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# How Does Each ESG Dimension Predict Customer Lifetime Value by segments?

## Evidence from U.S. Industrial and Technological Industries

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**Abstract:** The aim of this study is to analyse the research gap regarding the relationship between environmental, social and governance dimensions (ESG) of corporate sustainability initiatives and customer lifetime value (CLV). We divide an entire data sample (547 U.S. listed firms from the Refinitiv Thomson Reuters Eikon database) of both industrial and technological industries into three segments, using prediction-oriented modelling segmentation to test the hypotheses and evaluate the predictive validity of a partial least squares (PLS) model. As a result, we show that environmental, social and governance dimensions (ESG) encompass ten sustainability initiatives that, in turn, are the precursors of future financial firm performance, represented by CLV. Moreover, we found different poor-to-medium effects of each ESG dimension on CLV in segment 1. However, a stronger effect of the social dimension on CLV in segment 3 led to a poor effect, both positive by governance and negative by environmental dimensions, on CLV, while only the environmental dimension had greater effects on CLV in segment 2. The contribution of this research to the body of literature is twofold. First, it deepens the impact of each ESG dimension instead of considering sustainability initiatives as a whole. Second, it evaluates sustainability initiatives with a customer-based corporate firm valuation approach.

**Keywords:** sustainable marketing; customer lifetime value; partial least squares (PLS)

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## 1. Introduction

People recognise sustainable development as a chance to enhance the planet through relationships with firms and institutions. Firms are increasingly aware of undertaking sustainable activities with a holistic approach to their business. Sustainability encompasses environmental, social and governance initiatives (ESG) that help firms gain legitimacy and promote their reputation among their stakeholders. However, the relationship between ESG and financial performance is unclear. Moreover, a gap in the literature exists regarding how firms also contribute to social changes, well-being and quality of life from a customer-centric perspective.

On the one hand, ESG is an abbreviated term for the cumulative effect of environmental, social and governance policies, opportunities and challenges. The United Nations Principles for Responsible Investment (UNPRI) report first introduced it in 2006 [1]. These sustainable marketing dimensions were sourced from the [2] ‘triple bottom line’ (people, planet and profit) accounting concept. ESG is a nonfinancial corporate assessment system that promotes a firm’s transition from a single goal of profit maximisation to multiple goals of environmental protection and social responsibility [3]. ESG covers nonfinancial information and joint financial statements, as firms evaluate sustainability as a win–win situation in terms of social value and enterprise value.

On the other hand, firms can assess the effectiveness of their sustainability decision making and raise their financial performance using customer metrics. Marketing performance is one of the issues of firm financial performance, often associated with marketing effectiveness, efficiency, productivity and metrics [4]. Customer-based corporate valuation (CBCV) is the process of valuing a firm by forecasting current and future customer behaviours, using customer data in conjunction with traditional financial data [5]. Digital technologies enable firms and other institutions to enhance their business processes and improve their predictions and planning [6]. According to [7], firms used to evaluate ‘Good’ consumers through financial metrics, such as sales volume, revenue, profit or CLV. Therefore, calculating CLV means current and future customer relationships are a valuable—if not the most valuable—asset of a firm [8]. A solid link between CLV and firm value is confirmed, and advances in data models demonstrate that CLV models are good proxies for the market value of the firm. For many firms, CLV represents the majority of the firm’s shareholder value. Nowadays, management must close the gap between CLV and shareholder value [9].

Considering the above aspects, the aim of this research is to predict the marketing performance (CLV) of environmental, social and governance (ESG) initiatives aimed at sustainable development. In particular, our study addresses two key gaps in the marketing literature with regard to sustainability. First, existing research has explored ESG as a whole rather than assessing each individual ESG dimension, resulting in studies’ outcomes often contradicting one another: some authors provide evidence of a positive relationship between ESG and financial performance, while others provide evidence of a negative relationship. Second, existing research has generally derived measures of corporate financial performance from accountability, so the sustainability literature has yet to use customer-based financial measures. Our research addresses both of these gaps in the literature by analysing the relationship between individual ESG dimensions and CLV, making a valuable contribution to the literature. We review the existing literature on both sustainable marketing and marketing performance metrics to produce a model that incorporates elements from both issues. More specifically, we detail how each ESG dimension of sustainability acts as a precursor to the maximisation of marketing performance (CLV), discussing how these dimensions complement one another in distinct ways.

For this purpose, we use current approaches that focus on predictive model assessment, such as PLS prediction-oriented segmentation (PLS-POS) or predictive validity (q2\_predict). The PLS-SEM’s causal predictive nature also concerns heterogeneity that is likely to exist in the samples of studies, which enables superior performance in recovering segment-specific

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model estimates [10]. PLS-POS performs well in discovering unobserved heterogeneity in structural paths of measures, both reflective and formative [11]. Moreover, the PLS-SEM literature recognises that an apparent dichotomy exists between explanation and prediction models in this causal predictive nature. While explanation models focus on metrics to test hypotheses and evaluate explanatory power based on maximising the amount of explained variance of the constructs (R<sup>2</sup>), prediction models extend to whether we can predict new cases by drawing a holdout sample to cross-validate the final sample. Beyond using R<sup>2</sup> in our prediction model, we include the predictive validity of both indicators and constructs with this novel approach, named *q<sub>2</sub>\_PLSpredict* [12].

## 2. Literature Review

### 2.1. Sustainable Marketing

According to [13], sustainability marketing contributes to streams of sustainability literature and sustainable development, with existing differences in views and the role of marketing. Scholars notice that the marketing literature translates a firm production orientation to a market orientation and, more recently, to a sustainable marketing orientation (SMO). Firms with a high-level SMO have the potential to create long-term market returns due to strategic integration, social commitment and ethical capabilities [14]. Recently, [15] proposed a guiding framework for levels of sustainability in marketing, distinguishing positive (growth-oriented) and normative (well-being-oriented) scopes of marketing, such as mass marketing, green marketing, circular marketing, sustainable marketing and sufficiency marketing. Different stages refer to how firms entail sustainability. Starting with promoting green products and services for ‘green consumers’, firms otherwise did not implement sustainable marketing activities. Lacking information and knowledge from the consumer’s point of view, they continued promoting sustainable lifestyles and changes in consumer behaviour [16]. Eventually, consumer demand extended beyond products and services to engaging in sustainable activities (e.g., reduce, recycle and reuse). Furthermore, firms’ initiatives focused on such initiatives to provide customer satisfaction without involving property, since this direction entailed a decrease in production as well as an impact on the environment. Firms also sufficiently developed marketing initiatives as long as customer profile demand focused on ‘real needs’ rather than ‘wants’. At the top level, firms assumed involvement in environmental prevention initiatives during their business actions, for either themselves or their customers.

Firms also create and co-create sustainability by facilitating value for the consumer through sustainable products and services and engaging consumers with the brand’s core values [17]. On the one hand, brands create a higher-level perception of sustainable consumption through brand values when it takes place in relation to the consumer’s experience and journey. Thus, firms must integrate it into the main brand as a competitive differentiator. On the other hand, co-creation relies on the value that firms and consumers create jointly, through interaction, participation and the formation of quality relationships between the consumer and the brand. In [18], the authors introduced the concept of customer engagement value that incorporated the many novel forms of value that consumers create in these highly interactive relationships. These include monetary forms that traditionally refer to customers’ purchasing behaviour regarding a company’s products and/or services (CLV), and nonmonetary aspects (e.g., referrals, influence and knowledge). Co-creation is a cornerstone for sustainable consumption, inspiring initiatives for incremental changes towards more sustainable activities through shared values, knowledge and resources. Firms entail co-creation sustainability strategies, such as crowdsourcing sustainable product ideas, building brand communities around sustainability or holding innovation workshops that enhance awareness of not only sustainable products but also sustainable consumption practices [19].

Moreover, transformational value is a social aspect of value creation that enhances change for greater individual and collective well-being. While the basis of conventional value is the

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satisfaction of individuals' daily needs, the transformative value modifies that towards a well-being scope in terms of both consumption and the social structure. Sustainability is certainly a transformative value; it goes beyond conventional value propositions to meet conventional customer needs [20]. Recently, [21] showed the impact of overall transformative value and perceived sustainability on service experience and customer satisfaction, using an ecosystem approach. Theoretically, sustainable consumption does not provide individual or private benefits, but it contributes to the collective good. From a communal perspective, the motivation for sustainable consumption is not its direct benefit to the individual but, rather, its value-in-behaviour benefits [22]. According to [23], the concept of value-in-behaviour suggests moving from the conventional consumption value theory (i.e., explaining the consumers' choices of products or services) to an approach that addresses behavioural choice and consumers' motivation to perform pro-social behaviours by realising the value of performing them. Sustainable consumption behaviours encompass buying and nonbuying behaviour as well as moderate consumption. While buying behaviour for sustainable consumption refers to the purchase of products with environmentally friendly characteristics in terms of the production process, nonbuying behaviour refers to rejecting products that negatively affect the environment. Moderate consumption refers to limiting consumption behaviour to minimise negative impacts on the environment, such as reducing the use of goods and resources (e.g., energy). In this regard, transformations in both the firm's marketing function towards sustainability and the changing customer landscape reflect changes that can appear in the firm's financial results [24].

## *2.2. Customer Life Value Models as Marketing Performance*

CLV plays an important role in the value or valuation of the firm in the market through customer profit margins. CLV as a marketing metric is the sum of all economic transactions in the customer–firm relationship for a designated period. In [25], the authors provided a simplified approach that bases CLV on profit margin in a period and applies the resulting factors to the retention rate and the discount rate. Applying the discount rate to future streams of benefits determines their net present value and, therefore, the value of a firm's customers over time. Moreover, [25] demonstrated that this simple manner of calculating CLV is a good predictor of future firm value. Two separate analyses (Rust model and Gupta model) of the same market scenario (e.g., telecom industry) show similarities between the two methods/models for evaluating CLV as customer equity (CE), one using behaviour-based data and the other using market-based data.

On the one hand, the behavioural data model of CE provides identification based on customer-perceived dimensions, namely, value, brand and relationship. These three dimensions reflect the marketing effort with customers to market the firm's valuation and financial success [26]. Hence, firms can determine the customer-perceived drivers enabling them to establish retention and acquisition strategies, improve CLV and assist in allocating marketing resources. Numerous studies have used Rust's model, and its drivers (precursors) have extended beyond the customer's buying process. For instance, a model of sustainable marketing with ESG dimensions and using CE and perceived CE has also been found [27].

On the other hand, the market-based data model (Gupta model) functions as a financial indicator. CLV can be considered at different levels, including individual or segment, as well as an aggregated level named "customer equity" (CE), which is the sum of the CLVs of a firm on its current customers [8]. CE and the customer equity sustainability ratio (CESR) also provide managers with a reference standard for allocating marketing resources. Firms can use customer selection and resource allocation, due to higher lifetime values leading to higher profits, to reallocate resources to more profitable customers [28]. For instance, [29] determined five segments and identified who generated most of the profit, as well as two segments that have the greatest growth potential in the future.

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### 2.3. Hypotheses

ESG dimensions of sustainable marketing reflect a firm's marketing efforts. Researchers explore what kinds of sustainable methods customers truly value and how firms can build and maintain CE [24]. Sustainable marketing activities appear to have either no effect or, in some cases, a negative effect on CE [26,30].

The relationship between environmental, social and governance (ESG dimensions) and financial results has received much attention due to their impact on firm performance. To better understand the role of ESG dimensions, academics test the association of each single dimension instead of measuring sustainability as a whole. In general, firms deal with different ESG plans in order to determine which pillar scores higher or lower concerns, as well as how the ESG pillars complement each other [31]. However, there is a lack of studies that examine the net effects of each ESG impact on corporate financial performance [31] and studies that attempt to use performance marketing metrics [32].

Using the Refinitiv Thomson Reuters Eikon database [33], researchers revealed how the ESG dimensions complement each other. In [31], the authors examine the effect of different configurations of ESG pillars on corporate financial performance (CFP), rather than the net effects of each pillar on CFP. Using a sample of 42 listed new energy companies in China from 2016 to 2020 and the longitudinal fuzzy set qualitative comparative analysis (fsQCA), this study identifies two configurations that generate high CFP and four that generate low CFP, measured by return on assets (ROA). As an example of these results, while the S pillar had a much more important impact on high CFP than scores for the E and G pillars, the configuration analysis of low CFP indicates that firms invest too much in the E pillar due to environmental protection. Additionally, [34] shows evidence from a sample of 105 Italian banks during 2016–2020 that the governance pillar is a significant positive predictor of ROE and ROA but not Tobin's Q (TQ) and stock market return (SR). The results also indicate that both the environmental and the social pillars are not significant predictors for any of these four financial ratios (ROA, ROE, TQ and SR). In [35], the authors employ ROA related to the capital invested and the EBIT related to the income statement in a sample of 257 Italian-listed firms from 2011 to 2020. Their findings indicate that all ESG pillars show a significant and positive correlation with EBIT. However, only the environmental pillar shows a significant and negative correlation with ROA, and there is no correlation between ROA and both the social and governance pillars. Moreover, [36] employed data on 151 U.S. commercial banks from 2016 to 2020 and found an inverted U-shaped nonlinear association between the social pillar and the bank market value, as well as between the environmental pillar and market value. However, the governance dimension has no statistically significant influence on the market value (measured as the share price multiplied by the number of ordinary shares in the issue). It means increasing socially responsible investments or environmental investments has a positive impact up to a certain point, at which the impact turns negative.

Despite the large volume of this literature, academics have left its impact on marketing performance unexplored. To the best of our knowledge, [32] identified two different causal configurations that lead to higher marketing performance (measured as market share), highlighting the importance of the governance dimension in the pharmaceutical sector. ESG dimensions also relate to the cost of capital [37], the parameter used to calculate the CLV metric. Moreover, [37] found an inverse effect relationship between ESG dimensions and the cost of capital. Additionally, they did not find a relationship between the social dimension and the environmental dimension regarding the cost of capital. By contrast, the governance dimension shows a negative relationship with the cost of capital. Finally, [38] showed how firms belonging to these sensitive industries carry out the market values of the ESG dimensions. Accordingly, we propose the following hypotheses:

**H10.** *The environmental dimension (E) positively influences CLV.*

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**H2o.** *The social dimension (S) positively influences CLV.*

**H3o.** *The governance dimension (G) positively influences CLV.*

Given the critical role of CLV, numerous studies have worked to elucidate its drivers, which can be broadly divided into organisational and customer-based antecedents [39]. For instance, prediction-oriented models based on customer citizenship behaviours (CCBs) help to predict CLV, since they centre on engaged customers [40]. Moreover, [40] shows that prediction-oriented segmentation only requires a number of segments to determine balanced size segments through the assignment of observations. Prediction-oriented modelling segmentation (POS) constitutes an extension of the PLS distance-based segmentation approach, which enables us to identify hidden segments within an entire sample in a way that considers relationships among both dependent and independent variables. The characterisation of these segments is determined by latent response-based segmentation, meaning that researchers can only decide on the number of segments based on the details of the study at hand. The result of this process is a certain number of balanced size segments and the assignment of observations to each segment. Notably, this technique also reports the values of the trajectory or path coefficients that improve or worsen relative to the entire sample to analyse the path of each segment.

According to [41], maximising aggregated CLV requires firms to consider how their customised marketing strategies may affect CLV. By segmenting customers and allocating personalised marketing strategies to each segment, firms can enhance their returns in terms of aggregated CLV. Thus, in this study, we divide the sample into three segments to predict the aggregated CLV level. As indicated in Section 2.2, a firm has a CLV-aggregated level due to customer value in economic terms (otherwise known as ‘customer equity’ in the marketing literature). In this study, a firm’s sustainability assessment is tested by each driver (each ESG dimension) within each segment, so we propose the following hypotheses:

**H1a.** *In segment a, the environmental dimension (E) positively influences CLV.*

**H2a.** *In segment a, the social dimension (S) positively influences CLV.*

**H3a.** *In segment a, the governance dimension (G) positively influences CLV.*

**H1b.** *In segment b, the environmental dimension (E) positively influences CLV.*

**H2b.** *In segment b, the social dimension (S) positively influences CLV.*

**H3b.** *In segment b, the governance dimension (G) positively influences CLV.*

**H1c.** *In segment c, the environmental dimension (E) positively influences CLV.*

**H2c.** *In segment c, the social dimension (S) positively influences CLV.*

**H3c.** *In segment c, the governance dimension (G) positively influences CLV.*

### **3. Materials and Methods**

Analytical and methodological measurements of sustainability are an emerging research area for practitioners and researchers alike [42]. Our study uses the Refinitiv Thomson Reuters Eikon database [33], which has indicators for the three dimensions (environmental, social and governance, named ESG performance pillar scores in the Refinitiv Thomson Reuters Eikon database [33], as well as firm financial information. Most scholars who have used this database have focused on the link between ESG performance pillar scores and CFP due to its capability of evaluating the company’s sustainability performance as well as its financial impact. This

methodology employs different ESG criteria of sustainability according to pre-established weights on indicators (initiatives). Likewise, this database provides economic and financial information, such as sales, free cash flow and the weighted average cost of capital (WACC), which we employed to calculate the CLV.

Regarding measuring ESG pillar performance scores, the three dimensions—environmental, social and governance—are accompanied by ten indicators, each scoring between 0 and 100. The environmental dimension comprises 3 indicators, namely, resource use, emissions and innovation, with 61 rating items. The social pillar comprises 4 indicators, namely, workforce, human rights, community and product responsibility, with 63 rating items by which to score them. The governance category comprises 3 dimensions, namely, management, shareholders and corporate social responsibility (CSR) strategies, with 54 rating items by which to score them.

To measure CLV, we calculated two different indicators to define a reflective composite of CLV (see PLS methodology below). First, we employed free cash flow as profit margin and WACC and retention rate equal to one, which all remain constant for an infinite period, to calculate long-term CLV. Second, we employed net sales as profit margin and WACC and retention rate equal to one, all remaining constant for a finite period of a year, to calculate short-term CLV. Thus, in line with previous studies that analysed CFP, our CLV measurement includes both the long- and the short-term marketing performance metric.

Finally, the entire sample of this study included 547 U.S. firms from the Refinitiv Thomson Reuters Eikon database [33], dated 31 December 2022, comprising 262 technology industry firms and 285 industrial firms. Taking account of the aspects described above, we collected ten indicators (which this database calls ‘scores’) to calculate ESG dimensions and three parameters (free cash flow, net sales and WACC) to calculate CLV. The mean of the environmental dimension (E) was 50.09, the social dimension (S) 56.86, the governance dimension (G) 57.57 and CLV 8.04. Respecting the parameters for calculating CLV, the sample shows variability in these economic financial data due to the firms’ heterogeneity. Table 1 shows descriptive statistics of the entire sample.

**Table 1.** Descriptive statistics of entire sample.

Section	Indicators	Missing Values	Mean	Std	Min	Max
COMPOSITES (ESG DIMENSIONS and CLV)	Resource Use Score	44	53.02	28.62	1.28	99.90
	Emissions Score	44	49.47	28.04	1.35	99.90
	Innovation Score	86	47.79	24.23	0.45	98.28
	Workforce Score	0	55.32	26.23	2.45	99.86
	Human Rights Score	79	54.56	27.86	0.35	97.15
	Community Score	0	70.69	19.62	1.60	99.94
	Product Responsibility Score	5	46.88	25.80	5.53	99.85
	Management Score	0	61.00	24.74	4.14	99.86
	Shareholders Score	0	58.10	25.32	5.70	99.86
	CSR Strategy Score	81	53.62	28.02	0.10	99.97
PARAMETERS TO CALCULATE CLV	ln CLV FINITE	0	8.30	1.51	4.52	13.57
	ln CLV INFINITE	0	7.78	1.88	2.43	14.10
	Weighted Average Cost of Capital (WACC)	0	0.08	0.02	0.02	0.14
	Net Sales (margin profit of ln CLV FINITE)	0	7940	25755	47.55	406942

Free Cash Flow margin profit of ln_CLV_INFINITY	0	1368	6847	0	111868
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#### 4. Empirical Results

Constructs represent conceptual variables in statistical models. The construct definition guides the conceptualisation of its measurement in a structural equation model. It entails deciding questions such as whether to measure a construct reflectively or formatively or as a factor model or a composite model. We applied both reflective and formative indicators in a PLS composite model since that model did not impose any limitations on the covariances between the indicators of the same construct. PLS considers two models (measurement and structural) to perform a statistical analysis focusing on variance.

To evaluate the measurement model, we tested depending on whether they were reflective or formative indicators due to our mixed path model. On the one hand, to assess the measurement model with reflective constructs, we checked the measurement model at the indicator level and at the construct level. At the indicator level, we analysed individual reliability, which requires values (loadings) above the threshold (loading > 0.7). We also analysed collinearity, which requires values below the threshold (VIF < 3.3). On the other hand, to assess the measurement model with formative constructs, we also checked the measurement model at the indicator level and at the construct level. At the indicator level, we analysed individual reliability, which requires values above the threshold (loading > 0.5) and weights. While loadings report the absolute contribution of each indicator to the construct, the weights report the relative contribution of each indicator to the construct (relative contribution in order to rank them). We tested the significance of weights and loadings by bootstrapping with a two-tailed test ( $p < 0.05$ ). Table 2 shows the measurement model of PLS.

**Table 2.** Measurement model of PLS.

<b>Composite</b>	<b>Indicator</b>	<b>Loadings</b>	<b>Weight</b>	<b>VIF</b>	<b>Type</b>
Environmental (E)	Emissions Score	0.936	0.641	1.715	Formative
	Resource Use Score	0.856	0.428	1.715	Formative
	Innovation Score	0.489	0.068	1.235	Formative
Social (S)	Workforce Score	0.939	0.641	1.756	Formative
	Product Responsibility Score	0.428	0.095	1.142	Formative
	Human Rights Score	0.466	0.099	1.177	Formative
Governance (G)	Community Score	0.827	0.376	1.643	Formative
	CSR Strategy Score	0.952	0.918	1.029	Formative
	Management Score	0.422	0.316	1.061	Formative
Customer lifetime value (CLV)	Shareholders Score	0.142	-0.052	1.063	Formative
	ln_CLV_finite	0.961	0.556	3.174	Reflective
	ln_CLV_infinite	0.950	0.490	3.174	Reflective

Note: The results marked in *italics bold* indicate that confidence intervals include zero in PLS.



With reflective indicators of the CLV composite, we checked composite reliability, which requires values above the threshold (Cronbach alpha > 0.7), with the obtained value of 0.906. We also checked convergent validity, which requires values above the threshold (AVE > 0.5), with the obtained value of 0.913. Formative indicators required external or convergent validity, the correlation between latent variable formative and reflective measures, which requires values above the threshold of 0.7 [43]. According to [44], we can use a global item, so we extracted the ESG global indicator from the Refinitiv Thomson Reuters Eikon database [33] as a reflective indicator. We performed three single paths in PLS, one for each relationship between ESG composites and the ESG global score, to analyse the direct effect. The value obtained from the environmental -> ESG global score was 0.79; from the social -> ESG global score was 0.85; and from the governance -> ESG global score was 0.99. Therefore, they all exceeded the required threshold of 0.7. Finally, we also analysed discriminant validity, which requires values below the threshold of heterotrait–monotrait (HTMT) 0.9. Table 3 shows discriminant validity from HTMT.

**Table 3.** Discriminant validity with HTMT.

<b>Composites (HTMT)</b>	<b>Value</b>
Environmental <-> CLV	0.563
Governance <-> CLV	0.486
Governance <-> Environmental	0.622
Social <-> CLV	0.604
Social <-> Environmental	0.740
Social <-> Governance	0.554

Note: The results marked in *italics bold* indicate that confidence intervals include zero in PLS.

To check the structural model, we performed a nonparametric bootstrap resampling procedure (10,000 samples). The models estimated by PLS-POS or prediction-oriented segmentation [11] allowed for determining the number of segments and an optimisation criterion (we set the sum of target construct weighted R-square). Table 4 shows descriptive statistics from prediction-oriented segmentation PLS-POS.

**Table 4.** Descriptive statistics from Prediction-oriented segmentation PLS-POS.

<b>Item</b>	<b>Segment a</b>	<b>Segment b</b>	<b>Segment c</b>
Segment size (Number)	161	142	244
Segment size (Percentage)	29	26	45
Mean Environmental (E)	49.8	51.11	49.84
Mean Social (S)	57.27	58.29	56.01
Mean Governance (G)	56.61	59.02	57.82
Mean CLV	8.07	8.04	8.02

We also applied the above segmentation to the entire sample model to test predictive validity and the hypotheses. First, we performed the predictive validity test using the PLSpredict algorithm [12]. Previously, we had to take two decisions to carry out this procedure. We took several sections equal to 10 or  $k = 10$  due to the recommended minimum size of 30 observations for each section. In turn, we took the number of repetitions equal to 10 or  $r = 10$ —that is, we estimated or repeated the predictions  $r$  times and took their average to predict the

value of the new observation. In the model-level analysis, we calculated the  $q^2_{\text{predict}}$  indicator and compared the prediction errors of the PLS model against simple predictions based on the mean of the values of the training sample. If  $q^2_{\text{predict}}$  is positive, it means that the prediction errors of the first model are smaller than those of the second model, and therefore, the first model is more predictive of performance than the second model. This ratio  $q^2_{\text{predict}}$  is tested in each composite by three levels. A small effect is  $0.02 \leq q^2 < 0.15$ , a moderate effect is  $0.15 \leq q^2 < 0.35$  and a large effect is  $q^2 \geq 0.35$ . In addition,  $R^2$  indicates the amount of variance of a construct explained by the predictor variables of said endogenous construct in the model; the values of  $R^2$  range from 0 to 1 in each composite. It is considered poor if it is between 0.19 and 0.32, moderate if it is between 0.33 and 0.66 and substantial if it is higher than 0.67 (Hair et al., 2019). Table 5 shows predictive validity from the structural model of PLS.

**Table 5.** Structural model of PLS: Predictive validity.

Predictive Validity Indicator	Entire (o)	Segment (a)	Segment (b)	Segment (c)
$q^2_{\text{predict}}$	0.400	0.760	0.730	0.610
$R^2$	0.410	0.777	0.755	0.630

Note: The results marked in italics bold indicate that confidence intervals include zero in PLS.

Second, we tested the hypotheses for the study (direct effect), using the PLS technique of the structural model for the full sample and each segment. In PLS tests, path coefficients are statistically significant at 95% when confidence intervals (lower and upper) do not include the value zero [45]. According to [11], the models estimated by PLS-POS or prediction-oriented segmentation also provide information on the values of the trajectory or path coefficients that improve or worsen with respect to the entire sample. Indeed, we tested a model with the entire sample and we also tested one model more by each segment. Thus, we can compare hypotheses among models that predict CLVs aggregated level. Table 6 shows fulfilment hypotheses from structural model of PLS.

**Table 6.** Structural model of PLS: Path coefficients from hypotheses.

Hypothesis and Path	Entire (o)	Segment (a)	Segment (b)	Segment (c)
H1 (o,a,b,c): Environmental -> CLV	0.181	0.147	0.931	-0.175
H2 (o,a,b,c): Governance -> CLV	0.163	0.360	<b>-0.092</b>	0.154
H3 (o,a,b,c): Social -> CLV	0.380	0.486	<b>-0.065</b>	0.819

Note: The results marked in italics bold indicate that confidence intervals include zero in PLS [45].

## 5. Conclusions

In this research, we studied how sustainability effects predict firms' financial performance. We relied on the customer segments of 547 U.S. firms from the industrial and technological sectors. The proposal prediction model contained ten initiatives/indicators grouped into the three performance categories from the Refinitiv Thomson Reuter Eikon database [33], which the sustainability literature also generally recognises: environmental, social and governance [42]. The three initiatives under the environmental performance category are resource use, emissions and innovation. The four initiatives under the social performance category are personnel, human rights, community and product responsibility. The three initiatives under the governance performance category are management, shareholders and CSR strategies.

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The predictive quality is satisfied in the entire sample and each segment (see Table 5). Analysing the main indicator in the entire sample,  $q2\_predict$ , we obtained a large effect (0.40). The R2 indicator shows a moderate effect (0.41) in the entire sample. Both indicators of the prediction quality ( $q2\_predict$  and R2) also improved when we applied the PLS-POS technique in segments. With prediction-oriented modelling, our study shows that sustainability predicts the financial performance (CLV) in all three categories of sustainability initiatives, measured with ten formative indicators of a composite model due to predictive validity. However, four indicators (innovation, shareholder, product responsibility and human rights), whose loadings were low compared to the commonly accepted criteria and whose weights were not significant, can be excluded as they do not contribute to the prediction. According to [46], 'even if an item contributes little to explained variance in a formative construct, it should be included in the measurement model'. The motive is that dropping a formative indicator implies dropping a part of the composite latent construct. In this sense, we take into account these results of the measurement of the constructs for the purpose of predictive research to generate predictions with current data as accurately as possible.

The result of our study was proof of the hypotheses for the entire model (see Table 6). Of the three antecedents of CLV, the social dimension is the main precursor of CLV with a direct effect coefficient equal to 0.38, the environmental dimension is the second precursor of CLV with a direct effect coefficient equal to 0.18, and finally, the governance dimension is the third precursor of CLV with a direct effect coefficient equal to 0.16. According to the aim of this study, a firm's sustainability assessment is also tested by each driver (ESG dimension) in each segment. Thus, we compare hypotheses among segments that predict CLV. As a result, the three customer-predicted segments also demonstrated that the values of the path coefficients were very different among them as well as with respect to the entire model, which obtained path values between 0.10 and 0.40 in three performance categories (ESG). The prediction in-segment 1 was characterised by only a poor direct effect (0.15) of the environmental performance category on the CLV, which also suggests an absence of impact on the CLV by this segment. The governance performance category showed a medium and positive effect (0.36), and the social performance category showed a medium-high and positive effect (0.49), which suggests both mixed application of sustainability initiatives and their impact on the CLV of this segment. The prediction in segment 2 was characterised by nonsignificant effects of both the social performance category (-0.06) and the governance performance category (-0.09) on the CLV, which also suggests an absence of impact by this segment on the CLV. The environmental performance category showed a greater effect (0.93), which also suggests a greater full impact on the CLV of this segment. The prediction in segment 3 is characterised by a greater full direct effect (0.82) of the social performance category on the CLV and a poor impact of the governance category. The significant and negative effect of the environmental category on the CLV suggests that a nonprofitable effect is mixed with the rest of the sustainability initiatives of this segment.

This study's contribution to the literature is twofold. First, as the relationship between sustainability and CFP is still unclear, this study explains the impact of each ESG dimension on CFP rather than considering sustainability initiatives as a whole. Previous research has explored sustainability as a form of management of or responsibility for the environment; however, it has failed to effectively consider the effects of each individual ESG dimension on financial results. Thus, we contribute to the literature on the relationship between sustainability and valuable financial performance information about ESG dimensions' effects on CLV. While firms may be close in overall ESG levels, the three dimensions levels often vary considerably. As such, firms emphasise different elements to varying degrees in their ESG plans. This variance enables us to discuss each element's individual economic productivity by considering each predictive segment. This segmentation-based methodology revealed the relationship between the three segments and the three ESG strategies. In summary, varying degrees of every ESG initiative in segment 1 achieved financial performance relying on customer marketing metrics. However, in segment 2, only environmental initiatives achieved financial performance

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relying on customer marketing metrics. In segment 3, firms mainly applied social initiatives to achieve financial performance relying on customer marketing metrics as a result of both positive governance and negative environmental initiatives having a poor effect on CLV. This study's second contribution is its evaluation of sustainability initiatives with a customer-based corporate firm valuation (CBCV) approach. A CBCV approach suggests that customer metrics derived from customers' responses to a firm's marketing initiatives represent a good way to operationalise firm market value. This study shows that the identification of different sustainability initiatives can lead to economically productive strategies in terms of producing a higher aggregated CLV level. In turn, the customer-centric perspective in the marketing literature proposes that marketing-related decision making should occur on the basis of projected financial impact. A firm can design better strategies focused on their value proposition, achieving a different CLV as a marketing metric of the firm's financial performance. In this way, this study goes beyond the existing research on ESG dimensions and FP that measured FP via accounting data (e.g., ROA, ROE and Tobin's q). Notably, the current literature is unclear with regard to its outcomes, as such financial metrics can be represented as both short-term and long-term data when researchers use panel data. In fact, accounting and financial data are focused on transparency—not the transformative value of social changes. Consequently, firms can assess and predict financial performance based on the outcomes of sustainability initiatives when using the CLV aggregated level. In this context, both shifts in the firm's marketing function towards sustainability and the evolving customer landscape reflect changes that can appear in the firm's financial results. While sustainable consumption does not provide individual or private benefits to consumers, it contributes to the collective good. The motivation behind sustainable consumption is not its direct benefit to customers. However, this value-in-behaviour on the part of consumers benefits firms so long as it is reflected in their financial results from a communal perspective.

From a management point of view, sustainability initiatives are a good predictor of CLV. Our study defined CLV as marketing performance, which included both short- and long-term indicators, to predict within a single timeframe. The tests carried out on the quality of the prediction show that firms can forecast by gathering the results in two timeframes, using net sales in the short term and free cash flow in the long term. As such, policymakers can act differently regarding the fear that sustainability initiatives require a long term to have a positive effect. Previous studies with panel data underline that sustainability initiative investments add value to stakeholders in the long term but are not profitable in the short term. In contrast, our study shows that it does not extend to all stakeholders, so managers must be concerned with customers when sustainability initiatives are in the initial stage. In addition, our study identified four initiatives that have no effect on a customer-based firm's financial performance (innovation, shareholder, product responsibility and human rights), suggesting that managers can identify more economically productive sustainability initiatives.

Regarding limitations and future lines of research, the first limitation of this study is the sample of listed firms from the Refinitiv Thomson Reuters Eikon database [33], which is specific to the United States for both industrial and technology industries. In general, studies of the relationship between sustainability and financial results are usually adjusted to a single region due to the market rules of listed firms. However, this belief could be relaxed in studies predicting financial results based on clients. Therefore, we suggest a major study with more countries and industries. A second limitation refers to the CLV metric because we consider such profit margins as free cash flow and net sales. Parameters of CLV remain constant over time, even for retention rate, so we do not include new customers or acquisition costs in the CLV calculation. The large CLV literature shows how to parameterise CLVs, so we can apply it to customer acquisition and retention strategies from different countries and sectors, as well as other operational aspects of noncontractual models where purchase frequency is important. In contrast, the proposed basic CLV model is simple to apply and a good indicator of the value of the firm based on customers. Finally, a third limitation is the three categories with only ten

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sustainability indicators as drivers of a firm's financial performance in the prediction-oriented model. Although it is relevant for sustainability marketing research, we believe that it is only a step towards the understanding of valid sustainability models that employ new explanatory variables and forecasting by customer-based financial and nonfinancial outcomes.

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## References

1. Hoepner, A.G.F.; Majoch, A.A.A.; Zhou, X.Y. Does an asset Owner's institutional setting influence its decision to sign the principles for responsible investment? *J. Bus. Ethics* **2021**, *168*, 389–414.
2. Elkington, J. Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *Calif. Manag. Rev.* **1994**, *36*, 90–100.
3. Yuan, X.; Li, Z.; Xu, J.; Shang, L. ESG disclosure and corporate financial irregularities—Evidence from chinese listed firms. *J. Clean Prod.* **2022**, *332*, 129992.
4. Gao, Y. Measuring marketing performance: A review and a framework. *Mark. Rev.* **2010**, *10*, 25–40. <https://doi.org/10.1362/146934710X488924>.
5. McCarthy, D.M.; Fader, P.S. Customer-based corporate valuation for publicly traded noncontractual firms. *J. Mark. Res.* **2018**, *55*, 617–635.
6. Verhoef, P.C.; Broekhuizen, T.; Bart, Y.; Bhattacharya, A.; Dong, J.Q.; Fabian, N.; Haenlein, M. Digital transformation: A multidisciplinary reflection and research agenda. *J. Bus. Res.* **2021**, *122*, 889–901.
7. Reinartz, W.J.; Kumar, V. On the profitability of long-life customers in a noncontractual setting: An empirical investigation and implications for marketing. *J. Mark.* **2000**, *64*, 17–35.
8. Blattberg, R.C.; Deighton, J. Manage marketing by the customer equity test. *Harv. Bus. Rev.* **1996**, *74*, 136–144.
9. Wiesel, T. Value creation measurement and management in times of radical social and technological change. *J. Creat. Value* **2022**, *8*, 171–183.
10. Sarstedt, M.; Cheah, J. Partial least squares structural equation modeling using SmartPLS: A software review. *J. Mark. Anal.* **2019**, *7*, 196–202.
11. Becker, J.; Rai, A.; Ringle, C.M.; Völckner, F. Discovering unobserved heterogeneity in structural equation models to avert validity threats. *MIS Quart Manag. Inf Syst.* **2013**, *37*, 665–694.
12. Shmueli, G.; Sarstedt, M.; Hair, J.F.; Cheah, J.; Ting, H.; Vaithilingam, S.; Ringle, C.M. Predictive model assessment in PLS-SEM: Guidelines for using PLSpredict. *Eur. J. Mark.* **2019**, *5*, 2322–2347.
13. Kemper, J.A.; Ballantine, P.W. What do we mean by sustainability marketing? *J. Mark. Manag.* **2019**, *35*, 3–4, 277–309.
14. Lučić, A. Measuring sustainable marketing orientation-scale development process. *Sustainability* **2020**, *12*, 5.
15. Kelleci, A.; Yıldız, O. A guiding framework for levels of sustainability in marketing. *Sustainability* **2021**, *13*, 1644.

- 
16. Rakic, B.; Rakic, M. Holistic management of marketing sustainability in the process of sustainable development. *Environ. Eng. Manag. J.* **2015**, *14*, 887–900.
  17. Palakshappa, N.; Dodds, S. Mobilising SDG 12: Co-creating sustainability through brands. *Mark. Intell. Plan.* **2021**, *39*, 265–283.
  18. Kumar, V.; Aksoy, L.; Donkers, B.; Venkatesan, R.; Wiesel, T.; Tillmanns, S. Undervalued or overvalued customers: Capturing total customer engagement value. *J. Serv. Res.* **2010**, *13*, 297–310.
  19. Arnold, M. Fostering sustainability by linking co-creation and relationship management concepts. *J. Clean. Prod.* **2017**, *140*, 179–188.
  20. Blocker, C.P.; Barrios, A. The transformative value of a service experience. *J. Serv. Res.* **2015**, *18*, 265–283.
  21. Moliner-Tena, M.Á.; Monferrer-Tirado, D.; Estrada-Guillén, M.; Vidal-Meliá, L. Sustainable service ecosystems from the transformative value perspective: A study in tourism destinations. *Corp. Soc. Responsib. Environ. Manag.* **2023**, *30*, 342–357.
  22. Gordon, R.; Dibb, S.; Magee, C.; Cooper, P.; Waitt, G. Empirically testing the concept of value-in-behavior and its relevance for social marketing. *J. Bus. Res.* **2018**, *82*, 56–67.
  23. Hwang, H.; Yeo, H. Inconsistency between subjective propensity and practice of sustainable consumption: Impact of the consumers' values-in-behavior and social participation. *Sustain. Dev.* **2022**, *30*, 1796–1810.
  24. Kumar, V. Transformative marketing: The next 20 years. *J. Mark.* **2018**, *82*, 1–12.
  25. Silveira, C.S.; de Oliveira, M.O.R.; Luce, F.B. Comparing alternative approaches to estimate customer equity. *Mark. Intell. Plan.* **2017**, *35*, 611–625.
  26. Rust, R.T.; Lemon, K.N.; Zeithaml, V.A. Return on marketing: Using customer equity to focus marketing strategy. *J. Mark.* **2004**, *68*, 109–127.
  27. Sun, Y.; Garrett, T.C.; Phau, I.; Zheng, B. Case-based models of customer-perceived sustainable marketing and its effect on perceived customer equity. *J. Bus. Res.* **2020**, *117*, 615–622.
  28. Venkatesan, R.; Kumar, V. A customer lifetime value framework for customer selection and resource allocation strategy. *J. Mark.* **2004**, *68*, 106–125.
  29. Xue, W.; Sun, Y.; Bandyopadhyay, S.; Cheng, D. Measuring customer equity in noncontractual settings using a diffusion model: An empirical study of mobile payments aggregator. *J. Theor. Appl. Electron. Commer. Res.* **2021**, *16*, 409–431.
  30. Sun, Y.; Ko, E. Influence of sustainable marketing activities on customer equity. *J. Glob. Sch. Mark. Sci.* **2016**, *26*, 270–283.
  31. Liu, P.; Zhu, B.; Yang, M.; Chu, X. ESG and financial performance: A qualitative comparative analysis in china's new energy companies. *J. Clean. Prod.* **2022**, *379*, 134721.
  32. Paolone, F.; Cucari, N.; Wu, J.; Tiscini, R. How do ESG pillars impact firms' marketing performance? A configurational analysis in the pharmaceutical sector. *J. Bus. Ind. Mark.* **2022**, *37*, 1594–1606.
  33. Refinitive. Environmental, Social and Governance Scores from Refinitiv. May 2022. Available online: [https://www.refinitiv.com/content/dam/marketing/en\\_us/documents/methodology/refinitiv-esg-scores-methodology.pdf](https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf) (accessed on 25 January 2023).
  34. Menicucci, E.; Paolucci, G. ESG dimensions and bank performance: An empirical investigation in italy. *Corp Gov.* **2022**.
  35. Pulino, S.C.; Ciaburri, M.; Magnanelli, B.S.; Nasta, L. Does ESG disclosure influence firm performance? *Sustainability* **2022**, *14*, 13.
  36. Ersoy, E.; Swiecka, B.; Grima, S.; Özen, E.; Romanova, I. The impact of ESG scores on bank market value? evidence from the U.S. banking industry. *Sustainability* **2022**, *14*, 15.
  37. Ramirez, A.G.; Monsalve, J.; González-Ruiz, J.D.; Almonacid, P.; Peña, A. Relationship between the cost of capital and environmental, social, and governance scores: Evidence from latin america. *Sustainability* **2022**, *14*, 9.

- 
38. Miralles-Quirós, M.M.; Miralles-Quirós, J.L.; Gonçalves, L.M.V. The value relevance of environmental, social, and governance performance: The brazilian case. *Sustainability* **2018**, *10*, 3.
  39. Kumar, V.; Lemon, K.N.; Parasuraman, A. Managing customers for value: An overview and research agenda. *J. Serv. Res.* **2006**, *9*, 87–94.
  40. Segarra-Moliner, J.-R.; Moliner-Tena, M.-Á. Engaging in customer citizenship behaviours to predict customer lifetime value. *J. Mark. Anal.* **2022**.
  41. Marmol, M.; Goyal, A.; Copado-Mendez, P.J.; Panadero, J.; Juan, A.A. Maximizing customers' lifetime value using limited marketing resources. *Mark. Intell. Plan.* **2021**, *39*, 1058–1072.
  42. Kuo, T.; Chen, H.; Meng, H. Do corporate social responsibility practices improve financial performance? A case study of airline companies. *J. Clean. Prod.* **2021**, *310*, 127380.
  43. Hair, J.F.; Risher, J.J.; Sarstedt, M.; Ringle, C.M. When to use and how to report the results of PLS-SEM. *Eur. Bus. Rev.* **2019**, *31*, 2–24.
  44. Sarstedt, M.; Wilczynski, P.; Melewar, T.C. Measuring reputation in global markets-A comparison of reputation measures' convergent and criterion validities. *J. World Bus.* **2013**, *48*, 329–339.
  45. Henseler, J.; Ringle, C.M.; Sinkovics, R.R. The use of partial least squares path modeling in international marketing. *Adv. Int. Mark.* **2009**, *20*, 277–319.
  46. Roberts, N.; Thatcher, J.B. Conceptualizing and testing formative constructs: Tutorial and annotated example. *Data Base Adv. Inf. Syst.* **2009**, *40*, 9–39.

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