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From energy sector to other sectors: How Sustainable Marketing Practices and Sustainable Revenue relate to Environmental Performance in firms

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Abstract

Climate change and global warming have been attributed to, among other things, a high consumption of fossil fuels which has led to severe environmental problems. Sustainable marketing practices is increasingly being viewed as part of the solution especially when it comes to the energy sector, given the significant environmental impact of energy production and consumption in this sector. The energy sector has a lion's share in polluting the environment and causing climate change and a lot of effort has been done recently to move away from fossil fuels and to privilege renewable energy sources. It is believed that the adoption of sustainable marketing practices can help different organizations to reduce their environmental impact and promote sustainable development. Different firms are being urged to examine the ways in which marketing can become more sustainable. Research has shown that only those firms that incorporate environmental value into their business strategies will succeed in the future. We investigate how firms invest sustainably and take sustainable initiatives and how these sustainable marketing practices coupled with sustainable revenue

relate to environmental outcomes. Using a multiple linear regression, we analyse the relationship between sustainable revenue, sustainable marketing practices of 100 firms from various sectors and industries around the world. We examine how their sustainable investment, sustainable revenue, energy productivity and carbon productivity relate to environmental sustainability and performance. Our study provides empirical evidence of the interplay between financial factors (such as investment and revenue) and environmental performance. Results show that organizations need to consider allocating resources and implementing strategies to enhance sustainability practices to improve their environmental performance. This suggests that allocating resources and generating revenue from sustainable initiatives can contribute to better environmental outcomes.

Keywords: energy sector, sustainable investment, environmental performance, sustainability, sustainable marketing practices

1. Introduction

Private organizations have come under pressure for their activities that are harmful to the environment and have been called to act sustainably following growing environment-related concerns. Researchers and practitioners believe that one way organizations can incorporate sustainable practices is by implementing sustainable management systems or adopting sustainable branding and marketing (Gong, Xiao, Tang, & Li, 2023; Sun, Kim, & and Kim, 2014). The pressure towards organizations is spearheaded by several stakeholder groups, such as customers, regulators, and the public which keep calling firms to embrace sustainable and ethical practices to mitigate the grave consequences of environmental degradation (Bilal, Kalsom, & Zainon, 2016) . Specifically, the need for sustainable marketing practices has become increasingly important in the energy sector, given the significant environmental impact of energy production and consumption in this sector. For instance, it has been pointed out that the high consumption of fossil fuels causes severe environmental problems (e.g. increasing greenhouse gas emissions), which has led to climate change and global warming (Hou, et al., 2019) . Although energy companies have a lion's share in polluting the environment, other industries and sectors also have their part. The destruction of the ozone layer by greenhouse gas (GHG) emissions worry leading organizations of different sectors and has led some to act to make their businesses environment-friendly (Pérez-Calderón,

Milanés-Montero, & Ortega-Rossell, 2012; Segarra, Signes, Garrigos, & Pastor, 2011). The adoption of sustainable marketing practices can help different organizations to reduce their environmental impact and promote sustainable development. It is essential that firms examine the ways in which marketing can become more sustainable.

A great body of literature has already highlighted the connection between sustainable marketing and economic performance. Earlier studies showed that firms that endorse green marketing strategy (green product, green price, green distribution, green promotion, green people, green process, and green physical evidence) are expected to generate more profits than those firms that do not adopt such strategies (Bilal, Kalsom, & Zainon, 2016; Marcel & Dragan, 2014) . Some scholars even claimed that only those firms that incorporate environmental value into their business strategies have better chance of succeeding in the future (Marcel & Dragan, 2014). This is most likely due to the fact that people vest more trust in organizations that they believe to protect the environment having witnessed the severe consequences of global warming and climate change that have ravaged different parts of the world in the recent past.

Research have demonstrated that sustainable marketing could be regarded as an initiator and trigger of a sustainable society in a way that all of its functions are focused on the goal to preserve and protect environmental and social factors and on creating a general culture of sustainability within a society. Practitioners and scholars of sustainable development believe sustainable marketing is a social, ecological and nature-centred model and hence it has great potential as a force for shaping cultural changes of the whole society (Marcel & Dragan, 2014). According to Danciu (2013) sustainable marketing, pursuant to the triple bottom line concept has effect on economic, social and environmental sustainability. However, within literature the economic aspect has received more attention in comparison with social and environmental sustainability. Other previous research on sustainable marketing have typically focused on examining the relationship between sustainable marketing on consumer outcomes such as consumer loyalty, satisfaction, and purchase intentions in different industries (Gong, Xiao, Tang, & Li, 2023; Sun, Kim, & and Kim, 2014). There is little empirical research on the benefits of sustainable marketing practices and sustainable revenue on environmental sustainability and performance. This article aims to fill this gap by investigating how firms invest sustainably and take sustainable initiatives and how these practices relate to environmental outcomes.

Using a multiple linear regression, we analyse the relationship between sustainable revenue, sustainable marketing practices of companies around the world and their environmental performance. We leverage 2023 data from Corporate Knights. The dataset contains 100 firms from various sectors and industries. We examine how their sustainable investment, sustainable revenue, energy productivity, carbon productivity relate to environmental sustainability and performance.

The remainder of this article is as follows. The first section highlights literature review. This will allow us to determine the relationship between sustainable marketing initiatives and environmental performance and underlying theoretical frameworks. The second section will explain data and how it was collected. The third section will give a detail on results and their analysis before delving into a concluding section with discussion and a proposal of potential avenues for future research.

2. Literature review

From marketing to sustainable marketing

To be profitable firms adopt various strategies among which marketing holds a key place. There is a growing belief in marketing literature, sustainable marketing, and organizational theory that marketing plays a key role in helping firms, as well as consumers, operate in a more sustainable manner (Borin & Metcalf, 2010) . A great number of practitioners and researchers firmly believe that marketing on its own is not enough to have a clear cut effect on environmental sustainability. To have a significant effect not just to firms but also to society at large, it is argued, marketing has to be sustainable. To the extent that marketing is part of the problem of unsustainable production and consumption, it can and must be a major part of the solution (Martin & Schouten, 2014). For that to happen, firms absolutely have to espouse sustainable marketing policies. Earlier studies show that marketing clearly needs to be re-conceptualized for sustainability, and the basis for that new conceptualization needs to be an understanding of the natural systems upon which all life, including economic life, is predicated. Beginning with a system-level understanding of sustainability, the ‘how’ of sustainable marketing must be realized at both strategic and tactical levels (Martin & Schouten, 2014).

Scholars as well as practitioners of environmental sustainability have been asking: if marketing, as a business function, has the power to shape a more sustainable society, what is stopping it? For a long time, it was believed that one barrier that prevented organization managers to take sustainable marketing initiatives is the impression common in business that sustainable practices are too expensive and, therefore, compromise a firm's competitive position in the marketplace. However, this common impression is mistaken. In fact, sustainable practices can strengthen competitive advantage in the long run (Martin & Schouten, 2012) . Nevertheless, not every firm manager buys in this idea of long-term affordability. Hardliners still believe that the process of going green is expensive in terms of installing new technology and equipment, training people, absorbing external costs, and converting waste into recycled products. All these costs are inevitably integrated into the final price of a product. Green price is therefore a premium price, which further increases with the addition of the cost of promotion (Bilal, Kalsom, & Zainon, 2016) . As a consequence, although sustainability is usually somewhere on the corporate agenda, there are often problems with execution, even in the most committed companies (Bonini & Swartz, 2014).

Furthermore, some executives are still hesitant to put sustainability strategies to the core, as they believe cost outweighs benefits (Trivedi, Trivedi, & Goswami, 2018). The hesitancy to adopt sustainable marketing is mainly due to the fact that senior leaders will give sustainability lip service, not capital, if they do not see financial benefits. Such leaders say that sustainability metrics can seem like random numbers and do not do much. They are convinced that for their businesses, sustainability efforts have to compete directly with other demands, which means that financial impact is key (Bonini & Swartz, 2014). This mistaken belief is quite contrary to bottom line benefits and academic research on sustainable marketing practices. Sustainability practices definitely have positive influence on business performance (Trivedi, Trivedi, & Goswami, 2018). A number of scientific research have been carried out to bring sceptical senior leaders along. For instance, the business groups which showed greatest efficiency in energy and water consumptions in the study period 2007-2009 are also the ones which achieved the best economic and financial profitability ratios. The evidence is even stronger because when it comes to the groups listed as environmentally sensitive, efficient performance in consumptions of resources has a clear influence on economic and financial value generation, which is not the case for the group of non-environmentally sensitive companies. Pérez-Calderón, Milanés-Montero & Ortega-Rossell (2012) suggest that many small and medium-sized enterprises (SMEs) are clearly becoming

more confident that being environmentally responsible can result in good publicity, which in turn may win customers and help to retain staff. Other research prove that measures such as recycling and saving energy can help to reduce costs (Revell, Stokes, & Chen, 2010; Vo & Akeb, 2015).

Notwithstanding the increasing pursuit of firms' undertaking of environmental management, some scholars suggest that organizations have an interest in private returns from doing so, and this is the main consideration of firms when deciding on their environmental actions. There is some evidence that by pursuing environmental action firms can earn positive financial returns and stimulate responses from their (human) stakeholders with effects on their financial performance (De Mendonca & Zhou, 2019) . Sustainability initiatives can help to create profits and business opportunities (Bonini & Swartz, 2014). Besides the economic benefits, a strategic push toward sustainability reduces waste, material and energy costs, secures resource supplies, drives innovation, reduces risks, strengthens brands, and attracts and retains talented workers. The latter case of employee retention may look intriguing but recent research show that it is not just economic gains that enhance employee retention (Verlinden, Wynen, & Sempiga, 2024) . Ethical values like embracing sustainable marketing could be some of the emerging reasons that help firms keep their staff.

While hesitant senior leaders could help hinder organizations' contribution to environmental sustainability, other leaders could steer investment and adopt sustainable marketing practices that would lead to better environmental performance. Prior research showed that moving a firm towards sustainable marketing often takes the will and power of an internal organizational leader (Martin & Schouten, 2014) . Only a leader who understands the long-term effect of sustainable marketing initiatives not just on the economic progress of their firm but also with a concern on the environment at heart can steer their firm towards the direction towards sustainability. Eventually, leaders may learn from what happens in other organizations when they come to realise that in the end there are a lot of benefits associated with investing in sustainable practices (Sempiga & Van Liedekerke, 2023). According to institutional theory, companies will want to imitate firms that fare well. Through imitation, firms may capitalize on the successes of their peers. Firms will likely mimic the visible and well-defined activities of others, such as environmental audits and certified environmental management systems, especially when these activities have been reported to outsiders (Bansal, 2005; Mestdagh, Van Liedekerke, & Sempiga, 2024).

Sustainability and sustainable marketing in energy sector and beyond

Whether it is adopted because of financial motives or under the strong influence of a senior leader who cares for the environment, sustainable marketing is a holistic approach with the aim of satisfying the wants and needs of customers while putting an equal emphasis on environmental and social issues, thus generating profit in a responsible way (Reutlinger, 2012) . Fuller (1999) defines sustainable marketing as a process of planning, implementing and controlling the development, pricing, promotion and distribution of products with the purpose of satisfying the following criteria: (1) customers' needs are met, (2) organizational goals are attained, and (3) the process is compatible with ecosystems. This demonstrates that both the outcome-performance aimed at satisfying the customer's needs and the organization's goals is important as well as the process used to achieve that outcome (Sempiga, Van Liedekerke, & Mestdagh, 2023) . Sustainable marketing concerns all the activities of an organization that may have an influence on the environment, both in short and long-term. Such activities not only include the development of physical characteristics of products that do not harm the natural environment, but also the processes, promotions, and related claims (Awan, 2011) . As the interface between business and society, sustainable marketing has two imperatives: (1) marketing *sustainably*, i.e. designing and supporting organizational cultures and processes such that all marketing processes are environmentally and socially benign; and (2) marketing *sustainability*, i.e. advancing and supporting a global culture of sustainable consumption as a concept, a cultural value and a set of consumption practices (Martin & Schouten, 2014) . Both imperatives of sustainable marketing necessarily imply that economic, social, and environmental aspects should all be considered in sustainable marketing initiatives (Elkington, 1998). Such sustainable marketing initiatives can contribute to sustainable development not only through every day's practice of minimizing the environmental impact but also by implementing new policies and strategies to bolster a wider concept of sustainable growth as a fundamental part of economic entities (Marcel & Dragan, 2014) that benefit not just the firm and customers but the whole society as it mitigates social ills like climate change, poverty and inequality. In other words, besides empowering firms, sustainable marketing would also foster human empowerment and lead closer to a just society as it would lead to less climate challenges that particularly affect the less privileged (Daka, 2006; Sempiga, 2012).

Climate change mitigation seems to be one of the urgent areas where firms are called to devise sustainable marketing strategies. However, there is still a lack of how to do it in a collaborative and consistent way. Acknowledging that climate change can have a number of serious consequences, the EU has adopted a series of ambitious climate and energy targets in recent years. Their implementation will enable the EU economy to achieve climate neutrality by 2050 (i.e., it will become an economy with net zero GHG). To achieve that fit; different organizations have pledged or will need to adopt a number of practices including: 1) maximize energy efficiency, including effective energy management in buildings; 2) maximize the use of renewable energy sources; 3) implement the principles of clean, safe, and connected mobility; and 4) implement the concept of circular economy (CE) as a key factor in reducing GHG emissions (Janik, Ryszko, & Szafraniec, 2020). These are some of practices which business firms may decide to include in their marketing especially if they want it to be sustainable. Specifically, the energy sector may apply the principles of the circular economy (CE), which have been identified in the long-term vision as key activities contributing to the reduction of GHG and ensuring the competitiveness of the EU economy and beyond (Janik, Ryszko, & Szafraniec, 2020).

As the EU adopted a roadmap that sets a 60% reduction target for household solid waste by 2025, similar goals for everyone involved and for individual industries have been adopted, with the leading role being given to the energy sector as it both generates and consumes a considerable amount of various waste types (Magaril, Kozhevnikov, & Rada, 2019). The energy sector is of particular importance in reducing GHG emissions and in meeting other environmental challenges because it exerts a substantial environmental impact. In 2018 alone the energy sector was responsible for over 83% of GHG emissions produced in the EU (Janik, Ryszko, & Szafraniec, 2020). Researchers and practitioners seem to agree that the energy sector has a key role in the transition to a climate neutral economy. Energy firms were obliged many years ago to implement measures to reduce GHG emissions, which resulted in declining GHG emissions in this sector. But as the energy sector still has the lion's share, there is still some long way to go for the effort to make substantive impact. In order to achieve climate neutrality in 2050, further actions in the energy sector and elsewhere are necessary to increase the level of decarbonisation of the energy production process, increase the use of carbon-free energy sources, develop energy-efficient technologies, and increase the use of carbon capture and sequestration/utilization/storage where GHG have not been prevented or reduced (Janik, Ryszko, & Szafraniec, 2020).

Firms from sectors other than energy must also balance more carefully their growth goals with the need to pursue sustainability (Kotler, 2011). Sustainability requires that the value generated by businesses as they conceive and produce goods and services must be environmentally sustainable (Borin & Metcalf, 2010). For many years, the private sector has been playing an increasingly constructive role, with firms working to reduce the negative impact of their operations and using sustainability as a lens for the design of new products and services (Borin & Metcalf, 2010). Some firms are becoming aware that sustainable marketing helps economic sustainability by establishing credibility for the sustainable efforts and solutions of a business. The areas where credibility has to be obtained may comprise corporate and product brands, responsible product use and disposal practices (Marcel & Dragan, 2014). The corporate part that will lead to organization credibility and reputation can be adopted through sound corporate environmental management. The latter is an effort by firms to reduce the size of their 'ecological footprint.' Every firm has an environmental impact, whether it is merely by lighting office buildings or, more significantly, through the waste and emissions generated by production processes. However, sound corporate environmental management practices are likely to be related to strong corporate environmental performance (Bansal, 2005). Sound corporate environment management entail adopting sustainable marketing practices especially in the products used, produced and sold by firms. Sustainable marketing activities aim to generate revenue and provide outcomes that fulfil the product or product line objectives of both the organization and individuals (Bilal, Kalsom, & Zainon, 2016).

Green products, environmental performance and consumer responses

Selling products may at times entail adopting practices of green pricing which consider both the economic and environmental costs of production and marketing, while simultaneously providing value for customers and a fair profit for business. Firms that have understood the benefit of sustainable marketing initiatives on their revenue have adopted green marketing mix. The concept of green marketing mix pertains to the elements that are designed to achieve the strategic and financial goals of a firm, particularly in terms of reducing their negative (or increasing their positive) effects on the natural environment. This concept is consistent with the view that each element of the marketing mix is created and executed in a manner that reduces the detrimental effects on the natural environment. This conceptualization of the green marketing mix is congruent with previous definitions of environmental and green

marketing (Bilal, Kalsom, & Zainon, 2016). Green marketing mix is for example applied to different aspects of green products. A product is called "green" if its production process is ecofriendly and less damaging to the environment. Green products come in various forms. They are recycled from former goods and then reused. These products are considered economically efficient since they save water, energy or gasoline, and money (Bilal, Kalsom, & Zainon, 2016). Firms have been urged to be responsible for reducing the environmental pollution in their production process and those who do not abide may be held accountable when they do not follow regulatory measures in place. Waste management is highly essential in this aspect of making businesses and companies eco-friendly. Another aspect of green marketing mix is green distribution of products. Green distribution denotes the selection of channels in a manner that minimizes environmental damage. Most of the damages to the environment occur during the transportation of goods. As a result, firms must implement safety precautions on the delivery of products (Arseculeratne & Yazdanifard, 2014; Bilal, Kalsom, & Zainon, 2016).

Consumers have been playing a great role in encouraging firms to embrace green marketing mix. (Davis (1993) explains how before purchasing, some consumers are eager to know about the particular and specific information about the product or service which they are about to buy and to what extent the products or services are environmentally friendly. Through advertisements on radio, on billboards and in print media green firms inform the consumers about the environmental issues and encourage them to buy environmental friendly products (Awan, 2011). A number of enterprises decided to embody the concept of green products in the design and package of their products to increase their differentiation advantages of their products (Chen, 2008). This choice made by the enterprises is believed to be in line with sustainability. Sustainability is a complementary factor in the development of green products. Sustainability, which denotes the conscious minimization of the impact on the environment and increased usage of recycled materials, conveys the concept of recover, reuse, recycle, redesign, reduce, and remanufacture, all of which make circular economy (Tomasin, Pereira, Borchardt, & Sellitto, 2013). In the traditional linear economy, inputs go in and waste comes out. The circular-economy model, by contrast, is based on reusing resources, regenerating natural capital, and decoupling resource use from growth (Bonini & Swartz, 2014). Conceived this way, circular economy leads to sustainability and sustainable development even if it may require firms and individuals to make sacrifices towards the beginning like investing in adapted and costly technologies.

Sustainability also offers an interesting way to scope out product innovations that use fewer resources or that meet specific social needs. Redesigning products and services around sustainability can drastically increase profits or reduce costs (Bonini & Swartz, 2014) . Product innovation has led to green product innovation performance. This is about the performance in product innovation that is related to environmental innovation, including the innovation in product that are involved in energy-saving, pollution-prevention, waste recycling, no toxicity or green product designs (Chen, 2008; Shyh-Bao, Chao-Tung, & Wen, 2006). Product innovation that align with sustainability aims to reduce the environmental effects of the production, usage, and disposal of products and services; the process involves the selection of "environmental-friendly" materials, waste reduction, attainment of energy efficiency, and adoption of end-of-life strategies, among others (Gong, Xiao, Tang, & Li, 2023). The underlying principle of green products innovation and investment is the prevention, reduction, and elimination of the detrimental environmental effects on water, air, and soil. These products therefore represent an effective tool for resolving waste-, noise-, and ecology-related problems while producing beneficial goods and services.

Nonetheless, an increasing number of customers have expressed their environmental concerns and inclination to purchase green products as well as the willingness to pay relatively higher prices for these products (Bilal, Kalsom, & Zainon, 2016; Tseng & Hung, 2013). Some years ago researchers predicted that the consumer will make decision in purchasing the energy depending on environmental products (Wang, 2006). This is related to sustainable purchase and consumer trust in green products. Sustainable purchase intention also becomes an imperative concern for business firms (Gong, Xiao, Tang, & Li, 2023). In modern customer management literature, the concept of client involvement has gained prominence. Studies show that a brand needs a strong brand image to distinguish itself from its competitors. It serves as a brand representative, promotes the growth of customer connections, and makes it easier for customers to evaluate the brand. Brand image has an important role in engaging customers. As such sustainable marketing functions as certain relationship marketing. In other words, sustainable marketing stimulates the capacity of economic entities to develop long-term relationships with their customers. Accordingly, sustainable marketing is also a practice of creating long-term satisfying relationships with key partners, customers, suppliers and distributors for the purpose of maintaining long-term preference and business (Marcel & Dragan, 2014).

Studies show that sustainable marketing supports the environmental sustainability of organizations when these organizations develop and market higher quality products with social impact based on sustainable innovation, lasting products, developing sustainable brands which offer practical benefits like better ratio quality/price and cost/undesirable effects on resources and environment. Through environmental sustainability, consumers are stimulated to become sustainable along with companies they engage in transactions. It is achieved by supplying them with products with added value in terms of better health and environmental preservation awareness (Marcel & Dragan, 2014). With the rapid change in the consumer behavior resulting from the green movement towards the sustainability of the environment, the green power products will replace the traditional power products considering the environmental benefits if this phenomenon continues to rise and consumers are willing to pay for the green power then it will create a new market for renewable energy products (Awan, 2011) and other sustainable products. From the strategic perspective, firm can deploy techniques such as life-cycle costing (e.g., incorporating product costs from research to disposal) to determine prices for products within the sustainability context. For instance, already in 2011, customers of the German utility E.ON had the option to purchase green electricity at higher prices to reflect the costs of sustainably generating power. Similarly, Seventh Generation has sold its range of environmentally friendly household cleaners at considerably higher prices than regular alternatives to reflect the higher product cost (Bilal, Kalsom, & Zainon, 2016). This shows that major pressure for changing marketing practices may come from consumers themselves. Consumers are the ultimate power brokers. Marketers have viewed consumers as choosing among brands on the basis of functional and emotional criteria (Kotler, 2011). Some consumers are becoming very discerning and skeptical of corporations in general as many firms profess to protect the environment but fail to demonstrate that in their actions and performance (Nyilasy, Gangadharbatla, & Paladino, 2014).

According to stakeholders theory, the purpose of sustainable marketing practices is undoubtedly to align the interests of the organization's different stakeholders with those of the company itself (Adams & Frost, 2008; Freeman, 1984; Pérez-Calderón, Milanés-Montero, & Ortega-Rossell, 2012). The stakeholder theory runs counter to the shareholder model (sometimes called the 'financial' or 'outsider-based' model), the company should be run in the sole interests of its shareholders (or owners). This model gives priority to minority shareholder and is somewhat reluctant to consider the interests of other stakeholders (Crifo,

Escrig- Olmedo, & Mottis, 2019; Jensen & Meckling, 1976; Davis, Schoorman, & Donaldson, 1997). The stakeholder model (or pluralist model) relies on the idea that if the firm respects the interests of its shareholders, it also represents broader social interests that must be taken into account as much as those of capital providers (Freeman, 1984; Carroll, 1979). In this model, the control mechanism is based on internal pressures (Crifo, Escrig- Olmedo, & Mottis, 2019).

3. Materials and Methods

Data and variables

Since 2002 Corporate Knights has produced 100 most sustainable corporations. After screening companies, Corporate Knights shortlist 100 every year. Screenings are carried out based on: sustainability disclosure practices, product categories and behaviour, financial sanctions and financial health. Using various indicators for all these screening areas, Corporate Knights come up with a score between 0 to 100 before aggregating the scores into an overall score between A+ and D+. We attributed percentage to the letter score with five points separating each score (e.g. A+=100, A-=95, A=90, B+=85 etc.). We analysed 100 firms of 2023. These are firms from different parts of the world representing different sectors and industries. The Global 100 (G100) is also announced at the World Economic Forum in Davos, Switzerland, and provides crucial information for steering investment decisions of the socially responsible investment community (Parris, 2006). Environmental performance (envperform) is our dependent variable. We use different independent variables to explain our dependent variable but with sustainable investment (sustinvest) and sustainable revenue (sustrevenue) as our main independent variables. Sustainable investment is used to operationalize sustainable marketing practices. Other independent variables are energy productivity (energyprod), carbon productivity (carbonprod). Due to missing values for some companies, the number of observations fell from 100 to 79 observations (see Table 3). We control for firm size, sector and industry. The inclusion of control variables helps to account for potential confounding factors and provides a more comprehensive understanding of the relationship between the independent variables and environmental performance. Table 1 describes the exploratory variables and summary statistics. The mean of environmental performance is 69.6% whereas the mean of sustainable investment is 86.63% out of a possible 100% for both variables.

4. Results

Table 1. Summary statistics

Variable	Obs	Mean	Std. dev.	Min	Max
energyprod	96	54.33541	28.85166	6.4769	100
carbonprod	95	55.25887	28.21508	0	97.8724
sustrevenue	100	89.05571	12.29483	50.57471	100
sustinvest	85	86.63973	16.14889	35.71429	100
envperform	100	69.6	14.34918	40	100
size	100	2.27e+10	4.58e+10	7.83e+08	3.66e+11
sector	99	5.929293	2.91461	1	11
industry	99	19.36364	12.0809	1	38

Summary statistics also show that the average energy productivity score is 54.33541 which indicates the average efficiency of energy usage across the observed cases. The average carbon productivity score is 55.25887, indicating the average efficiency of carbon emissions across the examined firms. The average sustainable revenue score is 89.05571 which also indicates the average proportion of revenue that firms derived from sustainable sources. The average sustainable investment score is 86.63973, indicating the average proportion of investment allocated to sustainable initiatives. Finally, the average environmental performance score is 69.6, indicating the overall level of environmental performance among the observed entities. It is noticeable that the firms studied show variation in their energy productivity, carbon productivity, sustainable revenue, and sustainable investment levels. As expected, this shows that some firms are more efficient and sustainable than others and adopt different sustainable marketing initiatives. The environmental performance scores vary among the entities, suggesting differences in their overall environmental performance.

Table 2 shows the correlation matrix. The table shows that the correlation coefficient between energy productivity, carbon productivity and environmental performance is relatively low (respectively 0.0585, 0.0803). This indicates that there is a weak positive correlation between both variables which suggests that energy productivity and carbon productivity may have a limited influence on overall firms' environmental performance.

Table 2. Correlation matrix

	envper~m	sustin~t	energy~d	carbon~d	sustre~e	size	sector	industry
envperform	1.0000							
sustinvest	0.3921	1.0000						
energyprod	0.0585	-0.2164	1.0000					
carbonprod	0.0803	-0.1225	0.7381	1.0000				
sustrevenue	0.2849	0.3788	-0.1180	-0.1732	1.0000			
size	-0.1121	-0.2931	0.0967	0.0794	0.0648	1.0000		
sector	0.2921	-0.0050	0.0622	-0.0164	-0.1979	-0.0925	1.0000	
industry	-0.1628	-0.2658	0.0375	-0.1192	0.0514	0.0786	0.1538	1.0000

Note that this correlation matrix is based on 79 observations.

The weak correlations between energy productivity, carbon productivity, and environmental performance suggest that other factors beyond energy and carbon efficiency may play a more significant role in determining environmental performance. As expected firms that make revenues from sustainable sources tend to have better environmental performance as explained by the positive correlation (0.2849). The main results for the variables of our interest are shown in Table 3. The model we adopted shows overall statistical significance with a significant F-statistic ($F(7, 71) = 5.09$, $p < 0.0001$). The model explains a moderate amount of the variation in the dependent variable, as indicated by the R-squared value of 0.3343. The adjusted R-squared value of 0.2687 suggests that approximately 26.87% of the variation in the dependent variable is explained by the independent variables and control variables included in the model.

Table 3. Multiple linear regression of the relationship between environmental performance and sustainable marketing practices

Source	SS	df	MS	Number of obs	=	79
				F(7, 71)	=	5.09
Model	5058.00428	7	722.57204	Prob > F	=	0.0001
Residual	10072.3755	71	141.864443	R-squared	=	0.3343
				Adj R-squared	=	0.2687
Total	15130.3797	78	193.979228	Root MSE	=	11.911

envperform	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
sustinvest	.2203416	.1015057	2.17	0.033	.0179449	.4227382
energyprod	.0232434	.0740573	0.31	0.755	-.1244227	.1709095
carbonprod	.0589899	.0742223	0.79	0.429	-.0890052	.206985
sustrevenue	.3092496	.1180854	2.62	0.011	.0737941	.5447051
size	-6.22e-12	2.85e-11	-0.22	0.828	-6.30e-11	5.05e-11
sector	1.62192	.4442662	3.65	0.000	.7360784	2.507762
industry	-.1917078	.133108	-1.44	0.154	-.4571176	.0737021
_cons	15.66756	12.35636	1.27	0.209	-8.970329	40.30545

Our findings show that the sustainable marketing practice is statistically significant ($p = 0.033$) and positively related to environmental performance. This means that an increase in companies' sustainable marketing practices by 1 unit is associated with a 0.2203416 increase in the environmental performance score. This suggests that making sustainable investment positively affects environmental performance. Findings align with recent empirical studies Sempiga and Van Liedekerke, 2023). In addition, sustainable revenue is statistically significant ($p = 0.011$) and positively related to environmental performance. An increase in sustainable revenue by 1 unit is associated with a 0.3092496 increase in the environmental performance score. This implies that higher sustainable revenue positively influences environmental performance. Overall, sustainable marketing initiatives and sustainable revenue are strong predictors of environmental performance and sustainability.

We controlled for company size, sector and industry in our regression model[1]. The size variable does not show a statistically significant relationship with environmental performance ($p > 0.05$). Its coefficient is extremely small (-6.22e-12), indicating that size has no meaningful impact on environmental performance. Similarly, the industry seems not to be a strong predictor of environmental performance. However, the sector variable is statistically significant ($p < 0.001$) and positively related to environmental performance. An increase in sector by 1 unit is associated with a 1.62192 increase in the environmental performance score. This suggests that the sector in which a company operates has a significant influence on its environmental performance.

In summary our findings show that sustainable marketing practices and sustainable revenue are positively correlated with environmental performance, indicating that allocating resources and generating revenue from sustainable marketing initiatives can contribute to better environmental outcomes.

To confirm our results, we carried out a robust regression. The robust regression model in Table 4 shows overall statistical significance with a significant F-statistic ($F(7, 71) = 4.60$, $p = 0.0003$).

[1] In the context of business and economics, "industry" and "sector" are often used interchangeably, but we used them differently in this study for they can have slightly different meanings. Corporate Knights used both industry and sector to distinguish companies. An industry refers to a group of companies or businesses that produce similar products or provide similar services. It focuses on the specific activities or goods produced. Examples of industries include the automotive industry, technology industry, or healthcare industry. Industries are usually categorized based on their production processes and the nature of their products or services. A sector, on the other hand, refers to a broader classification or grouping of related industries. It represents a higher level of aggregation and encompasses multiple industries that share similar characteristics or operate within the same broader economic category. Sectors are typically based on common characteristics such as the type of customer served, the underlying technology, or the market structure. Examples of sectors include the manufacturing sector, service sector, or financial sector.

Table 4. robust regression of the relationship between sustainable investment and environmental performance

Robust regression — Number of obs = 79; F(7, 71) = 4.60; Prob > F = 0.0003

envperform	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
sustinvest	.2154713	.1079288	2.00	0.050	.0002674	.4306752
energyprod	.0324518	.0787435	0.41	0.681	-.1245583	.1894619
carbonprod	.0575411	.0789189	0.73	0.468	-.0998188	.214901
sustrevenue	.3111109	.1255575	2.48	0.016	.0607562	.5614655
size	-1.19e-11	3.03e-11	-0.39	0.696	-7.22e-11	4.85e-11
sector	1.630477	.4723785	3.45	0.001	.6885812	2.572373
industry	-.1998256	.1415308	-1.41	0.162	-.48203	.0823788
_cons	15.9409	13.13825	1.21	0.229	-10.25602	42.13783

Once again among the control variables only the sector variable is statistically significant ($p < 0.001$) and positively related to environmental performance. An increase in sector by 1 unit is associated with a 1.630477 increase in the environmental performance score. This suggests that the sector in which a company operates has a significant influence on its environmental performance. Size and industry do not have a substantial effect on environmental performance. These findings align with results observed in Table 3, providing further support for the impact of sector on environmental performance. This would partly explain why energy sector is said to play a big part in environmental pollution with the emissions that come out of this sector.

Companies' sustainable marketing initiatives is marginally statistically significant ($p = 0.050$) and positively related to environmental performance. An increase in sustainable investment by 1 unit is associated with a 0.2154713 increase in the environmental performance score. While the p-value is slightly above the conventional threshold of 0.05, there may still be some evidence of a positive relationship between sustainable marketing practices and environmental performance. Finally, the findings show that sustainable revenue is statistically significant ($p = 0.016$) and positively related to environmental performance. An increase in sustainable revenue by 1 unit is associated with a 0.3111109 increase in the environmental performance score. This implies that higher sustainable revenue positively influences environmental performance. The robust regression results largely align with our multiple linear regression results, providing further support for the effect of sustainable marketing

initiatives and sustainable revenue on environmental performance in different organizational sectors.

5. Discussion and conclusion

The main ambition of this article was to examine the impact of sustainable marketing practices and sustainable revenue on environmental performance. Practitioners and scholars of environmental sustainability and marketing have begun to recognize the importance of firm's green strategies on environmental performance (Roh, Noh, Oh, & Park, 2022). We build on these studies by showing that putting priority into sustainable marketing practices and sustainable revenue have a significant positive impact on a firm's environmental performance. Organizations should consider allocating resources and implementing strategies to enhance sustainability practices to improve their environmental performance. This suggests that allocating resources and generating revenue from sustainable initiatives can contribute to better environmental outcomes. In addition, we observe that the sector in which a company operates significantly affects its environmental performance. Firms operating in certain sectors may have inherent advantages or face unique challenges in achieving environmental sustainability. Consequently, firms operating in certain sectors (e.g. energy sector) may need to pay special attention to their sustainability practices and invest in sustainable initiatives to improve their environmental performance (Janik, Ryszko, & Szafraniec, 2020). In this sense investment in renewable energy sources makes even more sense if the energy sector has to make a serious impact in reducing GHEs and the ensuing global warming.

However, the size and the specific industry in which a company operates may not have a significant direct impact on environmental performance, based on the results obtained. We also discover that energy productivity and carbon productivity, however important, may not be decisive in determining environmental outcomes. While energy and carbon productivity are important factors, other factors (e.g. management practices, regulatory frameworks, and stakeholder engagement) may have a more significant influence on overall environmental performance (Baah, et al., 2021).

The substantial environmental performance which requires a holistic approach also entails that organizations need to move from having reactive environmental motive attitude to adopting an environmental proactive motive (Torugsa, O'Donohue, & Hecker, 2013). The reactive environmental motive stops on concerns to protect the environment by complying

with regulatory norms and standards. In this case, companies aim at expending only the minimum level of effort required for regulatory compliance (Chen, 2008). Some organizations feel they have no choice but to carry out environmental protection activities to comply with international regulations of environmental protection and environmental consciousness of consumers (Berry M. A., 1988; Hart, 1995) . These organizations are stuck at the reactive stage. Only those organizations that adopt the proactive environmental motive aim at transforming their operational activities to achieve eco-efficiency and develop environmental-friendly products/services (Bos-Brouwers, 2010) through the adoption of sustainable marketing initiatives, thereby engaging above and beyond regulatory requirements (Vo & Akeb, 2015) . Businesses that adopt the proactive strategies of environmental management could integrate the goals of environmental protections with different departments in companies to meet the environmental regulations and improvements by utilizing the innovative environmental management or technology (Chen, 2008).

Furthermore, the results emphasize the need for organizations to adopt sustainable practices and integrate environmental considerations into their business strategies. This involves investing in sustainable development initiatives (Sempiga & Van Liedekerke, 2023), diversifying revenue streams to include sustainable sources, and implementing sector-specific interventions to address environmental challenges. The findings suggest that organizations should adopt a holistic and integrated approach, considering multiple factors such as sustainable investment, revenue, sector-specific interventions and practices, to drive positive environmental outcomes and contribute to sustainability efforts.

There are implications associated with the findings. First, since sustainable marketing practices and sustainable revenue positively influence environmental performance. Organizations can consider integrating sustainable investment practices into their financial strategies, aligning their investment decisions with environmental goals. Second, organizations can focus on developing sustainable revenue streams, such as eco-friendly products or services, to enhance their environmental performance. Third, the study provides empirical evidence of the interplay between financial factors (such as investment and revenue) and environmental performance. This contributes to the integration of financial and environmental theories, emphasizing the importance of considering both dimensions in organizational decision-making and performance evaluation. These findings suggest that there may be opportunities for improvement in energy and carbon productivity, as well as environmental performance, among the entities. Policies and strategies focused on sustainable

investment and revenue generation may help drive positive environmental outcomes. Additionally, understanding the influence of sector on environmental performance can inform targeted interventions and initiatives.

The study has a number of limitations. First, the study utilizes a cross-sectional design, which captures data at a single point in time. This design can restrict the ability to establish causality or identify temporal relationships between variables. Future studies could adopt a longitudinal study which would provide insights into how variables change over time and their impact on environmental performance. This would provide stronger evidence of causal relationships and enable the examination of lagged effects and potential feedback loops (Rindfleisch, Malter, Ganesan, & Moorman, 2008) . Second, while the regression model used in this analysis provides insights into the relationships between variables, they cannot shed light on the mechanisms and processes that connect our independent variables to our dependent variable. Future research could adopt qualitative methods (i.e. process tracing, interviews or case studies) so as to help determine underlying causal mechanisms behind sustainable development practices, sustainable revenue and environmental performance and identify specific strategies that can effectively improve environmental performance. Additionally, qualitative research methods can provide richer insights into the motivations, strategies, and challenges faced by organizations in their pursuit of environmental performance. Third, while the study includes control variables such as size, sector, and industry, there may be other relevant factors that were not considered. Omitted variables, such as specific environmental policies, corporate governance practices, or technological advancements, could influence the relationship between the variables under investigation. Future research could explore the influence of external factors such as government regulations, market dynamics, and stakeholder pressures on environmental performance. Understanding how these factors interact with organization internal practices can shed more light on the broader environmental context.

While our study focuses solely on 100 companies, we are convinced that the findings may still be generalizable to other companies or sectors. Despite organizational differences that may be observed, we believe the effect of sustainable marketing initiatives and revenues on environmental performance is applicable to wider settings than those examined in this study. Consequently, our findings and underlying theoretical frameworks will be of use to practitioners and policymakers across different contexts. Our study provided a comprehensive understanding of how companies can make a contribution to the environmental challenges

that we face through adopting sustainable practices and by so doing complemented earlier studies that *inter alia* had focused on sustainable marketing effect on economic performance.

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