

UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ
PROGRAMA DE PÓS-GRADUAÇÃO EM ENGENHARIA DE PRODUÇÃO
MESTRADO EM ENGENHARIA DE PRODUÇÃO

GUILHERME FRANCISCO DO PRADO

THE EFFECTS OF SUSTAINABILITY PERFORMANCE ON
CORPORATE FINANCIAL PERFORMANCE: A STRUCTURAL
EQUATION MODELING APPROACH

MASTER THESIS

PONTA GROSSA
2020

GUILHERME FRANCISCO DO PRADO

**THE EFFECTS OF SUSTAINABILITY PERFORMANCE ON
CORPORATE FINANCIAL PERFORMANCE: A STRUCTURAL
EQUATION MODELING APPROACH**

Master Thesis presented as hurdle requirement to obtain the title of Master of Industrial Engineering, in the Post-Graduation Program in Industrial Engineering, Federal University of Technology - Paraná.

Advisor: Prof. PhD: Cassiano Moro Piekarski

PONTA GROSSA

2020

Ficha catalográfica elaborada pelo Departamento de Biblioteca
da Universidade Tecnológica Federal do Paraná, Câmpus Ponta Grossa
n.15/20

P896 Prado, Guilherme Francisco do

The effects of sustainability performance on corporate financial performance: a structural equation modeling approach. / Guilherme Francisco do Prado, 2020.
111 f.; il. 30 cm.

Orientador: Prof. Dr. Cassiano Moro Piekarski

Dissertação (Mestrado em Engenharia de Produção) - Programa de Pós-Graduação em Engenharia de Produção, Universidade Tecnológica Federal do Paraná, Ponta Grossa, 2020.

1. Desenvolvimento sustentável. 2. Empresas - Finanças. 3. Desempenho. 4. Modelos econométricos. 5. Análise econômico-financeira. I. Piekarski, Cassiano Moro. II. Universidade Tecnológica Federal do Paraná. III. Título.

CDD 670.42

Eelson Heraldo Ribeiro Junior. CRB-9/1413. 16/04/2020.



Ministério da Educação
UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ
Câmpus Ponta Grossa
Diretoria de Pesquisa e Pós-Graduação
Programa de Pós-Graduação em Engenharia de Produção



FOLHA DE APROVAÇÃO

Título da Dissertação n. **08/2020**

THE EFFECTS OF SUSTAINABILITY PERFORMANCE ON CORPORATE FINANCIAL PERFORMANCE: A STRUCTURAL EQUATION MODELING APPROACH

por

Guilherme Francisco do Prado

Este trabalho foi apresentado às 14:00h do dia **28 de fevereiro de 2020**, como requisito para obtenção de título de MESTRE EM ENGENHARIA DE PRODUÇÃO, área de concentração Gestão Industrial, do Programa de Pós-Graduação em Engenharia de Produção. O candidato foi arguido pela banca examinadora composta pelos professores subscritos. Após deliberação, a banca examinadora considerou o trabalho aprovado.

Profa. Dra. Barbara Galleli Dias
(UTFPR)

Profa. Dra. Regina Negri Pagani
(UTFPR)

Profa. Dra. Claudia Tania Picinin
(UTFPR)

Prof. Dr. Cassiano Moro Piekarski
(UTFPR)
Orientador e presidente da banca

Prof. Dr. Cassiano Moro Piekarski
Coordenador do PPGEP
UTFPR - Câmpus Ponta Grossa

ACKNOWLEDGEMENTS

To God, Supreme Intelligence, first cause of all things.

To my dear wife, for the unconditional support.

To my mother and father, my most beloved teachers.

To my professor advisor, Professor Dr. Cassiano Moro Piekarski, for the patience and guidance.

To my friends of the Sustainable Productions Systems Laboratory (LESP) for the assistance in times of need.

To the UTFPR for providing the needed structure.

To the Coordination of Improvement of Higher Education Personnel (CAPES) for the financial support.

To the Post-Graduation program in Industrial Engineering (PPGEP) for widening my possibilities.

ABSTRACT

PRADO, Guilherme Francisco do. **The effects of sustainability performance on corporate financial performance:** a structural equation modeling approach. 2020. 111 p. Thesis (Master's Degree of Industrial Engineering) - Federal University of Technology - Paraná, Ponta Grossa, 2020.

One of the often-cited definitions for sustainable development claims that for sustainable development to take place, the current generation must be able to supply its own needs without compromising the capacity of the future generations to supply their own. The most recent empirical studies sought to analyze the effects of sustainable business practices to determine whether there is a relationship between such practices and economic performance and the extent of the influence they have on one another. This thesis aims to determine what indicators for social, environmental and economic performance impact on corporate financial performance. To this end, a literature review was conducted in order to determine the gaps that the literature had left unexplored. The gaps found were related to variable usage and methods employed. The competing models strategy was employed in order to determine the effects of the proxies for sustainability performance over financial performance, employing data from 179 organizations that reported their sustainable information using the GRI standards reporting model, until the end of 2018. Both models found a relationship between environmental performance and financial performance. The construct portraying environmental performance was found to be substantially related to financial performance (R^2 values $>0,80$, as well as significant at a 0,05 level). The other relationship that was found regarded the Social Performance construct as weakly related to the accounting performance construct ($R^2 < 0,25$, also significant at a 0,05 level). The disclosure items of Sox and Nox emissions were considered as components of the environmental performance construct, while Tobin's Q was chosen to represent financial performance. The second model found evidence of a relationship between social performance, portrayed by board diversity, and financial performance, portrayed by return on sales. While the models were successful in detecting the existing relationship among the variables, causality could not be inferred, since there is not enough empirical evidence to support this claim. While no causal relationship could be found among the variables here explored, the results indicate which aspects should be more carefully examined by researchers in future studies.

Keywords: Sustainability performance. Financial performance. Structural equation modeling.

RESUMO

PRADO, Guilherme Francisco do. **Os efeitos da performance sustentável sobre a performance financeira corporativa:** uma abordagem de modelagem de equações estruturais. 2020. 111 f. Dissertação (Mestrado em Engenharia de Produção) - Universidade Tecnológica Federal do Paraná, Ponta Grossa, 2020.

Um das mais comumente definições citadas para desenvolvimento sustentável afirma que a presente geração necessita poder suprir suas próprias necessidades sem comprometer a capacidade de gerações futuras de suprir as suas. Estudos mais recentes vêm tentando analisar os efeitos de práticas sustentáveis corporativas para determinar se existe um relacionamento entre tais práticas e performance econômica, além da extensão da influência que têm uma sobre a outra. O objetivo desse estudo é determinar quais indicadores dos relatórios de sustentabilidade da *Global Reporting Initiative* para performance econômica, social e ambiental, exercem sobre Performance Financeira Corporativa. Para esse fim, uma revisão de literatura foi conduzida para determinar lacunas que foram deixadas inexploradas. As lacunas encontradas estão relacionadas com o uso de variáveis e as metodologias utilizadas. A estratégia de dois modelos estruturais concorrentes foi empregada para determinar os efeitos das variáveis de performance sustentável sobre as variáveis de performance financeira, utilizando os dados de 179 empresas que relataram suas informações sustentáveis, do início do ano de 2017 até o final do ano de 2018, nos padrões de relatórios GRI *standards*. Para os dois modelos, o constructo representando performance ambiental foi considerado fortemente relacionado à performance financeira (valores para $R^2 > 0,80$, além de estatisticamente significativo no nível 0,05). O segundo relacionamento encontrado foi entre performance social e performance contábil (valores para $R^2 < 0,25$, também significantes no nível 0,05). Para o primeiro modelo, os indicadores de mais destaque foram emissões de Sox, e emissões de Nox representando o constructo ambiental, enquanto o Q de Tobin foi o escolhido para performance financeira. Para o segundo modelo, os mesmos indicadores ambientais foram escolhidos para representar performance ambiental, enquanto os indicadores relativos a proporção de mulheres e proporção de homens em cargos de liderança na organização foram escolhidos para representar performance social. Neste modelo, o Q de Tobin foi mantido como representante da performance de mercado, enquanto o Retorno sobre Vendas representou performance contábil. Enquanto os modelos detectaram com sucesso os relacionamentos existentes entre as variáveis, a causalidade não pôde ser inferida, uma vez que não há apoio suficiente na literatura que suporte as relações encontradas. Enquanto não se tem uma relação causal entre as variáveis estudadas, os resultados indicam os aspectos que devem receber mais atenção de pesquisadores em futuros estudos.

Palavras-chave: Performance sustentável. Performance financeira. Modelagem de equações estruturais.

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ACCRONYM / ABBREVIATION LIST

ANOVA	Analysis of Variance
CFO	Cash Flow from Operating Activities
CFP	Corporate Financial Performance
CSD	Corporate Social Disclosure
CSR	Corporate Social Responsibility
EIRIS	Ethical Investment Research and Information Service
EMS	Environmental Management System
EPS	Earnings per Share
ESG	Environmental, Social and Governance
GRI	Global Reporting Initiative
GSCM	Green Supply Chain Management
ISE	<i>Índice de Sustentabilidade Empresarial</i> (Corporate Sustainability Index)
KPI	Key Performance Indicators
MANOVA	Multivariate Analysis of Variance
MSCI	Morgan Stanley Capital International
MTB	Market to Book Ratio
MV	Market Value
NO _x	Nitrous Oxides
PBT	Profit Before Tax
ROA	Return on Assets
ROCE	Return on Capital Employed
ROE	Return on Equity
SAM	Sustainable Asset Management
SEM	Structural Equation Modeling
SO _x	Sulfur oxides
TBL	Triple Bottom Line
TBQ	Tobin's Q

SYMBOL LIST

R^2	Coefficient of determination
n	Number of sample components;
N	Population
Z	Confidence level
d	Tolerable risk of error
p	(and q) Proportion of randomly choosing a given company

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1 INTRODUCTION

One of the often-cited definitions for sustainable development claims that it requires the current generation to be able to supply its own needs without compromising the capacity of the future generations to supply their own (BRUNDTLAND, 1987; OECD, 2017). One may argue, however, that although this definition seems to provide organizations with a philosophy to steer their actions towards sustainable development, it fails to deliver the concrete measures for addressing sustainable development, consequently leading to misuses or misappropriations of the definition (REDCLIFT, 2005).

For instance, one organization may adopt philanthropical practices in order to appear socially responsible and label its products as “green” in order to appear eco-friendly. In this case, these actions are aimed mainly at improving an organization’s reputation, while the actual sustainable practices and the information regarding measures for sustainability and its advances remain unaddressed and unverified (WANG; SARKIS, 2013; AMEER; OTHMAN, 2012).

The approach employed by researchers to fill this information gap states that organizations which adopt sustainability as their main philosophy are required to assess their results and align their strategies according to three main bottom lines: financial, environmental and social performances. When used, this approach enables organizations to tackle the full scope of sustainability, rather than focusing on micro aspects (BISWAS; SRIVASTAVA, 2018).

Organizations are then encouraged to not only adopt sustainable practices in their businesses, but to also disclose the information regarding practices and results obtained to their publics of interest. Thus, organizations find in sustainability reporting a mechanism which informs the public regarding practices and advances in turning their businesses more sustainable.

According to theory, the main goal of sustainability reporting is to provide a platform in which companies can keep their stakeholders up to date about their most recent actions regarding sustainability practices, thus enabling institutions to communicate their actions to the society (LU; ABEYSEKERA, 2014; HUANG; KUNG, 2010).

Sustainable practices may be therefore disclosed through annual reports, as when an organization builds its sustainability report from scratch or through the adoption of a recognized and accepted report structure, such as the Global Reporting Initiative’s (GRI) guidelines (GRI, 2018).

The GRI guidelines, for instance, have been used by organizations that seek to engage in sustainability reporting by disclosing information regarding both governance aspects and

measurable information of the financial, social and environmental performance that is deemed relevant to the organization's stakeholders (GRI, 2018; MOSEÑE *et al.*, 2013).

Brazil has an example of reporting guidelines in Ethos Institute. It plays a role as an emergent body of research focused on corporate social responsibility of Latin-American countries, supplying organizations with concepts and guidelines as to adopting sustainable and socially responsible business practices (BENITES-LAZARO *et al.*, 2018). Its guidelines for reporting focus mainly on the environmental, social and governance (ESG) aspect of sustainability (ETHOS, 2018).

While Ethos does not grant companies any kind of social responsibility certificates, it plays a major role in disseminating social responsibility culture in companies and organizations through orientation (ETHOS, 2018.).

Corporate social disclosure (CSD) is often referred to in the literature as information disclosed by companies to stakeholders via environmental or annual reports, widely available in manners that allow a permanent record-keeping (CORMIER *et al.*, 2004). The disclosure might contain financial or non-financial and quantitative or qualitative information regarding environmental and social issues (VIANA, 2016.) that will eventually contribute to the development of sustainability and welfare (LU; ABEYSEKERA, 2014).

When correctly employed, CSD provides a platform for dialog and the maintenance of a healthy relationship between companies and stakeholders, giving an opportunity for companies to demonstrate compliance with social responsibility practices (LU; ABEYSEKERA, 2014; HUANG; KUNG, 2010).

Companies might engage in CSD either when required by law or voluntarily. In either case, there is an underlying bias when it comes to the contents of disclosure, since the source of such information cannot be fully verified or audited. This implies that organizations can give a greater importance to practices that will help their reputation as well as hide inappropriate information (NEU *et al.*, 1998).

In order to provide organizations with means for reporting on their social matters, the Global Reporting Initiative (GRI) emerges. GRI is an international organization based on the Netherlands that claims to be the pioneer on sustainability reporting since the year of 1997. The organization focuses on aiding businesses and governments in understanding and communicating the impact on sustainability issues. Reporting, in GRI's point of view, inspires accountability and trust among organizations and their stakeholders and enhance an organization's reputation (GRI, 2018).

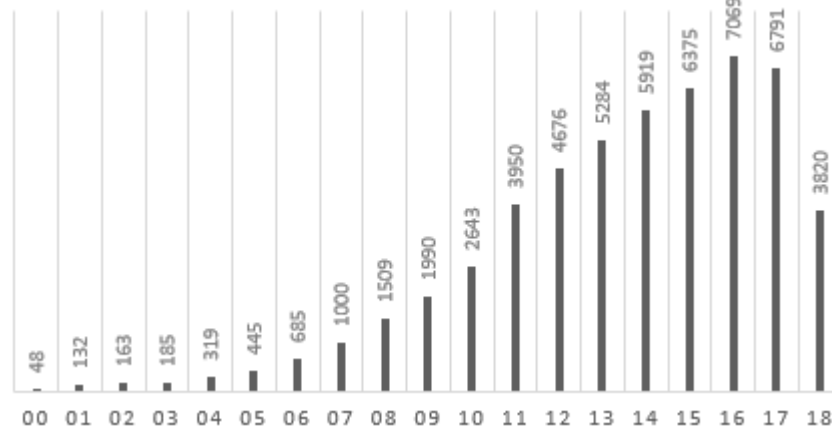
As an ambitious effort to become a reference on CSD. The Sustainability Reporting Standards, their main product, have been in development for the last 20 years and continue to be updated to this date (GRI, 2018).

The scale in which GRI operates is represented by the organizations that adopt their guidelines. The largest companies in the world, with revenues and structures that could considerably impact on the global economy have found the guidelines relevant enough to be adopted, so GRI claims to have responsibility on the improvement of environmental, social and economic aspects worldwide (GRI, 2018).

Several academic studies have pointed out the uniqueness of GRI when it comes to sustainability reporting. It has been stated that the GRI guidelines have a high international profile and influence (ADAMS, 2004), it is the basis on which organizations can articulate TBL and sustainability at the organizational level (MILNE; GRAY, 2008), and the widest known framework for reporting on environmental and social performances of businesses worldwide (BROWN *et al*, 2009).

The number of organizations that have adopted these guidelines for reporting corroborates to these statements. The tendency for growth from the year of 2000 to 2019, comprehending the guideline's creation and its establishment is shown in detail in Figure 1:

Figure 1 - Uptake on the GRI reporting guidelines



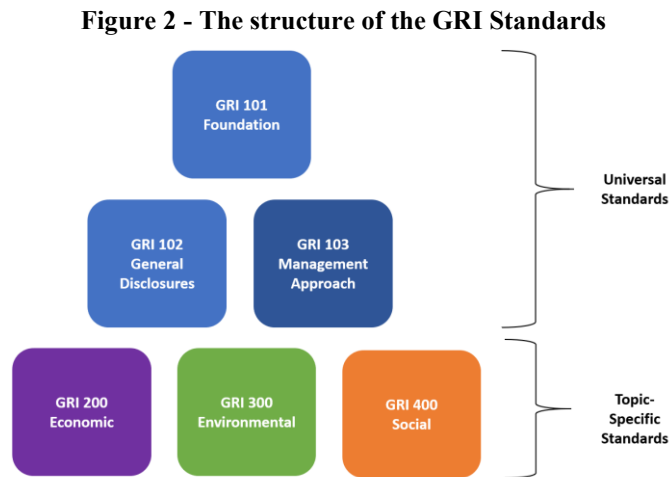
Source: GRI database (December 2019)

The GRI standards provide a set of indicators, which are entitled “disclosures”, are divided in modules and report on management practices and results related to the social, environmental and economic aspects of sustainability, coherent to the TBL approach on sustainability.

In previous versions, once an advancement was made by practitioners or researchers, the whole structure had to be updated to accommodate changes. The adoption of the modular structure allows the constant development of the guidelines and their update according to the

advances observed without compromising the whole structure of the system. This means that the guidelines are not expected to undergo severe changes.

The guidelines have been subject to constant revision, so the current version of the guidelines, named GRI Standards have adopted the modular structure depicted in Figure 2:



Source: Adapted from GRI (2018)

Thus, the universal standard disclosure items are to contain company information, regarding size, managerial structure and management practices, while each of the topic-specific disclosure items address the issues of economic, environmental and social practices and results.

Furthermore, there have been several attempts to employ the information portrayed by the GRI sustainability reports provided by organizations, which range from the earliest versions of the guidelines.

Azapagic (2004), developed a framework for sustainability performance assessment for the mining and minerals industry. In order to standardize the proposed framework, the author sought to make it compatible to the GRI guidelines for reporting. In this case, the GRI guidelines were used as a reference for development sustainable performance indices that would be further employed by mining organizations in order to identify internal hotspots and aid in sustainability reporting.

Adams (2004) compares the GRI guidelines for reporting to some of the other similar guidelines in order to determine whether it can help reduce the gap between the actual firm ethical, social and environmental performance and the results that were portrayed. The focus of this study, though, was on the ethical reporting aspect, rather than the triple bottom line. In this case, the GRI guidelines are analyzed as to its contributions towards making more transparent and externally audited indicators for reporting.

The study by Clarkson *et al* (2008) on the other hand, focused on the environmental aspect of sustainability. They developed a series of environmental performance indices based

on the GRI guidelines in order to prove whether the existing theories are enough to explain the relationship between environmental performance and environmental reporting.

Weber *et al* (2008) analyzed the relationship between GRI indicators and financial performance of firms. By employing regression analysis, financial performance indicators related to accounting performance were employed on the dependent side, while GRI indicators for economic, social and environmental performance were employed on the independent side. A positive relationship was found in this case.

One can consider sustainability indicators such as the ones provided in the GRI guidelines for sustainability reporting to be a useful tool for establishing a common measurement unit for corporate sustainability performance. Thus, the relevance and acceptance of the GRI guidelines for sustainability reporting in the academic scenario is evidently relevant, being subject of publication of several scientific peer-reviewed international journals. It is also undeniable that sustainability reporting is relevant to the scientific community, as it provides the necessary data for measuring corporate responsibility, reputation and most important, the sustainability practices and results that are being obtained by organizations around the world.

Furthermore, GRI's guidelines present at least three advantages when compared to its counterpart (GRI, 2018):

(i) It provides organizations with mechanisms to measure sustainability through the assessment of the economic, environmental and social indicators, while the counterparts are limited to asking whether the organization agrees with sustainable philosophies

(ii) Its guidelines provide organizations with indicators that quantify information, as well as detailed information regarding management practices, so that other organizations may have a starting point for adopting sustainable practices into their business models;

(iii) While other ESG reports are prolific and consequently possess a large number of pages that need to be screened so that the relevant information can be found, GRI provides both guidelines on how to report on an issue and a content index for this information to be easily found.

This has made the GRI guidelines one of the most accepted and adopted guidelines for sustainability reporting (GRI, 2018), whereas 75% out of 250 of the world's largest corporations have chosen to disclose their information according to its guidelines. The attention that this reporting model has drawn to itself has made a subject of sustainability studies.

There are several methodologies employed to determine the existence of the financial-sustainability relationship using different variables and data collecting methods. The data provided by the sustainability reports has been addressed by the quality and amount of the

information provided (CHING *et al.*, 2017; GOEL; MISRA, 2017), the adoption of companies to sustainable programs (LI *et al.*, 2016), belonging to sustainability indices (CRISTÓFALO *et al.*, 2016) and the reputation of companies that choose to disclose (ROBERTS; DOWLING, 2002).

The most recent empirical studies sought to analyze the effects of sustainable business practices to determine whether there is a relationship between such practices and economic performance and the extent of the influence they have on one another. For instance, the study of Roberts and Dowling (2002) shows, by the employment of a regression analysis, that there is a significantly strong, directional and causal relationship between financial performance and corporate reputation.

In their research, Wang and Sarkis (2013) used the regression analysis method to analyze a sample of the 500 greenest companies in the United States to determine if green supply chain management (GSCM) practices had an impact in the financial outcome of sustainable companies, compared to their counterparts. The results obtained indicated that the adoption of certain practices inside GSCM enables positive financial outcomes.

Yet, other studies sought to explore the effects of sustainability disclosures over financial performance in contexts such as construction companies (SIEW *et al.*, 2013), evaluating the impact of sustainable strategies on financial performance (SIMINICA *et al.*, 2015), determining whether the quality of the sustainability disclosures had an influence on the financial outcomes of companies listed in the ISE (CHING, 2017), determining the effects of the performance measuring parameters on the overall outcome of a business and on the index composed of sustainable development to determine its impact in Slovakian companies (RAJNOHA, *et al.*, 2016) and, describing the connection between financial results and sustainability levels (WAGNER; BLOM, 2011), bringing either positive, negative or inconclusive results.

Therefore, when analyzing the literature, one can observe the existence of, three major gaps, which will be addressed by this study:

- (i) **The employment of the novel GRI Sustainability Reporting Standards:** The guidelines for sustainability reporting have been updated in 2017, meaning that no studies prior to this period have had the opportunity to explore the information provided by the reports that adopted the most recent GRI standards guidelines, rather than the previous G3 and G4 versions.
- (ii) **The acceptance of distinct measurement units for environmental, financial and social performances:** The current literature has presented researchers

with quite a large range of indicators that can be used as proxies for the environmental, financial and social performance. Several authors have employed distinct measurement units and have succeeded in providing new pathways for researchers in the area. This work intends to explore this gap.

- (iii) **There is not a consensus regarding the direction and existence of a relationship:** Although the CSP - CFP is not a current topic, several authors have employed statistical analyses in order to identify the existence, direction and causality of said relationship. Overall, the current literature does not point at a unanimous decision of either there is a relationship, meaning that there are gaps related to variables, samples, time cuts and moderating effects that need further exploration.

There is, therefore, a quite interesting research opportunity, which will be addressed in the following research question:

1.1 RESEARCH QUESTION

-What are the GRI Standards indicators for economic, environmental and social performances that impact on Corporate Financial Performance?

1.2 OBJECTIVES

The purpose of this study is to determine what GRI indicators for economic, environmental and social performance impact the most on Corporate Financial Performance. The specific objectives are as follows:

- To determine the variables used as proxies for sustainability and financial performance, as well as statistical methods employed and their results.
- To develop the overall measurement and structural models.
- To undergo statistical analyses to determine whether there is a relationship to be found.

1.3 NEWNESS, ORIGINALITY AND RELEVANCE

The issue of identifying a relationship between sustainability and financial performance of an organization has been addressed since before the 1990s, whereas different

aspects of sustainability, such as governance, reputation and social responsibility have been evaluated along with different proxies for financial performance (AMEER; OTHMAN, 2012).

The current literature points towards accepting statistical methods as a valid approach to determine strength, direction and causality among variables. However, there is a great variety in terms of results obtained by these studies, mainly due to the diversity of statistical analyses, data collection methods, choice for variables and temporal cuts, which has led to different paths rather than a consensus (QUAZI; RICHARDSON, 2012). This implies that there is still ground to be covered and conclusions to be drawn from exploring such evidence, whether by exploring sources of information, employing new variables or testing new methods.

As a relevant proxy for sustainability and sustainable development, the GRI guidelines have been now and again used by the literature to bridge the gap between corporate sustainability practices and financial performance (SIEW, 2013; WEBER, 2017). None of these studies, however, employed the most recent version of these guidelines in their analyses.

Moreover, sustainability reports have been screened for qualitative data as, for instance, the length of the report and the quality of the data it possesses according to different sustainability reporting guidelines (GOEL; MISRA, 2017). There is not in the literature, however, a study built upon the quantitative data produced by an organization's sustainability report that evaluates and compares it to corporate financial performance (CFP).

Therefore, the originality of this thesis lies on two main aspects:

(i) While the literature has already used quantitative information, this project innovates by using the GRI standards indicators for sustainability, such as water disposal, energy usage and value created, as proxies for sustainability performance.

(ii) This is the first study to weigh the effects of the sustainability performance of an organization against CFP by considering both the overall sustainability performance and the separate economic, environmental and social performances.

Thus, the thesis provides meaningful contributions both to the literature and to practitioners:

- It contributes to the literature by providing results which adds up to the discussion regarding the relationship between sustainable practices and corporate financial performance.

- It provides practitioners and researchers on the sustainability - financial performance area with empirical data from real-world companies which are employing sustainability practices and disclosing their information. Should the results point towards the existence of a relationship, researchers would be provided with a pathway to be followed in future research.

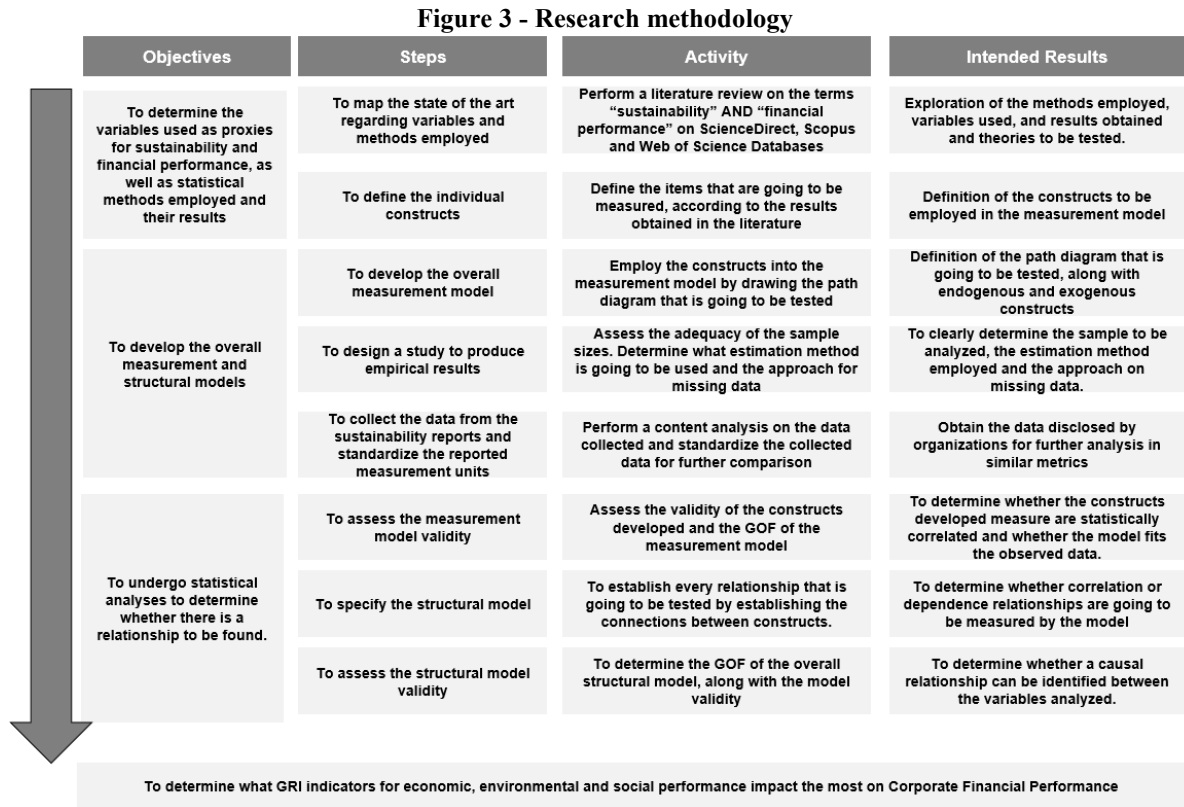
- As organizations become increasingly competitive, financial advantage becomes a key player in the field. By providing practitioners with information regarding which aspect of sustainability is related to financial performance, this research would help organizations focus their actions on relevant and often overlooked aspects of their sustainability practices, providing thus a benefit for both the organizations and society.

1.4 RESEARCH STRUCTURE

This study is divided into five sections. The introduction has presented and contextualized this research's problems. The following material and methods section will present the methods used for reviewing of the literature, collection of data and statistical analyses. The third theoretical review section will present a definition of concepts related to sustainability, an overview of the sustainability and financial performance literature. The following results and discussion section will present the model assessment, while the fifth section presents the concluding remarks for this study.

2 MATERIAL AND METHODS

The specific objectives, as well as stages and phases which this thesis will address to fill the research gap are shown in detail in Figure 3:



Source: Own authorship

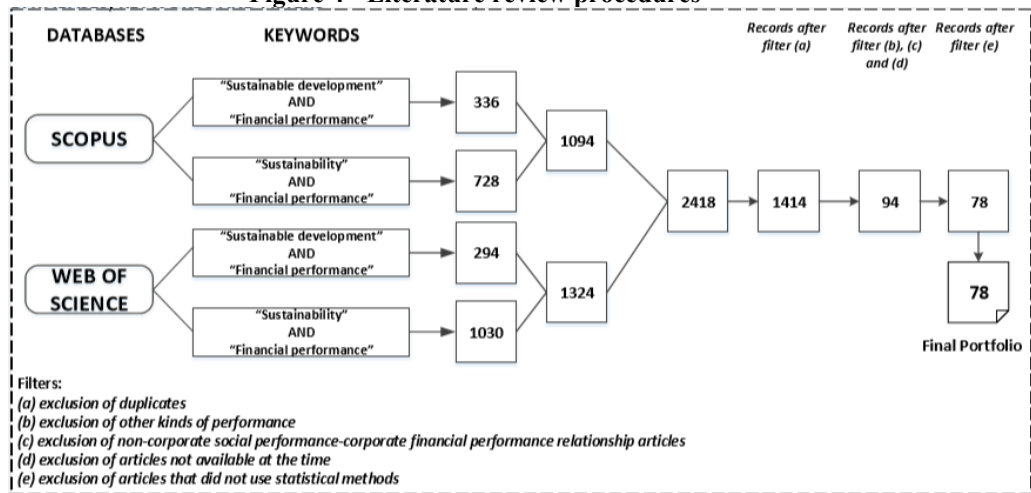
The methodology that will take place to complete the objectives presented above is going to be further described according to the steps necessary for attaining the main objective.

2.1 PROCEDURES FOR THE REVIEWING OF LITERATURE

To conduct this research, a search was done in two databases: Web of Science and Scopus. Papers that had sustainability, sustainable development and financial performance in their abstracts, titles and keywords were retrieved, with no time cut, to obtain the most comprehensive set of results.

By searching the three databases, 1687 documents were obtained, all of which were screened afterwards as shown in Figure 4.

Figure 4 - Literature review procedures



Source: Own authorship (2020)

The filters were employed as follows: (a) Exclusion of duplicates, such as papers that were on both databases; (b) Exclusion of authors that analyzed other kinds of performance rather than financial performance, or had different approaches than the one aimed in this study; (c) exclusion of any studies that were not related to the referred CSP-CFP relationship; (d) exclusion of articles that were not available for reading at the time and (e) exclusion of articles that did not employ statistical methods to achieve their results.

The resulting articles were then analyzed according to: (a) total citation per paper, per journal and journal JCR scores; (b) combination of methods that were employed, and results obtained; (c) analysis of the variables that were used and (d) analysis of suggestions for future research.

The employment of these filters, along with the abovementioned analyses, allowed this study to have a starting point regarding the construction of variables and the choice of the methods to be employed. Next, the procedures for statistical analyses are presented.

2.2 PROCEDURES FOR STATISTICAL ANALYSES

According to Hair Jr (2009) there are several issues which the researcher must address in order to identify the correct statistical method to be employed in order to solve a research question which contains several variables.

First, one should determine whether the research objectives lean towards identifying a dependence relationship or an interdependence relationship and then identify the number of variables that are going to be tested and further categorized between dependent and independent.

This study will address the dependency relationship, where corporate financial performance is predicted by the independent variables for sustainable performance. In this case, multiple relationships between dependent and independent variables are going to be measured, so Structural Equations Modelling (SEM) is the suitable method to be employed.

Furthermore, a regression model would be suitable if there was only one dependent variable to be measured, where in this case there will be several variables for sustainability performance and corporate financial performance.

The six steps proposed by Hair Jr *et al* (2009) for SEM are going to be employed in order to fulfill the objectives of this research.

2.2.1 Defining the Individual Constructs

The first step consists of determining what are the constructs that are going to be analyzed and the variables that are going to compose it. Following the guidelines by Hair Jr *et al* (2009), the constructs must be built according to theory.

The composition of the constructs that are going to be analyzed are portrayed in Table 1 and further discussed below:

Table 1 - Composition of the Constructs

Constructs	Categorization	Indicators	Number of indicators
Sustainability Performance	Exogenous	Social, environmental and economic indicators developed by GRI	110
Environmental Performance	Exogenous	GRI's Environmental Indicators (GRI 300, 301...)	66
Social Performance	Exogenous	GRI's Social Indicators (GRI 400, 401...)	28
Economic Performance	Exogenous	GRI's Economic (GRI 200, 201...)	16
Corporate Financial Performance	Endogenous	Accounting and Market valuation Indicators	6
Accounting performance	Endogenous	Accounting indicators (ROE, ROA, ROCE)	3
Market valuation performance	Endogenous	Market indicators (Price to book value, price/earnings ratio, Tobin's Q)	3

Source: Own authorship

The GRI indicators for sustainability reporting have been chosen to represent a firm's sustainability performance. Their choice is mainly due to portraying the triple bottom line performance of firms, thus in accordance to the approach adopted by this study.

The constructs were built according to the bottom line they represent. The economic indicators are part of the economic bottom line, while the social and environmental indicators represent their respective social and environmental bottom lines. These constructs are going to be considered as exogenous or independent, since the relationship measured in this study is the influence sustainability exerts on corporate financial performance.

The endogenous (dependent) constructs represent corporate financial performance. One might find in the literature, at least two different measures for financial performance, the first one represents the accounting measures, composed by accounting indices such as Return on Assets (ROA), Return on Equity (ROE) and Return on Capital Employed (ROCE) (ASSAF NETO, 2008; GALLON *et al*, 2009):

- (i) Return on Assets is calculated by dividing the organization's net sales by its total assets. It represents how much does one company earn based on the total assets it holds.
- (ii) Return on Equity is calculated by dividing the organization's net earnings by its total equity. As in the previous case, it represents how much does one company earn based on the total equity it holds.
- (iii) Return on capital Employed is calculated by dividing the earnings before interest and tax by a company's capital employed (total assets minus current liabilities). It is a similar measure to return on assets, as the only difference is the deduction of the current liabilities.

The second construct measures the market performance of a firm, composed mainly of Market to Book ratios (MTB), Price/Earnings ratio (PER) and Tobin's Q ratio (TBQ).

- (i) Market to book, or price to book ratios are calculated by dividing a firm's market value per share by its book value per share. It determines whether an organization is over or undervalued.
- (ii) Price/Earnings ratio is calculated by dividing a company's market value per share by its earnings per share. It compares, therefore, a company's market value with its earnings to determine whether its shares are overvalued.
- (iii) Tobin's Q ratio is obtained by dividing a firm's market value by its total assets value. The ideal ratio is 1:1, as it represents a company's balance between stock prices and assets held.

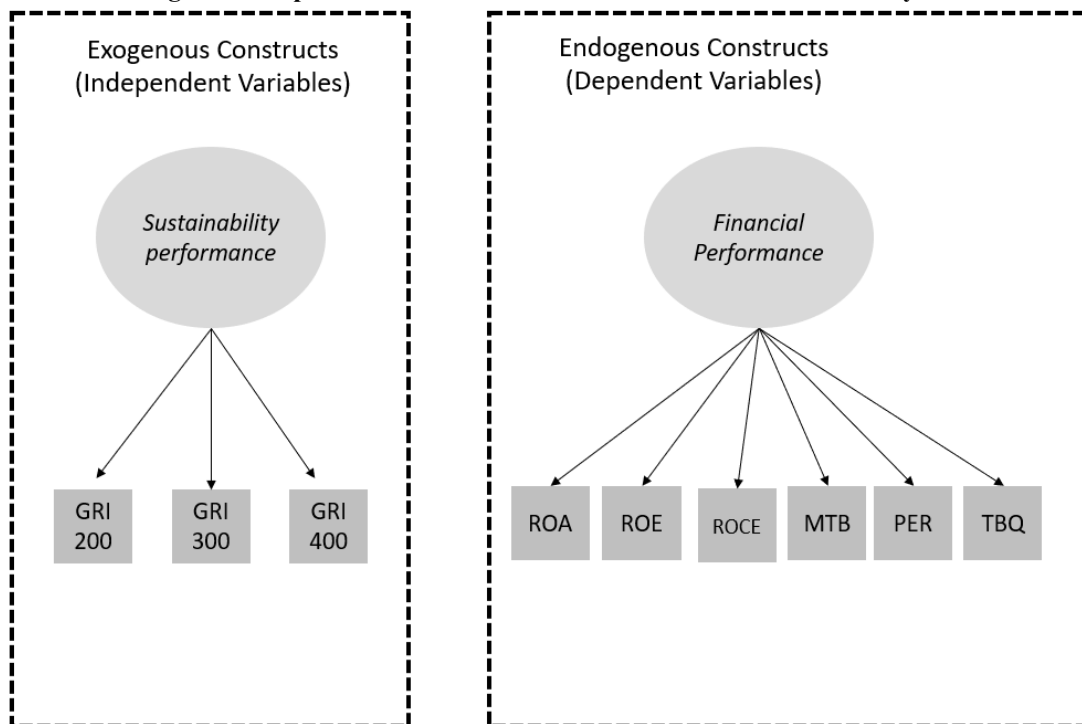
These indicators were chosen mainly due to representing distinct measures for a firm's financial performance. The next step involves the development of the overall measurement model, determining the relationships tested.

2.2.2 Developing the Overall Measurement Model

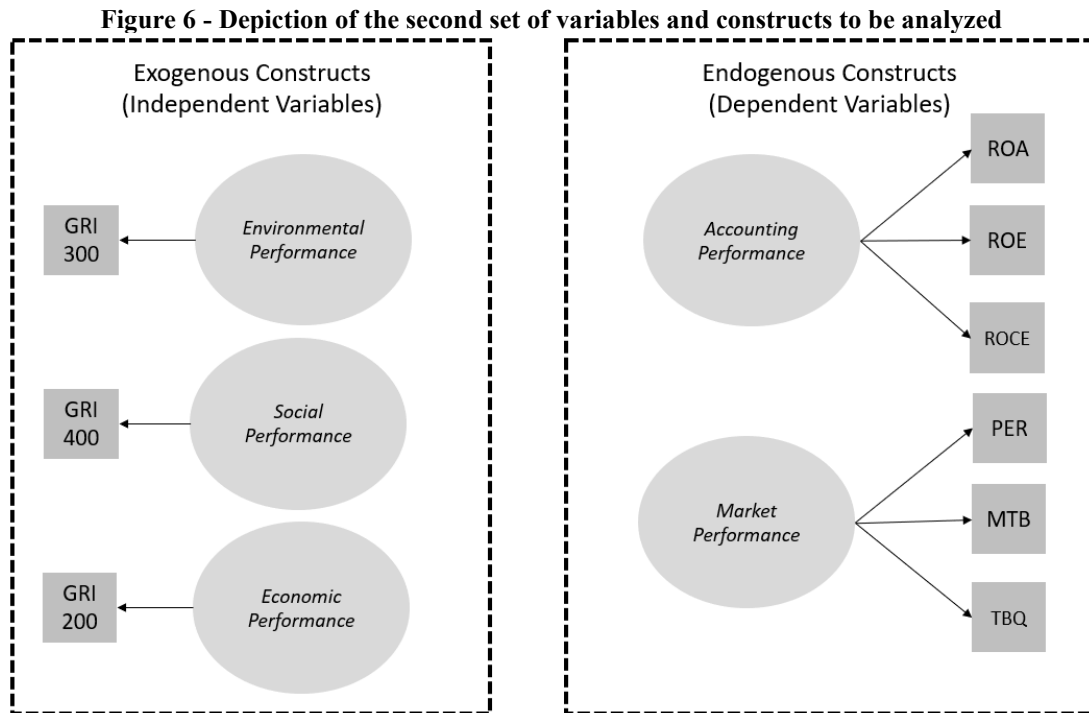
The development of the overall measurement model consists in depicting in a diagram, according to the correct notation, the constructs that are going to be part of the analysis as well as the variables that play a role in their composition.

This study is going to adopt the competing models strategy, so that further analysis can be elaborated. The constructs and the variables that are going to be analyzed are shown in Figure 5 and 6:

Figure 5 - Depiction of the first set of variables and constructs analyzed



Source: Own authorship



Source: Own authorship

According to Hair *et al* (2010), one must (i) assess the empirical evidence regarding the construct's validity and unidimensionality, (ii) determine whether there is a minimum or maximum number of constructs to be used and (iii) determine whether the measures are portraying or explaining the construct.

In the case of empirical evidence, the literature review demonstrated that there are several measures for sustainability, all of which can be categorized according to the triple bottom line. Furthermore, one should consider practitioner's experience when developing the model (HAIR JR *et al*, 2009). This experience is translated in the triple bottom line constructs which are going to be represented by the GRI indicators.

When it comes to determining whether there is a maximum number of constructs to be used, this study successfully captures the triple bottom line of sustainability as well as the distinct measures for financial performance. In this case, adding more measures would deviate the focus of this research, rather than enriching the analysis.

The measures in this study are to be seen as portraying a construct, as they are not an effect of the indicators to be analyzed, but conjoint measures for determining their respective performances.

2.2.3 Designing A Study to Produce Empirical Results

In order to produce empirical results and further contribute to the discussion, one must assess how the missing data is going to be addressed and evaluate the adequacy of sample sizes.

When it comes to sample sizes, Hair Jr *et al* (2009) argues that one should always care for the sample sizes that are going to be submitted to statistical analyses. A sample size greater than 400 might make statistic tests overly sensitive, while small samples may reduce the statistical significance. In both cases an unsuitable sample size might compromise the results and their applicability.

The sustainability reports that are going to be analyzed are those provided by organizations that adopted the GRI Standards Guidelines as their reporting model. These organizations are encouraged to notify GRI about this use and provide information regarding the organization's characteristics. Information such as company name, size, publication year, external assurance and report address are disclosed and stored in the GRI database and made available for academic use.

The reports that are going to be analyzed are those published from 2017 until the end of 2018. These reports are mainly related to the 2017, and in some cases, the 2017-2018 years. The sample is comprised of listed companies that are early adopters of the GRI Standards.

The year of 2017 was chosen due to the submission deadline for sustainability reports being in the end of the first semester of the subsequent year, this study will focus on the 2017 sustainability reports, while listed companies are going to take part for providing more accessible financial information.

The final amount of 375 sustainability reports were found on the GRI's database composing the abovementioned criteria. The sample of sustainability reports used in this research was calculated as shown below (SILVER, 2000):

$$n = \frac{N}{\frac{1 + N \cdot d^2}{z^2 \cdot p \cdot q}}$$

Where,

n = Number of sample components;

N = Population

Z = Confidence level

d = Tolerable risk of error

p and q = Proportion of randomly choosing a given company.

In this equation the total population (N) was 375. At a 95% confidence level, the associated value for Z was 1,96, and the tolerable risk of error (d) was 5%. The values for p and q adopted, were both 0,50, representing a 50% chance of randomly choosing a given company.

The results for this equation determine that a sample greater than 173 cases would be enough for statistically significant results. The sample composition is depicted in Table 2:

Table 2 - Frequency distribution of the sustainability reports currently on GRI database

Activity	Number of reports	%
Financial Services	31	17%
Energy	18	10%
Other	17	9%
Chemicals	12	7%
Real Estate	11	6%
Automotive	8	4%
Technology Hardware	7	4%
Telecommunications	7	4%
Construction	6	3%
Construction Materials	6	3%
Metals Products	6	3%
Energy Utilities	5	3%
Mining	5	3%
Retailers	5	3%
Equipment	4	2%
Logistics	4	2%
Tourism/Leisure	4	2%
Healthcare Products	3	2%
Commercial Services	2	1%
Computers	2	1%
Forest and Paper Products	2	1%
Textiles and Apparel	2	1%
Universities	2	1%
Agriculture	1	1%
Aviation	1	1%
Conglomerates	1	1%
Food and Beverage Products	1	1%
Healthcare Services	1	1%
Media	1	1%
Non-Profit / Services	1	1%
Public Agency	1	1%
Railroad	1	1%
Water Utilities	1	1%
Total	179	100%

Source: Own authorship, based on the GRI database (2018)

The recommended sample sizes for SEM range from 100 to 400. While samples that are too small would probably distort the results and hamper the conclusions, samples greater than 400 would cause over-sensitivity, which would also harm the results (HAIR JR *et al*, 2009).

Hair Jr *et al* (2009) claims that the sample sizes rely on five different aspects of data:

(i) Multivariate normality: Although the lack of collected data hampers this analysis, there is a general acceptance of keeping a ratio of 15 respondents for each parameter estimated in the model. In this sense, the sample size of 179 reports is enough to adhere to this criterion.

(ii) Estimation technique: Assuming the worst of conditions regarding missing data and normality, a minimum sample size for MLE to produce concrete results would be of 200. This study's sample meets this criterion.

(iii) Model complexity: SEM models can determine the several relationships between variables simultaneously. In this study's case, the relationships to be tested are rather simple, and would not necessarily require larger samples to be performed. In this case, the sample size is suitable.

(iv) The amount of missing data: Sample sizes should be calculated by estimating several cases that may be excluded from the analysis due to missing data. In this case, the sample sizes are adequate, given the minimum necessary for the proposed estimation technique.

(v) Average error variance of indicators: This requires that the average error variance is calculated. As there is no data collected to this point, one can only consider that larger sample sizes might be required as communalities become smaller.

Besides attending to the abovementioned criteria, the sample consists of random organizations, which, although are not equally distributed among their activity sectors, represent the early adopters to the GRI standards for reporting.

One must remember, however, that there might be a great amount of missing data for the sustainability indicators, as the reports are voluntary. Some indicators might not have enough respondents to be considered in this study, which may obstruct analysis. Thus, the chosen SEM technique for this study is Partial Least Squares (PLS) SEM (HAIR E AL., 2011), as it does not require all the above-mentioned criteria to be met in order to function.

2.2.4 Data Collection

For the data collection tool to be developed, it is first necessary to analyze the types of data that are provided by the GRI guidelines. This research is going to employ statistical

analyses as a mean for attaining its goal, therefore, the data that is going to be collected must be of quantitative nature.

The data collection tool was developed through a four-step process, and its results can be seen in Appendix A:

(i) Identification of the disclosure items which are going to be part of the analysis by examining the GRI guidelines, provided by the organization's website.

(ii) Segregation of the indicators that are not related to the Environmental, Social and Economic aspects of the company (indicators such as company name, company size, governance body) from those that address the triple bottom line issue and are, therefore, going to take part in the analysis. This step resulted in 60 indicators to be further collected.

(iii) Exclusion from the analysis of the indicators that are qualitative in their nature, and therefore cannot be accurately measured as a proxy for sustainability performance.

(iv) Inclusion of market and accounting variables and indices that are going to be used as proxies for financial performance.

The first data to be collected are the market and accounting variables, which will be collected from the organization's balance sheet and financial reports.

The data related to sustainability will be collected through content analysis of the sustainability reports that constitute the sample. The data consists of the indicators' values, such as total amount of recycled water (for environmental), total training hours per employee (for social) and total economic value generated (for economic).

2.2.5 Data Treatment Procedures

A preliminary analysis of the data contained in the sustainability reports shows that, even though the organizations are provided with guidelines as to what information to disclose, there are no suggestions as to how the information should be disclosed. This consequently leads companies into determining their own units of measurement for economic value, water volume and emission metrics, for instance.

The table containing the proposed standardization for the measurement units for each disclosure item identified is shown in Table 3:

Table 3 - Proposed metrics for measurement unit standardization

(continues)

Disclosure Item	Measurement unit used	Proposed measurement unit
Monetary Values	Local Currency	US\$

Table 3 - Proposed metrics for measurement unit standardization**(continued)**

Disclosure Item	Measurement unit used	Proposed measurement unit
Material usage (liquid)	Liters, Megaliters	m ³
Material usage (solid)	Kg (Kilograms)	t (metric tons)
Energy consumption	Gigajoules, Petajoules, MWh	Gigajoules

Source: Own authorship

The aim in this case is to simply standardize measurement units. It does not mean that there is a preferred measurement unit, but simply it was the chosen metric for standardization.

The standardization of the measurement units disclosed allows comparison among the data provided by organizations so that the constructs can be correctly portrayed.

2.2.6 Assessing the Measurement Model Validity

Next, the measurement model validity should be assessed according to the following steps (HAIR *et al.*, 2011):

(i) Internal consistency reliability: This step determines whether the constructs are internally consistent, and whether the indicators are measuring the same aspect. Composite reliability should be higher than 0,70.

(ii) Indicator reliability: This step determines if the indicators belong inside a certain construct. Indicator loadings should be higher than 0,70.

(iii) Convergent validity: It determines whether the indicators inside a construct are convergent. The average variance extracted (AVE) should be higher than 0,50.

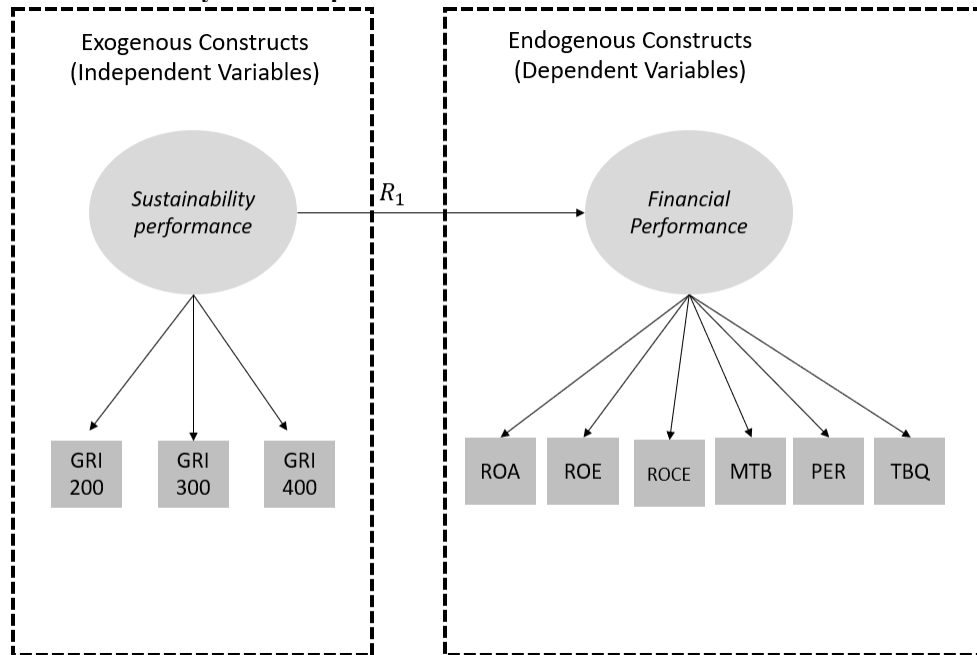
(iv) Discriminant validity: It determines whether the indicators can be placed under different constructs. The Fornell-Larcker criterion and the indicator's loading should be higher than its cross loadings.

These guidelines are going to be followed as to assure the construction of a trustworthy measurement model that is going to produce reliable results.

2.2.7 Specifying the Structural Model

The development of the structural model determines what relationships are going to be tested and what variables compose the constructs. Figure 7 depicts the first relationship tested by this study:

Figure 7 - The sustainability-financial performance model

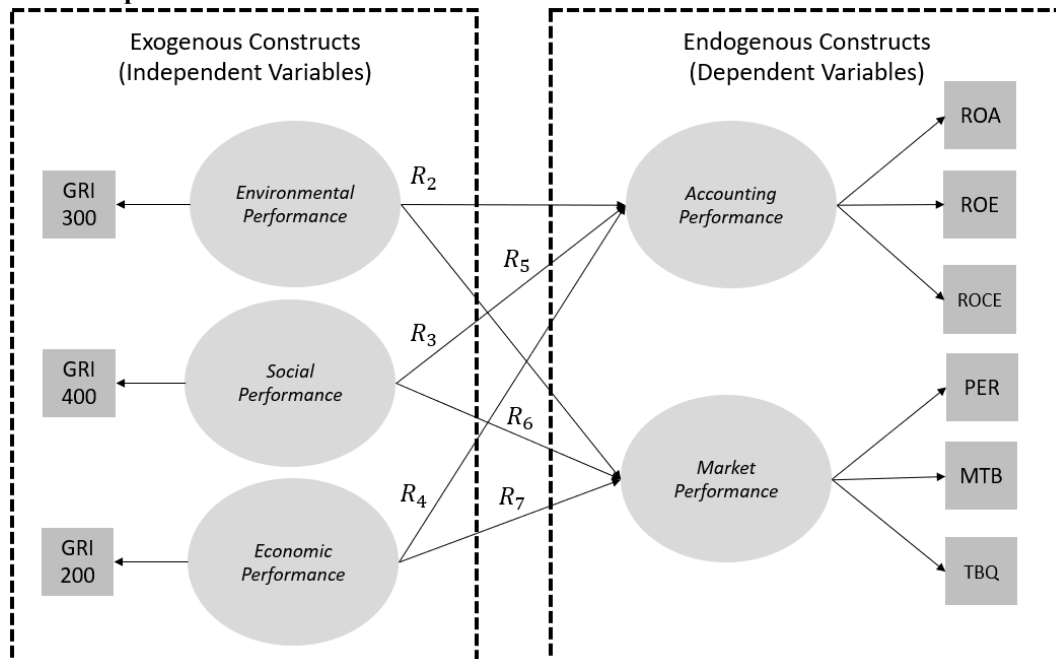


Source: Own authorship

The first relationship to be tested is the one between sustainability and financial performance as whole constructs. In this case, the triple bottom line indicators represent the sustainability performance, while the market and accounting indicators are proxies for corporate financial performance.

The remaining relationships proposed by this study are depicted in Figure 8:

Figure 8 - The separate dimensions model



Source: Own authorship

The relationships depicted from R_2 to R_4 portray the influence of the environmental, social and economic indicators on the accounting performance of firms, while the relationships

in R_5 to R_7 depict the triple bottom line constructs influence on the market performance of firms. In both cases, it is not assumed that there is a correlational relationship between the sustainability variables, as they are assumed to represent a single factor in the first analysis.

2.2.8 Assessing the Structural Model Validity

The main evaluation criteria for the structural model validity are described below (HAIR *et al.*, 2011):

- (i) The R^2 values are to be measured, following the criteria of 0,75, 0,50 and 0,25 for endogenous constructs described as substantial, moderate and weak, respectively.
- (ii) The path significance coefficient is going to be addressed by using bootstrapping techniques. Values over 1,96 are going to be considered as significant.
- (iii) The model's capability to predict will be analyzed by employing Stone-Geisser's Q^2 . Constructs that present a Q^2 value larger than zero have predictive relevance.

2.3 IMPLICATIONS FOR THE RESULTS DISCUSSION

Should the competing models prove to be valid, it will be possible to establish proper causation between the variables, if certain criteria are met (HAIR JR *et al.*, 2009):

- (i) Covariation: There must be correlation between the dependent and independent variables in order to establish causality. A change in the cause will result in a change in the effect. Therefore, if the variables show no correlation, no causality will be inferred.
- (ii) Sequence: In cases in which the variables cannot be manipulated regarding their sequence, the existing theory should be enough to establish a sequence of events. Should there not be theory available in this sense, no causality can be established.
- (iii) Nonspurious covariance: The relationships encountered must be explained by the existing theory. If the relationships found are unexplainable, no causality can be inferred.
- (iv) Theoretical support: Should the results not be supported by compelling literature, no relationship between the variables besides association can be established.

Thus, although the results provided might lean towards a causal relationship between the variables, no causality will be inferred if the abovementioned requirements are not met.

3 THEORETICAL REVIEW

There is a great haziness surrounding the terms sustainable development and sustainability. Experienced authors have already pointed out that the term has been employed inappropriately by academics that tackle this field of research, often employed as a wildcard by academics and practitioners (REDCLIFT, 2005).

In order to produce a meaningful contribution to the area, it was deemed useful to identify in the literature how has the sustainability - financial performance relationship been studied in order to familiarize oneself to the terms that have been employed in the literature. To that end, a theoretical review was conducted so that the differences and similarities among the main terms that have been identified would be illustrated and the contribution, delimited.

3.1 CORPORATE SOCIAL RESPONSIBILITY AND THE TRIPLE BOTTOM LINE APPROACH

Although it seems as a current topic, since before the 1950's has Corporate Social Responsibility been discussed in the literature. It has appeared either as CSR or social justice (KASSEL, 2011). While its definitions began to proliferate two decades later, in the 1970's. It is considered as one of the concepts that addresses and captures the most important concerns of the public, mainly regarding business and society relationships (CARROLL, 1999; MCWILLIAMS; SIEGEL, 2001; SEN, 2001).

CSR theory claims that rather than only turning a profit for its shareholders, an organization must address distinct aspects of society to which it has responsibilities. An organization must address the economic aspect as well as the legal aspect by complying with local legislation, the ethical aspect by acting ethically towards the market and the philanthropical aspect by providing the society with supplies it would otherwise not be able to achieve (CARROLL, 1999).

The scientific literature has come up with different methods for measuring the social performance of organizations, enabling thus the comparison between companies that adopt such practices and their counterparts. These measures range from the identification of the effects of CSR on CFP (MCWILLIAMS; SIEGEL, 2001), to determining whether there is a change in the behavior of customers towards socially responsible firms (SEN, 2001).

The Triple Bottom Line (TBL) approach is built on the same grounds as the CSR theory. It relies on the existence of a distinct pressure groups, ranging from government to society for an organization to communicate the actions it undertakes to its stakeholders so that

its goals will be correctly guided towards answering the questions of the most relevant groups (ELKINGTON, 1998; WHEELER; ELKINGTON, 2001).

It proposes three bottom lines so that organizations will act towards sustainable development: (i) Addressing the issue of economic prosperity by turning a profit for its shareholders, (ii) the issue of environmental quality by undertaking actions that are environmentally friendly, and (iii) the issue of social justice by providing means which will allow diverse groups of society to achieve equality (WHEELER; ELKINGTON, 2001).

It aims, then to measure the bottom lines through the analysis of the (i) economic, (ii) natural and (iii) social capitals:

(i) The economic capital should be measured through the evaluation of distinct indicators than those used by the accountability such as the long-term sustainability of a company's costs, the demand for its products, its pricing and profit margins, and investment in innovation procedures.

(ii) The natural capital, on the other hand, presumes the existence of two categories: critical natural capital and replaceable natural capital. It can be measured through indicators such as life cycle impacts of products, landscaping, remediation, decommissioning and abandonment costs, provision for fines, insurance and other legally related costs, energy, material and water usage. An organization's benchmark against best practitioners is also encouraged.

(iii) The social capital should be measured through indicators such as animal testing, weapons sales, employment of minorities, political contributions to political parties, wages and working conditions and women's rights, for instance. It relies on the theory that an organization exerts impact on people both inside and outside.

It is noticeable, though, that there is a movement in the literature to contribute to the seemingly unceasing question regarding the relationship between sustainability and CFP. Recent studies have collected the results from the studies that applied different methods and variables into their statistical analyses, providing researchers with different pathways to follow into further research (GOYAL *et al.*, 2013; ALSHEHHI *et al.*, 2018).

The relationship between CSR and CFP, has been tested, for instance, by authors that analyzed variables such as year of publication, sample sizes and statistical techniques. Sample size and statistical methodology were found as important variables in which future researchers should expand on (QUAZI; RICHARDSON, 2012).

Other studies that focused on sustainability rather than social responsibility found that different cultural and environmental characteristics should also be considered by future research

to enhance their generalizability. As for variables used, the researchers found out that some of the studies included non-financial variables as measures for firm performance, as a substitute for financial performance, while others should consider the role of moderating variables such as firm size, economy and industry type to be further examined in a different context to broaden the applicability of the research (GOYAL *et al.*, 2013; ALSHEHHI *et al.*, 2018).

These meta-analyses have played an important role in providing readers with pathways to be followed regarding methods variables and time cuts to be employed in future research, providing a service of summarizing the literature. Most importantly, these studies have showed a significant a movement from the individual measurement of social and environmental performance towards a combined measurement of sustainability performance, namely CSR. Such measurement has been targeted for criticism, since it focuses on the social and ethical aspects and consequently misses the full impact of environmental and economic sustainability (GOYAL *et al.*, 2013; ALSHEHHI *et al.*, 2018).

In this study, TBL will be regarded as one of the conditions for attaining sustainability, for encompassing the governance, environmental and economic aspects of the term. Furthermore, empirical studies have pointed out that TBL as a dominant concept that pervades business reporting and engagement towards sustainability (MILNE; GRAY, 2012).

While searching in the literature, it was identified that authors have now and again equated both CSR and the TBL terms, regardless of their conceptual differences, attesting to the claim that it has been employed as a wildcard (REDCLIFT, 2005).

While probing the literature, it was deemed appropriate to incorporate into the analyses papers that considered both CSR and the TBL terms, as restricting conceptually the scope of this study would be a severe limitation to the findings and contributions.

The following section will now address the issues and terms surrounding corporate financial performance and its aspects.

3.2 THE CORPORATE FINANCIAL PERFORMANCE ASPECT

Throughout the history, several authors have discussed what is the most compelling method for measuring Corporate Financial Performance (CFP). Since before the 1990's the scientific community has demonstrated in several studies that there is not a generic measurement unit for CFP, but distinct measures according to businesses and their respective complexities (GRIFFIN; MAHON, 1997).

There is a quite extensive literature regarding measurement units for CFP. This section will provide a definition for the measurement units adopted in this study, in order to clarify the

conceptual dissimilarities and establish a clear definition of the variables that are going to be further employed.

Since most of the information regarding the financial performance of a firm comes from its financial statements, the most common measurement units are often related to accounting earnings (DAMODARAN, 2007).

The profitability indicators are often-used measurement units for CFP. Their goal is to measure the economic capacity of an organization by comparing organization's profits to the parameters that better depicts its dimensions (ASSAF NETO, 2008).

An organization, for instance, might not allocate large amounts of resources in its assets due to market demands. Its structure, therefore, varies according to management, industry sector and other unobserved variables (ASSAF NETO, 2008). Thus, emerges the need to obtain distinct measurement units for financial performance.

The first indicator consists on Return on Assets (ROA). It is calculated by dividing the organization's net sales by its total assets. It represents how much does a company earn based on the total amount of resources allocated in assets (BARNES, 1987; ASSAF NETO, 2008).

However, analyzing the proportion of a firm's net sales by its total assets might not be appropriate for some organizations, due to their management practices. In such cases, the indicators intitled Return on Equity (ROE) weighs an organization's net earnings against the total equity it holds (ASSAF NETO, 2008).

One must also consider the origin of its resources. A firm might hold great amount of assets which are either funded by its own capital (equity) or debt (passive). The third alternative that considers this fact is named Return on Capital Employed (ROCE). It is calculated by dividing a firm's net earnings before interest and tax by its capital employed (total assets minus current liabilities). In this sense, it is quite like ROA, except it considers a firm's current debt as a deduction from its assets (ASSAF NETO, 2008).

These three main measurement units for corporate financial performance are based on accounting values, thus being considered henceforth as accounting performance. Although all three are design to measure a firm's profitability, the equations address different aspects which might be useful when controlling variables such as management practices and other undetected variables.

Market analysts have introduced new manners of measuring firms' financial performance by employing information from the stock market. Publicly traded firms are often analyzed by their market as opposed to their accounting value (NEZLOBIN *et al.*, 2016).

The market to book, or price to book ratio is calculated by dividing a firm's market value per share by the book value of its equity. It determines whether an organization is over or undervalued (NEZLOBIN *et al.*, 2016).

Similarly, Tobin's Q ratio determines whether there is a balance between stock prices and book value of a firm. The ideal ratio of 1:1 represents a perfect balance and displays whether a company is over evaluating its stocks. Often, there is an assumption that a firm's market value and its liabilities book value are similar. A Q value greater than 1 implies that a firm's stock is more expensive than the replacement costs of its assets (NEZLOBIN *et al.*, 2016).

The Price/Earnings ratio is calculated by dividing a company's market value per share by its earnings per share. It can be used to compare organizations from different sizes and sectors, as it weighs share prices per its earnings (NEZLOBIN *et al.*, 2016).

One can notice, therefore, that there are many methods that can be employed for measuring a firm's financial performance. One ought to consider, however, that each of them perform different approaches and can be useful in certain situations, while other are not appropriate when analyzing a greater amount of mixed companies (ASSAF NETO, 2008). Thus, the recommendation for employing distinct indicators.

The following section will present the findings in the current literature. The indicators employed to measure corporate social and financial performance by the current researchers will be presented and analyzed.

3.3 AN OVERVIEW OF THE CURRENT LITERATURE

This section presents an overview of the current literature, according to the methods depicted in the material and methods section.

The total amount of 78 studies were mapped and shown in Table 1. These studies have employed statistical analyses to determine the relationship among sustainability, reputation and financial performance in several industrial sectors, employing a quantitative approach as well as statistical analyses.

Table 4 - Summary of studies mapped

(continues)

<i>Authors</i>	<i>Year</i>	<i>Title</i>
Roberts & Dowling	2002	Corporate reputation and sustained superior financial performance
Lopez	2007	Sustainable development and corporate performance: A study based on the Dow Jones Sustainability Index
Chang & Kuo.	2008	The Effects of Sustainable Development on Firms' Financial Performance - an Empirical Approach
Weber	2008	The relation between the GRI indicators and the financial performance of firms
Lee	2009	Revisiting the Vexing Question: Does Superior Corporate Social Performance Lead to Improved Financial Performance?
Wagner	2010	The role of corporate sustainability performance for economic performance: A firm-level analysis of moderation effects
Aras	2010	Managing corporate performance: Investigating the relationship between corporate social responsibility and financial performance in emerging markets
Wagner & Blom	2011	The reciprocal and non-linear relationship of sustainability and financial performance
Ekatah	2011	The relationship between corporate social responsibility and profitability: The case of Royal Dutch Shell Plc
Ameer & Othman	2012	Sustainability Practices and Corporate Financial Performance: A Study Based on the Top Global Corporations
Humphrey	2012	The independent effects of environmental, social and governance initiatives on the performance of UK firms
Miron	2012	The linkage between corporate social performance and the corporate financial performance in the information and communication technology multinational companies of Romania
Skare	2012	Corporate social responsibility and corporate financial performance - is there a link?
Perez-Calderon	2012	Environmental Performance and Firm Value: Evidence from Dow Jones Sustainability Index Europe
Siew <i>et al.</i>	2013	The relationship between sustainability practices and financial performance of construction companies
Wang & Sarkis.	2013	Investigating the relationship of sustainable supply chain management with corporate financial performance
Sariannidis	2013	CO2 Emissions and Financial Performance of Socially Responsible Firms: An Empirical Survey
Fujii	2013	Corporate Environmental and Economic Performance of Japanese Manufacturing Firms: Empirical Study for Sustainable Development
Lean & Nguyen.	2014	Policy uncertainty and performance characteristics of sustainable investments across regions around the global financial crisis
Singal	2014	The Link between Firm Financial Performance and Investment in Sustainability Initiatives

Table 4 - Summary of studies mapped

(Continues)

Authors	Year	Title
Mervelskemper	2014	Are sustainable investment funds worth the effort?
Pătări	2014	Competitive and responsible? the relationship between corporate social and financial performance in the energy sector
Charlo <i>et al.</i>	2015	Sustainable Development and Corporate Financial Performance: A Study Based on the FTSE4Good IBEX Index
Martínez-Ferrero & Frias-Aceituno.	2015	Relationship Between Sustainable Development and Financial Performance: International Empirical Research
Siminică <i>et al.</i>	2015	The impact of corporate sustainability strategies on the financial performance of Romanian companies in the context of green marketing
Maletič	2015	Do corporate sustainability practices enhance organizational economic performance?
Przychodzen	2015	Relationships between eco-innovation and financial performance - Evidence from publicly traded companies in Poland and Hungary
Said	2015	The state of sustainability disclosure and effects on companies' financial performance
Vergini	2015	Impact of Social Responsibility in Financial Economic Performance of component Brazilian companies of Dow Jones Sustainability Index
DiSegni	2015	Corporate social responsibility, environmental leadership and financial performance
Dobre	2015	The Influence of Environmental and Social Performance on Financial Performance: Evidence from Romania's Listed Entities
Li	2016	Supplier integration, green sustainability programs, and financial performance of fashion enterprises under global financial crisis
Cristófaló	2016	Sustainability and financial market: performance study of companies that composes the corporate sustainability index (ISE)
Rajnoha <i>et al.</i>	2016	From Financial Measures to Strategic Performance measurement system and corporate sustainability: empirical evidence from Slovakia
Santis	2016	Do sustainable companies have a better financial performance? A study on Brazilian public companies
Suriyankietkaew & Avery	2016	Sustainable Leadership Practices Driving Financial Performance: Empirical Evidence from Thai SMEs
Rodriguez-Fernandez	2016	Social responsibility and financial performance: The role of good corporate governance
Younis	2016	The impact of implementing green supply chain management practices on corporate performance
Kasbun	2016	Sustainability reporting and financial performance of Malaysian public listed companies

Table 4 - Summary of studies mapped

(Continues)

Authors	Year	Title
Pandey	2016	Exploring the Association between Environmental Cost and Corporate Financial Performance: A Study of Selected NIFTY Companies
Ferrero-Ferrero	2016	The Effect of Environmental, Social and Governance Consistency on Economic Results
Goel	2017	Sustainability Reporting in India: Exploring Sectoral Differences and Linkages with Financial Performance
Gomez-Bezares <i>et al.</i>	2017	Bridging the gap: How sustainable development can help companies create shareholder value and improve financial performance
Lassala	2017	Sustainability Matter and Financial Performance of companies
Weber	2017	Corporate sustainability and financial performance of Chinese banks
Al Abri	2017	Under what conditions does it pay to be sustainable? Sources of heterogeneity in corporate sustainability impacts
Amacha	2017	Sustainability Practices as Determinants of Financial Performance: A Case of Malaysian Corporations
Martinez-Conesa	2017	Corporate social responsibility and its effect on innovation and firm performance: An empirical research in SMEs
Tan	2017	The impact of the dimensions of environmental performance on firm performance in travel and tourism industry
Lucato	2017	The environmental performance of SMEs in the Brazilian textile industry and the relationship with their financial performance
Cheon	2017	The link between economic and environmental performance of the top 10 US ports
Ching	2017	The Quality of Sustainability Reports and Corporate Financial Performance: Evidence from Brazilian Listed Companies
Carini	2017	Measure the Performance with the Market Value Added: Evidence from CSR Companies
Choongo	2017	A Longitudinal Study of the Impact of Corporate Social Responsibility on Firm Performance in SMEs in Zambia
Oh	2017	An analysis of CSR on firm financial performance in stakeholder perspectives
Paun	2017	Sustainability and financial performance of companies in the energy sector in Romania
Rivera	2017	Revisiting the Relationship Between Corporate Stakeholder Commitment and Social and Financial Performance
Beck	2018	CSR disclosure and financial performance revisited: A cross-country analysis

Table 4 - Summary of studies mapped**(Continued)**

Authors	Year	Title
Gatimbu	2018	Environmental sustainability and financial performance of the small-scale tea processors in Kenya
Alonso-Almeida	2018	Sustainability in small tourist businesses: the link between initiatives and performance
Xiao	2018	When Does Corporate Sustainability Performance Pay off? The Impact of Country-Level Sustainability Performance
Krause	2018	Relationship between the voluntary instrument of CSR in the textile industry in the Czech Republic and financial performance
Liang	2018	Does sustainability make banks more cost-efficient ?
Aboud	2018	The impact of social, environmental and corporate governance disclosures on firm value: Evidence from Egypt
Shin	2018	An Assessment of the Association Between Renewable Energy Utilization and Firm Financial Performance
Alexopoulos	2018	Environmental and financial performance. Is there a win-win or a win-loss situation? Evidence from the Greek manufacturing
Ang	2018	The market efficiency of socially responsible investment in Korea
Atan	2018	The impacts of environmental, social, and governance factors on firm performance: Panel study of Malaysian companies
Cubas-Diaz	2018	Do Credit Ratings Take into Account the Sustainability Performance of Companies?
Ganda	2018	The Impact of Carbon Emissions on Corporate Financial Performance: Evidence from the South African Firms
Hategan	2018	Doing Well or Doing Good: The Relationship between Corporate Social Responsibility and Profit in Romanian Companies
Kim	2018	Does sustainability affect corporate performance and economic development? Evidence from the Asia-Pacific region and North America
Zhao	2018	ESG and corporate financial performance: Empirical evidence from China's listed power generation companies
Lin	2019	Financial performance and corporate social responsibility: Empirical evidence from Taiwan
Xie	2019	Do environmental, social, and governance activities improve corporate financial performance?
Lin	2019	The causality direction of the corporate social responsibility - Corporate financial performance Nexus: Application of Panel Vector Autoregression approach
Adegbite	2019	Financial and corporate social performance in the UK listed firms: the relevance of non-linearity and lag effects
Cherian	2019	Does corporate social responsibility affect the financial performance of the manufacturing sector? Evidence from an emerging economy

Source: Own authorship

The study by Roberts and Downling (2002) sought to analyze through empirical research of quantitative approach, the reputation of companies and its relationship with financial performance by building regression models to finally determine causality among the variables, allowing to obtain the results of the existence of a bidirectional relationship between the variables.

CSR was a recurring theme, presumably due to being closely related to sustainability. Lopes *et al.* (2007) sought to determine whether business performance was influenced by CSR adoption. They employed regression analysis to determine whether there was a relationship using data from the Dow Jones Sustainability Index for CSR adopters. They found that there is a significant negative short-term impact of CSR adoption and business performance. The CSR-CFP relationship was visited again by several authors (SKARE *ET AL.* 2012; PATARI *ET AL.*, 2014; VERGINI *ET AL.*, 2015; RODRIGUEZ-FERNANDEZ, 2016; CARINI *ET AL.*, 2017; CHOONGO, 2017; OH *et al.*, 2017; ANG; WEBER, 2018; BECK *et al.*, 2018; HATEGAN *ET AL.*, 2018; CHERIAN *ET AL.*, 2019; LIN *ET AL.*, 2019; LIN *ET AL.*, 2019), some of which considered environmental leadership (DISEGNI *et al.*, 2015), its impact on innovation and firm performance as possible moderating variables (MARTINEZ-CONESA *et al.*, 2017).

Ekatah *et al.* (2011) sought to explore whether CSR is linked to profitability employing simple statistic methods and linear regression. Their results indicate a possible positive relationship, where socially responsible firms are more profitable than their counterparts. Another interesting approach is presented by Rivera, Muñoz, and Moneva (2017) who analyze the evolution of corporate social and financial performance in periods of financial crisis. They found both an increase in CSR strategic consistency in spite of financial turbulence as well as a positive relationship between CSR strategic consistency and financial performance.

Chang and Kuo (2008) used a sample of 624 global and listed companies, from 2003 to 2005, using distinct methods such as Dynamic Circulation Viewpoint and MANOVA in the analysis, to find the relationship between corporate sustainability and corporate performance. Although the time cut and the sample size could not be considered ideal, a positive and reciprocal relationship was found between the variables.

Weber *et al.* (2008) employed regression analysis to analyze the relationship among companies' non-financial and financial outcomes from GRI indices. A positive relationship could be found regarding sustainable activities, sustainable development and financial outcome of the companies comprising the sample. The same method was employed by Lee, Faff, and Langfield-Smith (2009) which used both market and accounting indices to determine the

financial performance of companies that comprise the DJSI. Their research, however, did not bring any concrete evidence of the explored relationship.

Regression was once again used by Aras, Aybars and Kutlu (2010) for investigating the CSP-CFP relationship in the context of emerging markets. Accounting indices such as ROA, ROE and ROS were employed as proxies for financial performance. Their research found no significant relationship between the variables explored.

Wagner (2010) used panel estimation techniques to identify a relationship between sustainability management and economic performance, testing innovation as a moderating variable. Their results do not regard innovation as a possible moderating variable in this relationship.

Ameer and Othman (2012) sought to analyze the relationship between the same variables by using regression analysis and hypothesis test in a sample consisting of the 100 most sustainable global companies. The main difference in their approach was the fact that it sought to determine whether different degrees of sustainability had an influence on the financial performance of the companies, enabling to analyze and compare results among different sectors of activity, finally determining the existence of a positive relationship between sustainability and financial performance.

Humphrey, Lee, and Shen (2012) developed an empirical model to investigate the effects of environmental, social and governance (ESG) factors on the financial performance of UK firms. Their study brought no significant conclusions establishing a relationship between the variables. ESG was once again explored by Ferrero-Ferrero, Fernández-Izquierdo, and Muñoz-Torres (2016), who sought to explore the effects of ESG consistency on economic performance, by Aboud and Diab (2018) who found a positive relationship between ESG quality and firm value, Atan *et al.* (2018) who found no relationships for the selected sample, Zhao *et al.* (2018) who analyzed power generation companies and Xie *et al.* (2019) who showed that most ESG activities have a non-negative relationship with financial performance.

Miron and Petrarche (2012) also found no evidence in their study, where Romanian companies were the subject of regression analysis regarding the relationship between social and financial performance in multinational companies.

However, when considering generation of value as a proxy for financial performance, Pérez-Calderón, Milanés-Montero, and Ortega-Rossell (2012) employed stochastic frontier analysis to analyze the effects of environmental performance on the generation of firm value. Their results indicate a positive relationship, where the better the environmental performance of a firm, the higher the firm value.

Fuji *et al.* (2013) also considered the environmental aspect of sustainability in their study, which aimed to examine the relationship between environmental performance and economic performance in Japanese manufacturing firms. A positive relationship was also found in their study, meaning that for Japanese manufacturing firms, there is an advantage in being a good environmental performer. A similar study conducted by Sariannidis *et al.* (2013) found a negative relationship for their sample of socially responsible firms. In their case, there is a relationship between firm's performance and an increase in CO₂ emissions.

Lucato, Costa, and de Oliveira Neto (2017) analyzed the environmental performance of companies in the Brazilian textile industry and tried to determine whether there was a relationship between environmental and financial performance. Although eco-efficiency indicators were employed as a new set of variables, the authors could not find any relationship whatsoever. The environmental aspect was once again used by Dobre, Stanila, and Brad (2015) who employed a panel fixed model to determine whether there was a relationship between environmental, social and financial performances, Pandey *et al.* (2016) who analyzed the connection between environmental cost and a firm's profit earning ability, Cheon, Maltz, and Dooley (2017) who used the top 10 US ports as their sample, Alexopoulos, Kounetas and Tzelepis (2018) who analyzed the relationship regarding Greek manufacturing companies, Gatimbu *et al.* (2018), who analyzed the relationship between environmental efficiency and profitability in small-scale tea processors in Kenya, Ganda and Milondzo (2018) who analyzed the impact of carbon emissions on financial performance and Shin *et al.* (2018), who examined whether employing renewable could have a relationship with firm performance.

On the other hand, Tan *et al.* (2017) explored further the dimensions of environmental performance of firms and investigated the possible effects of environmental and financial performance. For the sample selected, their results leaned towards a negative relationship, where there might be a possible trade-off as to being either environmentally friendly or financially successful.

In their research, Wang and Sarkis (2013) used the regression analysis method to analyze a sample of the 500 greenest companies in the United States to determine if green supply chain management (GSCM) practices had an impact in the financial outcome of sustainable companies, compared to their counterparts. The results obtained indicated that the adoption of certain practices inside GSCM enables positive financial outcomes. This relationship was once again visited by Younis *et al.* (2016), who also found positive relationships between the adoption of GSCM practices and firm performance.

By using different methods of financial and sustainability performance evaluation and the analysis of the relationship between a set of variables linked to sustainability, Lean & Nguyen (2014) sought to analyze the behavior of sustainable investments during the world financial crisis between 2008 and 2009, using an extended market model and correlation analysis to determine volatility of the investment portfolio. The results showed that even though sustainable investments were less volatile than their counterparts, they were still affected by the financial crisis. A similar study by Mervelskemper, Kaltofen, and Stein (2014) found that investors in German sustainability funds do not have to sacrifice financial performance. Other studies focused on the sustainability aspect and its relationship with firm financial performance (MALETIČ *ET AL.*, 2015; AL ABRI *ET AL.*, 2017; AMANCHA; DASTANE, 2017; PAUN, 2017; ALONSO-ALMEIDA *ET AL.*, 2018; KIM; LEE, 2018; ADEGBITE *ET AL.*, 2019).

Przychodzen and Przychodzen (2015) analyzed the relationship between eco-innovation and financial performance. They employed t-tests and correlation analysis to determine that there is a positive relationship between the variables, meaning that eco-innovators present higher financial returns than their counterparts. Suriyankietkaew and Avery (2016) address the relationship between sustainable leadership practices and their effects on financial performance in small and medium enterprises. Through regression and correlation analysis, the authors showed that the adoption of some sustainable leadership practices had a positive impact on financial results. It is possible to observe the existence of studies that seek to determine if belonging to sustainable investment portfolios can be related to the financial outcome of companies, as observed in studies such as Charlo, Moya and Muñoz (2015) and Lassala, Apetrei, and Sapena (2017). These studied a sample of companies that make up the FTSE4Good IBEX index and analyzed the volatility and value of stock of companies belonging and not belonging to sustainability indices and the effects of sustainability reports on corporate governance and financial outcomes, respectively.

Other studies aimed to examine the relationship between sustainability and financial outcomes in other aspects such as the hospitality industry (SINGAL, 2014), to clarify the relationship between sustainable behavior and financial performance (MARTÍNEZ-FERRERO; FRÍAS-ACEITUNO, 2013), to determine if supplier integration and sustainability programs have an influence on financial outcomes (LI, 2016), examine the relationship between sustainability disclosure and financial results in Indian companies (GOEL; MISRA, 2017), determine whether sustainability integrated to the company strategy has an impact in the financial outcome of companies (GÓMEZ-BEZARES *et al.*, 2016) and, analyze the relationship between sustainable performance from Chinese banks and their financial results

(WEBER, 2017). These have brought positive results to the discussion by analyzing the variables through different points of view and the use of different methods.

However, another paper by Cristófalo *et al* (2016) paper sought to analyze whether companies listed and components of the Brazilian ISE (Company Sustainability Index) had superior financial performance than those not listed in the investment portfolio. The study indicated the existence of some relationship between these variables, depending on the companies' acting sector. A similar study was developed by Santis, Albuquerque and Lizarelli (2016), showing that the obtained results were not enough to determine a positive relationship, mainly due to sample sizes and time cuts.

Yet, other studies sought to explore the effects of sustainability disclosures over financial performance in contexts such as construction companies (SIEW *et al.*, 2013), the relationship between sustainability disclosure and its effects on a firm's financial performance (SAID *ET AL.*, 2015; KASBIN *ET AL.*, 2016), sustainability reporting quality and its relationship with corporate financial performance (CHING *et al.*, 2017), CSR disclosure in the textile industry (KRAUSE, 2018), evaluating the impact of sustainable strategies on financial performance (SIMINICA *et al.*, 2015), determining whether the quality of the sustainability disclosures had an influence on the financial outcomes of companies listed in the ISE (CHING *et al.*, 2017), determining the effects of the performance measuring parameters on the overall outcome of a business and on the index composed of sustainable development to determine its impact in Slovakian companies (RAJNOHA *et al.*, 2016) and, describing the connection between financial results and sustainability levels (WAGNER; BLOM, 2011), bringing either positive, negative or inconclusive results.

Other studies worth singling out are the ones by Cubas-Diaz and Sedano (2018) which analyzed whether credit ratings, such as Standard and Poor's, take sustainability performance into account, Liang, Chang, and Shao (2018) which, while not analyzing the financial performance of banks using commonly employed variables based on revenue or assets, sought to determine whether sustainable banks are more cost efficient than their counterparts, and Xiao *et al.* (2018) that determined if country-level sustainability can be a moderating variable in the CSP-CFP relationship.

From the 79 studies analyzed, 39 found a positive relationship, meaning that sustainability had a positive influence when it comes to obtaining financial outcomes (ROBERTS; DOWLING, 2002; WEBER *ET AL.*, 2008; EKATAH *ET AL.*, 2011; SKARE; GOLJA, 2012; PÉREZ-CALDERÓN *ET AL.*, 2012; FUJI *ET AL.*, 2013; WANG; SARKIS, 2013; MARTÍNEZ-FERRERO; FRÍAS-ACEITUNO, 2013; PATARI *ET AL.*, 2014; SINGAL,

2014; DISEGNI *ET AL.*, 2015; PRZYCHODZEN; PRZYCHODZEN, 2015; KASBUN *ET AL.*, 2016; RODRIGUEZ-FERNANDEZ, 2016; YOUNIS *ET AL.*, 2016; GÓMEZ-BEZARES *ET AL.*, 2016; LI, 2016; RAJNOHA *ET AL.*, 2016; SURIYANKIETKAEW; AVERY, 2016; CARINI *ET AL.*, 2017; MARTINEZ-CONESA *ET AL.*, 2017; CHEON *ET AL.*, 2017; WEBER, 2017; AMACHA; DASTANTE, 2017; CHOONGO, 2017; RIVERA *ET AL.*, 2017; ALONSO-ALMEIDA *ET AL.*, 2018; ANG; WEBER, 2018; ABOUD; DIAB, 2018; CUBAS-DIAZ; SEDANO, 2018; HATEGAN *ET AL.*, 2018; KIM; LEE, 2018; LIANG *ET AL.*, 2018; SHIN *ET AL.*, 2018; ZHAO *ET AL.*, 2018; ADEGBITE *ET AL.*, 2019; CHERIAN *ET AL.*, 2019; LIN *ET AL.*, 2019 AND XIE *ET AL.*, 2019), twenty one studies did not find a significant relationship between the same variables (LEE *ET AL.*, 2009; ARAS *ET AL.*, 2010; WAGNER, 2010; WAGNER; BLOM, 2011; HUMPHREY *ET AL.*, 2012; MIRON; PETRACHE, 2012; SIMINICA *ET AL.*, 2015; MALETIČ *ET AL.*, 2015; SAID *ET AL.*, 2015; DOBRE *ET AL.*, 2015; FERRERO-FERRERO *ET AL.*, , 2016; PANDEY; KUMAR, 2016; AL ABRI *ET AL.*, 2017; CHING *ET AL.*, 2017; GOEL; MISRA, 2017; PAUN, 2017; LUCATO *ET AL.*, 2017; GANDA; MILONDZO, 2018; ATAN *ET AL.*, 2018; XIAGO *ET AL.*, 2018; KRAUSE, 2018). Ten studies either could not find enough evidence to determine the existence of such relationship (SIEW *ET AL.*, 2013; LEAN; NGUYEN, 2014; SANTIS *ET AL.*, 2016; CHING *ET AL.*, 2017), found mixed results when comparing different sectors (AMEER; OTHMAN, 2012; MERVELSKEMPER *ET AL.*, 2014; CRISTÓFALO *ET AL.*, 2016; LASSALA *ET AL.*, 2017; CHARLO *ET AL.*, 2015; CHANG; KUO, 2008; LIN *ET AL.*, 2019). Seven authors found negative relationships between the variables (LOPEZ *ET AL.*, 2007; SARIANNIDIS *ET AL.*, 2013; VERGINI *ET AL.*, 2015; OH *ET AL.*, 2017; TAN *ET AL.*, 2017; ALEXOPOULOS *ET AL.*, 2018; GATIMBU *ET AL.*, 2018).

3.3.1 Authorship and Journal Analysis

The first approach with the intent to statistically analyze the relationship between financial outcomes and sustainability published in the year of 2002. Publications are concentrated in the most recent years, indicating that the analyses addressed by this study are relevant, with publishing potential in peer-reviewed international journals.

It is possible to observe the highlights among the journals analyzed, whereas journals such as Sustainability, Journal of Cleaner Production, Business Strategy and the Environment Australian Journal of Management and Journal of Business Ethics are responsible for most publications in the area.

However, the existence of studies by itself is not enough to determine if the subject is relevant in the academic world. One of the commonly used metrics to determine the relevance of the debate is the analysis of the impact factor of publishing journals. Table 5 shows the journals that have any journal citation reports (JCR) impact factor.

Table 5 - Journals Citation Reports scores.

Journal	Count	JCR*
Amfiteatru Economic	1	0,664
Asia Pacific Management Review	1	0,000
Australian Journal of Management	3	1,150
Business Ethics-a European Review	2	3,029
Business Research Quarterly	1	2,410
Business Strategy and the Environment	4	5,355
Cornell Hospitality Quarterly	1	2,060
Ecological Economics	2	3,895
Economics Letters	1	0,581
International Journal of Environmental Research	1	1,019
Journal of Business Ethics	3	2,917
Journal of Cleaner Production	5	5,651
Journal of Environmental Management	2	4,005
Maritime Policy & Management	1	0
North Am. Journal of Economics and Finance	1	1,098
Strategic Management Journal	1	5,482
Sustainability (Switzerland)	14	2,075
Sustainable Development	2	2,750
Count	44	-

Source: Own authorship.

Table 5 shows that over half of the articles subjected to this analysis were published in journals that have a JCR impact factor higher than zero, which means that they were relevant enough to be published by high impact, internationally recognized, peer-reviewed journals.

The next step consists of identifying what are the most cited papers, as well as the most relevant journals publishing in the field of sustainability and financial performance.

By analyzing the article citations, one can observe that there are several papers which have been consistently cited in the literature. Table 6 summarizes the articles analyzed in this study, from most to least cited. Table 7 gives an overview of the most cited journals.

Table 6 - Cites by article.

(continues)

Author	Year	Title	Cites	%
Roberts	2002	Corporate reputation and sustained superior financial performance	849	37%
Lopez	2007	Measure the Performance with the Market Value Added: Evidence from CSR Companies	181	8%
Wang	2013	Investigating the relationship of sustainable supply chain management with corporate financial performance	137	6%
Ameer	2012	Sustainability Practices and Corporate Financial Performance: A Study Based on the Top Global Corporations	104	5%
Wagner	2010	ESG and corporate financial performance: Empirical evidence from China's listed power generation companies	98	4%
Fujii	2013	Social responsibility and financial performance: The role of good corporate governance	59	3%
Krause	2018	Corporate social responsibility and its effect on innovation and firm performance: An empirical research in SMEs	52	2%
Siew	2013	The relationship between sustainability practices and financial performance of construction companies	49	2%
Lee	2009	The impact of the dimensions of environmental performance on firm performance in travel and tourism industry	48	2%
Martinez-Ferrero	2015	Relationship Between Sustainable Development and Financial Performance: International Empirical Research	47	2%
Chang	2008	The Effects of Sustainable Development on Firms' Financial Performance - an Empirical Approach	46	2%
Ekatah	2011	Corporate social responsibility, environmental leadership and financial performance	45	2%
Lean	2014	Policy uncertainty and performance characteristics of sustainable investments across regions around the global financial crisis	44	2%
Przychodzen	2015	The impact of social, environmental and corporate governance disclosures on firm value: Evidence from Egypt	43	2%
Rodriguez-Fernandez	2016	Environmental and financial performance. Is there a win-win or a win-loss situation? Evidence from the Greek manufacturing	33	1%
Singal	2014	The Link between Firm Financial Performance and Investment in Sustainability Initiatives	31	1%
Hategan	2018	Exploring the Association between Environmental Cost and Corporate Financial Performance: A Study of Selected NIFTY Companies	25	1%
Wagner	2011	The reciprocal and non-linear relationship of sustainability and financial performance	22	1%

Table 6 - Cites by article.**(continued)**

Author	Year	Title	Cites	%
Martinez-Conesa	2017	Sustainability and financial performance of companies in the energy sector in Romania	21	1%
Mervelskemper	2014	Revisiting the Relationship Between Corporate Stakeholder Commitment and Social and Financial Performance	21	1%

Source: Own authorship.**Table 7 - Cites by journal.**

Journal	Citations	Participation
Strategic management journal	849	37%
Sustainability	383	17%
International Journal of Productivity and Performance Management	149	7%
Journal of Business Ethics	112	5%
Journal of Cleaner Production	109	5%
Business Strategy and the Environment	93	4%
BRQ Business Research Quarterly	59	3%
Sage Open	52	2%
Journal of Environmental Management	49	2%
Smar and sustainable built environment	49	2%
Social Responsibility Journal	45	2%
Applied Financial Economics	44	2%
Journal of Accounting in Emerging Economies	43	2%
Business Ethics: A European review	35	2%
Cornell Hospitality Quarterly	31	1%
Nmims Management Review	25	1%
Sustainable Development	21	1%

Source: Own authorship.

To determine whether there are pathways to be followed in future research, the next section will analyze the methodology that was used by the studies, as well as the results obtained, variables used and mentions of limitations and future research opportunities.

3.3.2 Implications for Future Research

The frequency distribution as to the combination of methods used by the authors for obtaining the neutral, positive or negative results can be seen in Table 8. Positive results are those obtained by authors that statistically prove the relationship between the socio-environmental and financial variables, while negative results mean the exact opposite. Neutral

are the results that authors could not identify positive or negative relationship between variables. There are also cases labeled as “no relationship” where no relationship could be found at all.

Table 8 - Frequency distribution of methods and results obtained.

(continues)

Combination of methods	No relationship	Negative	Neutral	Positive	Total
Analysis of the change in ratios			1		1
ANOVA			1		1
ARMA, Panel Vector Autoregression				1	1
Augmented Market Model			1		1
Chi-Squared, Pearson's Contingency Coefficient, Adjusted Contingency Coefficient				1	1
Correlation			2	1	3
Correlation, Regression	1		1	3	5
DEA (multivariate estimation method), Regression				1	1
Dick-Fuller test, Phillip-perron test, variance ratio test and autocorrelation tests.				1	1
Econometric analysis		1			1
Econometric model		1		1	2
Econometric model, logistics regression, Feasible generalized least squares.				1	1
Empirical model			2	2	4
Empirical model, Correlation, Multivariate analysis,				1	1
Euclidean distances, Cronbach's Alpha, Correlations				1	1
Fixed-effects ordered probit analysis				1	1
Fuzzy set				1	1
Fuzzy-set qualitative comparative analysis			1		1
Geospatial modelling, bootstrap data and data envelopment analysis				1	1
Granger causality				1	1
Hypothesis tests			1		1
Kruskal-Wallis, Correlation, Regression			1		1
Linear and Quadratic models				1	1
MANOVA / Structural equation modeling			1		1
Mean comparison				1	1
Multiple mediator model			1		1

Table 8 - Frequency distribution of methods and results obtained.

(Continued)

Combination of methods	No relationship	Negative	Neutral	Positive	Total
Non-parametric analyses			1		1
Paired t-tests, Wilcoxon signed-ranked tests				1	1
Panel estimation			1		1
Panel fixed effect model			1		1
Panel regression		2		1	3
Panel Vector Autoregression, General method of moments			1		1
Propensity score-matching; Difference-in-Differences; Quantile DID			1		1
Proportional Hazards Regression				1	1
Random effects model		1			1
Regression	3	1	6	6	16
Regression, ANOVA				1	1
Regression, Generalized method of moments			1		1
Regression; Linear mixed effects models			1		1
Simpson numeric integration method			1		1
Smart PLS structural equation modeling				1	1
Standard deviation			1		1
Stochastic frontier analysis, cluster analysis				1	1
Stochastic Frontier Analysis, Stochastic Metafrontier Approach				1	1
Structural equation modeling		1		2	3
System GMM-estimation method				1	1
T-tests, Correlation				1	1
Univariate and Multivariate analysis				1	1
Wilcoxon and T-tests			1		1
Wilcoxon Signed Rank Test, ANCOVA				1	1
	4	7	29	39	79

Source: Own authorship.

There were over 50 combinations of methods employed by the authors analyzed. The most used methods for analysis were regression, the combination of correlation and regression, followed by empirical modeling. One can observe that it was not possible to reach a conclusive outcome, since the number results with neutral, negative or no relationship outcome nearly surpasses the number of positive outcomes.

It is then necessary to deepen the analysis and assess the variables used in the studies, categorizing them in four basic groups according to their nature: (a) variables for economic

performance; (b) variables for social performance; (c) variables for environmental performance; and (d) other variables that did not fit in any of the previous categories.

3.3.2.1 Variables for economic performance:

When analyzing the variables that were employed to measure the financial performance of companies, we found that there are two main groups of variables used to measure the same aspect using different sources of information. The economic aspect of the relationship was measured both by market variables, such as Tobin's Q and price to book ratios, as well as accountability variables, such as return on assets or return on sales.

The variable that was most employed to reflect accountability performance was Return on Assets (ROA), which could be found in at least 22 studies. Tobin's Q was the most employed market performance measurement used as a proxy for financial performance, being used in 10 studies.

The most commonly employed market valuation variables for financial performance were five-year cumulative share increase (DISEGNI *et al.*, 2015), capital asset pricing model (CARINI *ET AL.*, 2017), and value in trading day compared to value on previous trading day (ANG; WEBER, 2018).

Other accounting variables used for financial performance were three-year average profit value (YOUNIS *et al.*, 2016), growth rate of sales (TAN *ET AL.*, 2017), average month revenues (LUCATO *et al.*, 2017), revenue, profit and rate trend (OH *et al.*, 2017), asset to total debt ratio (PAUN, 2017) and weighted average cost of capital (ATAN *ET AL.*, 2018).

When exploring deeper, however, one can observe that, although these same sets of variables are present in most of the studies, some authors found alternate manners for measuring financial performance. Non-financial indicators for economic performance from GRI were employed by some authors (WEBER *ET AL.*, 2008; MIRON; PETRARCHE, 2012). These indicators were made especially for non-financial reporting purposes, providing thus other information regarding the aspects of financial performance.

Other unusual indices for financial performance can be seen in Przychodzen and Przychodzen (2015) who used earnings retention ratio and financial capacity as measurements for financial performance, Al Abri *et al.* (2017) who calculated capital intensity ratios in their study, and Rivera, Muñoz, and Moneva (2017), who added shareholder and client loyalty as measures for financial performance.

Some studies built an index called sustainable rate of growth, which used over 12 economic variables in its construction (GÓMEZ-BEZARES *et al.*, 2016); and papers that used Standard and Poor's credit ratings as a proxy for financial performance (SINGAL *ET AL.*, 2014; CUBAS-DIAZ; SEDANO, 2018).

Neither Lean & Nguyen (2014) who built a market model, nor Suriyankietkaew and Avery (2016), who used a survey in order to build his variable, defined specific economic variables in the construction of their papers.

One can conclude, therefore, that most of the variables chosen as proxies for financial performance are based on market or accounting measurements, there are several other types of variables which were not designed specifically for financial reports that would present a distinct point of view from those usually employed. This indicates, therefore, a potential gap to be explored in future research.

3.3.2.2 Variables for social performance

The variables that were used to measure social performance in the studies analyzed can also be categorized in different groups. The first group consists of authors who considered analyzing a sample of companies present in sustainability investment portfolios, rather than developing social variables for their study. The second group is the one whose authors analyzed ESG, CSR or sustainable performance of companies by using existing indices or creating social performance indicators

Some authors either employed existing indices such as Weber *et al* (2008), Ameer and Othman (2012), and Kasbun, Teh, and Ong (2016) used either indicators developed by the Corporate Knights Research Group and GRI sustainability disclosures, Chang and Kuo (2008) and Humphrey, Lee, and Shen (2012) used ESG variables elaborated by Sustainable Asset Management (SAM).

Wagner (2010) used social indices developed by Waddock and Graves, Ekatah *et al.* (2011) developed key performance indicators for social performance, Sariannidis *et al.* (2013) used nonfarm payroll employment as a social indicator, Ferrero-Ferrero, Fernández-Izquierdo, and Muñoz-Torres (2016) analyzed the ESG performance of companies and Beck, Frost and Jones (2018) used Vigeo-Eiris for CSR and sustainability ratings.

Two studies deserve recognition as to the innovative nature of the social performance variables employed: Miron and Petrarche (2012) who used employee relations, products, community relations, environment, treatment of women and minorities as proxies for social

performance and Rodriguez-Fernandes (2016) who constructed a social behavioral index: GRI participation, DJSI inclusion, attending to good corporate governance recommendations and being a signee to the Global Compact.

The wide range of indicators which have been developed by researchers indicates that there is a tendency of accepting the development of new indicators to measure social performance. This means that the current literature points towards accepting self-developed indicators, as well as consolidated measurements, meaning there is a possible gap to be explored here.

3.3.2.3 Variables for environmental performance

Like in previous cases, authors chose to either create variables as a representation of environmental performance, or to use already established indices.

Many of the authors chose not to establish a proper method of measuring the environmental aspect of sustainability by comparing companies belonging to sustainability / social responsibility indices to their counterparts (LEE *et al.*, 2009; DESEGNI *ET AL.*, 2015; ADEGBITE *ET AL.*, 2019), analyzing the act of environmental disclosure and its effects on financial performance (SAID *ET AL.*, 2015), possessing an environmental friendly certification (KRAUSE, 2018). There is, however, a great variety of variables which were created to measure environmental performance specifically.

Most of the studies analyzed developed their own measure for environmental performance. Environmental KPIs were used (EKATAH *ET AL.*, 2011), a company's emissions and effluents were quantified (PÉREZ-CALDERÓN *et al.*, 2012; RIVERA *et al.*, 2017; GANDA; MILONDZKO, 2018), the concentration and CO₂, as well as its emissions were measured (SARIANNIDIS *ET AL.*, 2013; FUJI *ET AL.*, 2013), the environmental costs were explored (PANDEY; KUMAR, 2016) and undesired outputs quantified (GATIMBU *ET AL.*, 2018).

Weber *et al.* (2008) used the environmental indicators provided by GRI, Humphrey, Lee, and Shen. (2012) employed environmental data from SAM into their analysis, Wang and Sarkis (2013) sought to analyze Environmental Supply Chain Management (ESCM); Martínez-Ferrero and Frías-Aceituno (2013) used environmental indices from EIRIS database; Rajnoha, Lesniková and Koraus (2016) used over 8 variables for composing their environmental indicator; Siew, Balabat and Carmichael (2013) used climate change as a variable, Lucato, Costa, and de Oliveira Neto., (2017) who used eco-efficiency indicators as a proxy for

environmental performance, Weber (2017) used environmental policy to compose his variable, and Xie *et al.* (2019) used ESG score from Bloomberg environmental, social and governance database for composing a measurement of environmental performance.

While there were several indices used for separating environmentally friendly companies from their counterparts such as belonging to sustainability indices or not, this is where the literature has developed the wider variety of indicators, ranging from eco-innovation to CO₂ emissions to environmental costs. These results indicate that researchers could benefit from creating new manners of measuring the environmental performance of firms, as there is not a consensus for that matter.

3.3.2.4 Other variables

Some of the papers, built on the progress of previous studies not only aiming to establish a CSP-CFP relationship, but testing different variables and their possible moderating effects. Most authors used variables such as firm size, total asset or leverage for control, while others sought to explore different aspects, some quite unusual in the literature.

Such was the case of Roberts and Dowling (2012), who used reputation of companies as a variable and analyzed its relationship with economic variables; Martínez-Ferrero & Frías-Aceituno (2013) used the stakeholder / board index factor developed by EIRIS; Li (2016), added supplier integration as well as the financial “tsunami” into his analysis.

Al Abri *et al.* (2017) adopted research and development intensity as a moderating variable in their study, Ching, Gerab, and Toste (2017) somehow quantified the quality of sustainability disclosures and related them to economic variables, Lassala, Apetrei, and Sapena (2017) integrated factors such as company size, leverage and sector of activity into statistical analyses and Oh, Hong, and Hwang (2017) tested CSR motivation, Traditional CSR and strategic CSR approaches, R&D capacity and Technology commercialization as control variables.

From these results, one should consider the addition of control variables to moderate the effects of the sustainability - financial performance of companies. One may argue that the financial crisis and economic development level of countries might play an important role when it comes to firm’s investments in sustainable actions, as well as product or process innovation. The current literature regards the CSP-CFP relationship as existing, thus, one could determine what variables could play an important role in this relationship.

3.3.2.5 Analysis of suggestions for future research

Overall, 10 authors suggested the use of different variables to be followed into expanding their research. Roberts and Dowling (2002) suggested using the reputation variable in their analysis, if it is measured through different kinds of stakeholders, such as clients, employees and suppliers, while Ameer and Othman (2012) suggested including variables that considered inner and outer factors that may interfere in the result.

Wang and Sarkis (2013) suggested using variables that might cover economic, financial and organizational performance to enrich the research, while other authors suggested using market variables combined to control variables (LASSALA *et al.*, 2017), and the indebtedness ratio, company size, value generation and other control variables (SANTIS *et al.*, 2016; SIEW *et al.*, 2013; SURIYANKIETKAEW; AVERY, 2016).

Other authors suggested using variables that allow the measure CSR (FERRERO, 2015), investigating specifically each of the sustainability practices in companies belonging to the same sector (LI, 2016), analyzing operational efficiency and effectiveness of implementing sustainable policies (CHANG; KUO, 2008).

Overall, 8 authors included suggestions in their papers related to methodology and application. Ching, Gerab, and Toste (2017) suggested the use of another method to obtain the sample of companies to be statistically analyzed, while Lassala, Apetrei, and Sapena (2017) suggested that geographical diversification be considered, being that factor relevant to be considered in the statistical analysis.

Other authors suggested integrating qualitative aspects into the sustainability score (GOEL; MISRA, 2017), separating the effects among before, during and after (GÓMEZ-BEZARES *et al.*, 2016), the conduction of a sectoral analysis (SINGAL, 2014), the relationship between using the most recent version of the GRI disclosure and economic outcome of construction companies (SIEW *et al.*, 2013), the gathering of data through different sources (SIMINICA *et al.*, 2015) and the use of more direct means of measuring sustainable performance (WAGNER; BLOM, 2011).

Five authors identified the factor time cut as a limitation to their papers, suggesting the use of longer periods as a possible path to be pursued when expanding their research (CRISTÓFALO *ET AL.*, 2016; GOEL; MISRA, 2017; GOMEZ-BEZARES, 2017; SANTIS *et al.*, 2016; WAGNER; BLOM, 2011).

When it comes to samples, 16 authors suggested different methods for sample gathering. Ching, Gerab, and Toste (2017) proposed the analysis of companies listed in other countries stock exchanges to contribute to the research and present more accurate results.

Other authors suggested the analysis of not for profit organizations (AMEER; OTHMAN, 2012), analysis of a greater number of companies and other countries (CRISTÓFALO *ET AL.*, 2016; MARTÍNEZ-FERRERO; FRÍAS-ACEITUNO, 2013; GOMEZ-BEZARES, 2017; WEBER, 2017; CHANG; KUO, 2008; SIMINICA *et al.*, 2015; WAGNER; BLOM, 2011), and using different databases from those proposed by the ESG approach (SINGAL, 2014).

3.3.2.6 Similar literature reviews

Whether focusing on CSR or on the triple bottom line philosophies, there has been a movement in the literature to contribute to the seemingly unceasing question regarding the relationship between sustainability and financial performance. Recent studies have sought to collect the results from the studies that applied different methods and variables into their statistical analyses, providing researchers with different pathways to follow into further research.

Through meta-analyses, several researchers have tried to contribute to answering the question regarding sustainability-financial performance relationship. Through the statistical analysis of the data collected from the studies that applied different methods and variables into their analyses, they have provided future researchers with different pathways to follow.

The study of Quazi and Richardson (2012), for instance, did a meta-analysis on studies that analyzed the relationship between CSR and Corporate Financial Performance, testing variables such as year of publication, sample sizes and statistical techniques employed in the studies. The results showed that only 2 papers out of 34 employed different techniques than t-tests and regression. Sample size and statistic methodology were found to be important variables which future researchers should expand on.

As for variables to be further explored, the results leaned toward considering corporate reputation, degree of business risk and the level of support of regulating bodies also controlling for industry type, national culture and the effects of the global financial crisis (Quazi & Richardson, 2012).

Similarly, Goyal, Rahman, and Kazmi (2013) did a meta-analysis on studies that focused on sustainability rather than CSR and found out that different cultural and

environmental characteristics should also be considered by future research to enhance their generalizability. As for variables used, the researchers found out that some of the studies included non-financial variables as measures for firm performance, rather than analyzing the financial outcome. A great deal of the studies analyzed were from developed countries.

Alshehhi, Nobanee, and Khare (2018), also found through their meta-analysis that there is a greater deal of studies from developed countries. As for variables, the results indicated that the moderating role of control variables such as firm size, economy and industry type need to be further examined in different contexts to broaden the applicability of the research. It was also found that the literature continues to add new financial measures, such as market-based ones.

One of the main contributions of the meta-analyses is that it was shown that there is a struggle to define corporate sustainability within the three competing dimensions of sustainability, namely economic, environmental and social (ALSHEHHI *et al.*, 2018).

There was a movement from the individual measurement of social and environmental performance to a combined measurement of sustainability performance, detected by these studies (GOYAL *et al.*, 2013). This leads researchers to the adoption of CSR, that focuses on the social aspect and misses the full impact of environmental and economic sustainability (ALSHEHHI *et al.*, 2018).

Although the study of Quazi and Richardson (2012) focused their approach on CSR rather than sustainability and tested for year of publication and statistical techniques employed, rather than the variables employed, their results indicate that there is a need to develop new typologies for CSR and financial performance. It also indicates the need for considering variables that would moderate this relationship such as the global financial crisis, corporate reputation, degree of business risk, and the level of support of regulating bodies, for instance.

Goya (*et al.*, 2013) found that empirical studies should be directed towards the assessment of corporate sustainability performance, thus non-financial parameters would be included to determine firm performance. Their research also suggested the use of different mediating variables such as culture and legal environment characteristics to improve future research generalizability for a moderating effect.

Alshehhi, Nobanee, and Khare (2018) also conducted a meta-analysis on the results of CSR and financial performance studies. Their findings indicate that the literature has added new financial measures to account for financial performance, such as market-based ones. Their findings, however, indicate that there is no consensus as to what constitutes a suitable suite of financial measures. There should also be taken into consideration the role of moderating

variables such as firm size, economy and industry types so that the applicability of the research would be broadened.

Although the studies displayed the need to develop new variables and to consider the role of moderating variables on the CSR - CFP relationship to improve its applicability, there was only one suggestion regarding the development and improvement of new measures for the non-financial aspect of sustainability.

An important contribution comes from Alshehhi, Nobanee, and Khare (2018), which, consistent with this study, found that the measures for financial performance range from accounting variables to market-based ones. The use of such mix of variables would provide researchers with different proxies for financial performance.

Moreover, none of the authors employed the TBL framework to analyze the characteristics of the variables employed. This is mainly due to the adoption of the CSR aspect that consequently limits analyses on the governance and social responsibility aspect rather than tackling the full scope, as perceived by the authors themselves (ALSHEHHI *et al.*, 2018).

3.4 A SUMMARY OF THE FINDINGS

Firstly, it was found that the terms “sustainable development” or “sustainability” are often addressed in the literature as having similar meanings as CSR and ESG. From these results, one can conclude that even though each of these terms are based on different theories, the current literature regards them as common terms.

Second, it was found that there are plenty of published papers regarding the CSP-CFP relationship, being them statistical analyses (which were the aim of this study) or theoretical reviews. Most of the papers analyzes in this study have also been published in high impact factor journals, also having a considerable amount of citations. Our conclusion from these results is that the CSP-CFP relationship is indeed relevant to the scientific community.

The results which have been brought by the researchers were then analyzed. They would vary among not finding any relationship between CSP-CFP, finding neutral relationships where the direction could not be pointed, or finding positive or negative results. These results, however, lead to a conclusion that there is not an overwhelming evidence leading to a truth relationship.

It was then appropriate to analyze the methods that were employed, as well as the variables which were used for measuring financial, social and environmental performance, by each of the studies, in order to find possible gaps to be explored.

First, it is evident that there are 50 combinations of methods employed in this field. Whether researchers examined ESG, CSR or sustainable development, there is not a unanimous decision regarding the best statistical approach. We conclude, thus, that one is free to employ whatever statistical method one finds most appropriate, if it is proven to be useful regarding its context.

The nature of each of the variables that have been used was then analyzed. For variables which have been used to reflect financial performance, most researchers have employed both market-based or accounting-based measures such as profitability or market-to-book ratios. Although many authors have resorted to these measurements, some have either constructed their own variables or employed GRI indicators.

For social variables, social performance has been often measured by indicators that are already consistently employed in the literature. Several studies relied on already established sustainability or CSR indices, which would provide a score regarding the social aspect of companies. The environmental performance variables are the ones with the wider range of indicators.

As for control or moderating variables, it was found that several authors have employed distinct variables in order to determine whether there was a moderating effect in the CSP-CFP relationship.

The models were then built based on the results provided by the literature review, as to represent an accurate measure for the aspects analyzed in this study. The following results and discussion section will demonstrate the models structural and measurement validities.

4 RESULTS AND DISCUSSIONS

This section will present the final empirical model's validity tests and discussions. Two models have been built in order to depict the relationship presented by R1 to R7. The first model depicts the relationship among the variables described in R1, while the second model depicts the remaining relationships from R2 to R7.

4.1 ASSESSMENT OF THE FIRST MODEL

In order to determine the acceptance of a given model, two assessments were carried out, in accordance to the method by Hair *et al.* (2011). This section presents both the measurement model and the structural model assessment for the first model, built to test R1.

4.2.1 Measurement Model Validity

All the 60 GRI indicators for their respective economic, environmental and social performances were considered when developing the model. The first analysis carried out is related to the model's portrayal of the relationship. The constructs are analyzed as to their internal consistency and reliability, convergent validity, while the indicators are analyzed regarding their reliability and discriminant validity.

4.2.1.1 Results for the internal consistency reliability and convergent validity

In order to determine de internal consistency reliability and convergent validity, two tests are going to take place. First, the composite reliability will be evaluated in order to determine whether the constructs that were established are internally consistent. The target is values above 0,700.

Second, the convergent validity test determines whether the indicators placed inside a construct are convergent. For this test, AVE values should be above 0,50. Results for both tests are shown in Table 9:

Table 9 - Internal consistency reliability and convergent validity for the first model

Construct	Composite Reliability	AVE
Economic Performance	0.996	0.993
Environmental performance	0.983	0.950
Financial Performance	1.000	1.000
Social Performance	0.747	0.596

Source: Own authorship

The constructs that were established were considered internally consistent, meaning that the dimensions are being correctly measured, rather than composed of several unrelated indicators.

Furthermore, as all AVE values scored above 0,50, one can say that there is convergent validity for the established model. The indicator reliability could now be analyzed.

4.2.1.2 Results for indicator reliability

The aim of this test is to determine whether the indicators belong inside a certain construct by analyzing their factor loadings. In order to be consider reliable, an indicator must present a factor loading above 0,70. The results for the first model are depicted in Table 10:

Table 10 - Internal consistency reliability for the first model

Indicator	Label	Economic	Environ.	Financial	Social
v201x1a	Direct Economic Value Generated	0.995			
v201x1b	Direct Economic Value Distributed	0.997			
v305x7b	NOX Emissions		0.989		
v305x7c	SOX Emissions		0.984		
v305x7d	PM10 Emissions		0.950		
v405x1a	Diversity of governance bodies and employees - Governance - Male				0.770
v405x1b	Diversity of governance bodies and employees - Governance - Female				0.775
vTobinsQ	Tobin's Q Ratio			1.000	

Source: Own authorship

The table presents every indicator, as well as their factor loadings related to the construct to which they are connected. Every indicator scored above 0,70, thus meeting the established criterion.

4.2.1.3 Results for discriminant validity

This test will analyze the discriminant validity for the constructs and the indicators. The aim in the first test is to determine whether the constructs are measuring different things, and in the second test, to determine whether there is a significant difference among indicators selected to reflect the constructs. Test results for the first model are depicted in Table 11:

Table 11 - Fornell-Larcker criterion for the first model

	Economic Perf.	Environmental Perf.	Financial Perf.	Social Perf.
Economic Perf.	0.996			
Environmental Perf.	-0.059	0.975		
Financial Perf.	-0.024	0.895	1.000	
Social Perf.	-0.017	-0.173	-0.043	0.995

Source: Own authorship

In this case, the constructs should be more correlated to themselves than the other constructs. The 1.000 values are related to those constructs composed of single indicators. The four constructs established in the first model meet the criterion.

The results for indicator discriminant validity are depicted in Table 12:

Table 12 - Indicator discriminant validity for the first model

Indicator	Label	Economic Perf.	Environmental Perf.	Financial Perf.	Social Perf.
v201x1a	Direct Economic Value Generated	0.995	-0.054	-0.020	-0.028
v201x1b	Direct Economic Value Distributed	0.997	-0.062	-0.026	-0.009
v305x7b	NOX Emissions	-0.073	0.989	0.905	-0.095
v305x7c	SOX Emissions	-0.110	0.984	0.893	-0.119
v305x7d	PM10 Emissions	0.017	0.950	0.816	-0.305
v405x1c	Diversity of governance bodies and employees - Governance - Male	-0.011	-0.176	-0.039	0.995
v405x1d	Diversity of governance bodies and employees - Governance - Female	-0.022	-0.170	-0.047	0.996
vTobinsQ	Tobin's Q Ratio	-0.024	0.895	1.000	-0.043

Source: Own authorship

As in the previous case, each of the indicators must have a greater correlation to the construct in which they are placed, rather than the others. The indicators for the first model meet the criterion as well.

These results conclude the tests for the measurement model validity. The model has *met all* the criteria and is considered valid regarding the way it measures the different aspects of sustainability and financial performance.

The next step involves determining the validity of the structural model.

4.2.2 Structural Model Validity

In order to assess the structural model validity, the three-step method adapted from Hair (2011) will be employed. The R^2 values will be measured, the path significance will be assessed and the model's capability to predict will be analyzed via Q^2 .

4.2.2.1 Results for the R² values

The results for the R² values for the first model are depicted in Table 13:

Table 13 - R² scores for the first model

First Model		
Predicted construct	R Square	R Square Adjusted
Financ. Performance	0.803	0.792

Source: Own authorship

The adopted scale of R² values range from 0,25 (weak), 0,50 (moderate) and 0,75 (substantial). The first model presents a substantial predictive power of 0,815. This means that the variables and constructs that are on the exogenous side of the relationship have a substantial capacity of influencing the endogenous construct.

These results show that there might be a relationship between the variables presented for the first model. The next step consists of determining whether this relationship is significant or not.

4.2.2.2 Results for the path significance coefficient

Via a bootstrapping technique, one can determine the path significance coefficient of each construct to another. The results for the first model are depicted in Table 14:

Table 14 - Path significance for the first model

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Econ. Performance -> Fin. Performance	0.032	-0.015	0.085	0.352	0.725
Enviro. performance -> Fin. Performance	0.917	0.649	0.390	2.364	0.019
Soc. Performance -> Fin. Performance	0.116	0.024	0.098	0.311	0.756

Source: Own authorship

The values for the T statistics should be over 1,96 at a 0,05-significance level. The only path that scored over this value was Environmental performance to Financial Performance. This means that the variables chosen for environmental performance are the only ones that affect the variable chosen for financial performance.

The final part of the assessment consists of examining the models' predictive relevance via Q² test.

4.2.2.3 Results for the predictive relevance

For the model's predictive relevance test, the Stone-Geisser's Q^2 test was employed. Values above zero means that a given variable can be predicted by the independent variable. The results for this test can be observed in Table 15:

Table 15 - Predictive relevance for the first model

Construct	SSO	SSE	$Q^2 (=1 - SSE/SSO)$
Econ. Perf.	120.000	120.000	
Envir. Perf.	180.000	180.000	
Fin. Perf.	60.000	57.907	0.040
Soc. Perf.	120.000	120.000	

Source: Own authorship

For the first model, the results for the Q^2 tests were 0,040, above the target of zero, meaning that there is a significant relationship to be found on the first model. Overall, the first model was successful in detecting a relationship among the variables established. As it passed both the structural and measurement model, it can now be considered as valid. The relationships detected here must now be further analyzed and explored in order to determine whether there is a causal relationship between these variables. The same method used in the first model was then employed in the second model.

4.3 ASSESSMENT OF THE SECOND MODEL

The same procedure which was employed to analyze the measurement and structural validity of the first model is going to be employed in this section.

4.3.1 Measurement Model Validity

In a similar manner in which the first model had its constructs and indicators analyzed as portrayals of a relationship, the second model is going to undergo the same procedures.

4.3.1.1 Results for the internal consistency reliability and convergent validity

The constructs are analyzed according to their composite reliability and convergent validity. The results are available in Table 16:

Table 16 - Internal consistency reliability and convergent validity for the second model

Construct	Composite Reliability	AVE
Accounting Performance	1.000	1.000
Economic Performance	0.996	0.993
Environmental performance	0.983	0.950
Market Performance	1.000	1.000
Social Performance	1.000	1.000

Source: Own authorship

In this case, both the composite reliability and AVE values are over the targets of 0,700 and 0,50, respectively. The constructs that yielded 1.000 as a result, are those composed of a single indicator. Next, the indicator reliability will be assessed.

4.3.1.2 Results for indicator reliability

Indicator reliability test results are available in Table 17:

Table 17 - Internal consistency reliability					
Indicator	Accounting	Economic	Environm.	Market	Social
v201x1a		0.996			
v201x1b		0.997			
v305x7b			0.990		
v305x7c			0.984		
v305x7d			0.949		
v405x1b					1.000
vReturnonSales	1.000				
vTobinsQ				1.000	

Source: Own authorship

Every indicator scored above the critical value of 0,70 inside the construct that they were placed. For both cases, this means that the indicators are correctly placed regarding their factor loadings.

4.3.1.3 Results for discriminant validity

The results for discriminant validity for the second model are presented in tables 18 and 19:

Table 18 - Fornell-Larcker criterion for the second model

	Accounting Perf.	Economic Perf.	Environmental Perf.	Market Perf.	Social Perf.
Accounting Perf.	1.000				
Economic Perf.	0.016	0.996			
Environmental Perf.	0.134	-0.059	0.975		
Market Perf.	0.059	-0.024	0.895	1.000	
Social Perf.	0.318	0.031	0.053	0.013	1.000

Source: Own authorship

The constructs have shown to be more correlated to themselves than to the other established constructs. This means that the constructs meet the criterion.

Table 19 - Indicator discriminant validity for the second model

Indicator	Accounting Perf.	Economic Perf.	Environmental Perf.	Market Perf.	Social Perf.
v201x1b	0.014	0.997	-0.062	-0.026	0.040
v305x7b	0.136	-0.072	0.990	0.905	0.052
v305x7c	0.141	-0.110	0.984	0.893	0.032
v305x7d	0.112	0.017	0.949	0.816	0.074
v405x1b	0.318	0.031	0.053	0.013	1.000
vReturnonSales	1.000	0.016	0.134	0.059	0.318
vTobinsQ	0.059	-0.024	0.895	1.000	0.013
v201x1a	0.017	0.996	-0.054	-0.020	0.022

Source: Own authorship

The indicators should be more correlated to the construct that they represent than to the others. All the indicators used in this model meet the established criterion.

After the measurement model has been successfully assessed, the next step involves the evaluation of the structural model validity.

4.3.2 Structural model validity

The assessment that is going to take place, similarly to the first model, is composed of the assessment of the R^2 values, the path significance and the predictive relevance of the second model.

4.3.2.1 Results for the R^2 values

The R^2 values are calculated in order to determine how much of the variance of the dependent variable is predicted by the independent variable. The resulting R^2 values for the second model are portrayed in Table 20:

Table 20 - R^2 scores for the second model

Predicted construct	R Square	R Square Adjusted
Acc. Performance	0.115	0.068
Market Performance	0.804	0.793

Source: Own authorship

The second model presented two endogenous constructs. While the variables employed presented a substantial predictive power regarding Market performance (0,804), they do not render the same results in Accounting Performance (0,115).

Next, the path significance coefficient is going to be calculated, in order to determine the significance of the relationship.

4.3.2.2 Results for the path significance coefficient

The path significance test for the second model, is depicted in Table 21:

Table 21 - Path significance for the second model

Paths	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
Econ. Performance -> Acc. Performance	0.013	-0.001	0.112	0.116	0.908
Econ. Performance -> Mark. Performance	0.030	-0.014	0.079	0.386	0.699
Envir. performance -> Acc. Performance	0.118	0.147	0.084	1.408	0.159
Envir. performance -> Mark. Performance	0.899	0.633	0.384	2.343	0.019
Soc. Performance -> Acc. Performance	0.311	0.301	0.147	2.116	0.034
Soc. Performance -> Mark. Performance	-0.036	-0.012	0.074	0.489	0.625

Source: Own authorship

The only paths that are valid in this relationship, which scored above the 1,96 aim in T value, were Environmental performance to Market performance and Social Performance to Accounting Performance. This means that these two exogenous constructs are the ones who have a more significant influence on the endogenous ones.

The final assessment consists of the predictive relevance of the model.

4.3.2.3 Results for the predictive relevance

The test for predictive relevance determines whether there is a predictive power in the relationships observed. The results for the second model can be seen in Table 22:

Table 22 - Predictive relevance for the second model

Construct	SSO	SSE	Q ² (=1-SSE/SSO)
Acc. Perf.	60.000	53.964	0.101
Econ. Perf.	120.000	120.000	
Envir. Perf.	180.000	180.000	
Mark. Perf.	60.000	57.752	0.037
Soc. Perf.	60.000	60.000	

Source: Own authorship

As the second model had two predicted constructs (Accounting Performance and Market Performance), the test yielded two results. They were 0,101 for accounting performance and 0,037 for market performance, meaning that there is a relevant relationship regarding both constructs.

Overall, the second model passed both the structural and measurement validity tests, meaning that it can be considered as a correct manner of portraying the relationship investigated, while successfully detecting a relationship among the variables employed.

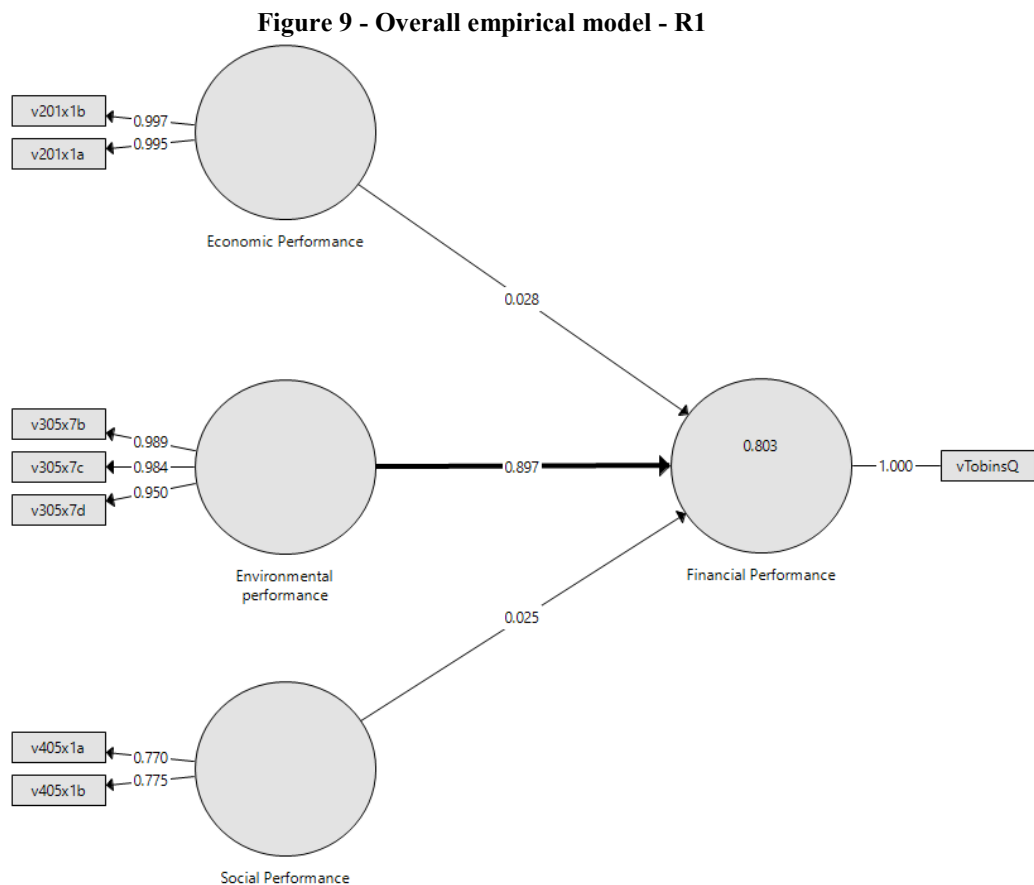
Next, the final empirical models are presented, and the relationships detected are further discussed.

4.4 FINAL EMPIRICAL MODELS

In this section, the final version of the models that have met both the structural and measurement model validity tests requirements are now presented and will be analyzed. In the sequence, we will present a brief discussion of each model and its implications is also going to take place.

4.4.1 First Model Analysis

The first model is presented along with its results in Figure 9. Next, the explanation of the variables used, their meaning and the significant relationship that was detected are presented.



Source: Own authorship

For the first relationship test, instead of considering a single construct entitled “sustainable performance”, three different constructs were created in order to reflect the indicator’s nature. GRI indicators for economic (200), environmental (300) and social (400) performance were placed on the independent side of the relationship.

The remaining variables for economic performance, labeled “v201x1b” and “v201x1a” represent “Economic value distributed” and “Economic value added”, respectively, as in GRI’s 201-1 indicator.

The variables for environmental performance labeled “v305x7b”, “v305x7c” and “v305x7d”, correspond to “NOx and SOx and other significant gas emissions”. The first one represents SOx (sulfur oxide) emissions, the second one NOx (nitrous oxide) and the third one VOC (volatile organic compounds) emissions.

The variables for social performance, labeled “v405x1a” and “v405x1b” represent gender diversity in the organization. The first one depicts the percentage of men and the second one the percentage of women in the organization.

On the dependent side, the single indicator representing financial performance which remained after the tests was Tobin’s Q. This is due the fact that it was the indicator that better represented financial performance regarding its relationship to any of the sustainability performance constructs. The model has discarded every other indicator for financial performance.

This model has successfully detected a relationship among the independent and dependent variables. The influence of the environmental over the financial performance, which is highlighted in the model, is substantial and significant.

This means that the relationship described in r1 can be partially accepted. While not every dimension for sustainability performance has a significant effect on financial performance, the environmental dimension has shown a significant relationship. The four requirements of covariation, sequence of events, nonspurious covariance and theoretical support are required, in order to infer causality.

4.4.1.1 Covariation

The covariation requirements determine that, for one variable to be considered a cause, and the other one to be considered an effect, there must be a correlation between them.

In this model, the cross loadings of the path that goes from environmental performance variables to those representing financial performance has scored a significant value (0,897).

This means that there is a strong correlation between the dependent and independent variables, and the analysis can proceed.

4.4.1.2 Sequence of events, nonspurious covariance

The sequence of events which were portrayed by both the established models regarded sustainability performance as a cause for financial performance.

The theoretical basis determining the existence of a directional relationship portrayed in this study is quite substantial. Several authors have considered the environmental aspect of sustainability as a steering force in this relationship, whether analyzing a company's emissions and effluents (PÉREZ-CALDERÓN *et al* 2012; RIVERA *et al*, 2017), analyzing the act of environmental disclosure (GIANNARAKIS *et al*, 2017), or by developing their own proxies for financial performance (EKATAH *et al.*, 2011).

There is, therefore, support regarding the sequence of events of the relationship explored here, therefore, a logical explanation for the covariance found between environmental and financial performance.

4.4.1.3 Theoretical support for the findings

There are several studies that have tried to link the environmental aspect of CSP to a company's outcome, as displayed in the theoretical review section. Some of them, whether intentional, have stumbled across a series of findings which may aid in understanding the relationships found in the first model.

While Weber *et al* (2008) employs the similar GRI indices for environmental, social and economic performance as a proxy for CSP, their work does not employ the same range of market variables which have been deployed here. Although their study found a positive relationship between CSP and CFP and accounting variables, there is not a clear definition of which of the environmental dimensions impact the most on CFP. They hint, however, at the importance of considering market variables in further analyses.

These findings happen again in Fuji *et al* (2012), whereas in they find that environmental performance, portrayed by CO₂ emissions, influences CFP, portrayed by ROA. They conclude that, the better a firm performs in terms of CO₂ emissions, the better its financial outcome will be.

Pérez-Calderón *et al* (2012), considered CO₂, NO_x and SO_x emissions in their study, against a set of variables that range from accounting to market performance. They have found

evidence of a relationship between emission efficiency and positive financial outcome. While this dissertation did not consider emission efficiency as a proxy for environmental performance, there is a clear relationship that can be found again in the literature.

Sariannidis *et al* (2018) found compelling evidence of a negative relationship between carbon emissions and CFP. This is displayed again in the study by Ganda and Milondzko (2018). This means that, although there is not a clear definition of a causal relationship, they detected a decrease of CFP whenever carbon emissions rose. The variables chosen for CFP are those related to accounting measurement units, but the evidence stands for both cases, nonetheless.

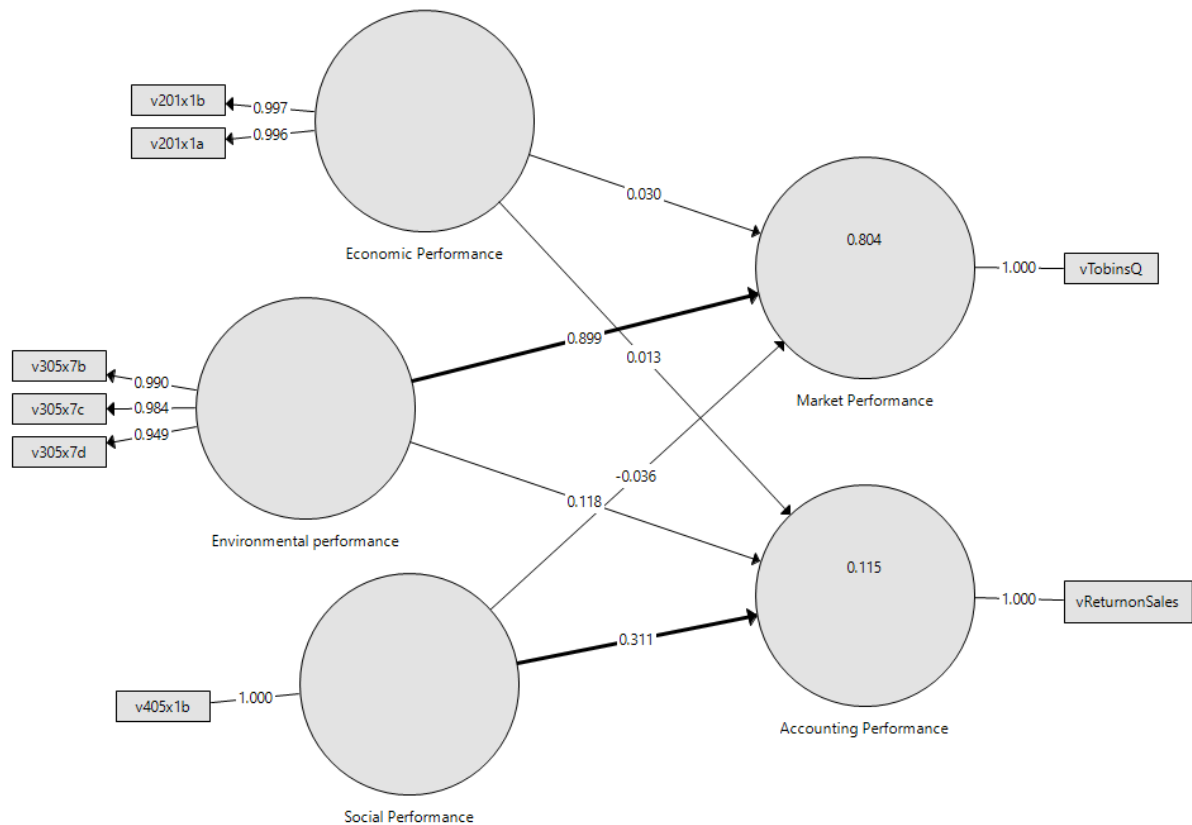
One can notice that there is compelling literature corroborating to the findings of this study. While there is not theoretical support consistent enough to determine the causality of this relationship, there is indeed a relationship which has been detected by similar studies. This model along with the current literature, demonstrates an existing relationship between variables for environmental performance and CFP, while not claiming that there is a causal relationship.

Next, the findings of the second model are analyzed.

4.4.2 Second Model Analysis

The second model that was rendered to test relationships 2 to 7 is depicted in Figure 10. The same criteria employed for the analysis of the first model will be employed to determine the existence of relationships as well as causality, where possible.

Figure 10 - Overall empirical model - R2 to R7



Source: Own authorship

There are two significant relationships in this model. The first one is the connection between environmental performance indicators, which are the same as the previous model, to the market performance indicator of Tobin's Q.

The other significant yet weak relationship found was detected between social performance and accounting performance indicators. The indicator "v405x1b" stands for "Diversity of governance bodies and employees - Governance - Female", while Return on Sales is the indicator chosen for accounting performance.

Thus, the relationships proposed by R3 and R7 can be considered as existing. The remaining relationships proposed by the R2, R4, R5 and R6 were not proved by this model under these circumstances.

The following section will present a discussion regarding the relationships found by each of the models with the results present in the literature.

4.4.2.1 Covariation

For the second model, the environmental performance variables have shown to be highly correlated to market performance variables, presenting a cross-loading value above 0,8. On the other relationship, the variable for social performance was shown to be weakly correlated to the variable for accounting performance, yielding a cross-loading value above 0,3. This means that, in the matter of inferring causality, the variables for environmental performance can be further considered, while the variable for social performance can be set aside.

4.4.2.2 Sequence of events, nonspurious covariance

The relationship found in the second model regards the same environmental performance variables as drivers for the same variable previously portraying financial performance, now labeled as market performance. This means that the relationship detected in this case is the same as the first model.

The same aspects that were pointed out for the first model are valid here, such as the literature pointing towards accepting environmental performance as an independent variable towards financial performance, as well as the lack of support for determining causation.

Therefore, the second model also detected a relationship between environmental performance and market performance, while not substantial enough to determine whether this is a cause-effect relationship. Causality, therefore, cannot be inferred for any of the models.

4.4.2.3 Theoretical support for the findings

There is indeed rich literature pointing towards the existence of a relationship between board diversity that was observed here, and CFP. Although the findings in this study's literature review have shown to be quite limited in this aspect, a brief search into the main research databases render a myriad of researches that ought to be explored by authors who choose to tackle the field.

Rather than being considered as a single measurable variable as in GRI Standards indicator, the gender diversity issue appears in the literature observed in this study in Miron and Petrarche (2012). When analyzing the social aspect of sustainability, they have considered treatment of women and minorities as an important and measurable indicator. Their study,

however, did not reach a conclusive outcome of whether improving CSP would reflect on CFP and vice-versa, as neither causality nor direction could be inferred.

A study by Erhardt *et al* (2003), on one hand, showed board diversity to be positively associated with the financial indicators for firm performance, valid for the largest US companies. Nguyen and Faff (2007) also showed that higher firm value is associated with the presence of women directors in Australian firms.

Other studies, as in Marinova *et al* (2015) were unable to detect any relationship between these variables for Dutch firms, by using Tobins' Q as a proxy for financial performance, and gender diversity as a dependent variable.

One should point out, nonetheless, that the relationship found in this study was found to be quite weak, nearly irrelevant. There are, however, authors in the literature that have explored these aspects in their paper, meaning that, although there might be some limiting factors regarding the choice of variables - which will be further addressed - the relationship found in this model should be further explored in more specific research.

Some effects, however, must not be left out of the results discussion. Aspects such as the unobserved effect of other variables and the discretionary nature of corporate social disclosure going to be discussed next.

4.6 REGARDING UNOBSERVED VARIABLES AND THE TIME PERIOD

While the literature demonstrates that there are many measurements for economic, environmental and social performance of companies, there is not a consensus regarding how each of these aspects should be measured. In this sense, the employment of GRI quantitative indicators aim to bridge this gap (CLARKSON *et al*, 2008; ADAMS, 2004; AZAPAGIC, 2004).

On one side of the relationship, there are variables for (i) economic performance, (ii) environmental performance and (iii) social performance:

- (i) In the first set of variables, there are indicators such as economic value generated, distributed and retained, as well as the percentage of goods/services procured from local suppliers. This set of variables surely measure distinct things, as the first one measures revenue, costs and profit as a basis, while the second one measures procurement practices. They are, therefore, distinct manners of measuring the same economic performance.
- (ii) In the second set of variables, there are proxies for environmental performance related to, for instance, energy consumption, water usage, water discharge,

water treatment, solid waste generated, waste recycled and emissions. Each of these variables measures distinct things, and therefore cannot be considered as a single construct. The result is that variables related to emissions have been grouped together and considered as a single construct, which has a significant impact on the dependent variable.

- (iii) In the third set of variables, there are indicators related to social aspects, such as percentage of men and women on corporate governance, percentage of men and women on companies and average training hours per employee. These three indicators cover different aspects of a company's social performance.

The same happened on the other side of the analyzed relationship. The six variables chosen to measure financial performance, were, in the first model, considered, whether being accounting or market variables. While these variables successfully address the financial performance of a company, each of them measures distinct aspects. Accounting variables measure Return on Sales, Return on Equity and Return on Capital employed, all of which consider different aspects of a company relevant. It is not illogical, however, to consider that they would belong in a single construct.

The other market variables considered, as Tobin's Q, Price/Earnings ratio, and Price to book value measure different markets aspects of a company. While accounting indicators are based on book values of companies, market indicators are more market oriented.

One must consider, therefore, that among the variables that have been employed for this study, there might be some which might have a moderating effect, which are not observable from this viewpoint, given the measurement model in place.

For the first model, for instance, the environmental aspect of NOx emissions has proven to influence the measure for financial performance, represented by Tobin's Q indicator. What is essentially being said here, is that the amount of emissions reflects on whether a company is overvalued or undervalued.

Whether this happens to other companies on larger samples is a matter for further investigation. It is not, however, illogical to connect these two variables and test their influence, as pointed out in the literature (PÉREZ-CALDERÓN *et al*, 2012; RIVERA *et al*, 2017; EKATAH *et al*, 2011).

For the second model, the same environmental aspect has once again appeared, but now it is clear that there is a relationship when it comes to market measurement units, then when it comes to accounting measurement variables.

The main difference, however, was the weak yet statistically significant relationship found between the social variable of the percentage of females on a company's governance and the accounting measurement variables for financial performance, represented by Return on Sales.

This is precisely where the moderation effect of other variables that have not been considered in this study, such as firm size and a greater time cut, could have an influence. In no logical manner can these two variables be connected without speculation of what other variables might be influencing this relationship. It is indeed, however, a result to be explored upon further research.

Furthermore, one must consider the distinct economic cycles which organizations are subjected to. Especially in the context of global market, while one organization operates on distinct markets, one must consider their dissimilarities. While the most recent global financial took its toll on organizations worldwide, some markets were less exposed and, therefore, quicker to emerge from recession. This certainly impacts organizations' market value, equity and assets held. A cross-sectional design might not be the most indicated to detect this kind of phenomena and isolate its possible moderating effects.

The following section will address the discretionary nature of corporate social disclosure and its effects on this research.

4.7 REGARDING THE DISCRETIONARY NATURE OF CORPORATE SOCIAL DISCLOSURE AND DATA RELIABILITY

In order to better understand the results yielded in this study, one must address the issue regarding the discretionary nature of sustainability reporting.

First, one must consider that, unlike financial reports, which are submitted to analyses, are third-party audited and their release is mandatory by law, sustainability reporting is mostly voluntary. This implicates in several matters which have influenced the results of this study.

The information contained in sustainability reports are not submitted to external audits. At most, it is information that is external assured by other organizations, but there are no agencies that regulate or rule on the matter. This has a substantial implication for researchers who are using these metrics in their studies. The organization chooses which information is going to be disclosed, leaving, therefore, information that might harm their reputation out of their reports (NEU *et al*, 1998). Furthermore, the lack of external assurance or auditing also implies that organizations can manipulate data in any manner (CORMIER *et al*, 2004; LU, &

ABEYSEKERA,2014). Therefore, researchers who employ this kind of data in their research should be cautious when establishing either causation or a mere relationship between variables.

Second, organizations can select what information they are going to be disclosed. Some argue that the supply of disclosure is driven by the relationship between managers and the organization's stakeholders (HUANG; KUNG, 2010). By analyzing what is relevant to their stakeholders, organizations develop a materiality matrix which is the basis for their information disclosure. Thus, not every organization found it pressing to report on data such as air emissions, or gender diversity in the workplace, assuming this process was in fact, stakeholder driven.

This also means that there is a great variability on the information disclosed by companies. Some organizations may disclose every indicator provided by the GRI guidelines, while others may not use any of the specific indicators at all. This can be considered as a severe limiting factor to any researchers which are employing this kind of information in their study. In this study, this was reflected on the number of indicators which could be considered for further analysis, in the final sample composition and most importantly, in the statistical significance of the results.

Thus, although the two models have been clear on establishing a relationship between the variables tested, one cannot rush to any concluding remarks without first considering these variables and their effects, which have a significant impact on research results. This means that, although the relationships found in this study contribute to the existing literature, there is no possibility of inferring causality without first addressing the aforementioned issues.

5 CONCLUDING REMARKS

This study set out to determine what GRI indicators for economic, environmental and social performance impact the most on Corporate Financial Performance. It was one of the first studies to employ the data from the most recent standards provided by GRI as proxies for sustainability performance of organizations, while weighing the effects of the overall sustainability performance over financial performance, and considering each economic, environmental and social performances separately.

A literature review was performed in order to establish which indicators were to be used, as well as to identify opportunities for further exploring the data. The variables that were selected for financial performance were separated into two groups of accounting performance, which measure financial performance through accounting indices such as ROA, ROE, ROCE, and market performance, which employs indices for analyzing financial performance based on company's stock prices and market value.

Data was then collected from content analysis of GRI reports for sustainability performance, while companies' financial statements were analyzed for data related to financial performance.

The structural equation modeling technique was employed. Two models were created in order to identify the possible relationships. PLS SEM was employed in order to fulfill this study's objectives. The first model tested the relationship for sustainable performance and financial performance, while the second tested the relationships among economic, environmental, and social variables over market and accounting variables. Both models meet the measurement validity and structural validity test requirements.

For the first model, the only relationship that was significant enough was the influence of the environmental performance (represented by NO_x and SO_x emissions) over the financial performance (represented by Tobin's Q) was found to be substantial ($R^2 > 0,8$) and significant at a 0,05 level. The relationship described in R1 can, therefore, be partially accepted, as the economic and social performances were not significant or substantial enough to be considered.

One must consider, however, that these variables for environmental performance have been chosen due to their relevance and overall predictive power criteria described in the methods section. Variables such as CO₂ emissions, energy usage and water withdrawal were excluded from the model, as their predictive relevance was not substantial enough to be further considered.

Overall, the literature validates the existence of a relationship between environmental performance variables and those selected for financial performance. There is not, however, a clear indicator of the direction and causality of this relationship.

The second model yielded two distinct relationships in the set of variables: The first one is the connection between environmental performance, composed of the abovementioned indicators, to the market performance indicator of Tobin's Q. R^2 values were again over 0,8, at a 0,05 significance level.

The second relationship detected was the one between social performance and accounting performance, where social performance is represented by the number of women in corporate governance (percentage), and accounting performance was represented by Return on Sales. Although this relationship was graded as weak ($R^2 < 0,025$), it was considered as evidence that should be further explored.

The literature is quite rich in studies that analyze the relationship that was detected here. This study could provide an evidence of an existing relationship among gender diversity on the board and corporate financial performance. While the requirements for determining causation such as nonspurious covariation and the sequence of events were met, there is not enough substantial literature support for assuring that there is a causal relationship between these variables, as this exploration outreaches the scope of this study.

Overall, this research has successfully demonstrated the existence of a relationship between variables for sustainability performance and their influence on a firm's financial performance, as displayed in the literature. There is not enough compelling evidence, however, for practitioners to determine which aspects of sustainability to focus on. Academically, while the method employed in this research surely demonstrated which indicators for sustainability performance influence a firm's financial performance, there is not enough information to establish a causal relationship between the variables employed.

This study is not without limitations. First, one must consider that there might have been some variables which could intervene in the results that might have not been considered while developing the models, such as firm size, for instance.

Furthermore, the discretionary nature of the information portrayed in sustainability reports can be a limiting factor. Unarguably, should the issues regarding data assurance and information reliability be addressed, researchers would be able to draw more conclusive results from research.

In addition, the development of a single, common database, where organizations might inform their sustainability performance could aid researchers regarding data collection,

providing greater samples to be analyzed and improving results generalizability, as content analysis of a greater amount of sustainability reports might be impracticable.

Future researchers should now have a pathway regarding which relationships to explore and determine what other variables could be influencing this relationship. Deeper analysis regarding the indicator composition, other sample compositions or the employment of other variables could be an expansion of this research, deepening the understanding on the ever-relevant sustainability-financial performance topic.

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APPENDIX A - Data collection Tool

	Disclosure	Disclosure Item
Economic Performance	201-1	Direct Economic value generated
	201-1	Direct Economic value distributed
	201-1	Direct Economic value retained
	201-2	Financial implications and other risks and opportunities due to climate change
	201-3	Defined benefit plan obligations and other retirement plans Estimated value
	201-3	Defined benefit plan obligations and other retirement plans Percentage of salary contributed by employee
	201-4	Financial assistance received from government
	202-1	Ratios of standard entry level wage by gender compared to local minimum wage
	202-2	Proportional of senior management hired from the local community
	203-1	Infrastructure investments and services supported
	203-2	Significant indirect economic impacts
	204-1	Works and Services
	204-1	Supplies
	205-1	Business units assessed for risks related to corruption
	205-2	Communication and training in anticorruption matters - Total number and percentage of governance body members that the organization's anti-corruption policies and procedures have been communicated to, broken down by region.
	205-2	Total number and percentage of employees that the organization's anti-corruption policies and procedures have been communicated to, broken down by employee category and region
	205-2	Total number and percentage of business partners that the organization's anticorruption policies and procedures have been communicated to, broken down by type of business partner and region. Describe if the organization's anti-corruption policies and procedures have been communicated to any other persons or organizations
	205-2	Total number and percentage of governance body members that have received training on anti-corruption, broken down by region
	205-2	Total number and percentage of employees that have received training on anti-corruption, broken down by employee category and region

	Disclosure	Disclosure Item
	205-3	Measures taken in response to incidents of corruption
	206-1	Legal action for anticompetitive behavior, antitrust, and monopoly practices
Environmental Performance	301-1	Material used by weight or volume - natural gas
	301-1	Material used by weight or volume - Coal
	301-1	Material used by weight or volume - Gas
	301-1	Material used by weight or volume - Water
	301-1	Material used by weight or volume - Energy
	301-1	Material used by weight or volume - Chemicals
	301-1	Material used by weight or volume - Catalyst
	301-1	Material used by weight or volume - Paper
	301-1	Material used by weight or volume - Diesel
	301-1	Material used by weight or volume - Petrol
	301-1	Material used by weight or volume - Lubricant Oil
	301-1	Material used by weight or volume - Lubricant Grease
	301-1	Material used by weight or volume - Ammonium Nitrate
	301-1	Material used by weight or volume - Steel
	301-1	Ore processed
	301-1	Metallic and non-metallic minerals
	301-1	Brine
	301-1	Salts
	301-1	Metals
	301-1	Solutions
	301-1	Other
	301-2	Recycled input materials used
	301-3	Reclaimed products and their packaging materials
	301-3	Programs and progress relating to materials stewardship
	302-1	Energy consumption within the organization - Natural Gas
	302-1	Energy consumption within the organization - Gasoil
	302-1	Energy consumption within the organization - Petrol
	302-1	Energy consumption within the organization - Electricity
	302-1	Energy consumption within the organization - Coal
	302-1	Energy consumption within the organization - Diesel
	302-1	Energy consumption within the organization - Gasoline
	302-1	Energy consumption within the organization - Waste Gas
	302-1	Energy consumption within the organization - Carbon
302-1	Energy consumption within the organization - lpgm ³	
302-1	Energy consumption within the organization - ANFO	

	Disclosure	Disclosure Item
	302-1	Energy consumption within the organization - Emulsion
	302-1	Energy consumption within the organization - Other
	302-1	Energy consumption within the organization - Total imported electricity
	302-1	Energy consumption within the organization - Total imported electricity in terms of natural gas
	302-2	Electricity consumption outside de organization
	302-3	Energy intensity
	302-3	Energy Intensity - Coal business
	302-3	Energy Intensity - Power business
	302-4	Reduction of energy consumption
	302-5	Reductions in energy requirements of products and services
	303-1	Water withdrawal by source - Sea Water
	303-1	Water withdrawal by source - Purchased water
	303-1	Water withdrawal by source - Surface Fresh Water
	303-1	Water withdrawal by source - Groundwater
	303-1	Water withdrawal by source - Rain Water
	303-1	Water withdrawal by source - Municipal Water
	303-1	Water withdrawal by source - Mine Water
	303-1	Water withdrawal by source - Waste Water
	303-2	Water sources significantly affected by withdrawal of water
	303-3	Water recycled and reused - Total
	303-3	Water recycled and reused - Percentage
	304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas
	304-2	Significant impacts of activities, products, and services on biodiversity
	304-3	Habitats protected or restored
	304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations
	305-1	Direct emissions
	305-2	Indirect Emissions (scope 2)
	305-3	Indirect Emissions (scope 3)
	305-4	Emission intensity ratio - Iron Ore
	305-4	Emission intensity ratio - Tons of production
	305-4	Emission intensity ratio - Manganese Ore

	Disclosure	Disclosure Item
	305-4	Emission intensity ratio - PGM
	305-4	Emission intensity ratio - Copper ore
	305-4	Emission intensity ratio - Gold
	305-4	Emission intensity ratio - ore milled
	305-5	Reduction of greenhouse gas emissions
	305-6	Emissions of ozone-depleting substances
	305-7	Nox and Sox and other significant gas emissions - SOX
	305-7	Nox and Sox and other significant gas emissions - NOX
	305-7	Nox and Sox and other significant gas emissions - VOC
	305-7	Nox and Sox and other significant gas emissions - PM10
	305-7	Nox and Sox and other significant gas emissions - NH3
	305-7	Halon
	305-7	R134a
	305-7	R22
	305-7	R410
	306-1	Water discharge by quality and destination - Surface
	306-1	Water discharge by quality and destination - Ground
	306-1	Water discharge by quality and destination - Sea
	306-1	Water discharge by quality and destination - Third Party
	306-1	Water discharge by quality and destination - Other
	306-2	Waste by type and disposal method - Hazardous
	306-2	Waste by type and disposal method - Hazardous-liquid
	306-2	Waste by type and disposal method - non-Hazardous
	306-2	Waste by type and disposal method - non-Hazardous-liquid
	306-3	Significant spills
	306-4	Transport of hazardous waste
	306-5	Water bodies affected by water discharges and runoff
	307-1	Noncompliance with environmental laws and regulations- Total monetary value
	307-1	Noncompliance with environmental laws and regulations- total number of non-monetary sanctions
	307-1	Noncompliance with environmental laws and regulations- cases brought through dispute resolution mechanisms
	308-1	New suppliers that were screened using environmental criteria
	308-2	Negative environmental impacts in the supply chain and actions taken
Performance For Social	401-1	New employees hired and employee turnover - Hired
	401-1	New employees hired and employee turnover - Fired

	Disclosure	Disclosure Item
	401-1	New employees hired and employee turnover - Retired
	401-1	New employees hired and employee turnover - Turnover
	401-2	Benefits provided to fulltime employees that are not provided to temporary or part-time employees
	401-3	Parental leave - maternity
	401-3	Parental Leave - paternity
	402-1	Minimum notice periods regarding operational changes
	403-1	Workforce represented in health and safety committees
	403-2	Absenteeism rate, occupational diseases, lost days, and total number of work-related fatalities - Injury Rate
	403-2	Absenteeism rate, occupational diseases, lost days, and total number of work-related fatalities - Occupational Disease Rate
	403-2	Absenteeism rate, occupational diseases, lost days, and total number of work-related fatalities - Lost Days Rate
	403-2	Absenteeism rate, occupational diseases, lost days, and total number of work-related fatalities - Absentee Rate
	403-2	Absenteeism rate, occupational diseases, lost days, and total number of work-related fatalities - Work Related Fatalities
	403-3	Workers with high incidence or high risk of diseases related to their occupation
	403-4	Health and safety topics covered in formal agreements with trade unions
	404-1	Average hours of training per year per employee - Female
	404-1	Average hours of training per year per employee - Male
	404-2	Programs for upgrading employee skills and transition assistance programs
	404-3	Percentage of employees receiving regular performance and career development reviews
	405-1	Diversity of governance bodies and employees - Governance - Male
	405-1	Diversity of governance bodies and employees - Governance - Female
	405-1	Diversity of governance bodies and employees - employees - Male
	405-1	Diversity of governance bodies and employees - employees - Female
	405-2	Ratio of basic salary and remuneration of women to men - Basic Salary - Men

	Disclosure	Disclosure Item
	405-2	Ratio of basic salary and remuneration of women to men - Basic Salary - Women
	405-2	Ratio of basic salary and remuneration of women to men - Women to Men
	406-1	Incidents of discrimination and corrective actions taken
	407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk
	408-1	Operations and suppliers at significant risk for incidents of child labor
	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor
	410-1	Security personnel trained in human rights policies or procedures
	411-1	Incidents of violations involving rights of indigenous peoples and measures taken
	412-1	Operational sites that have been subject to Human Rights reviews or impact assessments
	412-2	Employee training on relevant Human Rights policies of procedures - Existence
	412-2	Employee training on relevant Human Rights policies of procedures - Employee number
	412-3	Significant investment agreements and contracts that include Human Rights clauses or that underwent Human Rights screening
	413-1	Operations with local community engagement, impact assessments and development programs
	413-2	Operations with significant actual and potential negative impacts on local communities
	414-1	New suppliers that were screened using environmental criteria
	414-2	Negative environmental impacts in the supply chain and actions taken
	415-1	Political contributions
	416-1	Assessment of the health and safety impacts of product and service categories
	416-2	Incidents of noncompliance concerning the health and safety impacts of products and services

	Disclosure	Disclosure Item
	417-1	Requirements for product and service information and labeling
	417-2	Incidents of noncompliance concerning product and service information and labeling
	417-3	Incidents of non-compliance concerning marketing communications
	418-1	Sustained complaints concerning breaches of customer privacy and losses of customer data
	419-1	Noncompliance with laws and regulations in the social and economic area - values
	419-1	Noncompliance with laws and regulations in the social and economic area - occurrences
Sector Specific	MM1	Amount of land (owned or leased, and managed for production activities or extractive use) disturbed
	MM1	Amount of land (owned or leased, and managed for production activities or extractive use) rehabilitated
	MM2	The number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place
	MM3	Total amounts of overburden, rock, tailings, and sludges and their associated risks
	MM4	Number of strikes and lock-outs exceeding one week's duration, by country
	MM5	Number and percentage of operations or sites where there are formal agreements with indigenous peoples' communities
	MM5	Total number of operations taking place in or adjacent to indigenous peoples' territories, and number and percentage of operations or sites where there are formal agreements with indigenous peoples' communities

	Disclosure	Disclosure Item
	MM6	Number and description of significant disputes relating to land use, customary rights of local communities and indigenous peoples
	MM7	The extent to which grievance mechanisms were used to resolve disputes relating to land use, customary rights of local communities and indigenous peoples, and the outcomes
	MM8	Number (and percentage) of company operating sites where artisanal and small-scale mining (asm) takes place on, or adjacent to, the site; the associated risks and the actions taken to manage and mitigate these risks
	MM9	Sites where resettlements took place, the number of households resettled in each, and how their livelihoods were affected in the process
	MM10	Number and percentage of operations with closure plans
	EU1	Installed capacity, broken down by primary energy source and by regulatory regime
	EU2	Net energy output, broken down by primary energy source and by regulatory regime
	EU3	Number of residential, industrial, institutional and commercial customer accounts
	EU4	Length of above and underground transmission and distribution lines by regulatory regime
	EU5	Allocation CO2 emissions allowances or equivalent, broken down by carbon trading framework
	EU10	Planned capacity against projected electricity demand over the long term, broken down by energy source and regulatory regime
	EU11	Average generation efficiency of thermal plants by energy

	Disclosure	Disclosure Item
		source and by regulatory regime
	EU12	Transmission and distribution losses as a percentage of total energy
	EU13	Biodiversity of offset habitats compared to the biodiversity of the affected areas
	EU15	Percentage of employees eligible to retire in the next 5 and 10 years broken down by job category and by region
	EU17	Days worked by contractor and subcontractor employees involved in construction, operation & maintenance activities
	EU18	Percentage of contractor and subcontractor employees that have undergone relevant health and safety training
	EU22	Number of people physically or economically displaced and compensation, broken down by type of project
	EU25	Number of injuries and fatalities to the public involving company assets, including legal judgments, settlements and pending legal cases of diseases
	EU26	Percentage of population unserved in licensed distribution or service areas
	EU27	Number of residential disconnections for non-payment, broken down by duration of disconnection and by regulatory regime
	EU28	Power outage frequency
	EU29	Average power outage duration
	EU30	Average plant availability factor by energy source and by regulatory regime
	OG1	Volume and type of estimated proved reserves and production
	OG2	Total investment in renewable energy
	OG3	Total energy generated from renewable sources
	OG4	Number and percentage of operations in which risk for biodiversity has been controlled and evaluated.
	OG5	Volume and disposal of formation or produced water
	OG6	Volume of flared and vented hydrocarbon
	OG7	Amount of drilling waste (drill mud and cuttings) and strategies for treatment and disposal
	OG10	Number and description of significant disputes with local communities and indigenous peoples

	Disclosure	Disclosure Item
	OG11	Number of sites that have been decommissioned and sites that are in the process of being decommissioned
	OG12	Number of process safety events, by business activity
Self-Reported	-	Procurement spend on suppliers who self-identified as indigenous
	-	Number of revealed nonconformities
	-	Customers satisfaction assessment
	-	Company's share in the global market of fuel fabrication
	-	Funds reserved for nuclear waste management
	-	Average plant availability
	-	Investments to ensure availability and productivity of plant units
	-	Percentage of subcontractor employees who have undergone relevant health and safety training (%)
	-	Number of employees during annual outage
	-	Average number of subcontractors' employees on Olkiluoto 3 construction site
	-	Disaster/Emergency Planning and Response
	-	Level of safety
	-	Suppliers assessed by TVO
	-	Acceptance of nuclear power
	-	Export proceeds
	-	Export orders portfolio for products and services of FE NFC for a 10-year period
	-	Revenue from general industrial activities
	-	Environmental expenses
	-	Pollution of the environment with radionuclides
	-	Presence of RW on the sites of the TVEL Fuel Company subsidiaries
	-	Federal Target Program activities
	-	Investments into R&D
	-	Number of registered inventions, utility models, industrial designs and production secrets (know-how)
	-	Number of applications for inventions, utility models, software and databases, production secrets (know-how)
-	Number of patents of foreign countries	
-	Average salary	

	Disclosure	Disclosure Item
	-	Ratio of average pay in the subsidiaries of TVEL Fuel Company to average pay in regions of operations
	-	Succession pool
	-	Amount of financing for TVEL FC investment projects
	-	Structure of revenue from general industrial activities
	-	Water intensity
	-	Indigenous employment at select operations
Accounting	ROA	Return on Assets
	ROE	Return on Equity
	ROCE	Return on Capital Employed
Market	TOBSQ	Tobin's Q
	PTE	P/e (price/earnings ratio)
	PTB	Price to book value

APPENDIX B - Methods Employed, Variables Used and Results Obtained

Main Authors	Methods Employed	Variables for Sustainability	Variables for Financial Performance	Neutral / Mixed	Positive
Santis <i>et al.</i> , 2016	Non-parametric tests	Belonging to Sustainability Indices	(i)Profitability (ii)Liquidity Ratios	1	-
Lean & Nguyen 2014	Augmented Market Model	Belonging to Sustainability Indices	Sharpe Ratio	1	-
Rajnoha <i>et al.</i> , 2016	Chi-Squared, Pearson's Contingency Coefficient, Adjusted Contingency Coefficient	Composite Index of Sustainable Performance	Return on Equity (ROE)	-	1
Singal, 2014	Correlation	MSCI's ESG Indices (Environmental, Social and Governance)	Standard and Poor's ratings	-	1
Siminica <i>et al.</i> , 2015	Correlation	Qualitative approach as to degrees of sustainability practices: Substantive, Symbolic, Green-Washing and Green Highlighting	Return on Assets (ROA)	1	-
Siew <i>et al.</i> , 2013	Correlation and Statistical analysis	ESG Scores	(i)Profitability (ii)Equity Value	1	-
Li <i>et al.</i> , 2016	Correlation and Regression	Adoption to Sustainability Programs	(i)Net Income, (ii)Inventory Turnover, (iii)Return on Assets (ROA)	-	1
Suriyankietkaew & Avery, 2016	Correlation and Regression	Sustainable Leadership Practices	Manager's perception of a three-year period of revenue growth	-	1
Ching, 2017	Correlation and Regression	The quality of the sustainability reports	(i)Return on Equity (ROE) (ii)Return on Assets (ROA)	1	-
Lassala, 2017	Fuzzy-set qualitative comparative analysis	Belonging to Sustainability Indices	Return on Equity (ROE)	1	-

Main Authors	Methods Employed	Variables for Sustainability	Variables for Financial Performance	Neutral / Mixed	Positive
Goel, 2017	Kruskal-Wallis, Correlation, Regression	Self-Constructed Sustainability reporting construct	(i)Tobin's Q (ii)Price/Earnings Ratio (iii)Price/book Ratio (iv)Return on Sales (v)Return on Capital Employed (vi)Return on Equity	1	-
Chang & Kuo, 2008	MANOVA	Data from Sustainable Asset Management (SAM)	(i)Return on Assets (ii)Return on Equity (iii)Return on Sales	1	-
Cristófaló, <i>et al.</i> , 2016	Simpson's method of numerical integration, Standard deviation analysis	Belonging to Sustainability Indices	(i)Historical Market Value of stocks (ii) Stock Volatility	1	-
Wang & Sarkis, 2013	Empirical model	Green Supply Chain Management Practices	(i)Return on Assets (ROA) (ii)Return on Equity (ROE)	-	1
Charlo, <i>et al.</i> , 2015	Empirical Model	Belonging to Sustainability Indices	(i) Stock Volatility (ii) Return on Equity (iii) Earnings per share (iv) Price to book value (v) Size (vi) Leverage	1	-
Martínez-Ferrero & Frías-Aceituno 2013	Empirical model and correlation	EIRIS database for Responsible companies	Market Value (MV)	-	1
Roberts & Dowling, 2002	Proportional Hazards Regression	Reputation score from Fortune's Most admired Corporations	(i)Return on Assets (ROA) (ii)Market to Book Value (iii)Firm Size	-	1
Wagner & Blom, 2011	Regression	Environmental Management System (EMS)	Return on Sales	1	-

Main Authors	Methods Employed	Variables for Sustainability	Variables for Financial Performance	Neutral / Mixed	Positive
Weber, 2017	Panel Regression, Granger Causality, ANOVA	Environmental and Social Indicators like GRI and Thomsom Reuters ESG	(i)Total assets (ii)Net Profit (iii)Return on Assets (iv) Return on Equity (v)Non-performing loan ratio	-	1
Ameer & Othman, 2012	Hypothesis Test	KPI's from Corporate Knights Research Group	(i)Sales/Revenue Growth (ii)Return on Assets (ROA) (iii)Profit Before Tax (PBT) (iv)Cash Flows from Operating Activities (CFO)	1	-
Gómez-Bezares <i>et al.</i> , 2017	Wilcoxon Signed Rank Test and ANCOVA	(i) Publishing of CSR reports (ii)Stakeholder Engagement (iii)Awards (iv)Proactive environmental strategies (v)Annual reports of environmental practices	Growth of the book value of firms balanced with the growth of its liabilities	-	1
Total				12	9

APPENDIX C - Frequency distribution for sustainability disclosure

Item	Description	Responded
201-1a	Direct Economic value generated	55%
201-1b	Direct Economic value distributed	28%
201-1c	Direct Economic value retained	27%
201-4	Financial assistance received from government	8%
204-1	Works and Services (total)	11%
301-1	Material used by weight or volume (total)	6%
301-2	Recycled input materials used	1%
302-1	Energy consumption within the organization (Total energy)	46%
302-2	Electricity consumption outside de organization	8%
302-3	Energy Intensity	18%
303-1	Water withdrawal by source (total)	46%
304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	2%
305-1	Direct Emissions	49%
305-2	Indirect Emissions (scope 2)	48%
305-3	Indirect Emissions (scope 3)	30%
305-4	Emission intensity ratio	18%
305-6	Emissions of ozone depleting substances	2%
305-7a	Nox and Sox and other significant gas emissions - SOX	13%
305-7b	- NOX	11%
305-7c	VOC (tons)	8%
305-7d	- PM10	6%
305-7e	- NH3	0%
306-1	Water discharge by quality and destination	4%
306-2	Waste by type and disposal method (Total waste)	27%
306-3	Significant Spills (Number)	3%
307-1	Noncompliance with environmental laws and regulations	4%
402-1	Minimum notice periods regarding operational changes	1%
403-1	Workforce represented in health and safety committees	3%
403-2	Absenteeism rate, occupational diseases, lost days, and total numer of workrelated fatalities - Absenteeism	0%
403-3	Workers with high incidence or high risk of diseases related to their occupation	0%
403-4	Health and safety topics covered in formal agreements with trade unions	0%
404-1	Average hours of training per year per employee (Total)	27%
404-3	Percentage of employees receiving regular performance and career development reviews	3%
405-1a	Diversity of governance bodies and employees - Governance - Male	20%
405-1b	Diversity of governance bodies and employees - Governance - Female	21%

Item	Description	Responded
405-1c	Diversity of governance bodies and employees - employees - Male	39%
405-1d	Diversity of governance bodies and employees - employees - Female	39%
405-2	Ratio of basic salary and remuneration of women to men	2%
406-1	Incidents of discrimination and corrective actions taken	4%
407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	2%
408-1	Operations and suppliers at significant risk for incidents of child labour	1%
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labour	1%
410-1	Security personnel trained in human rights policies or procedures	1%
411-1	Incidents of violations involving rights of indigenous peoples and measures taken	1%
412-1	Operational sites that have been subject to Human Rights reviews or impact assessments	0%
412-2a	Employee training on relevant Human Rights policies or procedures - Existencia	0%
412-2b	Employee training on relevant Human Rights policies or procedures - Número de funcionários	1%
412-3	Significant investment agreements and contracts that include Human Rights clauses or that underwent Human Rights screening	0%
413-1	Operations with local community engagement, impact assessments and development programs	1%
413-2	Operations with significant actual and potential negative impacts on local communities	0%
414-1	New suppliers that were screened using environmental criteria	0%
414-2	Negative environmental impacts in the supply chain and actions taken	0%
415-1	Political contributions	3%
416-1	Assessment of the health and safety impacts of product and service categories	0%
416-2	Incidents of noncompliance concerning the health and safety impacts of products and services	0%
417-1	Requirements for product and service information and labeling	0%
417-2	Incidents of noncompliance concerning product and service information and labeling	1%
417-3	Incidents of noncompliance concerning marketing communications	1%
418-1	Sustained complaints concerning breaches of customer privacy and losses of customer data	3%
419-1	Noncompliance with laws and regulations in the social and economic area	3%