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ENVIRONMENTAL CAPITAL DISCLOSURE AND FIRM VALUE: DOES ENTITY BUSINESS MODEL MATTER? EVIDENCE FROM LISTED COMPANIES IN KENYA AND SOUTH AFRICA

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Abstract

Valuation of listed companies in the Nairobi Securities Exchange (NSE) has been found to be unpredictable as market-to-book values disclose huge variations. Corporate disclosures have been linked to firm value by prior studies. However, assessment of non-financial information disclosures with financial information in an integrated reporting context has not been explored

fully. Further, owing to the reported mixed results in other settings, this comparative study aimed at evaluating the effect of environmental capital disclosure on value of listed companies in Kenya and South Africa, by interrogating the role of company business model. 137 companies were sampled from a population of 209 companies constituting 19 and 118 companies listed on Kenya and South Africa securities exchanges respectively. A 3-year period 2018-2020 was covered by the study. Ingrained on the stakeholder and legitimacy theories, the study applied both exploratory and confirmatory research design. Secondary data sources encompassing audited annual integrated reports and financial statements were used. Data analysis methods composed of descriptive statistics, correlation and step-wise regression analysis technique. The study demonstrated that environmental capital disclosure positively and significantly influences firm value in both countries. Further, environmental capital disclosure and firm value is mediated by the business model. However, inconsistent and partial mediation was reported for Kenya and South African data respectively. The study recommends continued disclosures related to environmental capital due to its positive influence on firm value. Further, while adopting non-financial disclosures, entity business model should be considered since it provides a framework through which non-financial resources affect firm value.

Keywords: Integrated Reporting, Business model, Environmental Capital, Natural capital, Corporate Disclosures, Firm Value

INTRODUCTION

Integrated reporting <IR> is a procedure that accounts for and combines wholly significant facts about a company's accomplishments, its strategy and resource allocation and corporate governance in such a manner that represents social, environmental and commercial circumstance inside which the entity functions (International Integrated Reporting Council (IIRC), 2011). As a comprehensive report both financial and non-financial details are combined in one report (Abeysekera, 2013; Churet *et al*., 2014; Fernando *et al*., 2017). In this form of reporting company value creation is a function of resources (or multiple capitals) which take six forms; financial, manufactured, intellectual, human, environmental (natural), social and relationship capital (IIRC Discussion paper, 2011). The concern of this research was on this fundamental concepts of Integrated reporting that exerts emphasis on company resources (or multiple capitals) and their contribution to the firm's value particularly focusing on environmental capital disclosure and firm value.

Environmental capital comprises one of resources and processes emanating from the environment that may be renewable or non-renewable useful in the provision of products and

services inclusive of land, air, water and ecosystem health (IIRC, 2013b). This definition is in concurrence with the Organization for Economic Cooperation and Development (OECD) that regard natural capital as assets of nature that play a role in economic production by providing inputs in form of natural resources and environmental services. Within natural capital as elucidated by the IIRC (2013), the OECD also consider forests, materials, minerals, energy and biodiversity as aspects of natural capital. Furthermore, Ernst and Young (2013) equally take into account emissions, effluents and waste as natural capital related aspects. Natural capital reporting by companies has been through disclosure of sustainability reports on the cornerstone of the Global Reporting Initiative (GRI) guidelines before the emergence of IIRC's reporting framework of <IR>. Nonetheless, the GRI directions on sustainability reporting connects closely with IIRC reporting framework. In compliance with the <IR> framework, disclosure of natural capital has been given limited attention in company annual reports (Adams & Busola, 2017; Albertini, 2018). Nevertheless, studies by Nor *et al*. (2016), Gatimbu and Wabwire (2016), and Suttipun (2017) have affirmed that disclosure of environmental information influence firm performance.

In the contexture of IIRC Framework, the system chosen by the organization to aid in the process of organizing inputs, business activities (processes), outputs and outcomes with the aim of creating value in the short, medium and long term comprise the entity's Business Model (BM) (IIRC, 2013). Osterwelder and Pigneur (2010) concur with this statement by adding that the justification relative to which a company creates, conveys and captures value is described by the business model. Accordingly, the IIRC's <IR> framework has positioned the BM at the centre of the six capitals (i.e. financial, manufactured, intellectual, human, social and relationship and natural capital). These declares the resources of value that underlie the value creation process of companies by elucidating how financial and non-financial elements are connected (IIRC, 2013; Tweedie *et al.*, 2018). Thus, the business model provides a platform through which the company resources (or multiple capitals) contribute to the firm's value. On this note this study is centered particularly on environmental capital disclosure and firm value, and the association with the entity business model.

This study compares the effect of environmental capital disclosure on firm value in the Kenyan and South African listed companies, bringing the role of business model into perspective. Whereas, South Africa was the first country in the world to formally recognize integrated reporting when the Johannesburg Stock Exchange (JSE) endorsed parts of the King Report on Corporate Governance for South Africa 2009 (The King III Code) and has made it mandatory on a "report or explain" basis, in Kenya integrated reporting is voluntary.

Statement of the Problem

Integrated reporting is based on the six capitals framework and is aimed at fostering reporting a firm's value through a more holistic picture that integrates both financial and non-financial information in a single report. Central to the company's value creation process is the business model which integrates the capital resources of value in the form of financial capital, manufactured capital, intellectual capital, human capital, social and relationship capital, and environmental capital, thus providing a clear communication of the potential of the firms future value creation that will improve firm value of listed firms.

Notwithstanding, this proposition, Kenyan listed companies have continued to witness fluctuations in firm value as measured by market-to-book value over the last 5 years as evidenced by large differences between firm market values and book values (NSE, Handbook 2017-2018). Furthermore, the NSE 20 market performance index has also been fluctuating from as high as 6161.46 points to as low as 1004.70 percentage points from 1997-2022 (NSE, 2022). On average a declining trend of stock market index has been witnessed from 3323.88 in 2018 to 1799.52 in 2022 (Cytonn report (2022). Appropriate valuation of the firm should report a market-to-book value ratio equal to 1. Instead, listed firms in Kenya report a market-to-book value ratio of greater or less than 1. A value greater than 1, means the firm is overvalued, whereas a value less than 1, is an indication of undervaluation of such firms by the capital market (Musiega *et al.,* 2013; Dominic & Memba, 2015). On this notion, Healy and Palepu (2001) note that if the information disclosed is transparent and truthful, then the value of the firm, which is proxied through the stock market price will be precise. Further, Nyasha and Odhiambo (2014) in their study exclaim that volatility of firm value as indicated by market capitalization and NSE 20 Share index, makes it risk to hold such securities.

Owing to the fact that company disclosures in form of integrated reporting enhance firm value, earlier research on integrated reporting containing environmental capital disclosure variable and firm value has reported mixed results. A study by Anifowose *et al*. (2020) reveal positive results. While, negative and statistically significant results have been established by Suttipun (2017) on studying the association between environmental capital reporting and corporate financial performance in Thailand. However, a negative and insignificant relation was found between disclosure of natural capital and firm value of listed manufacturing companies' in Nigeria (Adegbie *et al.*, 2019). As Pillay (2019) study established inadequate disclosure of environmental capital both in quality and quantity by Kenya's banking sector institutions. These findings motivate the researcher to undertake the current study to add more evidence by further investigating the effect of non-financial information disclosures on value of listed companies and provide an explanation on how or why the relationship occur in the context of integrated

reporting. Specifically, the study focused on the effect of environmental capital disclosure on value of listed companies comparing Kenya and South Africa, focusing on the role of the business model.

Overall Research Objective

To assess the interconnection between Environmental Capital Disclosure and firm value among listed companies in Kenya and South Africa focusing of the role of the business model

Specific objectives

i. To compare the effect of environmental capital disclosure on value of listed companies between Kenya and South Africa
ii. To estimate the role of business model on the relationship between environmental capital disclosure and value of listed companies when comparing Kenya and South Africa.

Research Hypothesis

H_{01}: Environmental capital disclosure has no statistically significant effect on value of listed companies between Kenya and South Africa.

H_{02}: Business model has no statistically significant mediating effect on the relationship between environmental capital disclosure and value of listed companies when comparing Kenya and South Africa.

LITERATURE REVIEW

Theoretical review

Stakeholder Theory

The stakeholder theory was published by Freeman in 1984. The theory identifies the various groups or individuals who hold various interests in the company and how they can be dealt with. From the works of Freeman, the term stakeholder means any individual or group who can impact or can be impacted by the organization in the process of attaining its goals. In this context the IIRC (2013) emphasize that stakeholders are individuals who can be anticipated to be reasonably impacted significantly by the entity's business activities, outputs or outcomes or whose operations can be expected to reasonably impact significantly the entity's short, medium and long-term value creation ability. Thus, through <IR> entities are required to report how they affect and are affected by stakeholders (investors, shareholders, society, suppliers' relationship, governments, customers etc.) as part of the annual report.

The theory assumes that the organization engages in associations with diverse groups which captivate on or are allured by the company. Further, it assumes equality of interests in the sense that no exclusive overruling category of interests (Bosse & Coughlan, 2016). Thus, the theory's essential tenets are on the accountability of the organization to their stakeholders and that the management's proper objective is to balance the conflicting interests of stakeholders. On this note, Camara *et al.,(*2009) states that the purpose of the stakeholder theory is to provide an explanation on the response of the management to the ever changing demands from the stakeholders'.

The validity of Stakeholder theory as a general approach, is criticized on grounds that the clarity of the meaning of the term 'stakeholder' is mixed, following Freeman's seminal conception that it includes everyone who is or was impacted by the organization. A major challenge is devised on the recognition of stakeholders and effective management of their interests without the interference of the management (Bello & Abu, 2021). Further, as alluded by Nwanji and Howell (2007) criticism is established on the dynamism of the pool of stakeholders which keep on changing over time as a result of variation of current stakeholders interests and dealing with new interests that may emerge from the new stakeholders.

The relevance of this theory in this evaluation is on the premise that the company's accountability to stakeholders is reflected in the stakeholder theory. Thus, the theory therefore, informs on the first six objectives that are associating various integrated reporting capitals to firm value. Each disclosed form of capital can be attached to a specific stakeholder(s) who will be interested in a particular information disclosure in the financial statements.

Legitimacy theory

The propounder of the legitimacy theory is Suchman who started it in 1995 and claimed that the existence of an entity is pegged on its value that is perceived to match with that of the larger society in which it undertakes its operations. According to Suchman as supported by Linthicum *et al*. (2010) legitimacy theory postulates that an organization's operations thrive within a system that is socially constructed, defined by norms and values meant to maintain organizational legitimacy.

The theory assumes a social concurrence between the entity and society that it ought to report to, as the organization exerts influence on the society in which it operates and the organization gets influenced socially by the society. Thus, the organizational legitimacy concept, grants an organization the opportunity to undertake its operations in a contract with the interests of the society. Corporations therefore, pursue to function within the aspirations and norms of the respective communities where they are domiciled. The reasoning behind the legitimacy theory is

that companies' survival is dependent upon them operating within the framework of the society's norms and values (Deegan, 2014). The theory then explains the decision taken by firms to effectively disclose non- financial information so as to gain legitimacy (Dube & Maroun, 2017). Accordingly, Greiling and Grub (2014) on this aspect opine that organizations must be accountable for their actions.

The theory's criticism lies on the assumption that organizations perceive the legitimacy status to be under a threat. For this reason, Deegan (2014) reports that whatever the disclosures in annual reports and financial statements is all about the perception of the management other than being accountable to the stakeholders and is meant to advance their self-interest or purposefully for survival.

The relevance of this theory in this study is on the premise that the annual report has been spotted as a salient source of legitimization. This theory therefore, makes the foundation for fourth, fifth, sixth and seventh objectives to complement the stakeholder theory to inform on human, social and relationship capital, and environmental capital disclosure respectively, since the concept of legitimacy as discussed emphasize the provision of an explanation of the disclosures with regard to the social and environmental behavior of organizations.

Empirical Review

Makori and Jagongo (2013) studying on accounting for the environment and firm profitability, empirically analyzed selected companies quoted on the Bombay Stock Exchange, India. The paper determined to scrutinize the association between accounting for environment and capital employed returns, establish the relation between accounting for the environmental and profit margin, investigate environmental accounting and dividend per share relationship and establish the connection between environmental accounting and earnings per share. Using a sample of 14 companies randomly selected, annual reports of the identified firms formed the source of data and analysis was accomplished through multiple regression methods. The research results unveil that the association between accounting for the environment and capital employed returns and per share earnings was significant and negative, while an important and positive association was confirmed between environmental accounting and net profit margin and per share dividend.

Ong *et al*. (2015) on studying Malaysian manufacturing listed companies investigated on how the financial performance of these companies was influenced by environmental disclosures. The study was objectively set to determine the environmental disclosure levels by Malaysian listed manufacturing companies and to establish the association between disclosures on the environment and financial performance of Malaysian listed manufacturing firms. On the

stakeholder theoretical background, the paper employed survey research design. The distinct population for the research embodied of 254 manufacturing firms quoted on the Bursa stock exchange and a sample of 120 firms identified through simple random sampling method. Data for the study was captured from selected annual reports downloaded from their respective websites. Content analysis was conducted in reference to the global reporting initiative standard specifications on sustainability reporting to assess the level of disclosure of environmental information and regression analysis employed to test the association between the aspects of interest. The analysis findings recorded a generally low level of disclosure and that environmental disclosure positively and significantly affect company financial performance.

Turturea (2015) paper's concern was on environmental and social reporting as a fundamental part of integrated reporting. The paper aimed at examining the disclosure of environmental and social aspects as presented within annual reports as per the requirements of the integrated reporting framework. 21 companies formed the population drawn from 3 countries; France, Germany and United Kingdom. A sample of 18 firms was chosen from this population. The sources of data entailed 2013 integrated reports and content analysis was applied to aid in establishing the disclosure level of the aspects of interest within the content elements of external environment and organizational overview and resource allocation and strategy. The study findings reveal a lack of disclosure of a complete picture regarding the environmental and social issues of performance by companies. Further, it is evident that companies implicitly fail to achieve the IIRC purpose of sustainability reporting within integrated reporting.

Osuga and Okello (2015) examined the impact of waste management practices on environmental performance of timber processing company, Comply, located in Nakuru County, Kenya. Being guided by the stakeholder theory, case study census cross-sectional survey research design was adopted. The population for this study composed all the employees of Comply Company from whom primary data was sourced by the employing questionnaires that were self – administered, and data analysis conducted by involving descriptive statistics and inferential statistics. Accordingly, the findings suggest a positive effect of waste management on company environmental performance.

Magara *et al*. (2015) carried out an investigation on whether environmental accounting was influential on the financial performance among selected corporate organizations in Kisii County, Kenya. The paper was determined to assess the effect of information related to the environment, savings on environmental costs, environmental savings tracking and compliance with environmental aspects on an organization's financial performance. On the legitimacy theory ground, the paper applied descriptive research design and focusing on a population of 16

corporate organizations. The target respondents comprised of 144 employees working for the selected companies from which stratified random sampling technique was applied to identify a sample of 49 respondents for the purpose of this study. Secondary and primary data was used, with primary data piled from the sampled respondents using a structured questionnaire that was self-administered, while, secondary data was acquired from the selected corporations annual reports and financial statements for the period 2006-2011. Descriptive and inferential statistical data analysis approaches were used for data analysis. Results confirm a significant and positive association between information relating to the environment, environmental costs savings, and environmental costs savings tracking, environmental laws compliance and financial performance of the selected corporations.

Gatimbu and Wabwire (2016) provide evidence from Kenyan perspective by conducting a research on the impact of disclosure of corporate environmental issues on financial performance of companies quoted in the NSE. Basically this research assessed the extent to which various environmental disclosure items would impact financial performance of sampled entities. Employing causal research design, 61 listed firms formed the population of the study from where 32 firms were identified using purposeful sampling as the study sample. Appropriate secondary data was secured from the annual reports of sorted firms using a checklist. The data was then analyzed through content analysis, correlation and linear regression techniques. From the study it is revealed that environmental disclosure and financial performance are positively and significantly associated, while with a positive but insignificant influence by size of the company and leverage. However, the predictability of the results impacted by the small sample size and reliance on annual reports that might provide limited information.

Nor *et al*. (2016) carried out an investigation on the existence of environmental disclosure and its effect on financial performance of quoted firms on Bursa stock exchange, Malaysia. The study's main objective was to assess the degree of disclosure of environmental information and its interrelation with the performance of firms as proxied by return on assets, return on equity, per share earnings and profit margin. On the basis of voluntary disclosure theory the study focused on a population of all listed companies in Malaysia from which a sample of top 100 companies as per market capitalization were purposefully selected for the year 2011. Annual reports formed the source of secondary data that was adopted for the study. By way of content analysis, descriptive statistics, correlations and regression analysis, data analysis was performed. The results on how environmental disclosure affect financial performance are mixed, with disclosure of environmental issues and profit margin showing positive and significant association, while the impact of environmental disclosure on asset return, per share earnings, equity returns was insignificant. The study draw back lied on

concentration only on best 100 companies ignoring the small companies making generalization of the results difficult. Further, the research data was gathered from annual reports that may not be sufficient as some companies disclose information on environmental aspects in separate reports on company websites.

Dyduch (2017) article on financial environmental disclosures made in annual reports centered on quoted firms in Poland. The paper aimed at analyzing the magnitude and financial environmental information quality disclosure in annual reports of firms quoted on the War Saw Stock exchange representing 13 sectors considered environmentally harmful. The study was anchored on three main theories including the legitimacy, stakeholder, and voluntary disclosure theories. The study sample of 148 firms were obtained from a population of firms quoted in the war saw stock exchange and data racked up from annual reports availed form websites of selected firms. Data gathered was analyzed through content analysis and the study results indicate on average that the quality and degree of disclosure of financial environmental information was low, with energy and raw material and petroleum industry providing higher disclosure level compared to other sectors.

Nofianti *et al*. (2018) study on environmental information disclosure and firm valuation focused on the moderating role of corporate governance. The study purposed to assess specifically if disclosure of environmental information in corporate reports results to increase in the value of the firm. On the basis of the stakeholder theory, data was sourced from annual reports of 137 Indonesian listed firms that were purposefully selected to form the study sample. Partial least squares method was used to test the hypothesis. The study results reveal that disclosure of environmental information disclosure positively and significantly affect firm valuation. The moderating role of corporate governance was also confirmed.

Yusof *et al*. (2018) while studying social environmental disclosure compared the global sustainability reporting and IIRC-integrated reporting considering companies in Europe. The study purposed to establish the extent of sustainability environmental disclosure in integrated reports on moving to integrated reporting and to examine the existing motives and patterns on <IR> introduction in comparison to global sustainability reporting guidelines. Relying on the provisions of the legitimacy theory, annual reports provided the required data for the investigation for a sample of 10 European firms selected on condition that they were fully implementing the <IR> and does not engage in preparation of sustainability reports. Critical text analysis through extensive reading and reviews of environmental and social information was extracted from the data. The findings show that social environmental disclosure integration to <IR> is to a lesser extent and that <IR> approach is skewed toward investors compared to other

stakeholders, society and the environment. <IR> approach mirrors sustainability for the business strategy.

Usher and Maroun (2018) on reviewing the extent of biodiversity disclosure is an integral non-financial reporting aspect by companies in South Africa directed their study on selected firms from the seafood industry sector. The study examined the disclosure of specific environmental reporting aspects relating to biodiversity under eight themes (creating of scenes, exposure on species related issues, arrangements with partners, stakeholder dealings, determination of performance, policy or risk exposure, external reporting and managing internally) by selected listed entities on the JSE. On the foundation of the GRI and <IR> framework guidelines, exploratory research design was adopted and all listed companies that fall under the classification of farming and fishing industry represented the population of the study from where 7 companies were sampled that engaged in seafood harvesting and selling. For the goal of the study data, information contained in the sustainability and integrated reports for the period 2013-2015 were analyzed by researchers using content and interpretive analysis. From the study findings, the level of reporting biodiversity remained low relatively, with some companies committed to provide a detailed account of their impact on biodiversity. Further, biodiversity themes of social engagements, species related disclosures and external reports recorded highest in terms of disclosure while risk and scene setting were least disclosed. The study results are rooted on a fairly small sample and consider a section of the seafood of the broad South African food industry. This makes it inappropriate to apply the findings in making definitive conclusions.

Smit and Bungane (2019) study on natural capital examined the reporting of land by South Africa gold mining houses. The paper mainly assessed how adequate the disclosure of land was made within the integrated reports of mining houses in South African context. Specifically, the paper examined the extent to disclosure of environmental issues by mining organizations, how mining organizations reported and disclosed information on land and established the elements in respect to land that were disclosed by the organizations in the context of sustainability reporting. Employing descriptive research design, data was extracted from integrated reports from a sample of 14 mining houses quoted on the JSE. The data collection instrument entailed a self-constructed checklist developed from the sustainability reporting principles as presented by the global reporting initiative. Content analysis was used as the main technique of analysis. In overall, the outcome indicate a low disclosure level of land aspects by mining houses of South Africa. The integrated reports reflected relatively higher disclosure level concerning the site of operation owned, managed or leased by the mining organization and any significant effect on land was described. Disclosure on the species

affected and the duration of impact on biodiversity by the mining operations had minimal disclosure. The study attributes the low level disclosure to the ineffectiveness of the regulatory systems. That notwithstanding, non-listed companies were not considered in this study, thus, providing an incomplete reflection of the levels of disclosure on land by mining companies in South Africa.

Kipngetich *et al*. (2019) study on environmental disclosure evaluated the degree to which financial leverage determined the disclosure level by firms quoted on the NSE. Underpinning the paper on the stakeholder theory, explanatory and longitudinal research design was applied. 65 quoted firms comprised the target population from where a sample of 27 firms was identified on the basis of consistency in listing for the period 2008-2017 resulting into 270 firm year observations. Secondary data was sourced from annual reports of the identified firms and this was analyzed by utilizing multiple regression method. The study results indicate that environmental disclosure is inversely interconnected to the firm's level of leverage, as companies with high leverage were found to provide minimum environmental and social disclosure.

Landau *et al*. (2020) considered non-financial information reporting within the annual report by examining the market valuation of integrated reports containing information on environmental, social and governance (ESG) and financial accounting data. The study sought to examine how the market values were influenced by firms disclosure of ESG in an integrated form, examine whether differences in terms of market valuation exist between <IR> report and a separate ESG report, establish the influence of type of assurance supplier and the ESG reporting criteria applied on <IR> reports are perceived and the impact of quality of reporting on the market valuation of <IR> reports. Following on the provisions of the signaling theory, a sample of 49 companies were identified from the 50 blue-chip companies in Europe. Secondary data was extracted from Thomson Reuters Database and the GRI sustainability disclosure data base for the period 2010-2016 resulting into 343 firm year observations. Data analysis was conducted by use of descriptive statistics, correlations and empirically tested using regression approach on the basis of Ohlson (1995) model. The study findings suggest that <IR> disclosure is value relevant, no evidence that <IR> is connected with a greater market valuation in comparison to ESG reports prepared separately, the effect of ESG reports and external assurance was not confirmed and no support was found for the prediction that companies applying the <IR> best practices approach are highly valued by the market. However, the study suggest cautionary interpretation of the results due to small sample size from the blue-chip setting that may hinder generalizability. Further, the paper applied a broad <IR> definition

combining the reports relating to ESG as well as reports from the internet that may not be in conformity with the framework of IIRC.

Yang *et al.* (2020) studied on how disclosure of environmental information impacted on firm value of listed Chinese manufacturing firms. Using a panel dataset that comprised of quoted manufacturing firms in China over the period 2006-2016.The research employed difference in difference (DID) technique and the propensity score matching (PSM) method to probe whether environmental information disclosure influenced the value of the firm. The results affirm that environmental information disclosure significantly impact value of listed Chinese manufacturing companies.

Gerged *et al*. (2021) multi-country study investigated whether corporate environmental disclosure is associated with firm value focusing on Gulf cooperation council countries. The paper rated the influence of disclosing a corporation's environmental issues on market value and the effect of such disclosures on profitability. Underpinning the study on neo-institutional theory framework, the paper relied on data collected from annual reports collected from a sample of 100 firms sort from a total population of 405 non-financial companies attached to the 5 countries of the under the cooperation of Gulf council. The study covered a period of 5 years (2010-2014). Data analysis employed descriptive statistics, correlation and multivariate analysis using regression methods. The findings reveal that corporate environmental disclosure positively and significantly influence firm value as measured by Tobin's Q, while, the effect of corporate environmental disclosure on profitability as measured by return on assets was positive but weak.

Anggreni *et al*. (2022) probed the effect of environmental accounting disclosure and environmental performance on firm value of listed companies on the Sri Kehati Index, Indonesia. Specifically the study considered the effect of environmental accounting disclosure, environmental performance on firm value, the effect of environmental accounting disclosure on environmental performance whether environmental performance mediated the relationship between environmental accounting disclosure and firm value. The study was coined on the signal theory, stakeholder theory and legitimacy theory. Quantitative research design was employed. Secondary data from annual reports and sustainability reports published by companies contained in Sri Kehati Index, for 2016-2020. A sample purposefully selected resulted into 108 observations. Both descriptive statistical methods and panel data regression analysis were used to analyze the data, with Sobel test analysis used for testing the mediation effect. The study establishes a positive and significant effect of environmental accounting disclosure on firm value. The effect of environmental performance on firm value was also found to be positive and significant. While, environmental accounting disclosure had a positive and

significant effect on environmental performance, as, environmental performance was found to mediate the relationship between environmental accounting disclosure and firm value.

Chinedum (2023) study focused on voluntary environmental disclosure effect on firm value on Nigerian quoted financial services companies. On the grounds of the stakeholder theory, the study adopted longitudinal research design and positivism research philosophy. 52 quoted financial services companies formed the research population from which 37 companies that contained complete data were sampled. Secondary data was sourced from annual audited financial statements covering a 10 year period 2012-2021. Multiple regression was utilized used to effect data analysis. The study results indicated that voluntary disclosures in relation to environmental information cause a positive and significant change in firm value.

Fernando *et al. (*2024) study investigated the effect of green (environmental) accounting disclosure on firm value of listed Mining and Agriculture companies in Southeast Asia Countries. Explicitly, the research sought to establish whether implementing green accounting had any influence on firm value. The study was rested on the stakeholder theory. The population of the study comprised of 205 companies from 6 countries equivalent to 1025 firm year observations covering the period 2017-2021. The final sample of 89 companies was arrived at resulting into unbalanced panel data of 221 firm year observations. Secondary financial information was collected from Capital IQ S&P and annual report or sustainable report obtained from the websites of the listed companies. Descriptive statistics, Pearson correlation and regression methods formed the main tools of analysis. The finding echo that disclosures in relation to green accounting by Mining and Agriculture companies of Southeast Asia on firm value was negative and insignificant.

Summary of Research Gaps

From the above review, the following research gaps can be identified. The findings of reviewed studies remain mixed. Positive and statistically significant results of the effect of environmental capital disclosure on firm value have been reported (Ong *et al*., 2015; Gatimbu and Wabwire, 2016; Nofianti *et al*., 2018; Yang *et al.*, 2020; Gerged *et al*., 2021; Anggreni *et al*., 2022; Chinedum, 2023).On other hand some studies post statistically significant negative results (Makori & Jagongo, 2013; Fernando *et al.,* 2024)). As few studies report a lack of evidence that <IR> is connected with greater market valuation (Turturea, 2015; Landau *et al*., 2020). Whereas, low disclosures of information associated with environmental capital has been established (Ong *et al*., 2015; Dyduch, 2017; Yusof *et al*., 2018; Usher & Maroun, 2018; Smit & Bungane, 2019). This can fairly be attributed to variations in the applied methodologies, differences in the adopted frameworks by the studied organizations and differences in

regulatory systems among others. Thus, a further investigation on <IR> capitals disclosures is desired as the capitals-based analysis perspective is capable of providing an absolute and more direct account of the consequences of <IR> disclosures on firm value.

Conceptual Framework

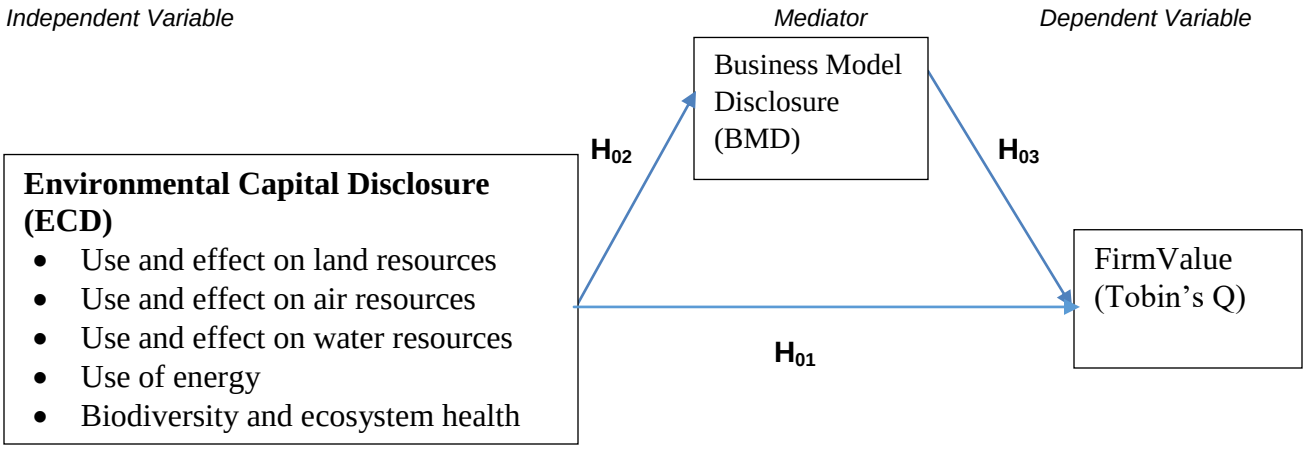

Figure 1. Conceptual Framework

The study can be conceptualized as presented in Figure 1. Environmental capital disclosure causes an improved transparency and accountability on the consequences of the firm's activities on the environment that builds stakeholder trust. When objectively and extensively disclosed it can enhance a firms share price which in turn will help create a strong and positive firm reputation that will eventually lead to improved firm value

METHODOLOGY

Positivist research philosophy and exploratory complemented by confirmatory research design was applied for this enquiry. The study target population was 209 firms comprising of 64 and 145 firms hailing from Kenya and South Africa respectively by December, 2020. This period was chosen as it represents years after the year 2017 considered as the momentum period in <IR> adoption by IIRC and that most companies in Kenya started preparing integrated reports from the year 2018. While, 2020 was the latest time as per the study to obtain the highest number of firms that had adopted <IR> more especially in Kenya where <IR> is discretionary. Using purposeful sampling 137 companies were selected encompassing 19 and 118 from Kenya and South Africa respectively. The companies were categorized into 11 sectors in accordance with the industry sector classification criteria prescribed by the Global Industry Classification Standard (GICS).

Secondary sources were the main source of data for this study in form of published annual report and financial statements or integrated report and financial statements were obtained from the listed companies' websites or hard copies for the period 2018-2020. A checklist was utilized as the main data collection instrument structured around the variable of interest (environmental capital (5 items), and business model (35 items) in respect to disclosure indicators based on the IIRC's (2013) framework and CIMA; IFAC; PwC (2013) business model background paper for <IR>. A 4-point likert scale scoring method was employed to provide a reflection of the extent of disclosure as provided in Table 1 below.

Table 1: Rating scale

Scale	Interpretation of Integrated reporting disclosure
0	Non-disclosure of an item, meaning no information is provided on the aspect.
1	Limited disclosure, meaning the item is only mentioned in the report.
2	A mention of the aspect with brief explanation of specific information.
3	A reflection of full disclosure involving detailed discussions incorporating the actions of the company and quantification of the aspect in monetary terms.

Tobin's Q a market-based performance measure of firm performance was used as a surrogate measure for firm value (dependent variable). Therefore, corresponding to (Yang *et al.*, 2020; Gerged et al., 2021; Fernando *et al.,* 2024),Tobin's Q was computed as market value of equity plus book value of total liabilities divided by book value of total assets. Where, Market value of equity (market capitalization= market price per share*shares outstanding at the balance sheet date) (Bhuyan *et al*., 2017). The market value per share was taken as an average value 5 months after the financial year end multiplied by shares outstanding at the financial position date. The 5 month period is within the period applied by prior studies Verbeeten (2014) and (Baboukardos & Rimmel, 2016; Simoni *et al.,* 2022) which considered the impact of disclosures on market value at 3 and 6 months after the fiscal year respectively, to allow for the time-lag effect between disclosure and use of information by investors. This is for assurance that the investors have assessed the published information as organizations' are legally obligated to publish their financial statement reports 3 months after financial year end. This information was extracted from daily stock trading records of NSE and JSE websites or stock brokers.

The disclosure index is unweighted as is assumes that each indicator of each disclosure variable is equally important (Gray *et al*., 1995). Despite that, based on prior studies (Alves *et al.,* 2012; Dumitru *et al*., 2017), an ordinal procedure was carried out in which the study items relating to <IR> capitals and business model disclosures were scored on a scale of 0 – 3 so as to capture the level of detail of information disclosed about each indicator contained in the study

variables. The company score was (0 = non-disclosure, 1= limited disclosure or only mentioned in the report, 2 = mention of the aspect with brief explanation and 3 = full disclosure involving qualitative and monetary quantification). Accordingly, following (Dyduch , 2017; Dumitru *et al*., 2017) the unweighted disclosure index for a particular <IR> capital disclosure or business model variable was derived by computing the ratio of actual scores awarded to total number of disclosure indicators attributable to a particular variable using the formula below.

$$DI_{IR} = \frac{\sum d_i \text{ effectively disclosed}}{n}$$

Where;

DI_{IR} *=Disclosure index of respective <IR> variable*

d_i *= Disclosure score for various indicators of disclosure in respect to <IR> variable*

n = Number of indicators that characterize the variable of disclosure based on the IIRC's (2013) framework and CIMA; IFAC; PwC (2013) business model background paper for <IR>

The range of disclosure index values for individual <IR> variables of environmental capital disclosure and overall were between 0 and 3. The average disclosure index computed on the variable was then linked to firm value measured by Tobin's Q.

Descriptive statistics applied frequency tables for data presentation and, mean, standard deviations, minimum and maximum to summarize the data.

Inferential statistics employed included Pearson's correlation coefficient for assessment of the association among environmental capital disclosure, business model and firm value measured by Tobin's Q. Cohen's *q* and Fisher's *r* to *Z* transformation methods were used to assess the magnitude (effect-size) of the correlation coefficients. Simple linear regression analysis was conducted to test for the direct relationship of the effect of environmental capital disclosure on firm value as hypothesized in $\mathbf{H_{01}}$ with Cohen's f^2 used to check for practical significance. Further, mediation analysis was conducted using stepwise regression analysis proposed by Judd and Kenny (1981), as presented in equations (1)-(3) below;

$$Y = i_1 + cX + e_1 \quad (1)$$

$$M = i_2 + aX + e_2 \quad (2)$$

$$Y = i_3 + c^1X + bM + e_3 \quad (3)$$

Where;

In equation (1*), 'c' represents the total (unmediated) effect of the exposure variable X on the outcome variable Y.*

In equation (2*), 'a' represents the effect of the exposure variable X on the mediator variable M.*

In equation (3), *'$c^{1'}$ represents the direct effect of the exposure variable X on the outcome variable Y, and b represents the effect of the mediator variable M on the outcome variable Y.*
In all three equations, *i represents the intercept and 'e' represents the error term.*

The Models

To test that total effect (*c*) (Unmediated effect) to show the causal effect of environmental capital disclosure on firm value, Equation (1) was used, restated as

$FV_{it} = i + cECD_{it} + e_{it}$ ..... *(i)*

Where;

FV_{it} = *is the dependent variable Firm value measured by Tobin's Q,*

i = *is the Intercept,*

c = *is the Coefficient of the independent variable*

ECD_{it} = *Environmental capital disclosure*

e_{it} = *is the error term*

To test hypothesis $\mathbf{H_{02}}$, and $\mathbf{H_{03}}$ the mediation role of the business model disclosure on the relationship between environmental capital disclosure and firm value equation (2) and (3) above were applied to arrive at indirect effects (*a* & *b*) and direct effect (c^1). Restated as;

$BMD_{it} = i_{19} + a_6 ECD_{it} + e_{19}$ ..... *(ii)*

$FV_{it} = i_{20} + c^1{}_6 ECD_{it} + b_6 BMD_{it} + e_{20}$ ..... *(iii)*

Baron and Kenny (1986) specified a statistical mediation path diagram as presented in Figure 2 below, which satisfies the stepwise regression process to test mediation effect.

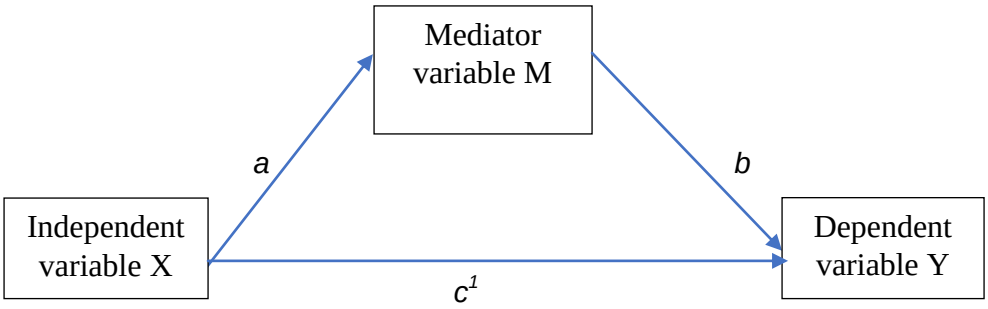

Figure 2: Mediation analysis model

Source: Adopted from Baron and Kenny (1986)

Where;

ab = *indirect effect of the mediator M on Y*

c^1 = *the effect of X on Y with the effect of the mediator controlled*

The total effect of X on Y 'c' can be calculated as the sum of indirect effects 'ab' and the direct effect 'c^1' as ($c = ab + c^1$)

Accordingly, to claim total mediation hypothesis the relationship between independent variable (environmental capital disclosure) and dependent variable (firm value) completely disappears when controlling for the mediator (the coefficient c^1 is zero), while, partial mediation hypothesis is the case when the association between independent variables (environmental capital disclosure) and dependent variable (firm value) is significantly reduced when mediator is controlled but does not completely disappear (i.e. when the absolute value of coefficient c^1 is small than *c* and greater than zero at the same time). The direct effect is determined as $c\text{-}ab = c^1$ (the beta coefficients of *c* total effect already established in equation 1 minus the product of coefficient *a* & *b* established in equations 2 & 3). Inconsistent mediation is said to occur if the coefficient of the direct effect *'c^1'* were opposite in sign to indirect effects *'ab'.* In this scenario the mediator is considered as a suppressor variable. This explains why some conditions may fail to be met yet mediation is still reported. Further, Kenny *et al*. (1998) expound that with inconsistent mediation, sometimes the direct effect 'c^1' is even larger than the total effect '*c*' and the mediated effect '*ab'* may explain more than 100% of the total effect.

Further, to assess the variance accounted for in the mediation models identified above the study adopted R^2 effect-size measures of mediation analysis proposed by Fairchild *et al.* (2009) stated as;

$R^2_{\text{med}} = r^2_{YM} - (R^2_{Y,\,MX} - r^2_{YX})$

Where;

R^2_{med} = *Portion of variance explained by the mediated effect*

r^2_{MY} = *The squared correlation of Y and M*

r^2_{XY} = *The squared correlation of Y and X*

$R^2_{Y,\,MX}$ = *The squared multiple correlation of Y jointly explained by M and X*

The significance of mediation effect was tested through bootstrapping using Process Macro procedure for SPSS Version 4.2 Model 4 developed by Hayes (2013) was utilized in SPSS version 21.0.

Mediation Testing Assumptions

In testing for mediation it is assumed that; the Mediator lies on the causal pathway between the exposure and the outcome such that the predictor causes the mediator and the mediator causes the outcome. There is a possibility to manipulate the exposure and mediator theoretically, as a minimal condition for claiming causal mediation. There should be no confounding if causal mediation is to be claimed in the sense that there is no third variable influencing the independent and mediator, independent and outcome and mediator and

outcome variables relationships. No interaction is expected between variables. Further, usual model assumptions for linear or logistic regression apply.

RESULTS AND DISCUSSIONS

Response rate

The study targeted a sample of 137 companies of which data was collected from audited annual integrated reports covering the period 2018-2020. The overall final study sample comprised 124 companies of which, 18 (13.13%) were from Kenya and 106 (77.37%) in relation to South Africa. This represents overall 90.5% of the targeted firms. 13 (9.5%) companies were eliminated from the analysis due to either lack of complete data, or suspension from stock exchange, or acquisition.

The pertinent data was investigated for a 3 year period, translating into a total of 54 (18*3) and 318 (106*3) firm-year observations for Kenya and South Africa respectively. Overall 372 observations were there.

Descriptive statistics

The descriptive statistics of <IR> capitals of environmental capital, business model and firm value variables by country is as provided in Table 2 below.

Table 2: Descriptive statistics

		N	Min.	Max.	Mean	Std. Devi.	Skewness		Kurtosis	
COUNTRY		Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Kenya	ECD	54	.00	2.80	1.6185	.69745	-.457	.325	-.415	.639
	BMD	54	.86	2.80	2.0894	.46648	-.467	.325	-.730	.639
	FV	54	.42	2.98	1.3653	.58422	.749	.325	.291	.639
	Valid N (listwise)	54								
South Africa	ECD	318	.00	3.00	2.1667	.67960	-1.121	.137	.649	.273
	BMD	318	.94	2.89	2.0864	.36452	-.490	.137	.201	.273
	FV	318	.24	3.38	1.1044	.48269	1.764	.137	3.718	.273
	Valid N (listwise)	318								

According to Table 2, Kenya listed companies data point out environmental capital least disclosed (*N* = 54, *M* = 1.6185, *SD* = .69745) compared to South Africa (*N* = 318, *M* = 2.1667, *SD* = .67960). This finding agrees with that of (Smith & Bungane, 2019; Landau *et al.,* 2020) in which environmental related disclosures were overly low.

Further, on average firm value of (*N*=54, *M* = 1.3653, *SD* = .58422) for listed NSE companies was higher for Kenya, compared to South Africa JSE listed companies (*N*=318, *M* = 1.1044, *SD* = .48269). Though the value of Tobin's Q is > 1 in both countries, South African companies are more appropriately valued than Kenyan listed companies supported by firm value revolving around 1. Considering the standard deviation, listed companies in Kenya recorded a higher standard deviation of 0.58422, compared to South African listed companies with a standard deviation of 0.48269. This shows that the value of listed companies in Kenya is more volatile compared to the value of listed firms in South Africa. The study finding agree with that of prior studies by (Musiega *et al.,* 2013) that reported an average firm value of (*M* = 1.6545, *SD* = 1.3788). This is an indication of overvaluation of the studied firms' value. In contrast (Fernando *et al*., 2024) study reported a mean firm value of < 1 indicating undervaluation.

Correlation Analysis

Pearson's correlation coefficient was determined on the data to assess the interrelation between environmental capital disclosure and firm value. The results are as depicted in Table 3 below.

Table 3: Correlation Matrix

COUNTRY			ECD	BMD	FV
Kenya	ECD	Pearson Correlation	1		
		Sig. (2-tailed)			
		N	54		
	BMD	Pearson Correlation	.546**	1	
		Sig. (2-tailed)	.000		
		N	54	54	
	FV	Pearson Correlation	.425**	-.026	1
		Sig. (2-tailed)	.001	.850	
		N	54	54	54
South Africa	ECD	Pearson Correlation	1		
		Sig. (2-tailed)			
		N	318		
	BMD	Pearson Correlation	.468**	1	
		Sig. (2-tailed)	.000		
		N	318	318	
	FV	Pearson Correlation	.190**	.212**	1
		Sig. (2-tailed)	.001	.000	
		N	318	318	318

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

On the foundation of Table 3, environmental capital disclosure and firm value correlated positively and significantly, (N = 54, r = .425, P =.001) and (N = 318, r = .190, P =.001) for Kenya and South Africa listed companies data respectively. This concurs with results of (Makori & Jagongo, 2013; Gatimbu & Wabwire, 2016; Landau *et al.,* 2020; Gerged *et al*., 2021). However, it refutes (Fernando *et al*., 2024)

Further, on the basis of the Pearson correlation analysis as contained in Table 3 in relation to Kenya and South Africa respectively, similarities and differences were noted. On the basis of Hopkins's (2002) criteria for interpretation of correlations in which (r < .1, trivial; .1 ≤ r < .3, small; .3 ≤ r < .5, moderate; .5 ≤ r < .7, large; .7 ≤ r < .9, very large and .9 ≤ r < .1, nearly perfect), a moderate positive correlation was exhibited by Kenyan NSE listed firms . Comparably, a small positive and statistically significant association between environmental capital disclosure and firm value was the case for South Africa, JSE listed firms.

Furthermore, the estimated effect-sizes and Z_{obs} statistic between the two correlations using Cohen's q and Fisher's r to Z transformation methods is as portrayed in table 4 below.

Table 4: Cohen's q effect-size and Fisher's Z_{obs} statistic

Variable	Correlation (r_1) Kenya N=54	Correlation (r_2) South Africa N=318	Cohen's q (effect size)	Effect size interpretation	Fisher's $Z_{obs\ Statistic}$	P-value
ECD	.425	.190	.261	Small effect	1.73	.0836
BMD	-.026	.212	.241	Small effect	-1.59	.1096

The correlations reported between the two data sets following Cohen's (1988) guidelines for social sciences (q < .1, no effect; .1 ≤ q < .3, small effect; .3 ≤ q < .5, medium effect; q > .5, large effect) indicated a small effect size. The computed Z-score values (Z_{obs}) for Environmental capital and business model disclosures were within the critical Z-score values of -1.96 and +1.96 and associated P-values >.05, evidencing that the correlations were not significantly different between Kenya and South Africa.

Diagnostic Tests

Linearity assumption was tested by inspecting the residual scatter plots. Multicollinearity using the Variance Inflation Factor (VIF) and Tolerance statistic, Durbin Watson statistic tested for autocorrelation, as Kolmogorov-Smirnov and the Shapiro-Wilk test was used to test for normality. Test of homoscedasticity was done using the Probability Plots (P-P plots). No major point was at issue as most of the requisite criteria was met affirming the suitability of the data for further analysis.

Hypothesis Testing

To test the mediating effect of the business model on the relationship between environmental capital disclosure and firm value when comparing Kenya and South Africa, the study analyzed a sequence of regression equations to establish the direct and indirect effects. The study rejected the null hypothesis if P-value <.05.The results are as summarized in Table 5 below.

Table 5: Comparative regression results of environmental capital disclosure, business model and Firm value

Country	**Variable**	**Model 1** ***(Total effect* 'c')***		**Model 2** ***(Indirect effect* 'a')**		**Model 3** ***(Direct effect path* 'c1 and 'b')**	
			Cohen f^2	***B*** **Coefficients/ Values**	Cohen f^2	***B*** **Coefficients/ Values**	Cohen f^2
Kenya	Intercept	0.789***		1.498***		1.580***	
		(0.185)		(0.137)		(0.313)	
	ECD	0.356***	0.22	0.365***	0.39	0.549	0.438
		(0.105)		(0.078)		(0.117)	
	BMD	-		-		-0.528	
						(0.175)	
	R^2	0.180		0.298		0.305	
	Adjusted R^2	0.165		0.285		0.278	
	F-Statistic	11.451***		22.114***		11.202***	
	$R_{mediated}$	-		-		-0.124	
	n	54		54		54	
South Africa	Intercept	0.812***		1.542***		0.519***	
		(0.089)		(0.061)		(0.155)	
	ECD	0.135***		0.251***	0.28	0.087*	0.055
		(0.039)		(0.027)		(0.082)	
	BMD	-		-		0.190*	
						(0.082)	
	R^2	0.036		0.219		0.052	
	Adjusted R^2	0.033		0.217		0.046	
	F-Statistic	11.856***		88.859***		18.677***	
	$R_{mediated}$	-		-		0.029	
	n	318		318		318	

(Note: ECD –Environmental capital disclosure, BMD-Business model disclosure, Standard errors are put in parentheses; * *P* <.05. ** *P*<.01, ***P < 0.001)

Model 1 in Table 5 environmental capital disclosure explains the variation in firm value of NSE listed firms to the extent of 18% (R^2 =.180), and therefore, 82.0% of the variation can be explained by other factors outside the model. On the contrary, in JSE listed firms 3.6% (R^2 = .036), is interpreted by environmental capital disclosure, as 96.4% is as a result of other factors.

Based on the findings (F (1, 52) = 11.451, P<.001) and (F (1,316) = 11.856, P<.001) both models fit in predicting the value of firms listed in NSE and JSE than a model without the independent variable environmental capital disclosure. Further, the results indicate that holding all else constant, the value of NSE, listed firms is .789. Whereas, a change in environmental capital disclosure by one unit will cause a positive and statistically significant change in the value of the firm (B = .356, P <.001) and f^2=.22 (medium to large effect-size). However, all other factors remaining the same JSE listed companies value is .812. Whereas, altering environmental capital disclosure by one unit will cause a positive and statistically significant change (B = .135, P <.001) and f^2=.04 (small to medium effect-size) of the value of JSE firms. The established models are;

FV_k =.789+.356ECDk + α

FV_s = .812+.135ECDs + α

Thus, the study finding rejects the null hypothesis that environmental capital disclosure has no statistically significant effect on value of listed companies between Kenya and South Africa.

The findings concur with that of Gerged *et al*. (2021) that found a positive and significant influence of corporate environmental information disclosure on value of non-financial companies attached to the Gulf Council. Similar results were found in the studies by (Ong *et al*., 2015; Nofianti *et al*., 2018; Yang *et al*., 2020; Chinedum, 2023). However, the results contradict that of Fernando *et al. (*2024) that show insignificant negative effect of green accounting disclosure on firm value.

In Model 2, the link between environmental capital disclosure and business model was evaluated to establish the indirect effects path ***'a'*** via regression analysis. In view of Table 12 the variation of business model of NSE listed firms as a consequence of environmental capital disclosure was indicated as 29.8% (R^2 = .298), leaving 70.2% of the variation as being explained by other factors outside the model. Alternatively, environmental capital disclosure explains the variation in business model of JSE listed firms to the extent of 21.9% (R^2 = .219), leaving 78.1% of the variation as being explained by other factors outside the model. Further, NSE firms report (F (1, 52) = 22.114, P =.000), whereas, for JSE firms (F (1,316) = 88.859, P =.000) was reported indicating the model is suitable in predicting business model than a model without the stated predictor variable. Further, a unit variation in environmental capital disclosure positively and significantly affect business model (B = .365, P = .000) in relation to Kenya. While, South Africa a positive and significant effect of environmental capital disclosure on business model (B = .251, P = .000) is reported. This is the indirect effect ***'a'***. Thus, the arrived models are stated as;

BMD_k =1.498 +.365ECDk + α

BMD_s= 1.542+.251ECDs+ α

In Model 3, the conducted multiple regression taking environmental capital disclosure, business model as predictors on firm value (Direct effect *'c^{1}'* and Indirect path *'b'*. Considering Table 5 environmental capital disclosure and business model as predictors explain the variation in value of NSE listed firms to the extent of 30.5% (R^2 = .305) and therefore, 69.5% of the variation can be explained by other factors not contained in the model. On the contrary, 5.2% (R^2=.052), is interpreted by environmental capital disclosure and business model as, 94.8% is rendered on account of other factors in the case of South Africa listed companies. The results in relation to NSE firms, (F (2, 52) = 11.202, P =.000) was reported. The result in respect of JSE firms (F (2,315) = 8.677, P =.000). This confirms the suitability of the models in predicting the association between environmental capital disclosure, business model and firm value. In addition the findings in Table 5 it can be deduced that all factors remaining constant, the firm value of NSE listed firms is 1.580. Whereas, the direct effect 'c^{1}' signify a change in environmental capital disclosure by one unit would significantly cause a positive change in the value of the firm (B = .549, P = .000). Conversely, a change in business model disclosure by one unit negatively and significantly influence the value of the firm (B = -.528, P = .004), the indirect path *'b'.* Inversely, containing all else constant, the value of listed firms in JSE is .519. The direct effect 'c^{1}' is elucidated as changing environmental capital disclosure by one unit causes a positive and significant change in value of the firm (B = .087, P = .048). While, the indirect path *'b',* changing business model disclosure by one unit positively and significantly influences firm value (B = .190, P = .022).The established models are stated as;

FV_k = 1.580 +.549ECDk -.528BMD_k + e

FV_s = .519 +.087ECDs +.190BMD_s + e

Determination of existence and nature of mediation

Using unstandardized beta coefficients of direct effect '$c^{1'}$ and total effect *'c'* the study evaluated whether mediation occurred. While, the significance of the direct *'$c^{1'}$* and indirect effects *'ab'* was evaluated to tell the nature of mediation if any in respect to Kenya and South Africa.

Summary of unstandardized coefficients of the total, direct and indirect effects for Kenya

Figure 3 and Table 6 summarizes the unstandardized coefficients of the total, direct and indirect effects from the three regression models above.

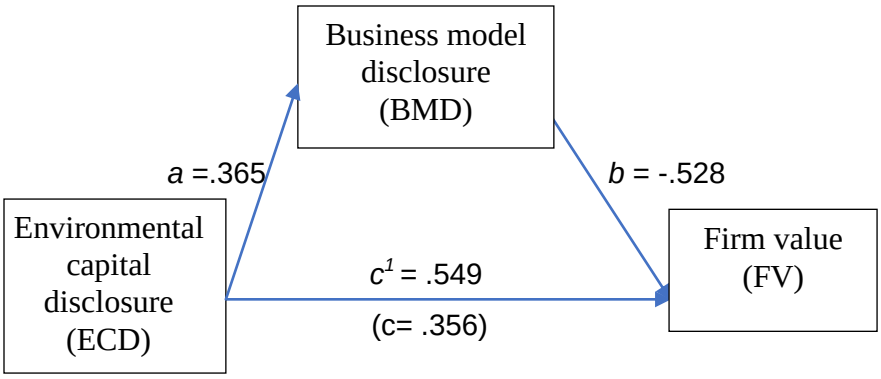

Figure 3: Mediation effect of business model in the association between environmental capital disclosure and firm value for Kenya

Table 6: The path unstandardized regression coefficient and its significance -Kenya.

Construct	Path	Construct	Unstandardized Estimate	P-Value	Result
Total Effects					
Firm Value	←-	Environmental capital disclosure	.356	.001	Significant
Direct and Indirect effects					
Firm Value	←-	Environmental capital disclosure	.549	.000	Significant
Business model disclosure	←-	Environmental capital disclosure	.365	.000	Significant
Firm Value	←-	Business model disclosure	-.528	.004	Significant

Regression analysis was performed to gain insight into the mediating effect of the business model in the connection between environmental capital disclosure and value of firms listed in the NSE. From figure 3 and Table 6 it is revealed that the total effect *'c'* of environmental capital disclosure on firm value was positive and significant (*B* = .356, *P* = .001). On incorporating the mediator variable business model, the direct effect '$c^{1'}$ of environmental capital disclosure on firm value increased and was significant (*B* = .549, *P* = .000).

The indirect path *'a'* of environmental capital disclosure and business model was found to be positive and significant (*B* = .365, *P* = .000) and a statistically significant indirect effect path *'b'* (*B* = -.528, *P* = .004). The resultant indirect effect *'ab'* is -.1927 (*a*b* = .365*-.528). This caused a value of about 54% (*ab/c* = -.1927/.356) as the proportion mediated. On comparing of the direct versus indirect paths (c^1 = .549 and *ab* = -.1927) suggest that c^1 > *ab* in absolute value. The established mediation ratio is .351 (ab/c^1=-.1927/.549). Because, c^1>*c* and both the

direct effect '$c^{1'}$and indirect effects '*ab*' were significant but opposite in sign, inconsistent mediation is inferred.

To evaluate the magnitude of the indirect effect of environmental capital disclosure on firm value through the business model, R^2_{med} was determined to find out the effect size of mediation. The calculated R^2_{med} value is -.124. A negative indicates possibility of suppression effect. The overall R^2_{med} value of -.124 propose that approximately 12% of the variance in firm value is attributable to the indirect effects of environmental capital disclosure through the business model. Taking into account that relatively 31% of the total variance in firm value is explained ($R^2_{multiple}$ = .305), out of this about 40% (-.124/.305) of the explained variance in the model was due to the mediated effect.

Testing the significance of indirect effect 'a*b*' mediation analysis for Kenya

Following Hayes (2013) Macro process via bootstrapping method, the presence and significance of mediation if any, was tested. The bootstrap was set at 5000 samples, with a bias corrected confidence level of 95%. The results are as provided in Table 7 below.

Table 7: Bootstrapping mediation analysis summary-Kenya

Relationship	Direct Effect	Indirect Effect	Confidence Interval		P-value	Conclusion
			Lower Bound	Upper Bound		
Environmental capital disclosure -→ Business model- →Firm value	.5488 (.0000)	-.1929	-.2964	-.0750	<.05	Inconsistent Mediation

As demonstrated in Table 7, the bootstrap conducted indicates that the direct effect is statistically significant (*B* =.5488, *P* = .0000). The indirect effect was also statistically significant as the confidence intervals of lower bound and upper bound excluded zero (*LLCI* = = -.2964, *ULCI* = -.0750). Since the indirect effect is significant and the direct effect remained statistically significant after considering the mediator into the relationship, the study concludes that mediation exists. The nature of mediation is inconsistent mediation, attested by direct and indirect effects having opposite signs.

Summary of unstandardized coefficients of the total, direct and indirect effects for South Africa

On account of the three regression models analyzed above, Figure 4 and Table 8 provides a summary of the unstandardized coefficients of the total, direct and indirect effects.

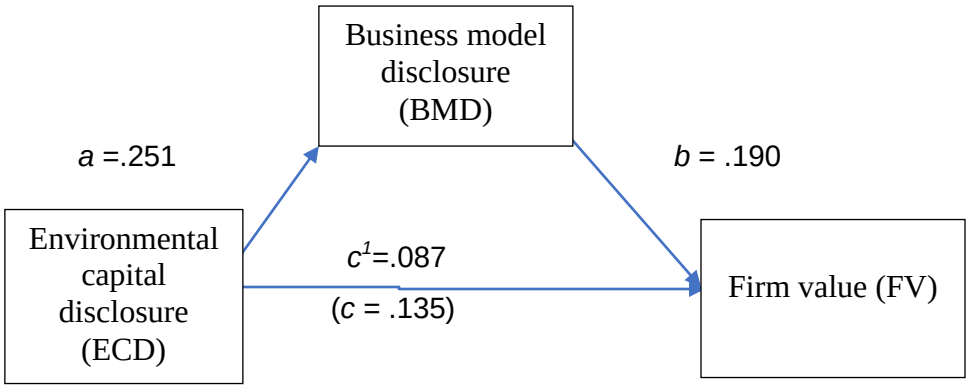

Figure 4: Mediation effect of business model on the association between environmental capital disclosure and firm value for South Africa

Table 8: The path unstandardized regression coefficient and its significance-South Africa

Construct	Path	Construct	Unstandardized Estimate	P-Value	Result
Total Effects					
Firm Value	←-	Environmental capital disclosure	.135	.001	Significant
Direct and Indirect effects					
Firm Value	←-	Environmental capital disclosure	.087	.048	Significant
Business model disclosure	←-	Environmental capital disclosure	.251	.000	Significant
Firm Value	←-	Business model disclosure	.190	.022	Significant

Regression analysis was applied to ascertain the mediating effect of business model in the relationship between environmental capital disclosure and value of firms listed in the JSE. The results reveal that the total effect *'c'* of environmental capital disclosure on firm value was positive and significant (*B* = .135, *P* =.001). On adding the mediating variable, the direct effect 'c^1' of environmental capital disclosure on firm value decreased and was significant (*B* = .087, *P* = .048).

The indirect path *'a'* (environmental capital disclosure and business model) was found to be positive and significant (*B* = .251, *P* = .000) and a positive and significant indirect effect path *'b'* (*B* = .190, *P* = .022). Approximately .0477 (*ab* = .251 * .190) comprise the indirect effects *'ab'*. The consequent proportion mediated is about 35% (*ab/c* = .0477/.135). The direct versus indirect paths compared (c^1 = .087 and *ab*= .0477) allude that $c^1 > ab$. The resulting mediation ratio is around .55 (ab/c^1 = .0477/.087). Thus, since the direct effect was statistically significant on controlling for the mediator and the indirect effect paths *'a'* and '*b'* were both significant, it

can be concluded that the business model partially mediates the relationship between environmental capital disclosure and value of firms listed in the JSE.

To appraise the magnitude of the indirect effect of environmental capital disclosure on firm value through the business model R^2_{med} was determined. The calculated R^2_{med} value is .029. The overall R^2_{med} value of .029 demonstrates that approximately 3% of the variance in the value of the firm is attributable to the indirect effects of environmental capital disclosure through the business model. Considering that relatively 5% of the total variance in firm value is explained ($R^2_{multiple}$ = .052), out of this about 55% (.029/.052) of the explained variance in the model was due to the mediated effect.

Testing the significance of indirect effect *'ab'* mediation analysis for South Africa

The mediation effect was validated using Process add-on Macro proposed by Hayes (2013) available in SPSS software. The presence and significance of mediation if any, was tested. The bootstrap was set at 5000 samples, with a bias-corrected confidence level of 95%. The results are as summarized in Table 9 below.

Table 9: Bootstrapping mediation analysis summary-South Africa

Relationship	Direct Effect	Indirect Effect	Confidence Interval		P-value	Conclusion
			Lower Bound	Upper Bound		
Environmental capital disclosure -→ Business model- →Firm value	.0874 (Sig=.0485)	.0477	.0130	.0856	<.05	Partial Mediation

As displayed in Table 9, the bootstrap conducted reveal that the direct effect is statistically significant (*B* =.0874, *P* = .0485). The indirect effect was also statistically significant and no zero was contained within bias-corrected confidence intervals of lower bound and upper bound (*LLCI* = .0130, *ULCI* = .0856). Since both the direct and indirect effects are statistically significant after considering the mediator into the relationship, partial mediation is confirmed.

Summary of the tested hypothesis

The study findings rejected the null hypothesis if *P*-value <0.05, while, *P*-value >0.05 led to the acceptance of the null hypothesis. The results summary of the tested research hypotheses is as presented in Table 10.

Table 10: Results summary on hypotheses testing based on unstandardized coefficients

Hypothesized relationship	Country	Unmediated effect		Mediated effect				Mediated effect-size		Nature of mediation
		Total effect		Direct effect		Indirect effect		Effect-size	R^2_{med}/ $R^2_{Multiple}$	
		'c'	*P*-value	*'c'*	*P*-value	*'ab'*	*P*-value	R^2_{med}	%	
ECD →BMD→FV	Kenya	.356	.001	.549	.000	-.1929	<.05	-.124(12%)	40%	Inconsistent mediation
	South Africa	.135	.001	.087	.048	.0477	<.05	.029 (3%)	55%	Partial mediation

From Table 10, it is affirmed that the relationship between <IR> capitals disclosure and firm value was statistically significant (unmediated effect *'c')* except for overall TIRCD for Kenya. On considering the mediator business model into the relationships, the total effect *'c'* was decomposed into the direct effect '$c^{1'}$ and indirect effect '*ab'.* Further, it is confirmed that the business model provides a mechanism through which environmental capital disclosure transmit their effect on firm value. The effect-size provides the practical significance of the business model in firm value determination. The effect-size was greater for Kenya, as the explained variance due to the mediated effect ($R^2_{med}/R^2_{Multiple}$) was greater for South Africa where <IR> is mandatory compared to Kenya where <IR> is voluntary.

SUMMARY

Effectively, the results of hypothesis testing, the association between environmental capital disclosure and firm value was positive and statistically significant between both countries individually. The finding is in line with that of Gerged *et al*. (2021) that found a positive and significant influence of corporate environmental information disclosure on value of non-financial companies attached to the Gulf Council. Similarly, Nofianti *et al*. (2018) found same results. However, the study results contravene the study by Landau *et al*. (2020) who found no support that companies applying the <IR> best practices approach are highly valued by the market.

On the role of business model on the relationship between environmental capital disclosure and value of listed companies when comparing Kenya and South Africa. Statistically significant influence of business model on the relationship between environmental capital disclosure and value of listed companies in both countries was established. Although, inconsistent mediation is spelled out by NSE listed companies data, partial mediation was advocated by JSE listed firms data.

CONCLUSIONS

While <IR> has been advocated as a change to the reporting landscape of corporate entities, it is important to understand how disclosure of different forms of capital affect the value of listed companies from a voluntary and mandatory setups. The study findings demonstrate a link between environmental capital disclosure and firm value. The results expressed in this work circumstantiate the message by the IIRC, (2013) view of the relevance of adoption of <IR> framework by corporate entities. The study hypothesized that environmental capital disclosure had no statistically significant effect on value of listed companies between Kenya and South Africa. Both countries reported statistically significant positive results.

On the cardinal function of the business model on the study relationships it was hypothesized that business model has no statistically significant mediating effect on the relationship between environmental capital disclosure and value of listed companies when comparing Kenya and South Africa. From the study findings, the associations between environmental capital disclosure and firm value were found significantly mediated by the business model. Inconsistent mediation was alluded by the study for Kenya, while, South Africa exhibited partial mediation.

IMPLICATIONS AND RECOMMENDATIONS

Implication to theory

The study was grounded on the stakeholder theory complemented by the legitimacy theory in explaining the effect of <IR> capitals of environmental disclosure on firm value. The findings of this study align with the theories as follows. Disclosure of environmental capital and firm value reported a positive and significant association in both countries. This can be credited to the fact that proper disclosures of environmental capital information heightens a firm's image and reputation. The finding supports the stakeholder theory which espouses consideration of the needs and interests of all stakeholders while undertaking its activities by voluntary disclosing environmental information. By unmasking information on how the entity affects or is affected by environmental aspects of (land, water, air, energy and ecosystem) its commitment to address the environmental issues to stakeholders best interest is demonstrated. This organizational capability of monitoring the environmental issues and addressing the concerns carefully will generate positive outcomes that will boost the value of the firm. Further, the finding supports the legitimacy theory. Under regulated conditions as in the case of South Africa where <IR> is mandatory, the finding can be interpreted on the lens of legitimacy theory. Thus compliance of the organization to environmental disclosures can be linked to the organization desire of using it as a legitimizing tool to gain societal acceptance purposefully to access the social license to

operate. Consequently, disclosing such information organizations' would gain greater acceptance by the society hence legitimize themselves along the way, gain competitive advantage hence increased firm value.

Management Policy and Practice

On the practical implication, the results suggest possible impacts on managers and policy makers interested in value of listed companies. On this note, environmental capital disclosure and firm value indicated a positive and statistically significant association. Through this finding the management is encouraged to be thoughtful on the disclosure surrounding environmental issues touching on how the firm affects and is affected by land, water, air, and energy and ecosystem health due to its importance in the value creation process.

Many countries in the African continent have not made <IR> mandatory despite the revealed importance from this study. Thus, a key policy priority to speed its adoption should therefore be the IIRC collaboration with the SASB reach other international standard setters, the corporate and investment communities, to mobilize and document international integrated financial reporting standards to guide in the nature and presentation of the integrated reports. This will drive uniformity in adoption and improve the quality of integrated reports for the benefit of both corporate entities and society at large.

LIMITATIONS OF THE STUDY

The study objectives were achieved, nonetheless, interpretation of the study findings should be done taking into consideration the following limitations that may also provide future research directions.

The study sample was small and the period covered was short given the number of companies that had adopted <IR> in Kenya by the year 2020. While, for the case of South Africa the sample was selected from firms whose reports were contained in the IIRC, <IR> Examples data base. Therefore, generalizations of the study findings is restricted.

The current study considered the <IR> framework prior to the International Integrated reporting Council (IIRC) and the Sustainability Accounting Standards Board (SASB) merger to form the Value Reporting Foundation (VRF) proposed to provide a comprehensive suite of tools to assess, manage and communicate value. As such any potential changes to the framework after the merger were not interrogated in this study. Therefore the study findings are restricted to pre-merger status of <IR> and may not be interpreted in the VRF context.

Furthermore, only on two countries, Kenya and South Africa were considered. Thus, the study findings may not be perceived as containing other firms outside the study area.

SCOPE FOR FUTURE STUDIES

The study investigated <IR> firms that are listed in the NSE, Kenya and <IR> firms contained in the IIRC, examples data base as integrated reporters, and listed in JSE, South Africa. Future research should consider an increased sample size covering a longer period and extend the study to firms that are not listed in the stock exchange but have adopted <IR> to compare the results.

While this study has provided insight into the <IR> reporting capital of environmental capital disclosure and business model disclosures as prescribed in the <IR> framework before the IIRC and SASB merger, the field is rapidly changing. Future research should consider post-merger potential advancements on the <IR> framework. Specifically explore the application of <IR> framework with IFRS S1 (General requirements for disclosure of sustainability-related financial information) and IFRS S2 (Climate-related disclosures) released sustainability reporting standards to gain more insight on assessment, management and communication of company value.

Finally, since the study utilized data from firms listed in NSE, Kenya and JSE, South Africa, future researchers might consider expanding the research to listed firms in other countries hailing from the African continent, so as to assess continental adoption of <IR>, and the effect of <IR> capitals of environmental disclosure on company value.

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