved as the researcher used information on the companies from the JSE and the websites which is available to the public. Validity tests will be used using the statistical information from companies. Furthermore, the multiple linear regression was used to offer more reliable results for the study and for the other researchers to be able to do further research on this study. Validity can be defined as the degree to which a specific measurement of some recognised quality or character (Plouffe, Paunonen & Saklofske, 2017). The researcher used the autocorrelation test in this study to detect the possibility of autocorrelation. The test used in this study enhanced the validity of the data.

3.8.2 Reliability

To ensure that the study reliable the information used for this study is from the audited integrated financial statements of the companies, and the financial statements and the

information is publicly available on the JSE SRI website. Reliability refers to the way information obtained is free from errors and can be used by other researchers (Kozłowski, 2015).

3.9 Ethical consideration

The researcher has not violated any ethical issue because the data used in the study was obtained from the annual integrated financial reports of the concerned companies without any alterations of the reports as they are the audited annual reports and they are available to the public from their websites and on the JSE. As the data obtained includes both social and environmental performances and sustainability the data was obtained from the sustainability reports of the annual integrated financial reports. The study does not require any ethical clearance from the Turfloop Research Ethics Committee (TREC).

3.10 Summary of the chapter

In this chapter, the research methodology for this study was discussed. The research design and method appropriateness were explained to assist with analysing the data and responding to the research hypotheses of this study.

The researcher adopted the correlational research design and quantitative method for this study which helped with the analysis of data for this study they were appropriate because it enabled the researcher to test whether there are any possible relationships between characteristics and environmental and social sustainability performance of companies.

The sample and population of this study are the 28 banking and retail companies listed on the JSE SRI for the period from 2007-2017, and the panel analysis was used for the companies. The researcher used the retail and banking companies because energy is mostly used through the technology which helps to operate the businesses and the skills development programs were chosen because most of this companies offer them to the societies which they operate in to enhance the skills of individuals while uplifting the performances of companies.

The chapter also discussed the control variables of this study which are the financial performance components which may affect the result of the multiple linear regression analysis which was used in this study to analyse the data. The data that was used in this study were obtained from the IRESS website. The researcher believes that through the adoption of the methods mentioned above the research hypotheses and objectives of this study were responded well. The next chapter of this study outlines the presentation, interpretation and the findings of this study based on the methodology discussed in this study.

CHAPTER FOUR: DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

The previous chapter discussed the overall methodology used in this study. It explains the appropriateness of the research design and method, research population, sampling and sample size, data collections, materials and instruments, data analysis, validity and reliability. This chapter analysed the results of this study based on the research hypothesis and research problem statement. The chapter outlined is as follows; Section 4.2: data management and analysis, Section 4.3: panel data analysis, Section 4.4: statistical models and tests, Section 4.5: an overview of the study and Section 4.6: summary of the chapter.

The following section discusses the data management and analysis.

4.2 Data management and analysis

The multiple linear regression was used in this study to examine whether there is a relationship between board characteristics and environmental and social sustainability performance of selected companies listed on the JSE(SRI). The population used in this study were the companies in the banking and retail sectors which are listed on the JSE(SRI), 28 companies were sampled for a period from 2007-2017.

The following section discusses the panel data analysis.

4.3 Panel data analysis

The study used the panel data analysis technique to analyse the data. The raw data extracted from the annual integrated and sustainability reports of the selected

companies were used for this study (see Appendix 1). The data was entered into a Microsoft Excel spreadsheet and applied on the Stata 12 software to analyse the relationship between board characteristics and environmental and social sustainability performance. There are two dependent variables in this study which are energy usage and skills development expenditure while the independent variables are the number of females on board, board independence and market capitalisation also control variables which were used to justify the findings namely ROA, sales growth and net profit margin.

The following section discusses the statistical model and tests.

4.4 Statistical model and tests

The following tests were used for this study to justify the validity of the panel data results; regression table, scatter plots, heteroskedasticity tests, autocorrelation tests, multicollinearity tests, covariance, correlation matrix, fixed and random effects and the Hausman test.

The following section discusses the descriptive data.

4.4.1 Descriptive statistics

Descriptive statistics assisted the researcher in describing the features of the data for this study. The summary of the descriptive statistics is based on the dependent variable- energy usage and the independent variables which are as follows; board independence, females and market capitalisation lastly on control variables which are sales growth and ROA, which shows the number of observations, mean, standard deviation, minimum and maximum results.

Table 4. 1: Summary of the descriptive statistics on energy usage

	Obs	Mean	Std. Dev.	Min	Max
Energy usage	308	293450.4	257760.7	0	999000
Board independence	308	55.18909	26.21765	0	88.89
Females	308	1.99026	1.561936	0	7
Market capitalisation	308	2030133	2102408	0	9980600
Sales	308	7.369351	12.21634	-88.91	83.82
ROA	308	11.48705	12.57746	-30.52	46.85

Source: Authors' results of descriptive data from Stata 12 software (2018)

Table 4.1 above shows 308 observations for 11 years for 28 banking and retail companies listed on the JSE SRI. The mean for the dependent variable energy usage (Rand) is 293450.4 while independent variables board independence, females and market capitalisation (Rand) is 55.18909, 1.99026, and 2030133 respectively. The mean variable for the control variables is as follows sales growth (%) and ROA (%) is 7.369351 and 11.48707 respectively.

Furthermore, the minimum and maximum for dependent variable energy usage is 0 and 999000 respectively, and the minimum and maximum for independent variables are as follows; board independence 0 and 88.9, females 0 and 7 and market capitalisation 0 and 9980600, while for the control variables sales growth -88.91 and 83.83 and ROA -30.52 and 46.85 respectively.

The table below shows the summary of the descriptive statistics are based on the dependent variable- skills development expenditure and the independent variables which are as follows; board independence, females and market capitalisation lastly on control variables which are sales growth and net profit margin, which shows the number of observations, mean, standard deviation, minimum and maximum results.

Table 4. 2: Summary of the descriptive statistics on skills development expenditure

Variable	Obs	Mean	Std. Dev.	Min	Max
Skills development expenditure	308	30460.53	28184.17	0	99603
Board independence	308	55.18909	26.21765	0	88.89
Females	308	1.99026	1.561936	0	7
Mark capitalisation	308	2030133	2102408	0	9980600
Sales growth	308	7.369351	12.21634	-88.91	83.82
Net profit margin	308	10.23175	48.83005	-1.45	637.71

Source: Authors' results of descriptive data from Stata 12 software (2018)

Table 4.2 above shows 308 observations for 11 years for 28 banking and retail companies listed on the JSE SRI. The mean for the dependent variable skills development expenditure (R'000) is 30460.53 while independent variables board independence, females and market capitalisation are 55.18909, 1.99026 and 2030133 respectively. The mean variable for the control variables is as follows sales growth (%) 7.369351 and net profit margin (%) 10.23175.

Moreover, the minimum and maximum for dependent variable skills development expenditure is 0 and 99603 respectively and the minimum and maximum for independent variables are as follows; board independence 0 and 88.9, females 0 and market capitalisation 0 and 9980600, while for the control variables sales growth -88.91 and 83.83 and net profit margin -1.45 and 637.71 respectively.

4.4.2 Two-sample *t*-test

The table below shows a two-sample test by the control variables sales growth and ROA.

Table 4. 3: Two-sample t-test (t-test sales growth = ROA, unpaired)

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Sales growth	308	7.369351	0.696091	12.21634	5.999638	8.739063
ROA	308	11.48705	0.716667	12.57746	10.07684	12.89725
Combined	616	9.428198	0.505989	12.55833	8.434522	10.42187
Diff		-4.1177	0.999077		-6.07972	-2.15567

Note: diff = mean (sales growth) - mean(roa); t = -4.1215; Ho: diff= 0; degrees of freedom =614; Ha: diff < 0 Ha: diff= 0; Ha: diff > 0; Pr(T < t) = 0.0000; Pr(|T| > |t|) = 0.0000; Pr(T > t) = 1.0000

Source: Authors' results of *t*-test from Stata 12 software (2018)

The above Table 4.3 presents an independent *t*-test using a sample of 616 combined *obs* of independent variables (Sales growth and ROA) to determine whether they influence energy usage differently. The *t*-test determines whether population means are equal or not for the two samples assuming that variances for the two samples are equal. The control variables tested are appropriate because they are of a different population and are independent variables.

The table below shows a two-sample test by the control variables sales growth and net profit margin.

Table 4. 4: Two-sample t-test (t-test sales growth = net profit margin, unpaired)

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Sales growth	308	7.369351	0.696091	12.21634	5.999638	8.739063
Net profit margin	308	10.23175	2.782351	48.83005	4.756863	15.70664
Combined	616	8.800552	1.434047	35.59211	5.984329	11.61677
Diff		-2.8624	2.868103		-8.49489	2.770079

Note: diff = mean (sales growth) – mean (net profit margin); t = -0.9980; Ho: diff = 0; degrees of freedom = 614; Ha: diff < 0; Ha: diff= 0; Ha: diff > 0; Pr(T < t) = 0.1593; Pr(|T| > |t|) = 0.3187; Pr(T > t) = 0.8407

Source: Authors' results of *t*-test from Stata 12 software (2018)

Table 4.4 presents an independent *t*-test using a sample of 616 combined *obs* of independent variables (Sales growth and net profit margin) to determine whether they influence skills development expenditure differently.

4.4.3 Regress test

The below regress tests are based on the dependent variable- energy usage and the independent variables which are as follows; board independence, females and market capitalisation lastly on control variables which are sales growth and ROA.

Table 4. 5: Regress test for energy usage

Source	SS	Df	MS
Model	2.9957e+12	5	5.9913e+11
Residual	1.7402e+13	302	5.7621e+10
Total	2.0397e+13	307	6.6441e+1

Number of obs	= 308
F (5, 302)	= 10.40
Prob >F	=0.0000
R-squared	=0.1469
Adj R-squared	=0.1327
Root MSE	2.4e+05

Energy Usage	Coef.	Std.Err.	t	p>t	95% Conf.	Interval
Board independence	3641.06	719.1428	5.06	0.000	2225.894	5056.225
Females	-11934.42	11458.06	-1.04	0.298	-34482.17	10613.32
Market capitalisation	0.0121793	0.0068684	1.77	0.077	-0.0013366	0.0256952
Sales growth	-973.81	1256.173	-0.78	0.439	-3445.771	1498.151
ROA	1456.793	1207.58	1.21	0.229	-919.5443	3833.131
_cons	81972.71	33079.96	2.48	0.014	16876.31	147069.1

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

Table 4.5 above shows the regression results for energy usage and the number of observations may give rise to the effect of autocorrelation which may have prediction errors in the regression results. The table above indicates the significant statistics where the *p*-values are taken note of, the significant level is set at 95% with *p*-values greater than 0.05 interpreted to be insignificant and there is a Prob > F = 0.0000 which

make the model to be good as it is significant as the independent variables can jointly affect the dependent variable. The R-squared is 0.1469 which is the variation of the dependent variable which can be explained by the independent variable, while the remaining is the error of terms which is the variation of the dependent variable can be explained by other independent variables that are not mentioned in this study. Moreover, to further explain this, the null hypothesis is used as follow: - Null is independent variables do not jointly affect the dependent variable and alternative is that independent variables do jointly affect the dependent variable. Therefore, F (5, 302) =10.40 and Prob = 0.0000 which is less than 0.005. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted because the independent variables do jointly affect the dependent variable.

The below regress tests are based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 6: regress test for skills development expenditure

Source	SS	Df	MS
Model	3.1599e+10	5	6.3198e+09
Residual	2.1227e+11	302	702865810
Total	2.4386e+11	307	794347347

Number of obs	= 308
F(5,302)	=8.99
Prob>F	=0.0000
R-squared	=0.7012
Adj R-squared	=0.1152
Root MSE	=26512

Skills development expenditure	Coef.	Std. Err.	T	P>t	[95% Conf.	Interval]
Board independence	315.5262	79.38044	3.97	0.000	159.3174	471.735
Females	752.6955	1264.799	0.60	0.552	-1736.24	3241.631
Market capitalisation	0.001334	0.0007586	1.76	0.080	-0.0001589	0.0028268
Sales grow	-107.6666	127.3121	-0.85	0.398	-358.1977	142.8646
Net profit margin	-4.689406	31.05522	-0.15	0.880	-65.80142	56.42261
_cons	9682.18	3583.672	2.70	0.007	2630.05	16734.31

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

Table 4.6 above shows the regress results and the number of observations may give rise to the effect of autocorrelation which may have prediction errors in the regression results. Table 4.6 indicates the significant statistics where the *p*-values are noted. The significant level is set at 95% with *p*-values greater than 0.05 and interpreted to be insignificant. The result shows a Prob > F = 0.0000, which means that the model is good and significant because the independent variables can jointly affect the dependent variable. The R-squared is 0.1296 which is the variation of the dependent variable which can be explained by the independent variable, while the remaining is the error of terms which is the variation of the dependent variable can be explained by other independent variables that are not mentioned in this study.

Moreover, to further explain this a null hypothesis is used as follow: - Null is independent variables do not jointly affect the dependent variable and alternative is that independent variables do jointly affect the dependent variable. Therefore, F (5, 302) =18.99 and Prob = 0.0000 which is less than 0.005. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted meaning that the independent variables do jointly affect the dependent variable.

4.4.7 Autocorrelation tests

The following tests for autocorrelation where the significant statistics where the *p*-values are taken note of, the significant level is set at 95% with *p*-values greater than 0.05 interpreted to be insignificant. In some of the tests below, autocorrelation residuals were used to determine the differences between the dependent variables and the predicted value which were predicted using the data through the regression test.

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 7: Durbin-Watson test on energy usage

Durbin-Watson d-statistic (6, 308) = 1.016492

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

The Durbin Watson test was performed to test the presence of autocorrelation panel analysis. The Durbin-Watson statistic is always between 0 and 4, where the value of 2 or close to 2 means that there is no autocorrelation in the sample. Table 4.6 shows Durbin Watson statistic results as 1.088373 which is closer to 2, meaning that there is no autocorrelation in this sample.

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 8: Durbin's alternative test for autocorrelation on energy usage

lags(p)	chi^2	Df	Prob > chi^2
1	95.548	1	0.0000

H_0: no serial correlation

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

Null hypothesis: residuals are homoscedastic Alt: residuals are not homoscedastic. The table above indicates a p-value of 0.0000 which is less than 0.005 which means the null hypothesis is rejected and the alternative is accepted therefore there is no serial correlation between the dependent and independent variables.

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 9: Breusch-Godfrey LM test for autocorrelation on energy usage

lags(*p*)	chi^2	Df	Prob > chi^2
1	74.213	1	0.0000

H0: no serial correlation

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

Null hypothesis: residuals are not serially correlated; Alternate hypothesis: residuals are serially correlated the table above indicates a *p*-value of 0.0000 which is less than

0.005 which means that the null hypothesis cannot be rejected therefore there is no serial correlation between the dependent and independent variables.

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 10: Shapiro-Wilk W test for normal data on energy usage

Variable	Obs	W	V	Z	Prob>z
EU	308	0.92226	16.953	6.652	0.00000

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

Null hypothesis: residual is not normally distributed Alt: residual is normally distributed the table above indicates a p-value of 0.0000 which is less than 0.005 which means the null hypothesis cannot be accepted and the alternative is accepted.

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 11: Durbin-Watson test on skills development expenditure

Durbin-Watson d-statistic (5, 308) = 0.974805

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

The Durbin Watson test is performed to test the presence autocorrelation panel analysis. The Durbin-Watson statistic is always between 0 and 4, where the value of

2 or close to 2 means that there is no autocorrelation in the sample. Table 4.8 shows Durbin Watson statistic results as 1.017198 which is closer to 2, indicating that there is no autocorrelation in this sample.

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 12: Durbin's alternative test for autocorrelation on skills development expenditure

lags(*p*)	chi^2	Df	Prob > chi^2
1	105.887	1	0.0000

H0: no serial correlation

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

Null hypothesis: residuals are homoscedastic Alt: residuals are not homoscedastic. The table above indicates a *p*-value of 0.0000 which is less than 0.005 which means the null hypothesis is rejected and the alternative is accepted therefore there is no serial correlation between the dependent and independent variables.

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 13: Breusch-Godfrey LM test for autocorrelation on skills development expenditure

lags(*p*)	chi^2	df	Prob > chi^2
1	80.153	1	0.0000

H0: no serial correlation

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

Null hypothesis: residuals are not serially correlated; Alt hypothesis: residuals are serially correlated in the table above indicates a *p*-value of 0.0000 which is less than 0.005 which means that the null hypothesis cannot be rejected therefore there is no serial correlation between the dependent and independent variables.

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 14: Shapiro-Wilk W test for normal data on skills development expenditure

Variable	Obs	W	V	Z	Prob>z
EU	308	0.92226	16.953	6.652	0.00000

Source: Authors' results of autocorrelation test from Stata 12 Software (2018)

Null hypothesis: residual is not normally distributed; Alternative hypothesis: residual is normally distributed the table above indicates a *p*-value of 0.0000 which is less than 0.005 which means the null hypothesis cannot be accepted and the alternative is accepted.

4.4.4 Scatter plot for energy usage

The scatter plot below shows the relationship between dependent variable energy usage and the independent variables which are as follows; board independence, females and market capitalisation lastly on control variables which are sales growth and ROA.

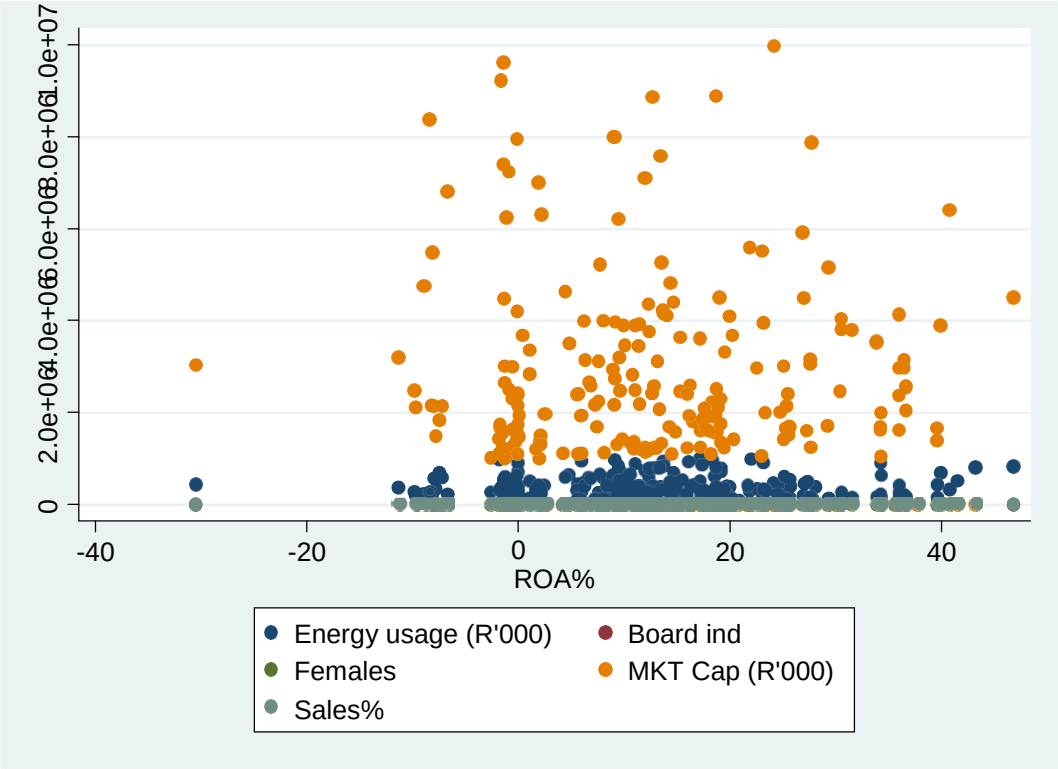

Figure 4. 1: Scatter plot on energy usage

Source: Authors' results of scatter plot from Stata 12 Software (2018)

From the Figure 4.1 above there is no clear indication of the relationship between the energy usage and females and board independence variables since it does not bear the resemblance of a linear pattern as indicating a negative correlation between variables the results as energy usage decreases the market capitalisation increases and vice versa.

4.4.5 Scatter plot for skills development expenditure

Below is the scatter plot which shows the relationship between dependent variable skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

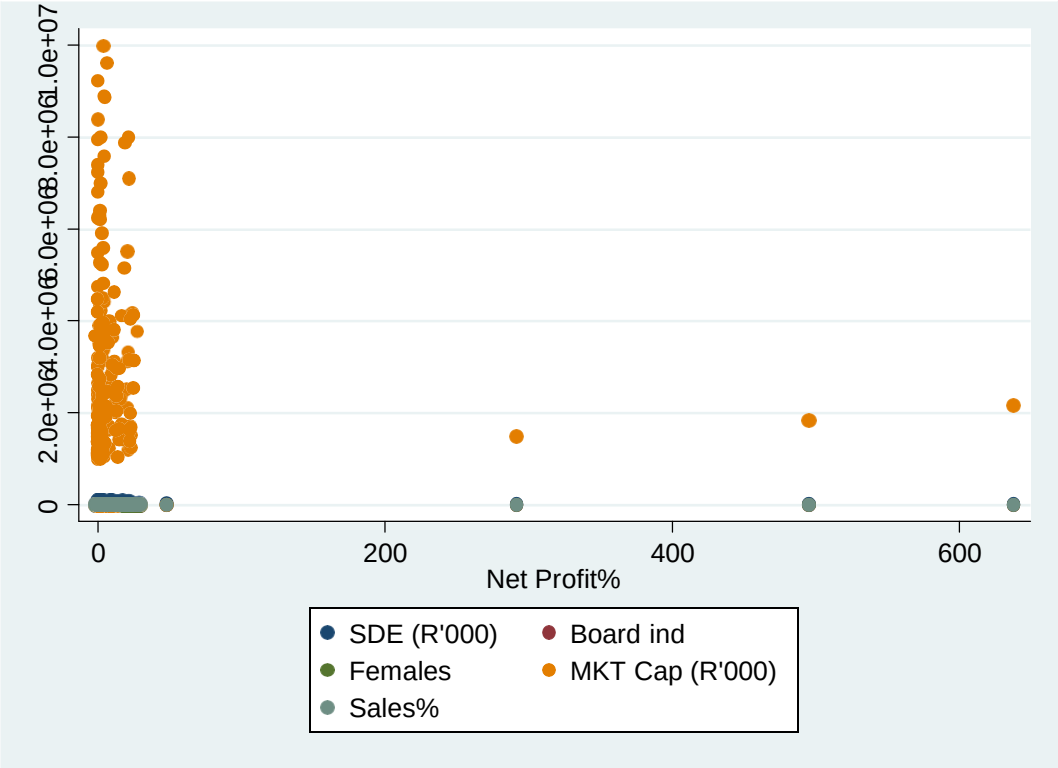

Figure 4. 2: Scatter plot on skills development expenditure

Source: Authors' results of scatter plot from Stata 12 Software (2018)

Figure 4.2 above shows that there is no clear indication of the relationship between the variables since it does not bear any similarity of a linear pattern as indicating a negative correlation between variables the results as skills development expenditure decreases the market capitalisation increases and vice versa.

4.4.6 Heteroskedasticity test

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 15: Breusch-Pagan/Cook-Weisberg test for heteroskedasticity on energy usage

Ho: Constant variance
Variables: fitted values of energy usage
$chi^{2(1)}$ = 7.68
Prob > chi^2 = 0.0056

Source: Authors' results of heteroskedasticity test from Stata 12 Software (2018)

Heteroskedasticity test is used to test the existence of variance errors that may be constant across the observations if the constant errors exist in the observations they are called homoscedastic. From Table 4.15 above, the chi-square is 0.0126 which illustrates that there is no homoscedastic meaning there is no constant error in the observations.

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 16: Breusch-Pagan/Cook-Weisberg test for heteroskedasticity on skills development expenditure

Ho: Constant variance
Variables: fitted values of skills development expenditure
$chi^{2(1)}$ = 13.76
Prob > chi^2 = 0.0002

Source: Authors' results of heteroskedasticity test from Stata 12 Software (2018)

Table 4.16 above illustrates the heteroskedasticity test. The results indicate that the chi-square is 0.0003 which means that the there is no homoscedastic in these observations.

4.4.7 Multicollinearity test

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 17: VIF- Multicollinearity test on energy usage

Variable	VIF	1/VIF
Board independence	1.89	0.527991
Females	1.71	0.585997
Sales growth	1.25	0.797008
ROA	1.23	0.813628
Market capitalisation	1.11	0.900127
Mean VIF	1.44	

Source: Authors' results of multicollinearity test from Stata 12 Software (2018)

The multicollinearity test was performed to enhance the validity of the multiple linear regression. However, it can lead to biases in the probability value (*p*-value) as it can lead to some situation where independent variables are closely correlated with one another. The Variance Inflation Factor (VIF) was performed to test the presence of multicollinearity using the Stata 12 software. Based on the result in Table 4.17 above the mean VIF is 1.44 which shows that there is no presence of multicollinearity between independent variables since the VIF is less than 5.

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 18: VIF- Multicollinearity test on skills development expenditure

Variable	VIF	1/VIF
Board independence	1.89	0.528591
Females	1.70	0.586630
Market capitalisation	1.11	0.899977
Sales	1.06	0.946482
Net prof	1.00	0.995613
Mean VIF	1.35	

Source: Authors' results of multicollinearity test from Stata 12 Software (2018)

The multicollinearity test was performed to enhance the validity of the multiple linear regression. However, it can lead to biases in the probability value (p-value) as it can lead to some situation where independent variables are closely correlated with one another. The Variance Inflation Factor (VIF) was performed to test the presence of multicollinearity using the Stata 12 software. Based on the result in Table 4.18 above the mean VIF is 1.35 which shows that there is no presence of multicollinearity between independent variables since the VIF is less than 5.

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 19: Covariance matrix of coefficients of regress model for dependent variable- energy usage

e(V)	Board independence	Females	Market capitalisation	Sales growth	ROA	_cons
Board independence	517166.42					
Females	-5163070.1	1.313e+08				
Market capitalisation	-1.3465561	4.5348033	0.00004717			
Sales growth	-157545.38	2398111	-0.00808836	1577971.4		
ROA	-60756.399	-534514.85	0.0076746	-603075.84	1458250.5	
_cons	-13673487	2910867.5	-30.509082	-762722.34	-7905379	1.094e+09

Source: Authors' results of covariance matrix from Stata 12 Software (2018)

The table above indicates the possibilities of the relationship between the dependent variable, independent variables and the control variables. The covariance between board independence and the number of female board members is -5163070.1 which is a negative relationship. For board independence and market capitalisation, there is a negative relationship with covariance of -1.3465561. The relationship between females and market capitalisation is positive with covariance of 4.5348033 also a positive relationship between females and sales growth indicated by 2398111. There is a negative relationship between market capitalisation and sales growth shown by -0.0080883 and a negative relationship between sales growth and ROA indicated by -603075.84.

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 20: Covariance matrix of coefficients of regress model- skills development expenditure

e(V)	Board independence	Females	Market capitalisation	Sales growth	Net profit margin	_cons
Board independence	6301.2537					
Females	-63376.164	1599716.6				
Market capitalisation	-0.01646918	0.05560198	5.755e-07			
Sales growth	-2235.9502	26596.526	-0.00004443	16208.368		
Net profit margin	-151.23124	798.28131	0.00030439	49.177092	964.4264	
_cons	-170165.95	-3225.0351	-0.37293458	-49392.063	-4090.6059	12842703

Source: Authors results from covariance matrix from Stata 12 software (2018)

Table 4.20 above indicates the possibilities of the relationship between the dependent variable, independent variables and the control variables. The covariance between board independence and the number of female board members is -63376.164 which is a negative relationship. For board independence and market capitalisation, there is a negative relationship with covariance of -0.01646918. The relationship between the number of female board members on corporate boards and market capitalisation is positive with covariance of 0.05560198. Also, a positive relationship exists between the number of female board members and sales growth indicated by 26596.526. There is a negative relationship between market capitalisation and sales growth shown by -0.00004443 and a positive relationship between sales growth and net profit shown by 49.177092.

Table 4. 21: Correlation matrix for dependent variable- energy usage

	Board independence	Females	Market capitalisation	Sales growth	ROA	_cons
Board independence	1.0000					
Females	-0.6266	1.0000				
Market capitalisation	-0.2726	0.0576	1.0000			
Sales growth	-0.1744	0.1666	-0.0009	1.0000		
ROA	-0.0700	-0.0386	0.0009	-0.3976	1.0000	
_cons	-0.5748	0.0077	-0.1343	-0.0184	-0.1979	1.0000

Source: Authors' results of correlation matrix from Stata 12 Software (2018)

The correlation matrix was used for multicollinearity existence between independent variables. The correlation between the independent variable board independence and itself is perfect at 1.0000 same applies to the other independent variables females and market capitalisation. Moreover, all control variables are correlated perfectly at 1.0000. The correlation matrix table above shows a weak negative relationship between board independence and females by -0.6266 and -0.2726 for board independence and market capitalisation while females and market capitalisation show a low positive at 0.0576 and 0.1666 for market capitalisation and sales growth. The control variable sales growth and the independent variable board independence show a weak negative relationship by -0.1744 and a low positive relationship between independent variable market capitalisation and ROA by 0.0009.

Table 4. 22: Correlation matrix for dependent variable- skills development expenditure

e(V)	Board independence	Females	Market Capitalisation	Sales growth	Net profit margin	_cons
Board independence	1					
Females	-0.6312	1				
Market Capitalisation	-0.2735	0.0579	1			
Sales growth	-0.2212	0.1652	-0.0005	1		
Net profit margin	-0.0613	0.0203	0.0129	0.0124	1	
_cons	-0.5982	-0.0007	-0.1372	-0.1083	-0.0368	1

Source: Authors' results of correlation matrix from Stata 12 Software (2018)

The correlation matrix was used for multicollinearity existence between independent variables. The correlation between the independent variable- board independence and itself is perfect at 1.0000 same applies to the other independent variables females and market capitalisation. Moreover, all control variables are correlated perfectly at 1.0000. The correlation matrix table above shows a weak negative relationship between board independence and females by -0.6312 and -0.2735 for board independence and market capitalisation while female members on corporate boards and market capitalisation show a low positive at 0.0579 and 0.1652 for market capitalisation and sales growth. The control variable sales growth and the independent variable board independence show a weak negative relationship by -0.2212 and a low positive relationship between independent variable market capitalisation and net profit margin by 0.0129.

4.4.8 Fixed effect model for energy usage

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 23: Fixed effects model for energy usage

Fixed-effects (within) regression	Number of obs = 308
Group variable: cocode	Number of groups = 28
R-sq: within = 0.2203	Obs per group min = 11
between = 0.0207	avq = 11.0
overall = 0.1420	max = 11
corr(u i, Xb) = -0.1644	F(5.275)=15.54
	Prob > F = 0.0000

Energy usage	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Board independence	3927.6	694.8527	5.65	0.000	2559.693	5295.506
Females	936.5754	12405.29	0.08	0.940	-23484.82	25357.97
Market capitalisation	0.01161	0.0068691	1.69	0.092	-0.0019127	0.0251327
Sales growth	-877.4484	1144.457	-0.77	0.444	-3130.459	1375.562
ROA	2419.603	2171.036	1.11	0.266	-1854.36	6693.565
_cons	29928.05	36382.89	0.82	0.411	-41696.32	101552.4
sigma_u	145733.98					
sigma_e	203269.51					
Rho	0.33950528	(fraction of variance due to u_i)				

F test that all u_i=0: F (27, 275) = 5.41 Prob > F = 0.0000

Source: Authors' results of fixed effects model from Stata 12 Software (2018)

The table above indicates the significant statistics where the *p*-values are set at the significant level of 95% where *p*-values greater than 0.05 is interpreted to be insignificant and indicate that there is a Prob>F = 0.0000 which make the model good. The above results show that there is a positive and a significant relationship between energy usage and board independence by a *p*-value of 0.000. The results indicate that

there is a positive and an insignificant relationship between energy usage and females with a *p*-value of 0.0.940.

Furthermore, the results indicate a positive and an insignificant relationship between energy usage and market capitalisation with a *p*-value of 0.092. The results show a negative and an insignificant relationship between energy usage and sales growth with a p-value of 0.444. Lastly, a positive and an insignificant relationship between energy usage and ROA with a *p*-value of 0.266.

4.4.9 Random effect model for energy usage

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 24: Random effects model for energy usage

Random-effects GLS	Number of obs = 308
Group variable: cocode	Number of groups = 28
R-sq: within = 0.2198	obs per group:min = 11
Between = 0.0203	avq = 11.0
Overall = 0.1444	max = 11
Corr(u_i, x) = 0 (assumed)	Wald $chi^{2(10)}$ = 76.73
	Prob > chi^2 = 0.0000

Energy usage	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
Board independence	3886.048	675.0396	5.76	0.000	2562.995	5209.101
Females	-2580.361	11739.1	-0.22	0.826	-25588.57	20427.85
Market capitalisation	0.0120529	0.0066133	1.82	0.068	-0.000909	0.0250148
Sales growth	-866.6026	1123.603	-0.77	0.441	-3068.823	1335.618
ROA	1847.305	1695.305	1.09	0.276	-1475.432	5170.041
_cons	44815.77	42114.35	1.06	0.287	-37726.83	127358.4
sigma_u	138859.51					
sigma_e	203269.51					
Rho	0.31818182	(fraction of variance due to u_i)				

Source: Authors' results of random effects model from Stata 12 Software (2018)

The table above indicates the significant statistics where the regressors and *p*-values are taken note of and the significant level is set at 95% with *p*-values greater than 0.05 interpreted to be insignificant. The above results show that there is a positive and significant relationship between energy usage and board independence by a *p*-value of 0.000. The results indicate that there is a negative and an insignificant relationship between females on board and energy usage indicated by females with a *p*-value of 0.826.

Furthermore, results from the table above indicate a positive and an insignificant relationship between energy usage and market capitalisation with a *p*-value of 0.068. An insignificant and negative relationship between energy usage and sales growth with a *p*-value of 0.441. Lastly, a positive and an insignificant relationship between energy usage and ROA with a *p*-value of 0.276.

The Hausman test is employed to assist in deciding which model is appropriate between the fixed effect model and the random effect model for energy usage. The table below present the Hausman test.

4.4.10 Hausman test for energy usage

The table below is based on the dependent variable- energy usage while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and ROA.

Table 4. 25: Hausman test- energy usage

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	Random	Difference	S.E.
Board Independence	3927.6	3886.048	41.55189	164.7478
Females	936.5754	-2580.361	3516.936	4010.584
Market capitalisation	0.01161	0.0120529	-0.0004429	0.001857
Sales growth	-877.4484	-866.6026	-10.84584	217.4838
ROA	2419.603	1847.305	572.2981	1356.223

b = consistent under Ho and Ha; obtained from xtreg; B = inconsistent under Ha, efficient under Ho; obtained from xtreg; Test: Ho: difference in coefficients not systematic

$chi^{2(9)}$ = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 1.81

Prob>chi^2 = 0.7697

Source: Authors' results of Hausman test from Stata 12 Software (2018)

The Hausman test was performed to test which model is appropriate to interpret the results of the study. The null hypothesis suggests that random effect model is appropriate while the alternative suggests that fixed effect is appropriate. The results from the table above of the Hausman test indicate the choice of use of random effect model since the Prob > chi^2 = 0.7697 which is greater than 0.05 meaning the null hypothesis cannot be rejected. Therefore, the study used the results from the random effect model to determine the relationship between dependent variable (energy usage) and independent variables (board independence, females and firm size).

4.4.11 Fixed effect model for skills development expenditure

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 26: Fixed effects model for skills development expenditure

Fixed effects (within) regression
Group variables: cococdes
R-sq: within = 0.2408
Between = 0.0001
Overall = 0.1210
Corr(u_i, Xb) = 0.1944

Number of obs = 308
Number of groups= 25
obs per group: min= 11
avq= 11.0
max= 11
R(5.275) = 17.45
Prob > r = 0.0000

Skills development expenditure	Coef.	Std. Err.	T	P>t	[95% Conf.	Interval]
Board independencee	438.1929	72.60059	6.04	0.000	295.2693	581.1164
Females	1644.939	1297.423	1.27	0.206	-909.2049	4199.083
Market Capitalisation	0.0001065	0.0007212	0.15	0.883	-0.0013132	0.0015263
Sales growth	-118.1331	114.9875	-1.03	0.305	-344.5008	108.2345
Net profit margin	-1.428603	28.68381	-0.05	0.960	-57.89636	55.03915
_cons	3672.145	3229.648	1.14	0.257	-2685.83	10030.12
sigma_u	17751.271					
sigma_e	21261.08					
Rho	.41075574	(fraction of variance due to u_i)				

F test that all u_i=0: F(27, 275) = 7.21 Prob > F = 0.0000

Source: Authors' results of fixed effects model from Stata 12 Software (2018)

The table above indicates the significant statistics where the coefficient and of the regressors and p-values are taken note of, and the significant level is set at 95% with p-values greater than 0.05 interpreted to be insignificant. The above results show that there a positive and is a significant relationship between skills development expenditure and board independence by a *p*-value of 0.000. The results indicate that there is a positive and an insignificant relationship indicated by skills development expenditure and female representative on corporate boards with a *p*-value of 0.206. Furthermore, the results indicate a positive and an insignificant relationship between skills development and market capitalisation with a *p*-value of 0.883.

Furthermore, the table above indicates a negative and an insignificant relationship of skills development expenditure and sales growth with a *p*-value of 0.305 lastly a negative and an insignificant relationship between skills development expenditure and net profit margin with a *p*-value of 0.960.

4.4.12 Random effect model for skills development expenditure

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 27: Random effects model for skills development expenditure

Random-effects GLS regression	Number of obs = 308
Group variable: cocode	number of groups = 28
R-sq: within = 0.2404	obs per group: min = 11
Between = 0.0002	avq = 11.0
Overall = 0.1235	max = 11
Corr(u_i,x) =0 (assumed)	Wald $chi^{2(11)}$ = 83.61
	Prob > chi^2 = 0.0000

Skills development expenditure	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Board independence	418.5069	71.14292	5.88	0.000	279.0693	557.9444
Females	1403.297	1244.357	1.13	0.259	-1035.598	3842.191
Market Capitalisation	0.0003408	0.0007015	0.49	0.627	-0.0010342	0.0017157
Sales growth	-119.5316	112.9238	-1.06	0.290	-340.8583	101.795
Net profit margin	-1.406927	28.05441	-0.05	0.960	-56.39256	53.57871
_cons	4774.087	4437.069	1.08	0.282	-3922.408	13470.58
sigma_u	16427.882					
sigma_e	21261.08					
Rho	.37383571	(fraction of variance due to u_i)				

Source: Authors' results of random effects model from Stata 12 Software (2018)

The table above indicates the significant statistics where the *p*-values are taken note of, and the significant level is set at 95% with *p*-values greater than 0.05 interpreted to

be insignificant. The above results show that there is a positive and significant relationship between skills development expenditure and board independence by a *p*-value of 0.000. The results indicate that there is positive and an insignificant relationship skills development expenditure and female members on corporate boards with a *p*-value of 0.259. Moreover, results from the table above indicate positive and an insignificant relationship between skills development expenditure and market capitalisation with a *p*-value of 0.627.

Furthermore, Table 4.27 indicates a negative and insignificant relationship between skills development expenditure and sales growth with a *p*-value of 0.290. Lastly, a negative and insignificant relationship between skills development expenditure and net profit margin with a *p*-value of 0.960.

4.4.13 Hausman test for skills development

The table below is based on the dependent variable- skills development expenditure while independent variables are as follows; board independence females, market capitalisation and control variables as sales growth and net profit margin.

Table 4. 28: Hausman test for skills development expenditure

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	Random	Difference	S.E.
Board independence	438.1929	418.5069	19.68599	14.47517
Females	1644.939	1403.297	241.6424	367.2652
Market Capitalisation	0.0001065	0.0003408	-0.0002342	0.0001673
Sales growth	-118.1331	-119.5316	1.398492	21.68729
Net profit margin	-1.428603	-1.406927	-0.0216765	5.975881

b = consistent under Ho and Ha; obtained from xtreg; B = inconsistent under Ha, efficient under Ho; obtained from xtreg; Test: Ho: difference in coefficients not systematic.

$chi^{2(11)}$ = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 4.94

Prob>chi^2 = 0.2937

Source: Authors' results of Hausman test from Stata 12 Software (2018)

The Hausman test was performed to test which model is appropriate to interpret the results of the study. The null hypothesis suggests that random effect model is appropriate while the alternative suggests that fixed effect is appropriate. The results from the table above of the Hausman test indicate the use of random effect model use since which is Prob > chi^2 =0.2937 greater than 0.05 meaning the null hypothesis cannot be rejected. Therefore, the study used the results from the random effect model to determine the relationship between dependent variable (skills development expenditure) and independent variables (board independence, females and firm size).

4.5 Overview of the research findings

This study aims to determine the relationship between board characteristics and environmental and social performance of banking and retail companies listed on the JSE SRI. This study used 28 banking and retail companies listed on the JSE SRI for 11 years (2007-2017).

The hypotheses were tested using the panel data analysis techniques through the fixed effect model and the random effect model to be able to cater for the problem of unobserved heterogeneity in the relationship between board characteristics and environmental and social performance. The Hausman test was used to decide which model to use between fixed effect model and random effect model where the random effect was chosen to be appropriate since Prob > chi^2 is higher than 0.005. The descriptive statistics indicate that the banking and retail companies listed on the JSE SRI are complying well regarding corporate governance on board independence and expertise but lack the board racial and gender distributions. The compliance is in line

with King IV recommendations for companies to have many independent boards of directors which is illustrated by the results above. These results are in line with Alazzani *et al*. (2017) who found that the board gender and racial distributions are lacking in many companies. Hence, companies should consider having a balanced gender on their board of directors as this would help ensure that they are seen to be responsible citizens.

4.5.1 Random effect model: Number of females on board of directors and environmental sustainability performance (energy usage) *(H_1)*

The research hypothesis *(H_1)* of this study states that there is no relationship between the number of females on the board of directors and environmental sustainability (energy usage) in selected banking and retail companies listed on the JSE SRI. From the random effect model results in Table 4.24, there is a negative and insignificant relationship between the number of female board members and energy usage at a *p*-value of 0.826 where the significance confidence interval was set at 95% and *p*-value less than 0.05 was set to be significant and *p*-value greater than 0.05 was set to be insignificant.

The results suggest that the number of females on the board of directors of do not influence energy usage of companies. The results imply that there is no relationship between the number of females on board of directors and environmental sustainability (energy usage). The results of the study similar to that of Alazzani *et al.* (2017) who focused on the influence of female board members on environmental performance of companies where the statistical results indicated the estimated *p*-value of 0.446, where the *p*-value is greater than 0.05 and led to the conclusion that there is a negative relationship between number of females on the board and environmental performance.

The study also indicated that whether there is a high or low number of females as the board of directors, companies' environmental performance may not depend on that. However, a company's sustainability report reflects the values and cultures within the companies and the mechanisms of its corporate governance agenda.

The study of Post *et al.* (2015) examined the relationship between board composition and environmental performance where board composition involved female representative on board. Their result indicated that there is a positive relationship between gender distribution and environmental performance with a *p*-value less than 0.05 meaning that an increase in the number of females on board improves the environmental performance of companies. This shows that when there is an increase in the number of females, there is an increase in environmental performance of the companies as there is a positive relationship between the number of females and environmental sustainability performance. Moreover, the King IV Code of Corporate Governance (Institute of Directors in Southern Africa, 2016) indicated that the board of directors of companies should have a balance of gender distribution since many companies have more males on the board than females and should disclose such in their annual integrated reports. Meanwhile, the agency theory suggests that board members of companies whether females or not have to engage more in sustainability projects of the companies and by so doing they will be acting in the best interest of companies (Mori & Towo, 2017). The results of this study from the table above therefore support the study hypothesis that there is no relationship between females on board and the environmental performance of companies, hence the alternate hypothesis is accepted, and the null hypothesis is rejected.

4.5.2 Random effect model: Firm size (market capitalisation) on environmental sustainability performance (energy usage) *(H_2)*

The research hypothesis *(H_2)* of this study states that there is no relationship between firm size (market capitalisation) and environmental sustainability (energy usage) in selected banking and retail companies listed on the JSE SRI. The random effect results indicate a positive and an insignificant relationship between energy usage and firm size (market capitalisation) with a *p*-value of 0.068 where the significance confidence interval was set at 95% and a *p*-value less than 0.05 was set to be significant and *p*-value greater than 0.05 was set to be insignificant.

The results indicate that the larger the firm size, the higher the occurrence of energy usage of companies. The study of Lei *et al.* (2017) support the results as they also suggest that there is a positive relationship between firm size and environmental performance of companies. Moreover, the results of Azizi *et al*. (2015) where the firm size influences energy usage indicates there is a need to let people know about energy efficiency strategies. The study also suggests that the energy usage strategies should be communicated to the individuals frequently to be able to achieve a better environmental performance (Azizi *et al*., 2015). The results support the study hypothesis that there is no relationship between firm size and the environmental performance of companies as it indicates that there is an insignificant relationship between the firm size of the companies and the environmental performance of companies, hence the alternate hypothesis is accepted, and the null hypothesis is rejected.

4.5.3 Random effect model: Board independence on environmental sustainability performance (energy usage) *(H_3)*

The research hypothesis *(H_3)* of this study states that there is no relationship between board independence and environmental sustainability (energy usage) in selected banking and retail companies listed on the JSE SRI. The results of the random effect model above indicate a positive and a significant relationship between energy usage and board independence by a *p*-value of 0.000 where the significance confidence interval was set at 95% and a *p*-value less than 0.05 was set to be significant and *p*-value greater than 0.05 was set to be insignificant. This means that the more the independent board members are added to the board of directors of companies the more the companies will perform well environmentally through energy usage. Also, the independence of the non-executive board members as advisors to the executive board means they can influence the environmental sustainability performance of companies. According to the King IV Code, the board of directors of companies should have a balanced board of both independent and non-independent board members. The results of this study are consistent with previous studies such as (Safa *et al.,* 2017) where the result suggests that the independence of the board of directors of companies protect the shareholders and act in the best interest of companies to achieve better environmental performance. The results, therefore, do not support the study hypothesis that there is no relationship between board independence and the environmental performance of companies. Hence, the alternate hypothesis is rejected, and the null hypothesis is accepted.

4.5.4 Random effect model: Number of females on board of directors and social sustainability performance (skills development expenditure) *(H_4)*

The research hypothesis *(H_4)* of this study states that there is no relationship between the number of females in the board of directors and social sustainability (skills development expenditure) in selected banking and retail companies listed on the JSE SRI. The results of the random effect model suggest that there is a positive but an insignificant relationship between skills development expenditure and the number of female board members with a *p*-value of 0.259 where the significance confidence interval was set at 95% and *p*-value less than 0.05 was set to be significant and *p*-value greater than 0.05 was set to be insignificant.

The result suggests that skills development expenditure of companies is not affected by the number of females in the board of directors. However, the study of Alazzani *et al.* (2017) indicated a significant relationship between female directors and social performance by the *p*-value of 0.006 meaning the presence of both females in the board of directors have an impact on skills development expenditure. Also, Boulata (2013) found a negative relationship between gender distribution and social performance of companies with a coefficient of -0.335, which means that the higher the percentage rate of gender distribution balance the lower the negativity of the association between gender distribution and skills development expenditure. Moreover, King IV indicated that the board of directors of companies should have a balance of gender distribution as many companies have more males on the board than females and disclose such in their annual integrated reports. The results support the study hypothesis that there is no relationship between board independence and the

social performance of companies, hence, the alternate hypothesis is accepted and the null the hypothesis is rejected.

4.5.5 Random effect model: Board independence and social sustainability performance (skills development expenditure) *(H_5)*

The research hypothesis *(H_5)* of this study states that there is no relationship between board independence and social sustainability (skills development expenditure) in selected banking and retail companies listed on the JSE SRI. The results of the random effect model above indicate a positive and significant relationship between skills development expenditure and board independence by a *p*-value of 0.000 where the significance confidence interval was set at 95% and a p-value less than 0.05 was set to be significant and p-value greater than 0.05 was set to be insignificant.

The results suggest that companies need to comply more with King IV regarding the principle of the balance of power between the independent and non-independent board of directors of companies. The study of Deschênes *et al.* (2015) support the results of this study with a positive relationship between the board independence and the social performance of companies with a coefficient of 2.51 which consists of skills development expenditure. The study further suggests that the independent board of directors of companies has a positive impact on the social performance of companies regarding their decisions on the social activities of the companies such as skills development expenditure. The study of Vallascas *et al*. (2017) suggests that the independent board of directors of companies need to engage more in the sustainability issues of the companies to improve their performance. The results, therefore, do not support the study alternate hypothesis that there is no relationship between board

independence and the social performance of companies. Hence, the alternate hypothesis is rejected, and the null hypothesis accepted.

4.5.6 Random effect model: Firm size (market capitalisation) and social sustainability performance (skills development) *(H_6)*

The research hypothesis *(H_6)* of this study states that there is no relationship between firm size (market capitalisation) and social sustainability (skills development expenditure) in selected banking and retail companies listed on the JSE SRI. The random effect results indicate a positive and an insignificant relationship between skills development and firm size (market capitalisation) with a *p*-value of 0.627 where the significance confidence interval was set at 95% and a p-value less than 0.05 was set to be significant and p-value greater than 0.05 was set to be insignificant. However, the study of Alazzani *et al.* (2017) indicated a significant relationship between firm size and social performance with a *p*-value of 0.001. Also, the study of Schreck and Raithel (2015) found the firm size and social performance with a p-value of 0,289 which is insignificant meaning firm size does not influence social performance. The results, therefore, support the study hypothesis that there is no relationship between firm size and the social performance of companies. Hence, the alternate hypothesis is accepted, and the null hypothesis is rejected.

4.6 Summary of the chapter

This chapter presents the interpretation, presentations and findings of this study through statistical analysis to address research hypotheses and objectives of this study. The study revealed both the significant and insignificant relationships between board characteristics and environmental and social sustainability performance of listed banking and retail companies on JSE SRI. Given the results above it can be concluded

that the board of directors influences the environmental sustainability performance of companies. Moreover, the number of females on board and firm size should be taken into consideration to improve environmental and social sustainability performance.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The previous chapter presented the result, provided interpretation and discussed the findings of this study. This chapter discusses the summary, conclusions and recommendations. Section 5.2 discusses the summary of the study; Section 5.3 discusses the conclusions and Section 5.4 outlines the recommendations of this study.

5.2 Summary of the study

This study aimed to determine whether there is a relationship between board characteristics and environmental and social sustainability performance. The study accomplished its aim and objectives through the discussion of the existing literature with the theoretical framework and the analysis discussed in this study. The chapter discussed three theories namely is the agency theory, legitimacy theory and the stakeholder theory. The study noted that companies adhere to King IV code of corporate governance which improves their companies' performance. The stakeholder theory encourages the board of directors to have good behaviour and have a way to manage and act towards the interests of the stakeholders to improve the sustainability performance of companies. The legitimacy theory encourages individuals to respect the companies' values and to act in the best interest of companies and agency theory suggest that there has to be a good relationship between shareholders and company executives which are the board of directors as that will assist in decision making and will improve the companies' performance.

Chapter two of the study discussed the literature review, legislative pronouncements and King IV. The theoretical framework discussed in this study which is related to this

study while King IV discussed the principles that are in line with this study's corporate governance structure and the literature review discussed the existing literature, the literature discussed was structured into subtitles according to the study's proxies of board structures and environmental sustainability performance. It reveals that most board of directors of companies still has fewer female members. However, that does not have much impact on the sustainability performance as the board of directors have a balance of members who are independent.

Chapter Three of this study discussed the research methodology. The chapter discussed the adoption of the quantitative method and the correlational research design which assisted the researcher to address the research objectives of the study. The correlational design is appropriate as it allowed the researcher to discuss the relationship between board independence, the number of females on the board and firm size on energy usage and skills development expenditure. The quantitative approach was appropriate as the number of females and board independence were measured in numbers, and firm size, energy usage and skills development expenditure were measured in Rand. The researcher believes that the research method used in this study is suitable to achieve the objectives of this study. The study used a sample of 28 banking and retail companies which were selected on the JSE SRI. The study used the banking and retail companies because they contribute to both environmental and social sustainability and their data are valid and can be obtained from the companies' website through the integrated annual reports through the IRESS database. The independent and dependent variables were defined and energy usage and skills development expenditure as the dependent variables and number of females on board, board independence and firm size as independent variables. Lastly, the control variables were used to justify that other variable such as sales growth, and

net profit margin may affect the dependent variables. The panel data analysis was employed to analyse the data of the banking and retail companies sampled over a period of 11 years (2007-2017).

Chapter Four presents the analysis, interpretation and the discussion of the results of the data which was outlined using methods described in Chapter Three. The MLRA statistical models were used to analyse the data collected in this study to fulfil the research objectives and hypothesis identified in the study. This study aims to determine the relationship between board characteristics and environmental and social sustainability performance of the banking and retail companies listed on the JSE SRI. The panel regression analysis was used to determine the effect of the number of female board, board independence and firm size on energy usage and skills development expenditure. The results revealed that there is a negative and insignificant relationship between the number of females on board and energy usage while there is an indication of a positive and an insignificant relationship between energy usage and firm size (market capitalisation). However, a positive and a significant relationship between energy usage and board independence is indicated. The results suggest that companies should try to balance the number of female members on company boards as there is no relationship between the number of females on board and energy usage. Firm size indicates that it does not influence environmental sustainability performance, board independence is indicated to boost environmental performance of companies. Moreover, the companies selected in this study indicated that there is good corporate governance compliance as King IV suggest that the board of directors should consist of a majority of independent non-executive directors.

The study further indicated that there is a positive but an insignificant relationship between skills development expenditure and female board members while there is an indication of a positive and significant relationship between skills development expenditure and board independence. However, a positive and an insignificant relationship between skills development and firm size (market capitalisation) is indicated. The results suggest that there should be an increase in the number of females on board as there seem to be a lack of balance of gender on most board of directors of companies analysed and it has no influence on social sustainability performance. There is an influence of board independence on social sustainability performance which also indicates that there is compliance of King IV, there is no influence of firm size on social sustainability performance.

5.3 Contribution of the study

The study adds to existing literature on board characteristics and environmental and social sustainability performance from the South African perspective. The interconnections between sustainability performance and board characteristics in this study came with mixed results. Most significant in this study is that the number of females on board and firm size influences environmental and social sustainability performance positively albeit not too significant.

5.4 Research limitation

The study's is limitation may result from its sampling of only the banking and retail companies. The study used only 28 banking and retail companies listed on JSE SRI. Although different sectors and samples may be used by other researchers and other banking and retail companies are not listed on the JSE SRI, but they can be regarded

as representative of the banking and retail companies in South Africa because of their listing and adherence to the King IV Code of Corporate Governance.

5.5 Conclusions

The study provides a significant contribution to addressing the effect of board characteristics on sustainability performance in a South African context. The study is among few studies on the relationship between board characteristics and environmental and social sustainability performance in South Africa on banking and retail companies. Moreover, the banking and retail industries in South Africa are major contributors to economic growth and in the process of their operations impact both the environment and society. However, board characteristics could possibly influence a company's sustainability practices and it is against the background that the relevance of the study is hinged. Hence, the findings of this study are crucial in adding to the existing corporate governance/sustainability debate. In view of the environmental challenges, board characteristics that is aligned to promoting and influencing sustainable business practices is seen by many stakeholders as one of the means of confronting organisational sustainability challenges. Moreover, the South African banking and retail sectors' board of directors (management) are morally bound to ensure that companies' operations or activities are sustainable into the future. Future research could reveal interesting insights on the effect of board characteristics and environmental and social sustainability performance. The study concludes that if the number of female on corporate boards could be increased, it is plausible that sustainability performance in most companies could become positively influenced.

5.6 Recommendations

The study provides academic, social and industrial recommendations.

5.6.1 Academic

Future studies can be conducted using a larger sample and different variables of board characteristics and environmental and social sustainability performance of companies. The study used only the quantitative approach and for future research the researchers could use the mixed method approach. The study contributes to future and existing literature for other researchers. The study provides information regarding board characteristics and environmental and social sustainability performance to stakeholder which will assist in further academic research.

5.6.2 Social

The study will assist the society when companies try to adhere to regulations and embrace good corporate governance to contribute to society through environmentally friendly practices such as sustainable energy usage through skills development programs that will enhance societal values.

5.6.3 Industrial

The results of this study should encourage companies to comply with King IV Code of Corporate Governance to for improved sustainable benefit to society, environment and the companies. The results of this study encourage the board of directors of companies to strategically align their companies by ensuring a balance in board characteristics for the sake of the social and environmental performance of companies. There is an indication of the lack of number of female members on boards.

The result of the study indicates that the debate about gender imbalance in corporate entities requires concerted effort by regulators and corporate individuals to redress.

5.7 Future Research

Future researchers may opt for other sectors, use different variables for board characteristics and environmental and social performance of companies and many companies.

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APPENDIX 1

LIST OF ACCRONYMS

JSE	Johannesburg Stock Exchange
SRI	Socially Responsible Index
ROA	Return on Assets

Table 4. 29: raw data for Panel Data Analysis

Co.Name	Co.Code	Period	Dependent variable	Dependent variable	Independent variable	Independent variable	Independent variable	Control variables		
			Energy usage	Skills development exp	Board independence	Females	Market capitalisation	Sales	ROA	Net Profit
			R'000	R'000			R'000	%	%	%
ADH	1	2007	373000	40000	0	0	2000000	16	24.8	12.38
ADH	1	2008	392000	59000	60	1	0	24.7	28.2	12.95
ADH	1	2009	498000	73000	63.64	1	0	14.6	27.4	11.64
ADH	1	2010	478000	94000	66.67	1	0	6.84	24.1	10.12
ADH	1	2011	982000	97000	66.67	2	0	9.22	22	9.73
ADH	1	2012	999000	68000	77.78	2	0	5.08	17.2	8.2
ADH	1	2013	100000	93000	66.67	3	0	4.69	15.2	8.82
ADH	1	2014	103800	95000	62.5	2	0	9.37	14.4	8.65
ADH	1	2015	203050	10030	75	1	0	40.2	15.2	8.31
ADH	1	2016	206060	13000	70	4	0	23.8	18.9	11.11
ADH	1	2017	0	0	0	0	0	0	0	0
BGA	2	2007	0	0	0	0	0	0	-0.8	0
BGA	2	2008	0	21010	0	0	7230000	0	-0.9	0
BGA	2	2009	0	28020	66.67	4	9230000	0	-1.6	0
BGA	2	2010	0	37000	73.68	5	1000000.6	0	-1.3	0
BGA	2	2011	0	52600	72.22	3	1170000.8	0	-1.5	0
BGA	2	2012	0	60600	70.59	3	1120000.1	0	-1.5	0
BGA	2	2013	0	93200	66.67	4	1540000.1	0	-1.5	0
BGA	2	2014	0	18000	58.33	3	1220000	0	-1.5	0
BGA	2	2015	0	23600	75	4	1430000	0	-1.9	0
BGA	2	2016	0	37600	71.43	4	1510000	0	0	0
BGA	2	2017	0	0	0	0	0	0	0	0
CHP	3	2007	0	0	0	0	0	0	0	0

CHP	3	2008	0	0	0	0	0	0	0	0
CHP	3	2009	0	0	0	0	0	0	0	0
CHP	3	2010	0	0	0	0	0	0	0	0
CHP	3	2011	0	0	0	0	0	0	0	0
CHP	3	2012	312502	80908	50	1	2150362	0	0	0
CHP	3	2013	324060	81203	60	1	2379724	0	0	0
CHP	3	2014	341000	99603	71.43	2	2418696	0	0	0
CHP	3	2015	421020	10507	57.41	2	2418991	0	12.7	3.41
CHP	3	2016	580060	16015	66.67	1	2658720	24	6.67	1.49
CHP	3	2017	634082	12050	70.59	2	3512420	20.1	4.83	0.95
CLS	4	2007	291033	16500	62.5	1	4821000	0.51	14.4	3.79
CLS	4	2008	302104.1	26700	54.54	3	4500000	12.2	19	3.92
CLS	4	2009	302301.3	39907	63.64	3	5600009	7.93	21.9	3.88
CLS	4	2010	314407.3	56800	60	3	9980600	9.04	24.2	4.26
CLS	4	2011	301507.9	47000	60	3	1054008	6.23	23	4.62
CLS	4	2012	306808.6	40000	55.56	4	0	9.46	21.9	4.46
CLS	4	2013	349001.3	45000	66.67	3	0	13.6	21.8	4.28
CLS	4	2014	371620.3	52500	77.78	4	0	9.16	19.7	4.52
CLS	4	2015	391250.6	49000	66.67	3	0	15.3	20	4.33
CLS	4	2016	398570.5	57800	60	3	0	9.52	19.8	4.53
CLS	4	2017	409000	45000	66.67	4	0	-88.9	0	47.66
CMH	5	2007	0	0	0	0	0	34.5	15.3	2.04
CMH	5	2008	0	0	0	0	0	-3.01	10.1	1.11
CMH	5	2009	419301.4	51205	0	0	1968280	-25.3	2.51	0.12
CMH	5	2010	441208.1	62000	57.43	1	2413000	-1.13	5.64	0.84
CMH	5	2011	723025	85000	66.67	1	2483139	13.1	9.58	1.63
CMH	5	2012	623200	10120.3	77.78	2	2176761	12.7	9.07	1.58
CMH	5	2013	880602.4	90000	66.67	3	2494624	8.18	11.1	2.08

CMH	5	2014	790405.9	75000	77.78	2	2574700	19.9	12.8	1.58
CMH	5	2015	585990.5	82000	57.43	2	4360180	0.18	12.3	1.41
CMH	5	2016	826760.1	10340.8	66.67	2	5270338	2.61	13.5	1.65
CMH	5	2017	927330	10708.6	77.78	3	4236013	-7.25	13.7	1.93
COH	6	2007	0	0	0	0	0	0	0	0
COH	6	2008	0	0	0	0	0	0	0	0
COH	6	2009	0	0	0	0	0	0	0	0
COH	6	2010	0	0	0	0	0	0	0	0
COH	6	2011	474066.7	30000	62.5	1	4000000	5	6.2	8.3
COH	6	2012	574120	70000	66.67	2	4000000	5	8	7.2
COH	6	2013	633740	51420	70	3	8000000	15.1	9	1.9
COH	6	2014	829100	28110	62.5	2	6200000	14.2	9.5	1.7
COH	6	2015	956650	76850	55.56	2	8000000	19.1	9.1	21.5
COH	6	2016	743700	43700	70	2	7100000	11.2	12	22.1
COH	6	2017	0	0	0	0	0	0	0	0
CPI	7	2007	426004	15000	44.44	1	3031000	0	-31	0
CPI	7	2008	376190	19200	50	1	3195000	0	-11	0
CPI	7	2009	276690	11800	55.56	2	2485000	0	-9.9	0
CPI	7	2010	222110	19600	44.44	1	6805000	0	-6.7	0
CPI	7	2011	343570	28000	54.54	2	1485000	0	-7.8	291.96
CPI	7	2012	692620	35000	66.67	2	1836700	-0.98	-7.5	495.02
CPI	7	2013	136380	26500	58.33	2	2151500	14.4	-8.2	637.71
CPI	7	2014	201310	35000	81.81	2	2118600	0	-9.7	0
CPI	7	2015	238807	44400	58.33	3	4740700	0	-8.9	0
CPI	7	2016	242604	53500	72.72	2	5480700	0	-8.2	0
CPI	7	2017	279940	60200	75	3	8383000	0	-8.4	0
CSB	8	2007	504700	30000	66.67	1	1599932	27.2	27.3	3.53
CSB	8	2008	112704	53000	62.5	1	1244850	17.3	17.3	3.98

CSB	8	2009	222800	63000	55.56	2	1651542	25.3	25.3	3.5
CSB	8	2010	281490	74000	66.67	2	1935917	5.99	5.99	3.05
CSB	8	2011	317110	58000	60	1	2393032	5.56	5.56	2.65
CSB	8	2012	416870	93000	70	2	3451004	11.3	11.3	4.55
CSB	8	2013	503330	70000	60	3	3350245	1.06	1.06	3.85
CSB	8	2014	420190	68000	60	2	3148728	6.34	6.34	3.92
CSB	8	2015	390480	53000	70	3	7582000	13.4	13.4	4.67
CSB	8	2016	396890	72000	70	2	8871000	12.7	12.7	5.05
CSB	8	2017	397015	11800	71.43	2	8891000	12.2	18.7	4.78
FSR	9	2007	147700	10040	50	0	1270000	0	-0.5	0
FSR	9	2008	223600	17700	66.67	1	7400000	0	-1.4	0
FSR	9	2009	265000	20500	75	3	1010000	0	-2.6	0
FSR	9	2010	214400	21600	82.61	4	1110000	0	-0.6	0
FSR	9	2011	161100	21100	84.21	3	1480000	0	0.08	0
FSR	9	2012	174300	34000	77.78	4	1630000	0	-0.6	0
FSR	9	2013	116900	40500	76.19	4	2290000	0	-0.6	0
FSR	9	2014	104700	45100	76.19	3	2990000	0	-0.6	0
FSR	9	2015	106900	43700	78.26	4	2510000	0	-0.9	0
FSR	9	2016	156900	47200	73.91	3	3010000	0	-1.3	0
FSR	9	2017	168900	56100	80	5	2644000	0	-1.3	0
HIL	10	2007	0	0	0	0	0	0	0	0
HIL	10	2008	679000	90000	76.96	5	0	0	0	0
HIL	10	2009	715200	97000	63.63	6	0	0	0	0
HIL	10	2010	890100	12000	57.43	3	0	0	0	0
HIL	10	2011	209130	23000	57.43	3	0	0	0	0
HIL	10	2012	406800	28000	71.43	2	0	0	0	0
HIL	10	2013	617300	35000	57.43	3	3000000	0	25.2	0
HIL	10	2014	911250	36000	71.43	2	0	0	23.1	29.28

HIL	10	2015	101092.8	35000	66.67	3	0	10.4	20.9	29.46
HIL	10	2016	896540	39000	77.78	2	0	11.8	0	28.37
HIL	10	2017	0	0	0	0	0	0	0	0
IPL	11	2007	350000	12380	73.91	2	2966100	5.4	22.6	10.22
IPL	11	2008	320000	18970	88.89	1	1238560	5.9	12	5.2
IPL	11	2009	310000	19010	63.17	3	1191010	7.2	11.5	21.2
IPL	11	2010	330000	11006	75	4	1236700	6.1	12.9	6.9
IPL	11	2011	430000	18203	76.19	4	1809500	6.7	16.5	5.3
IPL	11	2012	410000	27000	80.95	3	2593700	3.2	16.3	9.1
IPL	11	2013	520000	23000	78.95	3	3609300	2.1	17.2	7.9
IPL	11	2014	700000	0	84.21	4	4400000	8.5	14.7	4.8
IPL	11	2015	830000	22000	75	3	4156030	4.5	13.7	23.6
IPL	11	2016	790000	27000	80.95	5	3761060	3.2	12.4	27.3
IPL	11	2017	810000	28350	71.43	2	3118000	2.5	13.2	20.2
ITE	12	2007	140000	40000	50	0	5147000	14.9	29.3	18.28
ITE	12	2008	120000	40000	57.14	0	2410600	10.7	25.5	16.82
ITE	12	2009	170000	43700	50	2	2516000	-20.3	18.7	19.72
ITE	12	2010	140000	62000	57.14	1	2109000	3.91	18.9	20.16
ITE	12	2011	140000	50000	71.43	2	3316000	12.3	19.6	21.1
ITE	12	2012	160000	50000	62.5	7	4094000	21.3	20	20.49
ITE	12	2013	150000	10500	63.64	2	5514000	16	23.1	20.74
ITE	12	2014	140000	14000	70	3	7875000	26.8	27.7	18.75
ITE	12	2015	120000	60000	66.67	2	1707070	14.8	29.2	22.47
ITE	12	2016	145000	12000	77.78	3	1237030	13.6	27.7	22.97
ITE	12	2017	165000	70000	62.5	2	1514720	3.7	25.6	23.02
LEW	13	2007	400000	10000	63.64	1	1685000	15.6	25.7	18
LEW	13	2008	0	45000	50	3	1419000	8.21	25.1	17.86
LEW	13	2009	0	30000	64.28	2	1418800	5.86	20.4	14.89

LEW	13	2010	610000	50000	58.14	3	1554000	-15.9	18.5	18.46
LEW	13	2011	730000	79000	66.67	2	2300500	42.9	19.1	15.55
LEW	13	2012	790000	83000	64.29	3	1747200	6.11	19.1	16.48
LEW	13	2013	0	92000	64.29	4	1633700	6.8	17.5	17.49
LEW	13	2014	0	11700	61.54	2	1568700	-21.5	14.9	20.68
LEW	13	2015	0	12000	71.43	1	1687600	7.47	14.3	19.18
LEW	13	2016	0	15000	57.14	2	4105900	32.2	14.1	16.62
LEW	13	2017	0	11652	66.67	3	1685200	-3.33	7.45	6.4
MSM	14	2007	220000	21000	78.57	3	1706940	17.2	17.2	7.91
MSM	14	2008	203000	48000	78.57	3	1230720	18.9	19.5	7.65
MSM	14	2009	235000	12200	71.43	2	1610040	19.3	17.5	7.17
MSM	14	2010	206000	11900	84.62	2	2458030	10	15.3	7.12
MSM	14	2011	244000	84000	66.67	3	2831060	12.9	10.8	9.47
MSM	14	2012	251000	11000	50	2	3638400	10.2	15.3	10.34
MSM	14	2013	261000	12500	66.67	3	2941040	12.7	8.93	11.59
MSM	14	2014	251000	89000	66.67	3	3124090	19.3	7.58	11.8
MSM	14	2015	269000	11306	70	2	2240080	13.8	7.61	12.73
MSM	14	2016	283000	13100	60	4	0	10.6	8.47	13.28
MSM	14	2017	0	0	0	0	0	0	0	0
MRP	15	2007	536100	65000	0	0	1699500	16.2	25.7	3.04
MRP	15	2008	455900	71000	71.43	0	4490800	14.3	27	3.36
MRP	15	2009	194790	79000	64.71	2	5909400	8.41	26.9	2.81
MRP	15	2010	325840	70000	70.59	3	1983700	10	23.4	2.38
MRP	15	2011	0	0	0	0	0	11.6	37.8	1.58
MRP	15	2012	520000	0	0	0	0	83.8	41.6	1.92
MRP	15	2013	820000	25100	0	0	0	-25.8	43.2	1.78
MRP	15	2014	700000	30800	64.29	3	3900000	8.18	40	1.38
MRP	15	2015	328200	33800	60	2	6400000	8.39	40.8	1.31

MRP	15	2016	820000	38500	50	3	4500000	7.69	46.9	1.43
MRP	15	2017	372320	34800	0	0	0	0	0	0
NCS	16	2007	0	0	0	0	0	0	0	0
NCS	16	2008	0	0	0	0	0	0	0	0
NCS	16	2009	0	0	0	0	0	0	0	0
NCS	16	2010	0	0	0	0	0	0	0	0
NCS	16	2011	0	0	0	0	0	0	0	0
NCS	16	2012	272000	16470	62.5	2	9609100	6.3	-1.4	6.21
NCS	16	2013	580000	21520	77.78	1	2143800	4.5	-7.2	5.4
NCS	16	2014	573000	31000	66.67	2	2143700	9.2	-8	3.9
NCS	16	2015	588000	75000	57.43	0	4630890	4.4	4.44	11.54
NCS	16	2016	655000	85000	62.5	2	5233300	12.4	7.7	2.92
NCS	16	2017	101000	97000	75	0	3967200	13.7	9.2	3.85
NED	17	2007	486100	17450	70.58	3	6250000	0	-1.1	0
NED	17	2008	541600	24050	81.25	1	4480000	0	-1.4	0
NED	17	2009	332800	0	73.33	5	1671000	0	-1.7	0
NED	17	2010	315100	30100	75	5	1736600	0	-1.7	0
NED	17	2011	383000	0	70.58	5	0	0	-1.5	0
NED	17	2012	418800	39600	66.67	4	0	0	-1.4	0
NED	17	2013	451600	0	69.23	3	1070000	0	-1.3	0
NED	17	2014	488100	0	77.78	4	0	0	-1.2	0
NED	17	2015	492300	0	75	3	0	0	-1.2	0
NED	17	2016	592800	0	70.59	3	0	0	-1.2	0
NED	17	2017	0	0	0	0	0	0	0	0
PIK	18	2007	291700	46000	57.42	2	1597440	12.1	17.2	1.72
PIK	18	2008	100000	99300	53.85	1	1569020	15.4	18.8	2.06
PIK	18	2009	814000	89000	55.56	2	1940820	14.4	18.7	2.02
PIK	18	2010	954000	98000	61.54	3	2230970	6.51	18.3	2.15

PIK	18	2011	799600	72000	60	4	2069070	-6.09	13.4	1.51
PIK	18	2012	112670	66300	66.67	5	2180000	13.6	11.5	1.89
PIK	18	2013	121370	68800	56.25	5	2170000	0.49	7.24	0.93
PIK	18	2014	550000	80100	62.5	4	2570000	6.49	6.87	0.92
PIK	18	2015	400000	55850	66.67	2	2744000	6.06	9.13	1.29
PIK	18	2016	510000	83000	63.64	3	3200000	8.22	9.52	1.47
PIK	18	2017	496100	71300	46	5	3460000	6.96	10.1	1.6
RMH	19	2007	0	0	0	0	0	0	4.78	0
RMH	19	2008	0	0	0	0	0	0	2.69	0
RMH	19	2009	146000	23000	0	0	2840000	0	1.03	0
RMH	19	2010	165000	23000	60	1	1377000	0	2.01	0
RMH	19	2011	461000	21600	63.64	1	1377000	0	-0.2	0
RMH	19	2012	410000	0	50	2	1492000	0	-0.1	0
RMH	19	2013	0	0	66.67	3	1556000	0	-0.1	0
RMH	19	2014	0	0	68.75	2	1742000	0	-0	0
RMH	19	2015	0	0	62.5	4	1935000	0	0.12	0
RMH	19	2016	0	0	75	2	7940000	0	-0.1	0
RMH	19	2017	620000	81000	66.67	4	4200100	0	-0.1	0
SBK	20	2007	0	0	0	0	0	0	-0.2	0
SBK	20	2008	0	0	0	0	0	0	-1.4	0
SBK	20	2009	966000	64000	61.54	1	1118000	0	-1.8	0
SBK	20	2010	0	0	0	0	0	0	-1.4	0
SBK	20	2011	0	0	0	0	0	0	-1.2	0
SBK	20	2012	107000	42300	64.29	2	1143700	0	-1.4	0
SBK	20	2013	0	0	0	0	1200000	0	-1.2	0
SBK	20	2014	124000	63400	68.75	2	0	0	-1.2	0
SBK	20	2015	196000	74600	87.5	3	0	0	-1.2	0
SBK	20	2016	251600	85000	80	5	0	0	-1.1	0

SBK	20	2017	0	0	0	0	0	0	0	0
SFN	21	2007	0	0	0	0	0	0	0	0
SFN	21	2008	0	0	0	0	0	0	0	0
SFN	21	2009	0	0	0	0	0	0	0	0
SFN	21	2010	0	0	0	0	0	0	0	0
SFN	21	2011	0	0	0	0	0	0	0	0
SFN	21	2012	208300	11000	62.5	1	1000000	12.1	2	2.09
SFN	21	2013	253400	18100	58.33	2	6300000	10.2	2.2	1.02
SFN	21	2014	342800	17000	61.54	4	1500000	5.7	2.1	2.24
SFN	21	2015	420370	21000	70	3	7000000	15.6	1.89	1.98
SFN	21	2016	201500	12600	66.67	3	1300000	9.7	2.12	3.7
SFN	21	2017	336600	12400	75	2	1200000	10.3	1.64	3.2
SHP	22	2007	180000	16341	46.15	0	0	16.2	14.4	2.76
SHP	22	2008	210000	13857	53.85	1	2400000	22.3	15.9	3.33
SHP	22	2009	310000	18091	72.73	0	0	24.5	17.6	3.37
SHP	22	2010	370000	17917	60	0	0	13.6	18.7	3.36
SHP	22	2011	350000	20601	50	1	0	7.26	19.5	3.47
SHP	22	2012	380000	24235	75	1	0	14.4	14.9	3.66
SHP	22	2013	410000	25841	53.85	2	0	12.1	16.4	3.88
SHP	22	2014	470000	21564	69.23	1	0	10.2	14.9	3.65
SHP	22	2015	490000	28942	69.23	2	0	11.2	14.3	3.63
SHP	22	2016	530000	36581	76.92	1	0	14.4	15.6	3.72
SHP	22	2017	230500	38124	61.54	2	1100000	8.44	14.5	3.85
SPG	23	2007	0	0	0	0	1113492	6.2	4.2	1.24
SPG	23	2008	251400	20800	0	0	1102101	2.58	0	1.93
SPG	23	2009	125000	30500	62.5	1	1103491	3.64	5.6	2.54
SPG	23	2010	926000	42000	57.14	0	1120160	17.2	6	2.69
SPG	23	2011	120700	24000	62.5	0	1125506	15.9	8.1	2.81

SPG	23	2012	164200	27400	62.5	1	1148080	20.2	12	3.59
SPG	23	2013	199500	23000	62.5	0	1173000	21.9	12.2	3.23
SPG	23	2014	241800	18000	50	1	1196020	19.2	11.8	1.59
SPG	23	2015	278300	17800	75	1	1199420	14.6	10.9	2
SPG	23	2016	140000	15600	62.5	1	1413000	15.3	9.8	3.2
SPG	23	2017	159252	39800	60	0	1287900	16.7	9.3	2.24
SPP	24	2007	917000	16300	50	1	1917000	27.6	16.1	2.41
SPP	24	2008	850400	16900	60	1	1850400	23.2	17.4	2.55
SPP	24	2009	110380	16400	63.64	2	1103000	19.5	18.1	2.33
SPP	24	2010	158890	19300	50	1	1580890	9.02	18	2.63
SPP	24	2011	163270	19600	66.67	2	1630270	10.4	17.7	2.48
SPP	24	2012	220570	11400	61.54	3	1220570	12.2	15.9	2.45
SPP	24	2013	208770	11800	77.78	2	2089090	9.78	17.6	2.51
SPP	24	2014	217080	13200	83.33	1	1217080	15	13	2.47
SPP	24	2015	320270	14100	75	2	1320270	34.5	13.5	1.94
SPP	24	2016	370040	13200	72.73	3	1370040	23.8	10.9	2
SPP	24	2017	655300	14200	61.58	2	1321640	5.26	10.6	1.91
TFG	26	2007	430000	30900	62.5	2	1660018.4	12.4	39.6	15.48
TFG	26	2008	423000	30800	70.59	3	2960160.6	6.07	36	14.71
TFG	26	2009	622000	43200	66.67	5	1050670.5	5.49	34.3	14.16
TFG	26	2010	884000	43200	82.35	5	1610130.4	6.37	34.3	12.62
TFG	26	2011	101000	37000	0	0	2040800.8	15.5	36.7	13.1
TFG	26	2012	114700	10980	73.33	4	2970440.8	17.1	36.5	13.6
TFG	26	2013	110900	12030	80	5	2570740.6	10.9	36.7	13.9
TFG	26	2014	117600	63400	82.35	3	2370870.8	9.79	36	13.13
TFG	26	2015	120600	15376	78.95	6	3810001.2	13.6	30.6	11.55
TFG	26	2016	125000	35900	70.58	3	3040590.2	31.2	27.6	10.21
TFG	26	2017	0	0	0	0	0	11.6	24.5	9.99

TRU	25	2007	156000	19000	55.56	1	1392020	27.3	39.6	22.23
TRU	25	2008	166000	23100	66.67	1	1620280	16.3	36	22.6
TRU	25	2009	158000	14100	77.78	2	1992100	10.6	34.3	22.96
TRU	25	2010	216000	16400	62.5	2	1678080	11.1	34.3	23.12
TRU	25	2011	174000	18100	66.67	1	2542800	13.3	36.7	24.73
TRU	25	2012	211000	18300	66.67	2	3143002	12.4	36.5	25.2
TRU	25	2013	259000	18500	75	1	4134100	10.6	36	24.66
TRU	25	2014	268000	18700	77.78	3	4032800	7.1	30.6	23.01
TRU	25	2015	163000	10300	70	1	3165006	7.96	27.6	21.79
TRU	25	2016	217000	10700	77.78	1	0	47.5	24.5	16.84
TRU	25	2017	301000	10500	66.67	2	0	8.47	23.5	15.65
VMK	27	2007	0	0	0	0	0	-9.91	27.7	4.57
VMK	27	2008	274000	71500	60	0	0	-12.8	12.3	1.77
VMK	27	2009	114500	31000	50	0	3670000	-0.21	0.38	-1.45
VMK	27	2010	118400	40000	50	0	3680000	37.6	20.3	3.92
VMK	27	2011	170600	41000	50	1	3540000	32.9	33.9	7.25
VMK	27	2012	157200	0	66.67	1	3800090	-2.28	31.6	5.94
VMK	27	2013	232000	0	60	1	3900000	0.65	9.96	1.96
VMK	27	2014	333900	0	60	0	3950000	-5.2	23.2	4.1
VMK	27	2015	363000	0	60	0	3900000	-2.97	11.1	2.7
VMK	27	2016	384000	0	66.67	1	3920000	3.41	11.5	1.96
VMK	27	2017	423100	0	0	0	0	1.67	21.8	5.88
WHL	28	2007	415000	0	66.67	5	0	22.3	8.42	6.18
WHL	28	2008	111200	0	75	3	1917900	15.5	5.91	4.7
WHL	28	2009	126000	0	58.33	3	1900000	5.53	18.4	5.89
WHL	28	2010	145000	0	64.29	4	1347000	10.5	19.2	5.38
WHL	28	2011	121000	0	73.33	6	2136500	9.36	25.4	6.38
WHL	28	2012	0	0	71.43	5	2458000	11.8	30.4	7.16

WHL	28	2013	0	0	66.67	4	0	23.2	35.6	7.37
WHL	28	2014	0	0	83.33	2	0	12.7	20.4	7.27
WHL	28	2015	0	0	66.67	4	0	42.3	21.7	5.51
WHL	28	2016	0	0	62.5	6	0	15	22.9	6.68
WHL	28	2017	0	0	75	5	0	3.7	30	8.08