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DOCTORAL THESIS

Sustainability and Corporate Social Responsibility in Bottle Water Sector

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ABSTRACT

This PhD thesis analyses water management and bottle water industry, in particular, in the context of sustainable development and corporate social responsibility. Since business leaders make decisions every day that affect the water management and the sustainability of the bottle water sector, it is important to identify where such decisions lead to improvements in this industry sector.

The propose of the PhD thesis is proposed new models and principles to corporate social responsibility and stakeholder engagement of these companies since the last developments of environmental policies in Europe and in Portugal, bring to the sector new challenges that influence the sustainability of their business.

The methodology of this PhD thesis is the outcome of tree papers related water an essential element for the life of all living beings and aim to contribute to knowledge about bottle water companies in Portugal, exploring the role of these companies in relation to economic, social and environmental aspects.

The findings of the PhD Thesis suggest that regional natural and socioeconomic characteristics of Portugal call for a new differentiated approach of dealing with water resources. To response to the increasing pressure on water resources in Portugal is imperative to increase efficiency and effectiveness in water use, due to the risks of climate change and its impacts on water resources. Besides, the managers of bottle water companies need to understand that the gains due the disclosure of CSR practices, go far beyond simple social and environmental activities. Through the research of level of CSR disclosure on the websites of the Portuguese bottle water companies this PhD thesis emphasizing the websites as a tool for improving CSR practices and to demonstrate to their stakeholders their commitment with the social, environmental and financial aspects. The last investigation reveals that economic and financial performance have a positive impact on sustainability of bottle water companies opposite to the commercial and operational performance that have a negative impact on sustainability. This research highlights the knowledge that sustainability and social responsibility are becoming important business practices in today's organizations and in bottle water industry in particularly.

Key Words: Water, Sustainability, Corporate Social Responsibility.

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LIST OF ABBREVIATIONS

- APIAM – Associação Portuguesa dos Industriais de Águas Minerais Naturais e de Nascente
- CMVM – Comissão do Mercado de Valores Mobiliários - Portugal
- CSD – Corporate Social Disclosure
- CSR – Corporate Social Responsibility
- CSP – Corporate Social Performance
- CSRA – Corporate Social Responsibility Accounting
- EA – Environmental Accounting
- EEA – European Environment Agency
- EPAL - Portuguese Water Company
- ER – Environmental Reporting
- EIRIS – Ethical Investment Research Service
- EU – European Union
- GRI – Global Reporting Initiative
- IRAR – Regulation of Water and Waste
- NAP – National Water Plan
- PNUEA – National Program for the Efficient Use of Water
- PIANSMW – Portuguese Industrial Association of Natural and Spring Mineral Waters
- OECD – Organization for Economic Co-operation and Development
- SA – Social Accounting
- SABI – Sistema de Analysis de Balances Ibéricos
- SAI – Social Accountability International
- SAu – Social Audits
- SuA – Sustainability Accounting
- SDGs – Sustainable Development Goals
- UN – United Nations
- US – United States
- WEF – World Economic Forum
- WHO – World Health Organization

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INTRODUCTION

Introduction

Contextualisation of the research problem

A rising number of organizations around the world have already adopted sustainable practices based on CSR perspective since most of stakeholders and consumers are increasingly concerned with environmental and health issues related with business companies' and products. Even though, the lack of knowledge in sustainability and CSR practices can represent a limit to the sustainable transformation of the Portuguese's bottle water companies (Luzzani et al, 2021).

Sustainability development is considered as a principle, which assumes business approaches and methods to exploring natural resources satisfying human needs and allowing business activity and its constant development. By other hand, Corporate Social Responsibility (CSR) is considered as a response from economy sector for sustainability assumptions. The implementation of CSR practices is an important part of business activity in scope of sustainability actions (Szczyka, 2015).

In 2015, the United Nations signed Agenda 2030, an action program for people, planet, and prosperity (UN, 2015), that combines environmental objectives of sustainable development - such as the fight against climate change, the protection of water resources, the protection of ecosystems – to social and economic ones - as gender equality, quality of education, decent work, and economic growth. Policy makers have focus on sustainable development of industries that have a high level of environmental impact (Janicke, 2012) like bottle water companies that facing unprecedented challenges to protect the waters sources and the ecosystem from climate change and have to prevent the pollution resulted from the waste packaging, business process and transport.

Additionally, CSR is very relevant to accomplishing with the recent sustainable development goals (SDGs) established by the United Nations (UN) providing explicit guidelines for achieving SDGs issues many of which are split into goals that directly influence the sustainable development in business (Xia et al, 2018).

Emerging sustainable development concerns, like environmental protection, social and environmental accountability, ethics, and education are the new rules in twenty-first century business. Owners, general managers, and line managers cannot disregard these advances, and need to recognize and respond to the new expectations of the stakeholders and policymakers and frequently demonstrate and detail their actions and achievements in CRS context (Sloan et al, 2009).

Objectives: Final and Intermediate

In line with the previous context this PhD thesis has the global objective of analyses water management and bottle water industry, in particularly, in the context of sustainable development and corporate social responsibility.

The recent increasing pressure on water resources has called for growing attention to an inclusive and integrated water governance in many industrial segments and in beverage industry in particularly since the rising impacts on water resources by the climate change. Since the protection of ecosystems and biodiversity of water sources have a central role in bottle water industry, the producers have to manage the precious water resources in a responsible way to ensure the sustainability and the efficient use to future generations.

Given the management of a vital resource to live is fundamental to the sustainability of bottle water industry this study aimed to reveal and conceptualise the CSR's state of art in this type of industry in the context of sustainable development. A conceptual framework was developed to add to the literature providing facts about reporting practices in bottle water sector, rarely investigated, in order to try to understand of the reality in this sector attending the nexus between CSR and sustainable development. Two models are proposed, one to reflect the level of disclosure CSR practices and another to assesses the sustainability of the bottle water industry.

This research pretends to make significant scientific contributions to the existing literature about CSR and sustainable development as well as insights to producers of bottle water industry to improve the efficiency of their business achieving their sustainability. Additionally, this study will pretend to contribute to the development of knowledge to the current literature by introducing a coherent theory to a building

approach to investigate a link between CSR, Sustainable Development, and a company's performance.

Assumptions and limitations of the research problem

The PhD thesis were conducted based in the assumption that the degree of corporate social responsibility (CSR) contributes to strong sustainability, mainly in businesses whose activity are dependent on the proper management of a natural resource. CSR is recognized as fundamental tool in today's business life, and its several definitions highlight its contribution to sustainability (Málovics, et al, 2008).

This study was developed based in the definition that corporate social responsibility is a concept according to the primacy that companies decide to voluntarily integrate commitments covering the three pillars of the sustainable development, economic, social, and environmental aspects, which are not addressed legislation, through proximity and interaction with its stakeholders (Málovics, et al, 2008).

Additionally, this study is based in Global reporting initiative (GRI) framework the global standard of sustainability since is being used widely in worldwide for reporting sustainability initiatives and exemplifies the global best practice of triple bottom line (Marimon et al., 2012; Narula et al, 2021). By other hand, the GRI standard represent the best available choice for sustainability reporting for being commitment with the CSR pillars of economic, environmental, and social features (Simmons et al., 2018). The literature review has recognized that the GRI standard represents the most consistent, coherent, standardized, and objective report for all firms worldwide (Marimon et al., 2012).

As the main limitations in this study are recognized the sample size, since statistical methods often require larger sample sizes, an increased sample size could help to achieve significant results for some of the tests, so in future lines of research could be included companies from another country or from another sector of beverage industry. However, the number of companies in this investigation represent all the population of this type of industry in Portugal.

Other limitation is related with the methodology developed, models, variables, and standards, future studies can adopt other design of research, still the embraced approach was based in the best practices described in the literature review.

Motivation of the PhD Thesis

The motivation of this PhD thesis is related with the study of value-added resource that is the heart of sustainable development for the 2030 Agenda, since empowers the socio-economic growth, helps to reduce poverty, and safeguards the environment supporting the healthy ecosystems, is crucial to the production of energy and food, and for the existence of the human species, promoting the geographic development of a country and the sustainability of a planet (Chen et al. 2020).

One of the most industries related with a correct management of water resources is bottle water industry, the focus of this investigation, since water is his main raw material, and the sustainability of this industry is dependent of the proper management of this sources to guarantee the natural renewal, in quantity and quality. By other hand, it's essential the investigation of a reality of an industry, whose sustainability is mostly dependent a resource subject to various climate changes. Additionally, this sector has experienced sustained growth over the last few years, gaining a prominent place in the beverage sector, becoming a significant sector to the Portuguese economy (PIANSMW, 2022).

The investigation is centred in Portugal because represents one of the richest countries in the World to the number and variety of natural springs, attending to its size, population, and geological diversity. About 400 springs are known and categorized as natural mineral water by a legislative Act before the Decree-Law of 1990 (Decree 15401 of 1928) and the other springs have therapeutic qualities with exceptional physico-chemical properties, which have been verified by authorities (Lourenço et al, 2010).

Structure of the PhD Thesis

This thesis is divided into six parts, as follows: The section 1 of this thesis provides a general background about sustainability and CSR importance in business in general and in bottle water industry particularly. Additionally, it addresses a link between corporate water use and environmental changes such as water scarcity. Links to European and

Portuguese law have been included as example to make theoretical concepts more concrete. The conceptualization about bottle water sector and their link with water resources are noted to draw the attention to the current discussion concerning corporate use of water.

The section 2 presents the methodology used during this investigation, although this part is detailed in each of the articles developed, which, despite being interconnected, all present their specificity at a practical level. This section is followed by the first article developed about Water as a Public or Private Good: The future of Water in Portugal who analyze the public and private goods provided by water Management. The section 4 is related with the investigation about Digital Corporate Social Responsibility Reporting in the Water Industry identifying the main factors that influence the CSR disclosure e the bottle water companies websites.

In the section 5 the article “Sustainability Assessment of Bottle Water Industry in Portugal” are presented, determining the level of sustainability performance of this business. The last section (6) presents the main conclusions, the discussion and implications of the PhD Thesis, the Limitations of the PhD Thesis, and the Future lines of PhD Thesis.

1.1. Introduction

The Humanity faces problems with a complex dimension, like the water scarcity. Without water, there wouldn't be life on earth, the water is essential for the sustainable of the countries, so the lack of water or the lack of potable water decrease the quality of people's life. Considered a natural resource, water is essential to human life, food security and the maintenance of ecosystems. This resource has an economic value added, when used in industrial process, irrigation, energy, navigation, among others.

Thus, the water should be recognized not only as an economic profit, but also a social profit, and is vital to reducing poverty and essential for sustainable development of the planet (EEA, 2009). In this perspective, Lemos et al. (2013, p.157), argue: “is a natural resource vital both for humans and for ecosystems but one that is becoming increasingly scarce owing to increasing demand from different human and economic activities and the effects of climate change.”

Portugal, giving to its size, population, and geological diversity, is one of the richest countries in the World with respect to the number and diversity of natural springs, some of which with recognized medicinal properties that were known since primordial times (Lepierre, 1930). There are 33 different types of bottled water, 18 of which are classified as natural mineral water and the remaining as spring water. Most of these waters are of low mineralization in contrast to greatest European bottled waters (Lourenço et al, 2010). Around 400 springs are identified in Portugal: springs categorized as natural mineral water by a legislative Act before the Decree-Law of 1990 (Decree 15401 of 1928) and springs with exceptional physico-chemical properties, which have been certified by specialists or their therapeutic qualities have been known over a long time. The great geological diversity of Portugal is reflected by a huge variety of physical-chemical composition of our natural mineral waters and spring waters.

The hydromineral wealth of Portugal is known and used since Roman times. From the marketing point of view, mineral and spring waters are outstanding economic valuable natural resources, representing a non-negligible income for the regions where they occurred through bottling industries, with significant impact on tourism. Bottled natural mineral waters contributed with 172 million € (2014) to the Portuguese economy, the sector accounts for nearly 2 percent of the Portuguese food industry and about 7 percent of the beverage industry, ensuring more than 10 000 jobs.

In essence, the social responsibility arises as a strategic response of the company that faces the current world challenges as new demands to the profitable economic growth (Aras and Crowther, 2010) at the same that demands for more social equity, respect with the environment, diminish climate changes and limited natural resources (Crowther and Rayman-Bacchus, 2004). Then it justifies the knowledge of the reality of the company which depends from water as a natural resource (Amores et al., 2013). Usually, a company from beverage sector produces more than bottled waters. Also, diet and light beverage, iced teas, juice drinks and, allowing to identify a set of products and respective strategies to the company's sustainable development.

1.2. The importance of Sustainability

Sustainable development is a part of strategy of modern company. The knowledge of this conception creates business activity due too social, environment and economic benefits. Sustainable guidelines point ways of exploring natural resources satisfying human needs and enabling business activity and its continuous development (Szcuka, 2015).

In this context, the debates of CSR and sustainability in the sector of water industry became part of a new agenda among leading water company managers. Stakeholders such as customers, landowners, and citizens were implicitly connected to the way that these managers talked about CSR alongside environmental issues such as ‘mitigating the climate change’ and ‘substitution for green energy’ (Lauesen, 2014).

However, in the face of new agendas such as the introduction of reporting instruments of environmental, social, and financial bottom lines such as the Triple Bottom Line (Elkington, 1998), Aras & Crowther critically point to the theoretical dilution of the term

‘sustainability’ (2008, p. 434), the authors propose as an alternative a vision based on the initial definitions of the Gaia Hypothesis (Lovelock & Margulis 1974; Lovelock 1979): “[The Gaia Hypothesis is] a model in which the whole of the ecosphere, and all living matter therein, is co-dependent upon its various facets and formed a complete system...interdependent and equally necessary for maintaining the Earth as a planet capable of sustaining life” (Aras & Crowther, 2008).

From this perspective Aras & Crowther (2008), have established four fundamental issues of sustainability of equal importance: (1) societal influence, defined as a measure of the impact that society makes upon the corporation in terms of the social contract and stakeholder influence; (2) environmental impact, defined as the effect of the actions of the corporation upon its geophysical environment; (3) organisational culture, defined as the relationship between the corporation and its internal stakeholders, particularly employees; and (4) finance, understood in terms of an adequate return for the level of risk undertaken (Aras & Crowther, 2008).

In this context, the sustainability concept was not only about how the business sphere should change its conduct but also to mitigate human poverty, dissimilarity, and environmental depletion and pollution, but evolved into a model that also framed business financial aims in a sustainable method combined in a holistic, management framework (Lauesen, 2014). This recognition is important to transform sustainability strategy to economic success and social and environmental development of the society in which companies are inserted, is unquestionable (David et al., 2014).

Indeed, social responsibility and sustainable development arise as a response strategy by the beverage industry, to the immense current challenges of the world, by the simultaneous demand for profitable economic growth, progress industrialisation, social equity and respect for the environment, such as population development, the climate changes, the need for increased agricultural production and the existence of limited natural resources, such as the water, the global supplies of freshwater are ever more under pressure (WEF, 2015). According to the annual report 2015, of the World Economic Forum (WEF) one of the greatest dangers facing the world for the next ten years is water scarcity. Approximately 4-5 billion people lack access to potable water, and the Middle East country that stands out in this fight.

1.3. The relevance of Corporate Social Responsibility

In Portugal, there is increasing adherence of companies to implementing CSR practices, however, when compared to other EU countries, it's still low (Ramos et al, 2013). The implementation of CSR practices depends on visibility that the company has on the market and the growing concern in areas such as health and safety and environment, this evolution is driven internally or motivated by external pressures, given the presence of Portugal in the International Labour Organization and in the European Union, which requires all companies to move forward to meet with their legal responsibilities (Branco, 2015).

At international level, in the past decade, the attention in “corporate social responsibility” (CSR) has grown-up from the field of a small group of researchers to the mass of investors, firms, and, indeed, the public (Nguyena, Kecskés and Mansi 2017). Although the term ‘corporate social responsibility’ seems to be new, the business literature indicates that the concept has evolved over recent decades, social, political, and environmental developments (Moura-Leite and Padgett, 2011).

Though the impression that firms had some duties to society beyond that of making profits has been around for hundreds of years (Carroll and Shabana, 2010), it was not until the end of the last century that CSR became a reality in business and one of the determinant factors that has been taken into account in decision-making (Garriga and Melé, 2004). In this context, CSR has become a significant issue for corporations, with over 80% of publicly-traded companies reporting CSR activities online (PriceWaterhouseCoopers, 2010).

Although its growing importance, there is little consensus among scholars about the motivation for CSR and its effect on shareholder investment (e.g., Margolis et al., 2007). According to a report from The Economist, CSR is an “significant” or “dominant” consideration for 81% of investors and 86% of managers (Economist Intelligence Unit, 2005). In perfect financial market, investment decisions are self-regulating from financial situation, companies should carry out all positive net present value projects and decline all negative net present value projects (Modigliani and Miller, 1958).

The evolution of the CSR has a long history associated with how it impacts on companies' behaviour (Moura-Leite and Padgett, 2011). Since 1920, business executives have paid more attention to some explanations of responsibility and responsible performance (Windsor, 2001).

In the 1950s the main attention was on businesses' responsibilities to society and doing good conducts for society. An important reference for the discussion of CSR is the work of Bowen (1953), *Social Responsibilities of the Businessman*, whose theoretical approach emphasized the obligations of the business man, and the entrepreneur, who should be in line with the values required by the society, arguing that social responsibility in a company should be understood as a social reaction, should not be limited to the current legal regulations, but rather to respond to the needs and demands of different social groups.

CSR can be understood as the way in which a company is deliberately responsible for its action(s) and non-action(s) and the influence of these on society and the environment. The concept refers to the approach used by companies to integrate social, environmental and economic concerns into their values, culture, decision making, strategy and operations in a transparent and ethical manner (Waniak-Michalak et al, 2016). The term CSR includes a variety of subjects revolving around companies' relations with society. The types of issues covered include ethics, governance, social activities such as philanthropy and community involvement, product safety, equal opportunities, human rights and environmental activities (Tilt, 2009).

Since the mid-1990s, an increasing number of firms around the world have started to disclose nonfinancial information related to social issues, such as environmental preservation, human rights protection, employees' welfare improvement, and contributions to their communities and societies. An increasing number of firms are publishing information on their social performance in the form of separate corporate social responsibility (CSR) reports (Dhaliwal, et al.2014).

In this context, prominent themes continued to grow like, corporate social performance (CSP), stakeholder theory, business ethics, sustainability, and corporate citizenship

(Carroll, 2008). But these definitions reveal that they are more than micro-definitions and raise macro concepts of CSR, that “reflects three different perspectives, namely, shareholder value, social value and stakeholder value” (Rath and Gurtoo, 2012).

Over the past two decades, companies have focused on the recognition and measurement of environmental issues in financial reporting as the effect of business activities and operations on environment has progressively become significant for stakeholders who, apart from shareholders, comprise the customers, employees, government agencies, and the public in general (Bobe and Dragomir, 2011; Ilinitch et al., 1998).

Nowadays, business performance is no longer measured in terms of the balance sheet value, but by the positive influence of business on the shareholders and other important publics (Friday, 2015). Many investors, to make investment decisions, regularly consider a company’s CSR activities along with traditional financial performance measures (Elliott et al., 2014).

In this context, shareholders may consider how a company returns to various stakeholders in the broader social environment (i.e., CSR) to be as a significant component of the company’s achievement (KPMG, 2011; Van der Laan et al., 2008). Shareholders may also view CSR investments as an appropriate use of resources to reduce the free cash flow problem (Jensen, 1986), they can be more supportive of boards and/or management that have made decisions to engage in CSR activities.

Several researches have explored various useful aspects of CSR and have found evidence that CSR practices are related with higher firm value (Lin et al., 2009), lower financial constraints (Cheng et al., 2014), lower investment-cash flow sensitivity (Attig et al., 2014), improved information quality (Cho et al., 2013; Cui et al., 2015 and Lopatta et al., 2015) and reduced agency conflicts (Waddock and Graves, 1997; Harjoto and Jo, 2011 and Eccles et al., 2012).

Prior research about whether CSR activities develop company value/performance has produced mixed results (Aggarwal, 2013), with the balance of research favoring a positive relationship among CSR activities and company value/performance (Cullinan, Mahoney and Roush, 2017). Shaista and Sara (2014) found a positive correlation among CSR and

organizational performance. Equally, Kim and Kim (2014) examine CSR in tourism industry and studied if CSR increases value for shareholders.

Evidence from research shows that CSR is related with profitability and contributes to employee assurance and customer loyalty (Fraedrich and Ferrell 2008; Friday 2015). The study used ESG rating from 1991 to 2008, to test the consequence of CSR on two different types of equity-holder risks proposed that social responsibility was found to expand shareholder value by growing Tobin's Q, although firms with minimal CSR reduce shareholder value and increasing the risk (Maqbool and Zameer, 2018).

Similarly, Hammond and Slocum, (1996) highlighted that CSR can develop corporate reputation and minor financial risk, so firms having minimal chance of getting bankrupt, compared to non-CSR firms. Finally, McGuire et al. (1990) provide the evidence that the reputation-performance effect may operate in both directions: a firm's financial performance affects its reputation, but its reputation also affects its performance (Roberts and Dowling 1997).

Theoretical work on CSR accounting has formed several theories as to the incentive of companies to statement or disclose information on their CSR activities, greatest deriving from the broad theory called Political Economy Theory which is defined as 'the social, political and economic framework within which human life takes place' (Gray et al., 1996, 47). Legitimacy theory is one such theory and suggests that reporting is used as a communication mechanism to inform and/or manipulate the perceptions of the companies's actions. Suchman (1995, 574) describes legitimacy as: a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.

According to Schaltegger and Burritt (2006), there are at least three aspects that encourage executives to create a corporate accounting system that affords information for evaluating business activities and actions on sustainability: legislative pressure, self-regulation, and the sustainability in business.

First, legal regulations require companies to report the results of their activities on environmental issues. Non-conformity with regulations leads to sanctions on companies.

A second factor is self-regulation that origins voluntary disclosure of social and environmental evidence, which is significant for businesses to expand their performance and reputation. Self-regulation also aids companies avoid mandatory governmental regulations. Third, sustainability accounting supports management to recognize and understand the economic potential, such as cost reduction or increase in sales revenue, of voluntary environmental activities and even in tax subjects (Lanis and Richardson, 2012). This is related with better business performance. Additionally, these three factors are considered vital for sustainability in businesses (Akisik and Gal, 2011).

It is clear, the Corporate Accountability Movement arisen as one of the greatest influential phenomena of global civil society, enquiring the blind and irrational dominion of free markets as supported by large companies (Held and McGrew, 2002; Bendell, 2004). However, while the concept of accountability is widely used in business and sustainability reporting there is a need for clear definition. A key challenge discussing the literature on corporate accountability is the apparent lack of agreement on the definition of accountability (Cooper and Owen, 2007).

Gray et al. (1996) provide the most direct definition of accountability as “the duty to provide an account (by no means necessarily a financial account) or reckoning of those actions for which one is held responsible”. Cooper and Owen (2007) add to this definition a normative standpoint, by including a requirement for “purposeful communicative action” and “empowerment, in terms of facilitating action” by stakeholders.

Although several authors, from different academic fields, are currently working in the field of corporate accountability, there is no consensus on its content. Current literature includes a variety of diverse terms (with different meanings) and record-keeping procedures of corporate accounting practices. These include social accounting (SA), corporate social responsibility accounting (CSRA), environmental reporting (ER), environmental accounting (EA), social audits (SAu) and sustainability accounting (SuA) (Taplin et al., 2006). Mathews (1995, 668) reflects that SA, CSRA and CSR are identical terms and describes them as the “extension of accounting reports to include information about products, employees’ interests, community activities, and environmental impacts”. He also notes that this evidence is noted on a voluntary basis and could be classified in

two main categories affording to the unit of measurement: quantitative and qualitative (Mathews,1997).

Giving the literature review, in recent years, there seems to be an increasing convergence of corporate governance and sustainability reporting which is enhancing accountability (Kolk, 2008). In a framework for human rights Ruggie (2008) calls for “positive duty of due diligence” on companies in their discharging of their responsibility. It is essential that a clearer definition of corporate accountability is established, one that is grounded in the sustainability context and facilitate collaborative action.

Ramanathan (1976) stated that the core goal of social responsibility accounting is to appraise whether companies have met their social responsibilities satisfactorily or not. This author stated three goals of social responsibility accounting: to determine and measure a business’ social performance in the financial period by calculating the social expenses and profits of the business, to control the relationship among current performance and the business’ approaches, affording to social measures and preferences, to report social performance and its effect on consumers’ choices, and finally to offer information about the goals, policies, and social projects of the business and in what way it is meeting consumer needs (Homayoun et al., 2015).

In short, CSD research has been a vigorous area of activity for accounting scholars over the past four decades with quantitative content analysis providing the dominant form of investigation. The paper draws on Gray et al. (1995a, 1995b) seminal classification of CSD with the development of their comprehensive database, identifying six CSR categories. The theoretical framework employed is institutional theory one component of which - legitimacy - has been previously applied in CSD scholarship (e.g., Adams et al., 1988; Campbell, 2003; Deegan, 2002).

1.4. The water resources management

Over the years, correct management of water has led to developments and improvements in health across the European Region. In fact, the public water supply activities, like the public sanitation of urban wastewater and management of municipal waste are public services essential to the general welfare of the population, health and public safety and

contribute to the economic activities and environmental protection; indeed, the water resources affect health, the economy and sustainable development.

With the industrialization, intensification of agriculture, developing populations and increases in recreational demands accentuate the requirement for sufficient high-quality water resources, so an industrial growth and prosperity have depended on a safe, consistent, and well managed water supply (EEA, 2002). According to the annual report 2015, of the World Economic Forum (WEF) one of the greatest dangers facing the world for the next ten years is water scarcity.

Approximately 4-5 billion people lack access to potable water, and the Middle East country that stands out in this fight, water is a basic human need and access to minimum quantities of safe water (20 liters per person per day) should be everyone's right. In this context, conflicts involving uses and users, coupled with the occurrence of natural disasters such as droughts and floods, highlight the need for the provision of a continuous supply of potable water and sanitation.

In 2010, the United Nations General Assembly declared access to potable water and sanitation, an essential human right the full enjoyment of life and all other human rights. However, water-related diseases occur throughout Europe, to which rural populations, socially excluded people and populations in areas affected by armed hostilities are especially vulnerable. In general, there has been increased concern about water quality at microbiological level and physical - chemical level, given that it's exposed to several factors that contribute to contamination, such as pollution the air and soil. Consequently, a systematic preoccupation to prevent diseases caused by water contamination, are growing because the cost of treating these diseases is much higher than the price paid by consumers for supply of potable water and sanitation (EEA, 2002; ERSAR, 2013).

In Portugal, the title of water resources is established in Law No. 54/2005, of November 15 (as edited by Law No. 78/2013, of November), which delimits the water public domain, maritime public domain, lakes and rivers public domain and their respective rights, as well as the creation of public easements on private plots and public waters margins. The fundamental law in this matter is the Water Law, approved by Law No. 58/2005 of 29 December, as amended by Decree-Law No. 130/2012 of 23 June, which,

proceeding to implementation for the national law of Directive 2000/60 / EC of the European Parliament and of the Council has established the foundation for the sustainable administration of water and fixed the correct institutional framework.

The Water Act was supplemented by a set of diplomas, among which stands out the Decree-Law No. 226-A / 2007 of 31 May, that states all activities which have a significant impact on water status can only be developed since under title of use, this ruling regulates the conditions under which is assigned to authorization, permit or award and the private use of the public domain. In 2006, was formally created the Regulatory Authority for Water and Waste Services (ERSAR), consecutively, these activities with significant environmental impact, water services and waste are still conditioned by the requirements-imposed goals and instruments for environmental legislation to ensure the sustainable use of resources (ERSAR, 2013).

In this context, water is a resource that needs a management with environmental concerns, the Water Act, determines the institutional framework for sustainable water management, and establishes a number of principles of environmental management: the principle of environmental dimension water (need for a high level of protection of water, to ensure sustainable use); the principle of the economic value of water (the water is or will be a scarce resource hence it has to do a cost-effective use, with cost recovery in environmental terms, based on the principle of polluter pays); the precautionary principle (measures must be taken to divert the negative impact of an action on the environment); the precautionary principle (actions with negative effects on the environment must be considered in advance); and the principle of correction (correction of damages to the environment) (Barraca, 2008).

It is clear, the water supply services to the population, are fundamental to society, since they contribute for a true development of the country, from the point of view of public health, quality, and safety for the life of Portuguese households and environmental sustainability without increasing availability of these services across the country, attended by improvement the quality of services at reasonable prices for the population. For this reason, the water supply and sanitation wastewater are of interest General or, more precisely, of interest general economic. Services of interest are those groups that meet the

needs basic of all citizens, whether economic, social, or cultural, and whose existence is essential to life, health, or social contribution of citizens (Gouveia, 2001).

The water and waste sector contributes significantly to the economic and social development of the country, by capacity to generate economic activity and create jobs and wealth, through increased improvement that has given the population's living conditions, as can be seen from the achieved in 2014, 95% of houses were covered with the water supply service, 83% were covered with drainage service wastewater and 82% included the proper treatment of such water; with regard to municipal waste management service, the entire population benefits from the collection and treatment of waste services (ERSAR, 2015). However, one problem arises, related to financial sustainability, since the use of municipal and Community budgets will decline more and more, to finance the sector, the prices paid by consumers, constitute much of the activity of financing, which contributed to the increase the price of these services, and it's expected significant increases in the future.

The worldwide campaign for a human right to water has grown up over the past decade, in the past most cities and utilities in the world have provided water to their customers practically free of charge since water is considered an essential resource and was moderately cheap and abundant resource. But now, with considerable communities requiring service, the only way to ensure that everyone has access to this basic need is to share it in some way. And the best way to utilize water and most-valued uses is to put a price on water, and concept correct tariff structures to meet different social, political, and economic aims in diverse situations (Rogers; Silva; Bhatia, 2002).

Indeed, water is recognized as an economic good in many international declarations, as well as in the policies of major lenders and donors, but there is a risk in promotion the notion of water as a commodity, since it shifts the public perception away from a sense of water as a common good, and from a shared duty and responsibility. A simple and straightforward solution, designed based on pure economic efficiency, has the potential of ending up unsustainable (Rahaman; Varis, 2003).

According to Selborne (2000), in several developing countries, the water is priced by all urban societies, and the poor often have no choice but to pay high prices, spending

between 5-10% of their income; by other hand in most industrialized countries, the lower-middle class spends 1-3% of their income on potable water and sanitation. In OECD countries, the families spend about 1% of their income on water; instead, in Onitsha, Nigeria, the poor spend as much as 18% of their income on water (Rogers; Silva; Bhatia, 2002).

It is clear, the use of economic principles to the distribution of water is acceptable and offers a simple tool for the expansion of water services in a more efficient way. Though, water should not be preserved as a market-oriented commodity when it comes to domestic use for very basic needs, particularly for people in extreme poverty (Gunatilake; Gopalakrishnan, 2002). In Portugal, in the last 25 years, have been changes in water supply sectors, drainage and water supply to the population, the country adopts an institutional model, based on the regulatory and management French model where the services are under the responsibility of local municipal authorities. Though, there are some differences compared to the French model, such as the separation between “bulk” and retail services, the government as the main operator through government-owned companies, and the existence of a dedicated regulatory agency, the Institute for the Regulation of Water and Waste (IRAR).

The municipal authorities can choose between 4 provision models, such as the municipal services without autonomy, the municipal services with autonomy, the municipal companies, and the concessionaire companies. There are also the cases of two state-owned companies which constitute exceptions, one from Lisbon (EPAL), and the other from the isle of Porto Santo (IGA). The first three models and the exceptions referred are under public management carried out by the local municipal authority or the government, whereas the concessionaire companies are under private management.

In addition, the neoliberalist approach of the sector, which, the right to water, oppose its commercialization, is an option that hasn't shown effective to solve the problems of the poorest people, especially in developing countries, because many multinationals of the sector, have economic problems or don't provide the correct services and have seen their concessions denounced, in Europe, in US and in Latin America. So, is urgently looking for a correct management model, to ensure that no one is privet of water, for economic reasons, the tariff implemented by water consumption should disowner the consumers of

modest means and strongly encumber those who squander without; that no population, however small it may be, is privet from accessing water as much as it costs in terms of investment, and at last, the water distribution should always have, a suitable treatment, to supply a high quality water to the consumers (Neto, 2006).

In this perspective, international trade gains breath, considering that the exchange of scarce resources has always been the subject of discussion in the international economy, the management of potable water and sanitation services is now in all European countries, an economic game. The water industry, in industrialized countries, gains emphasis, in the management of this public well, represent an attractive value for the private sector, which has in concessions a form of ownership, as public-private partnerships are no more the beginning of the privatization of a community well. In this context, the problems caused by water commoditization can be minimized, through the framework of social responsibility practices in governmental, non-governmental and international organizations, particularly in all the world's citizens.

According to European Environment Agency (2009), introducing water pricing across all sectors will be crucial to achieving sustainable water use, the effective water pricing needs to be based, at least in part, on the volume of water used, rather than adopting a flat-rate approach, and reflect the 'water user pays' principle, since requiring that pricing, provide adequate incentives to use water resources efficiently and recover the full cost of water services. To this end, water metering plays a key role and must be implemented extensively across all sectors, guaranteeing universal access to potable water and sanitation, however, pricing must not mean that anyone should compromise personal hygiene and health to pay their water bill.

On the other hand, some consumers are extremely eager to pay for water of good quality, for this reason, consumption of bottled water is growing in several countries. By other way, some people lack confidence in the quality of their tap water and have therefore invested in household filtering devices, without knowing that most of these filters don't effectively control contaminants or pathogens. For this reason, natural mineral waters and spring waters represent an excellent choice, as are pure in origin, aren't treated with chemicals and are rich in salts minerals and trace elements essential to the human body,

thus standing out the importance of this type of industry worldwide (EEA, 2002; APIAM, 2015).

In this case, the price of this product in the market is dependent on the structural characteristics of the markets in which they operate, as the concentrations of supply and demand structures, rather, by price or product differentiation, or by a combination of both. Portugal is one of the richest countries in Europe in Natural mineral waters and spring waters, these products are characterized by their original purity, with underground source that protects them from external aggressions, are microbiologically own products for consumption, don't suffer any human contamination or chemical treatment.

Natural mineral waters and spring waters are regulated by demanding European legislation, which distinguishes it from other water intake, protected underground source, original purity, the prohibition of any kind of chemical treatment; the obligation to be bottled on site at source, are subject to all rules relating to foodstuffs, as regards hygiene, Hazard Analysis & Critical Control Points, labelling and the possibility of screening. According to Directive n° 54/2009 (p.164/51) “natural mineral water, are microbiologically pure water, with the origin a sheet or an underground deposit and emerging from a spring tapped at one or more natural or bore exits”.

The beverage industry makes a distinction between natural mineral waters and spring waters, which isn't only based on its concept, but also in the fact that the first part is in the public domain status. Indeed, the Law n° 156/98, of 6 June (p. 2594), defines spring of water as: “Groundwater considered bacterially own with physico-chemical characteristics that make it suitable for human consumption in the state Natural”. Therefore, it is the responsibility of companies operating the protection of aquifers as well, the surrounding perimeters, ensuring responsible marketing, and have a stable chemical and physical composition, having therapeutic effects or simply favourable to health, while the latter are subject privately owned, although they must be licensed, just must be in its origin, own potable water.

The sustainable development of companies related with the extraction and commercialization of natural mineral water or spring water, goes through the proper management of the underground aquifer, so it's important rational use of the resource, for

the mineral and spring waters continue to reach the consumer, pure, natural and quality, so that, over time is critical, the water permanently underground always keep the same volume and composition, it's therefore necessary, implement a protection policy of resources and moderating the impact of activity in the environment, preserving the surrounding environment of aquifers, protecting them from any possible contamination (APIAM, 2015).

The bottling activity is responsible for wealth and employment for the Portuguese. The production units are located predominantly within the country, near the springs, helping to increase employment in rural areas, where there are no employment alternatives for populations. The commitment of this sector is to support the job creation within the country and to respect the best available and sustainable practices by taking environmental responsibility program to bring to the consumers a choice of proper hydration with a 100 % natural (original purity).

To overcome these problems, the beverage industry needs to adopt a sustainable development approach based in socially responsible practices that incorporate in their business the economic, social, and environmental pillars. To allow the beverage industry to develop socially responsible practices (SRP), the Corporate Social Responsibility (CSR): “is a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis” (EC, 2001: 5).

It's fundamental; to the bottled water industry combine a competitive economic activity with sustainability and responsibility to future generations, defending and preserving water as irreplaceable natural resource and grounding an important industry for the country and its consumers (APIAM, 2016). In this perspective, the several stakeholders of the Portuguese water companies can clarify the internal factors affecting CSR, which is characteristic for any business in the EU (Pedersen, 2009; Crane & Matten, 2004, 2007; King, 2000).

Thus, CSR practices are a challenge to water sector companies, making it an alternative to regulatory models and business management, since position the persons (consumers and employees) and the environment at the same level that the economic results of

radically oriented different from classic business regulation models are featuring, as a form of corporate self-regulation in the various areas of business activities have an impact on the biophysical and social surroundings. Although the objectives of the companies are making a profit, with the integration of corporate social responsibility there is that they can both contribute to the fulfilment of social and environmental objectives, generating sustainable businesses, aware of the importance of social, economic, and environmental.

According to Ferro (2007, p. 33): "*The CSR refers to sustainability strategies, in addition to financial performance; include the concern with social and environmental effects of their activities. At the base is the principle of sustainable development, that economic development, social cohesion, and environmental protection are interdependent and the inextricably linked.*"

Briefly, water sector companies need to take on new responsibilities, engage its partners in the formulation of social policies and ensure clear and transparent communication in relationships with its stakeholders. According to Topal (2009, p. 20-21), the reasons for adherence to social responsibility practices in a company are: "*Profit increase; increased access to capital; operating costs reduction and increased operational efficiency; brand reputation and image improvement; increased sales and respective loyalty by customers; increased productivity and quality; increased capacity to attract and maintain employees; strengthen the reduction of regulation and supervision; reduced risk and promoting risk management; competitive advantage.*"

Finally, the authors highlight the absence of investigations related to this industry, so it is essential to know an increasingly complex market, to outline strategies of excellence to increase business competitiveness, satisfaction of consumer needs, agility of production factors and the ability to combine them effectively, allowing more efficient production and more efficient, faster and at lower cost, minimizing the resources at the expense of maximizing revenues, in the design companies like added organizational value systems based on knowledge, information, differentiation and intangible factors.

1.5. Final considerations

The academic accounting literature on Corporate Social Responsibility (CSR) have recognized relevant findings about the factors and consequences of CSR, and the relation among CSR and sustainability context, and the influence of CSR practices in shareholder investment.

Investors or owners, in the context of the bottle water industry, recognize that the company influences the external environment through its actions, and, at the same time, these must produce effects on its economic decisions. But each investor adopts a different position related to the difficulties of evaluating the decision, especially the most complex decisions. This trend implies increasing the vulnerability of the company towards the opportunistic behaviour of the owners and therefore there is an adverse reaction of these in the adoption of measures within the framework of social responsibility. There is no doubt that these issues are important for business decision-making, but even more so if we can relate them to the corporate social responsibility that the company adopts in the society in which they are implemented.

For these purposes, the authors identified the sustainability and corporate social responsibility practices that give priority to the objective of improving the decision process in the company and its respective stability, guaranteeing trust in the business and its continuity in the future and certifying a risk management, anticipating problems. To serve this purpose, the main explanatory variables of the research have been substantiated in the literature, in order to support the empirical analysis, which explores the studies on financial performance aimed at the beverage market, seeking to find in the perspective of the different stakeholders, the models that determine, with all their breadth, the value of the company, especially the influence derived from social responsibility practices and their viability in the short, medium and long term.

In contemporary society, the uncertainties and risks are dominant concerns in the business environment, as well as, in the management of public assets. Increasing problems of water scarcity and drought clearly require a more sustainable approach to water resource management across Europe; this need is already reflected in water-related policy and legislation.

The water is a general interest feature, so implementing technologies and practices that either conserves water or use it more efficiently plays a key role in the demand-side approach to water management, it's also important, the protection and sustainable management of this resource into other community policies, such as environmental, agricultural, energy and among others in the industry, in which the rational use it's important, not only to contribute for sustainability of the water, but also the business of the companies.

In Portugal, the water supplier and waste services show a positive evolution, due to current public policies established for almost two decades and have been adapted, and sustained mainly on EU funds, allowing a huge advance and a generalization these services to almost all its population. However, the pressure to appeal to the rationalization of water use, the frequent changes in the sector, with a public, private, or mixed management, the need to increase the price of water services, to maintain their sustainability, leads to the conversion of water into an economic good, causing a discuss about water's identity, as an entitlement for citizens, or as commodity for customers.

In contrast to this sector, the private market of natural mineral waters and spring waters have, in recent years, bet the differentiation of products for several markets required the development of targeted premium products for consumers who value the product differentiation, either in their natural characteristics or the package itself. However, the severe economic crisis, led to a change of some patterns of consumption, which influenced the sector of bottled waters required in increased tap water consumption, as there is a growing interest of municipalities in promoting water consumption tap as an alternative to bottled water which opened the door to a new battle in the price, quality and the environment.

One factor that has also led to obvious changes to the sector, was the growing economic power of the market in the retail industry, since the increase of the spaces on the shelves, with private label products at low cost, who allowed over the years a quick growth of purchasing of these products, mainly for the people who don't value product differentiation. In nowadays, the retailers control shelf space, promoting their own brands while the manufactures must purchase the space in shelves, the advertising and the promotions.

The food prices grew on average less in retail industry than in traditional shops, but this effort was mostly supported by producers, so we can get into a cycle in which advantages microeconomic, with low prices for consumers, can lead to serious macroeconomic consequences with closing of companies and unemployment. In this context, it's clear that the bottled water market is very competitive, where price is the predominant factor, however the development of premium products, with a higher quality and better image, the exportation of these products to another country, with scarcity of potable water and have economic conditions to pay for them, are some solutions for the bottle water industry overcome the crisis and combating market of retail industry.

As the business activities allied to tourism emerge as a differentiating factor in the market through innovative projects that promote the product "bottled water" and on the other hand Hydrotherapy activities, health, and well-being, allowing a greater sustainability of the sector and the revitalization of numerous thermal infrastructures associated to luxury hotels in Portugal.

Finally, is evident, a battle between the consumption of bottled water and tap water, a sharp growth of retail brands of bottled water and a new market segment of premium products and tourism activities. Thus, it can be concluded that the bottled water market is a dynamic sector, significant for the economy of a country, whose sustainability involves the differentiation of their products and the development of activities related to tourism. It is in this perspective that fits the Responsibility Social and Sustainable Development, through the simultaneous search of lucrative economic growth, social progress and equality and respect for the environment, for this reason, the beverage industry, needs to adopt strategies based on these concepts, which conjugated the business sustainability with the protection of their main raw material which is water.

Chapter 2 – Methodology of the PhD Thesis

2.1. Introduction

Methodologically, this research focuses on the one hand, in the literature review to contextualize the Sustainability, in general, and the Corporate Social Responsibility based in the international standards, as well as the firms' financial performance context. On the other hand, it promotes an empirical analysis to investigate the Bottle Water Industry in the last years, using different qualitative and quantitative methods.

The research is supported on the International Organization for Standardization (ISO) 26000: 2010 - Guidance on social responsibility (ISO, 2010) and the Social Accountability International (SAI) - SA 8000: 2008 - Social Accountability 8000 (SAI, 2008) to analyse the corporate social responsibility framework, as well as the International Accounting Standards to analyse the financial performance and corporate governance framework of firms.

The literature review is based on the study of international standards and bibliographic databases of scientific articles (ABI/Inform, ScienceDirect, SAGE, Emerald, and others). The empirical analysis is based on several databases with CSR and Financial/Accounting Information, such as: SABI (Sistema de Analysis de Balances Ibéricos), database of the Stock Exchanges, i.e.: CMVM (Comissão do Mercado de Valores Mobiliários - Portugal); and Thomson One Analytic, for accounting and financial data, and the EIRIS (Ethical Investment Research Service), for data on CSR and Corporate Governance. Also, the availability of information through the websites of the firms from the Beverage Industry will collected manuscripts, management reports, internal reports, conference reports, publications, and websites from or about the two field of research. The statistical and econometric analysis of the data is supported on the SPSS (Statistical Package for Social Sciences).

2.2. Research questions

The literature analysis above suggests that CSR practices are material for the sustainable performance of bottle water industry, such as environmental risks and opportunities, focusing in sustainability of water sources and ecosystems. Therefore, the objective of this study is to analyse the connection between indicators that address sustainable bottle water industry management as well as the factors that influence the CSR practices in the companies and their disclosure.

Based on the proposal of Watts & Zimmerman (1986), the research method aims to satisfy two assumptions: analyse how the variables relate logically among themselves to understand the empirical phenomena of CSR and second, the definition of substantive hypothesis is that the predictions generated by the analysis. The study addresses the following research questions:

There is corporate social responsibility in bottle water industry?

What role does CSR play in bottle water industry?

CSR practices in this sector are engagement with its stakeholders?

2.3. Sample and data collection

The database used is made up of companies that operate in Portuguese market and whose economic activity is Bottling of Natural and Spring Mineral Waters (code 11071 of Portuguese National Registry of Economic Activities).

For each sample company, the selection criteria include:

- The company should belong to the bottle water industry;
- The company should come from Portugal;
- The company should have available annual report.

2.4. Research methods

The research methods consist of three main parts related with the articles developed during the investigation (1) the contextualization of water as a Public or Private Good, (2) the development of a framework and a model to assess CSR policies implemented in the bottle water companies, through the analyses of the information disclosure in the

company's websites (3) the definition of a model to characterize the level of sustainable performance in bottle water sector.

The abovementioned activities have been supported by following a mixed methodology that includes literature review on water management and bottle water sustainability (about environmental impact assessments and features) to business sustainability, field of application and further strategies to top managers to overcome the new trends and challenges of business in the twenty one century.

2.5. Final Considerations

After the development of the applied methodology, it is possible to conclude it was adequate, allowing to achieve the intended results in the three articles developed. This investigation was planned according to the literature review carried out, selecting the best methods, models, variables, and practices to achieve the intended objectives in the three research works.

Additionally, it is also possible to state that the methodology developed allowed to answer the hypotheses formulated and the questions proposed at the beginning of the investigation, as well as, to reach the general and specific objectives to which this research work was proposed. The results obtained allowed the characterization of the bottled water sector, as well as the confirmation that the application of social responsibility practices is fundamental for the sustainable development of these organizations.

The methodology applied in this project, where the problem under study was framed, as well as that of the sector under study, allows to conclude that it can be used without major limitations, by other researchers, contributing to the expansion of the literature on social responsibility allied to sustainable development and applied in studies of other sectors of the industry, whose activity has a high environmental impact and its dependent on the applicability of these concepts in its business to become more economic efficient.

Chapter 3 – Water as a Public or Private Good: The future of Water in Portugal

3.1. Introduction

Water is the driver of nature and its accessibility and quality often constitute a limit on economic development and human welfare. For this primacy, the mission of providing water in sufficient quantity and suitable quality to the world's human population while assuring its availability for future needs constitutes one of the distinguished challenges of the twenty-first century (Tarhule 2017). Consider the most significant resource on the planet, no human or any other life could live without water. However, water resources, is becoming progressively scarcer. This scarcity, joined with the numerous competing uses for water, creates complex choices over how water resources must be allocated (Grafton et al., 2013).

The pressures on European water resources arise from the natural variability in water availability and climatic changes, but they are also linked to national and international social, environmental, and economic policies. In Europe, the problem of water scarcity is particularly intense in the Mediterranean region, while water quality is reasonably a typical concern in western European countries. However, it is possible that on a continent like Europe—increasingly vulnerable to extreme weather phenomena and with a growing imbalance between water demand and availability—unequal distribution and allocation of water resources will intensify competition between single users, sectors, or even between neighbouring countries.

In this context, the call for Europe-wide water strategies, “effective” water policies, and “good” management practices have become crucial to ensure both water security and quality (Zicos and Hagedorn, 2017).

Over the last decade, international law has acknowledged a right to safe drinking water and sanitation, most prominently at the United Nations (UN) level, such as: 12 OECD principles on water governance and when science meets the policy (OECD, 2011, 2015;

Akhmouch and Francisco, 2016). The access to safe drinking water and sanitation is inextricably linked to the right to life and human dignity and to the need for an adequate standard of living. In this context, the European Union has been launched several documents to ensure the higher relevance of the water as a public good and, also, to increase the quality of life and all citizens which clarifies expectations, roles, and responsibilities (European Communities, 1998; European Commission, 2014a, b).

In this context, “Right2Water” is the first European Citizens’ Initiative to have met the requirements set out in the Regulation of the European Parliament and the Council on the citizens’ initiative. It was officially submitted to the Commission by its organisers on 20 December 2013, after having received the support of more than 1.6 million citizens. The Right2Water initiative invites the Commission (EC, 2014a:2): to propose legislation implementing the human right to water and sanitation, as recognized by the United Nations, and promoting the provision of water and sanitation as essential public services for all.

According to the European Union, the Directive of the Water Framework or Directive n° 2000/60/EC of the European Parliament and of the Council, of October 23 (EU, 2000:1), establishing a framework in the field of the: Water is not a commercial product like any other, but a heritage, which must be protected, defended, and treated as such.

At the European level, the Parliamentary Assembly of the Council of Europe declared (EC, 2014a:3): that access to water must be recognised as a fundamental human right because it is essential to life on earth and is a resource that must be shared by humankind”. The EU has also reaffirmed that “all States bear human rights obligations regarding access to safe drinking water, which must be available, physically accessible, affordable, and acceptable.

According to the annual report 2015, of the World Economic Forum (WEF) one of the greatest dangers facing the world for the next ten years is water scarcity. Approximately 4–5 billion people lack access to potable water, and the Middle East country that stands out in this fight (WEF, 2015). So, we move into the International “Water for Life” Decade the debate over whether water is an economic commodity, or a social good is at the top of the international agenda. As well as the privatization of water services is one of the

most controversial issues in freshwater management at the international level (Brewster, 2007).

The growing scarcity of fresh water in the world, and the frequent difficulties of management and interest in contributing to change this situation were the main reasons for conducting this study. The study of water management in different contexts enables a greater understanding of the topic supporting the decision of managers, governs and society in general, in relation to the sustainability of this important resource.

3.2. Water as a Public or Private Good?

The pure public goods have two important structures. One is ‘non-rivalry,’ meaning that one person’s enjoyment of a good does not diminish the ability of other people to enjoy the same good. The other is ‘non-excludability,’ meaning that people cannot be prevented from enjoying the good. Many environmental resources are characterized as public goods, including the water. However, it’s rational to inquiry whether environmental resources are public goods in a fully pure sense (Kotchen, 2014).

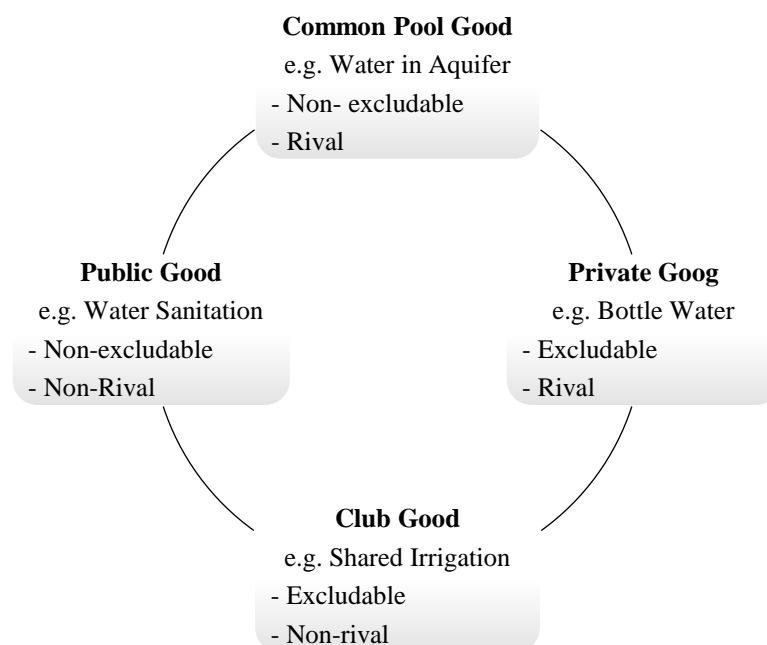
According to this fact, the goods for which property rights do not exist are known as open access resources and the lack of ownership or control of these resources can lead to over consumption. Since one person’s use does not prevent or reduce its value to others i.e., they are ‘non-rival’. Overuse can become a severe problem when resources are ‘rival’ so that use of the resource decreases the amount available for others and ‘non-excludable so that consumers cannot be prohibited from using the resource without considerable cost. These resources, such as water can be when in its natural state, are known as common-pool resources. The overuse of commonpool water resources arises when each user extracts the amount of water they need, without fully considering the impact this has on the amount of water available to other users (White, 2015).

Nevertheless, several environmental resources come close to sustaining the definition of pure public goods, and even when not exact (possibly closer to an impure public good), the basic concept is useful for understanding the causes of many environmental problems and potential solutions (Kotchen, 2014). The notion of public goods is also becoming

increasingly important at the international and global levels. Many environmental problems transcend national boundaries, with scarcity of water being the most prominent example, and maintaining a correct governance of this resource is essentially to a global public good (Barrett, 2007; Olson, 1971).

The public classification of water comes from a fundamental value: its importance in relation to the subsistence and development of any human community, the vast common of water must be excluded from private legal commerce (Moreira, 1920). In this context, water is not a normal economic good, its value beyond its economic terms to the societies. It has a large number of characteristics that distinguish it from other goods. Individually, these characteristics may not be unique, but their combination makes water a special economic good (Savenije, 2002). According to this perspective, water resources have a number of unique characteristics which mean that traditional market mechanisms can lead to inefficient and inequitable allocations. This creates questions over whether water should be considered a public or a private good (White, 2015).

Figure 1 - Water as a public and private good. Source: Adapted from Akhmouch and Francisco (2016)



According to United Nations (2010) and EEA-WHO (2002) the access to safe drinking water and sanitation was declared a ‘human right’. As a human right, water cannot be

treated the same way as other marketable goods because the allocation of water to those who value it most highly may be morally unacceptable if this allocation means that some people no longer have access to the basic water needed to survive (White, 2015).

Summary, water can be a public and a private good, as well as a concept between (see Fig. 1) this two perceptions.

These characteristics mean that water is not a traditional marketable good and markets can lead to poor allocations of water resources if designed badly. At the same time, certain aspects of water resources can be allocated efficiently by market processes if the unique characteristics of water uses are taken into account. Considering this perspective, it's clear that water in its natural state doesn't have defined property rights. (White, 2015; Global Water Forum, 2018).

However, after the basic water needs have been satisfied, additional water use is no longer considering a basic human right. Households could use water to fill a swimming pool, water their lands, or take long showers. In this case, the water use exceeds about 50–100 l per person per day, so turn into a private good, similar to other private goods, through the markets (Green, 2003; Wai Wah Chan, 2012; White, 2012; Ward and White, 2012; Ward, 2011).

Considering that the exchange of scarce resources has always been the subject of discussion in the international economy, the management of potable water and sanitation services is now in all European countries, an economic game. The water industry, in industrialized countries, gains emphasis, in the management of this public well, represent an attractive value for the private sector, which has in concessions a form of ownership, as public-private partnerships are no more the beginning of the privatization of a community well. In this context, the problems caused by water commoditization can be minimized, through the framework of social responsibility practices in governmental, non-governmental and international organizations, particularly in all the world's citizens (Neto and Bau, 2006; EC, 2001).

In addition, the neoliberalization of the sector, which, the right to water, oppose its commercialization, is an option that hasn't shown effective to solve the problems of the poorest people, especially in developing countries, because many multinational of the

sector, have economic problems or don't provide the correct services and have seen their concessions denounced, in Europe, in US and in Latin America.

So, is urgently looking for a correct management model, to ensure that no one is privet of water, for economic reasons, the tariff implemented by water consumption should disowner the consumers of modest means and strongly encumber those who squander without; that no population, however small it may be, is privet from accessing water as much as it costs in terms of investment, and at last, the water distribution should always have, a suitable treatment, to supply a high quality water to the consumers (Neto and Bau, 2006).

According to European Environment Agency (EEA, 2009), introducing water pricing across all sectors will be crucial to achieving sustainable water use, the effective water pricing needs to be based, at least in part, on the volume of water used, rather than adopting a flat-rate approach, and reflect the 'water user pays' principle, since requiring that pricing, provide adequate incentives to use water resources efficiently and recover the full cost of water services. To this end, water metering plays a key role and must be implemented extensively across all sectors, guaranteeing universal access to potable water and sanitation, however, pricing must not mean that anyone should compromise personal hygiene and health in order to pay their water bill (Neto and Bau, 2006).

In Portugal, the public classification of waters originates in Classical Antiquity and its first and most relevant systematization arises with the Roman law, which classified in three fundamental categories: public, common and private (Moreira, 1920: 16), the concept of "public domain" were created in the drafting of the Royal Decree, which in 1864 created the concept of "maritime public domain" (DPM), also establishing the concept of "sea water", which would relate to a band with special conditions, of access protection (APA, 2018a).

The first Decree n. ° 8 of December 1, 1892—provide the classification of water by public, common and private. Indeed, public waters would be:

- (a) salt water of the back, as far as, it reached the lap of the highest high water of living waters.

-
- (b) sweet water can be lakes, channels, ditches, and navigable and floating watercourses, with their respective beds and banks, and public sources.

Common waters would be composed of

- (a) channels, ditches, and watercourses not navigable or through municipal or parochial public lands, or even buildings persons, whether they were thrown into the sea or into any other public common.
- (b) lakes, ponds, or marshes situated on municipal or parochial grounds, or surrounded by different private buildings, or by uncultured public lands, municipal and parish.
- (c) the reservoirs, wells and wells built at the expense of counties and parishes.

And following the definitions of Pato (2007) the particular waters by:

- (a) waters that are born in a building private and running, as long as they do not exceed the limits of the same building; or that overcoming these limits, and running through private buildings, are consumed before being thrown into any public or common stream.
- (b) lakes and lagoons situated in a single private building and surrounded by are fed by some current of public or common use.

Nowadays, the public water domain, commonly known as public waters, is now regulated by Article 84/1 (a) of the Constitution, which includes in the public domain “territorial waters with their beds and contiguous sea beds, as well as lagoons and navigable and floating waterways with their respective beds” and by Law n.º 54/2005, of November 15, which establishes the ownership of water resources, providing that the public water domain comprises the public domain the public domain of other waters (Article 2/1) (Guerreiro, 2012).

According to the legal framework in Portugal, the Law nº 54/2005, of November 15, establishes the ownership of water resources, which include waters, their respective beds and banks, adjacent areas, maximum infiltration zones and protected areas.

Depending on their ownership, water resources are classified as private resources, or belonging to the public domain, and as patrimonial resources, belonging to public or private entities (APA 2018a). In Portugal, the public water service and public health is

classified as an essential public service of general economic interest, by national law, in particular the Law of Essential Public Services or Law n° 23/1996, of July 26 (ERSAR, 2013).

In 2005, a new Water Law as Law n. ° 58/2005, was approved by the Portuguese Parliament, which is a framework law for all the Portuguese water resources, including groundwater. This law not only transposes the EU Framework Directive to the Portuguese legislation but also considers and updates the historical issues and principles of the Portuguese water legislation (Cunha et al., 2006). This law established the framework for the management entities for water services, municipal waste management services and management of surface waters, including inland waters, transitional and coastal waters, and groundwater, to ensure rational use and prevent degradation of resources allowing its sustainability and long-term protection (ERSAR, 2013).

By other hand, the Water Act, determines the institutional framework for sustainable water management, and establishes a number of principles of environmental management: the principle of environmental dimension water (need for a high level of protection of water, to ensure sustainable use); the principle of the economic value of water (the water is or will be a scarce resource hence it has to do a cost-effective use, with cost recovery in environmental terms, based on the principle of polluter pays); the precautionary principle (measures must be taken to divert the negative impact of an action on the environment); the precautionary principle (actions with negative effects on the environment must be considered in advance); and the principle of correction (correction of damages to the environment) (Barraca, 2008).

However, the public ownership of the goods that are part of the public water domain does not determine that these goods cannot be used and enjoyed by the community in general or even individually by individuals. The common use of the public water domain has no specificity regarding the common use of the public domain. Common usage is translated into the collective use of goods in the public domain, anonymously, untitled and, in most cases, unconscious. A trip to the beach, the use of a marginal for physical exercise or fishing configures uses of the public water domain (Guerreiro, 2012).

In accordance with, the Decree-Law n. ° 280/2007, of August 7, Public domain assets may be enjoyed by all through non-arbitrary or discriminatory access and use conditions, except where their nature proves otherwise, being characterized by the gratuitousness, unless the law provides that the use is divisible and provides a special advantage.

In ordinary usage, said extraordinary, the beneficiaries of the use may be subject to authorization and the payment of fees (Guerreiro, 2012). It is clear, that the legislative scenery of water in Portugal has undergone significant changes over the years, mostly caused by the obligation to comply with Community directives. By other hand, the discussion on the Portuguese water industry's reorganization has gained relevance since 2014, when the Government presented a plan, justifying it with efficiency gains, financial sustainability, and the promotion of territorial equity/social cohesion (Portuguese Groundwater Report 2018).

However, Portugal has one of the largest Water Footprint (WF) of consumption per capita of the world and resides in the sixth place in the world ranking of the Water Footprint, among 151 countries, with 2260 m³ /person/year—the equivalent of the content of an Olympic swimming pool (WWF, 2011). So, it will be important a new cultural water approach in Portugal too guaranty the sustainable of this resource.

3.3. The Future of Water in Portugal

From a hydrogeological point of view, Portugal is a favoured country. There is a large diversity of porous, karstic and fissured aquifers, where groundwater is stored in great quantities, interacting with surface water systems like rivers, estuaries and sea in a variety of climatic conditions, from the wet North to the dry South. There are also important hydro-mineral and thermal resources, with a relevant national economic value. About 20% of the geographical extension of Portugal is occupied by 62 aquifer systems, of which 60% are porous (Cunha et al., 2006; APIAMNN, 2017).

Significant renewable groundwater resources are available in some aquifers of Portugal, mainly in the huge Tagus-Sado aquifer system, the major groundwater unit of the Iberian Peninsula. In some aquifers under-exploitation may occurs, while in other areas,

especially in the Algarve region situations of groundwater over-pumping can occur, in some cases generating water quality problems. Groundwater plays an important role in public, industrial and agricultural sectors, this last one being the greatest consumer of groundwater. Groundwater resources are facing increasing pressures from those sectors. Climate change contributes to an increase of water scarcity in Portugal especially in arid and semi-arid cases, as is the case of some regions of south of Portugal, in Alentejo and Algarve (Cunha et al., 2006).

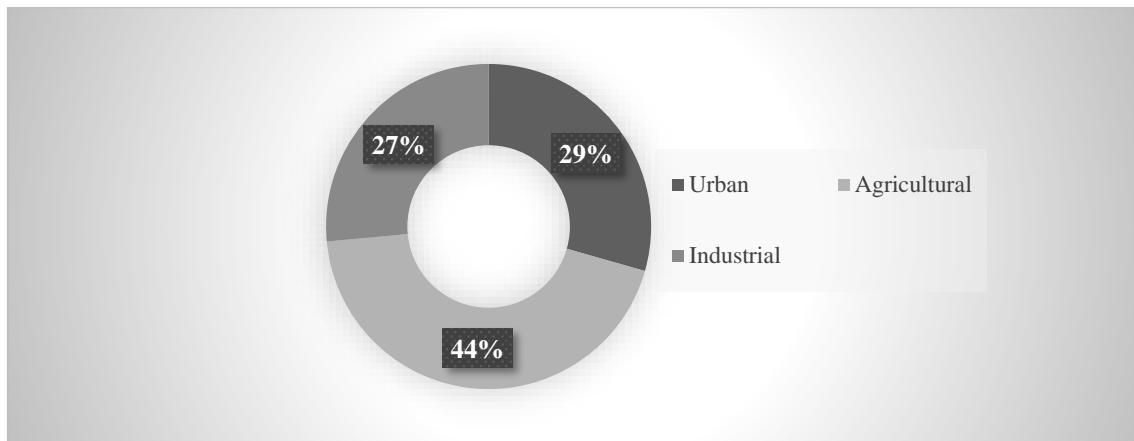
In Portugal, at the beginning of the twenty-first century, the annual demand for water in the continental estimated at 7500 million m³, in all three sectors: urban, industrial (Gil 2011). According to National Program for the Efficient Use of Water (PNUEA 2012), the national inefficiency (waste) in the use of water by sector related to losses in storage, transportation and distribution in 2009 was 25% in the urban sector, 37.5% in the agricultural sector and 22.5% in the industrial sector (see Fig. 2).

Since water is a key factor for socio-economic development and a strategic and structuring resource for the country, it is essential that planning and water management be done in a rational and optimized way, and that high efficiency in its use. So, it becomes fundamental to introduce a new culture on water in Portugal. However, the future of the Portugal water sector will depend on a variety of external and internal drivers of change (variables), including economic development; government policy and the skill of the water sector to appeal investment; international relations and trade; technological developments and public attitude towards water use (Proskuryakova et al., 2018).

In this context, it is clear that improving the effectiveness and efficiency of water use is fundamental for the sustainable development of country in particular in Portugal, considering the three pillars of sustainability:

Environmental: water is a limited resource that needs to be protected, conserved and managed to ensure the sustainability of ecosystems and the services they provide to society at large and to ensure the sustainability of other intrinsically associated resources. It is a strategic necessity: increasing availability and water reserves in the country is fundamental.

Figure 2 - Inefficiency of water use by sector. Source: Adapted from PNUEA (2012)



Economic: Correspond to economic interests at several levels; national (waste of water represents a “diseconomy” for the country); business (water is an important factor of production); water management entities (allows greater rationality of investments); consumers (allows a reduction of water charges).

Social: It is an obligation of the country, to comply with national and community standards. It is an ethical imperative: water is fundamental to life, needs to be managing taking into account the following generations (APA, 2018b; PNUEA 2012).

In Portugal, water planning, and management is implemented through the following instruments: National Water Plan (NAP), of territorial scope, that covers the entire national territory.

Hydrographic Region Management Plans (PGRH) cover river basins and coastal waters integrated into a river basin district and form the basis of support for the management, protection, and social and economic valuation of waters.

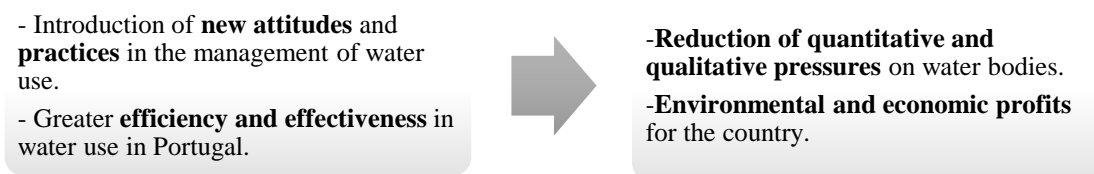
Specific Water Management Plans are complementary to the river basin management plans. They may be of territorial scope, covering a sub-basin or a specific geographical area, or of sectoral scope, covering a problem, type of water, specific aspect, or sector of economic activity with significant interaction with the waters (APA, 2018b).

The National Water Plan (NWP) defines the national strategy for integrated water management. It sets out the broad options of the national water policy and the principles and rules of policy of that policy, to be applied by river basin management plans and other water planning instruments.

The planning of waters aims to base and guide the protection and management of waters and the compatibility of their uses with their availability in order:

- To Ensure their sustainable use by ensuring that the needs of present generations are met without compromising the ability of future generations to meet their own needs.
- To Provide criteria for allocating to the various types of intended uses, taking into account the economic value of each, as well as ensuring the harmonization of water management with regional development and sectoral policies, individual rights and local interests. To Establish environmental quality standards and water status criteria (APA, 2018b).

Figure 3 - PNUEA Assumptions. Source: Adapted from APA (2018b)



In turn, the PNUEA - National Program for the Efficient Use of Water, included in the Specific Water Management Plans is a national environmental policy instrument whose main objective is to promote the Efficient Use of Water in Portugal, especially in the urban, agricultural and industrial sectors, contributing to minimize the risks of water scarcity and to improve environmental conditions in water resources, without undermining the vital needs and quality of life of the population, as well as the socio-economic development of the country (APA, 2018b). The National Program for the Efficient Use of Water is based on the assumptions shown in Fig. 3.

It is clear that the NAP and the PNUEA represent an important development in the formulation and implementation of coherent strategies, indispensable to an integrated water resources management policy and ecosystems in Portugal.

However, the authors consider the success of its mission depends on a number of operational factors, including the following:

- Harmonization of the NAP and the PNUEA with other land-use planning instruments, in particular the Special Plans and the Municipal Plans.
- Strengthening the capacity of intervention and the exercise of authority by supervisory bodies.
- Prepare a serious and realistic analysis of the financing and self-financing of the NAP and the PNUEA, given the unpredictable budget of the Portuguese Government.
- Perform hydric audits in buildings in the urban and industry sector.
- Introduction of quantitative limits in the specific objectives by sector.
- Promoting the participation of the population and industry professionals in the implementation of NAP and UNEP and in pursuance of its objectives.

The National Program for the Efficient Use of Water (PNUEA, 2012) established one strategic objective and seven specific objectives by sector and, for example, in Table 1 is enumerated for the Urban Sector.

Table 1. Strategic and specific objectives of PNUEA for urban sector

Strategic objectives	Specific objectives
<ul style="list-style-type: none"> – Reduction of water losses in supply systems. 	<ul style="list-style-type: none"> – Increase the knowledge of managers and operators of water and users in general. – Promote the awareness, information, and training of the main actors in water use, as well as the introduction in specific textbooks and textbooks. – Know the level of inefficiency of the public systems of water supply through its equipping with measuring equipment and with transmission and covering the entire urban water cycle. – Ensure a dynamic of success in the implementation of efficient water use, directing the largest efforts for public (non-domestic) systems, and for the highest human concentrations where costs are not borne directly by water users (e.g., schools, shopping service stations, hospitals, hotels, swimming pools, stadiums, airports, restaurants, laundries). – Reduce the use of drinking water to a minimum in activities that may perform water of alternative quality and of sources other than the public drinking water network, promoting the use of rainwater and the possible re-use of treated wastewater. – Promote the use of standardized and certified equipment for the efficient use of water. – Establish official awards and distinctions for equipment, installations and systems that demonstrate their added value at the level of efficiency and that prestige the entities that produce equipment and systems managers.

Source: Adapted from PNUEA (2012)

The National Program for the Efficient Use of Water (PNUEA, 2012) established two strategic objectives and three specific objectives by sector and, for example, in Table 2 is enumerated for the Agricultural Sector.

Table 2. Strategic and specific objectives of PNUEA for agricultural sector

Strategic objectives	Specific objectives
<ul style="list-style-type: none"> – Reduction of water losses in irrigation water management systems and gross irrigation appropriations. – Gradual articulation of revenues associated with tariffs and the real cost of water, with emphasis on volumes without losing competitiveness in the sector. 	<p>Increase the overall efficiency of irrigation systems by:</p> <ul style="list-style-type: none"> – Improvement of the quality of the projects (capture, exploitation, watering). – Reduction of water losses in storage, transport and distribution (rehabilitation of dams, waterproofing of channels, construction of compensation tanks at strategic points and in the channels, automation of regulatory structures, etc.), for example through ProDeR, or other successor programs (after 2013). – Reduction of losses in the application of groundwater (introduction of warning and agrometeorological systems, reconversion of irrigation methods, with automation and adequacy of procedures in gravity irrigation, sprinkling and location).

Source: Adapted from PNUEA (2012)

The National Program for the Efficient Use of Water (PNUEA, 2012) established two strategic objectives and six specific objectives by sector and, for example, in Table 3 is enumerated for the Industrial Sector.

Table 3 Strategic and specific objectives of PNUEA for industrial sector

Strategic objectives	Specific objectives
<ul style="list-style-type: none"> – Optimization of water use in the industrial unit, without prejudice to the efficiency of the processes and operations in this use, as in the application of best available techniques (BAT) in context of the integrated pollution prevention and control (IPPC) regime. – Limitation of the environmental impacts associated with discharges of industrial wastewater, achieved by better management of the water cycle, towards prevention linked to greater foreseen in the PCIP. 	<ul style="list-style-type: none"> – Reduction of the consumption of water and the volumes of wastewater generated through the adaptation of procedures, more efficient use of equipment and devices and reuse / recirculation of water. – Reduction of water consumption in the industrial unit by reducing actual losses in distribution systems. – Reduction of the water consumption in the industrial unit rationalizing the water through changes made at the level of industrial manufacturing processes. – Use in the industrial unit of residual or residual water from other cooling systems and equipment washing. – Reduction of water consumption in the industrial unit by changing user habits. – Reduction of water consumption in the industrial unit by recovering the water vapour generated in the heating unit.

Source: Adapted from PNUEA (2012)

Finally, water management must contribute to outcome-oriented public policies, based on mutually reinforcing and complementary dimensions. One of these dimensions is efficiency as seen in the contribution of such governance to the maximization of the benefits of sustainable water management on welfare at the least cost to society.

However, it must be allowed in attention that water efficiency is a developing “science”, whose proposals for assistance must be supported by appropriate technical and scientific studies, which taking into account economic, comfort, performance of networks and public health. There is still a very important nexus between efficiency and energy efficiency, which should be priority attention in Portugal.

3.4. Final Considerations

In contemporary society, the uncertainties and risks are dominant concerns in the business environment, as well as, in the management of public assets. Increasing problems of water scarcity and drought clearly require a more sustainable approach to water resource management across Europe; this need is already reflected in water related policy and legislation.

The water is a general interest feature, so implementing technologies and practices that either conserves water or use it more efficiently plays a key role in the demand-side approach to water management, it's also important, the protection and sustainable management of this resource into other community policies, such as environmental, agricultural, energy and among others in the industry, in which the rational use it's important, not only to contribute for sustainability of the water, but also the business of the companies.

In this context, the pressure to appeal to the rationalization of water use, the frequent changes in the sector, with a public, private, or mixed management, the need to increase the price of water services, to maintain their sustainability, leads to the conversion of water into an economic good, causing a discuss about water's identity, as an entitlement for citizens, or as commodity for customers.

In Portugal, it is imperative to increase efficiency and effectiveness in water use, for environmental and sustainability reasons, for being a strategic necessity of Portugal, due to the risks of water stress, and because it corresponds to an economic interest of all (citizens and entities), which can be achieved without damage and protection of public health.

In order to contribute to a future understanding of water management, the authors aim to research about the new water management approach that takes into account the five pillars of good governance: accountability, adaptability, participation, rule of law and transparency. There are much to be done about the water itself.

Chapter 4 – Digital Corporate Social Responsibility Reporting in the Water Industry

4.1. Introduction

Globalization and the growing competition in international markets have forced organizations to develop their communications in the field of environmental protection. The relationship between companies and the information published in digital technologies is a very important element to achieve sustainable development, to disclose their commitment with the environmental protection and to improve their relationships with the stakeholders (Michalska-Szajer et al. 2021). In addition, access to digital information allows consumers to access a clearer volume of information and, subsequently, make a better and more suitable decisions in fewer time, giving a competitive benefit to the companies (Kerras et al. 2020).

This assumption led the bottle water industry start to intensify the use of the internet as a fundamental tool to disseminate digital information, to promote their products, to manage their online reputation, to rise their transparency, to disclose non-financial information, and to improve communication with stakeholders (Helberger et al. 2018; Johnson et al. 2017). The intensification of digital CSR disclosure in current years has formed a new rich information environment, as increasing competitive improvement of companies that offer vital information not only about firms' products, services, but also about financial, social, and environmental performance (Dutot et al. 2016; Okazaki et al. 2020).

Nowadays, companies' websites are one of the most cost-effective resources to communication CSR initiatives, since can be the perfect network to send indicators concerned to the CSR level as they provide quickly updated data allowing companies to link all types of reports and data (Annual Report, Financial Report, Site-specific Reports, and Sustainability Reports) in a updated version, which makes it an attractive instrument for companies and his stakeholders at a low cost (Lakatos et al. 2011; Salvi et al. 2021).

According with the survey developed by KPMG International Cooperative (KPMG 2020), the definition of the 2030 Agenda, consisting of 17 Sustainable Development Goals (SDGs) contributed significantly to an increase in companies disclose between 2017 and 2020. In turn, 80 percent of the companies in worldwide now report on Sustainability and GRI remains the dominant global standard for sustainability reporting (KPMG 2020). But the rate of sustainability reporting in Europe has remained at 77 percent since 2017, while the American continent leads the Sustainability reporting rates with 90% (KPMG 2020).

In Portugal, the sustainability reporting rate are below the global average (less than 77%), and in the past three years decrease of 8% (KPMG 2020), so digital CSR disclosure was reflected as “incipient” according to Neves and Bento (2005) but is recognized an increase on CSR practices in the companies (Branco and Delgado 2011). According with Branco and Delgado (2016), the research about CSR and Social Responsibility Disclosure (SRD) in Portuguese field is not abundant, exceptionally low investigations are known about the drivers of SRD in Europe, particularly in Portugal. As such, this research pretends to address this gap allowing determining the level of CSR practices in Portuguese context and by identifying the factors that influence that disclosure.

The authors chose to investigate the bottle water market in Portugal, for several reasons, such as: The digital corporate social responsibility reporting in bottle water companies is vital and crucial to sustainability development framework since this activity contributes significantly to local societies’ economic growth, through the creation of direct and indirect jobs, indirectly downstream and upstream of the activity (suppliers, services, distributors), helping to mitigate Portugal's regional asymmetries, since bottling plants must be in proximity of the springs (PIANSMW 2022).

The bottle water industry is an important sector to Portuguese economy in the beverage market, representing, according to official data for 2019, a turnover of approximately 224 million EUR and a production of over 1,490 million litres (PIANSMW 2022). By on hand, this is a sector under increasing pressure to manage several contemporary CSR factors, such as an exploration of a natural resource, product safety and concerns relating to the environment, including packaging. By other hand, these factors are increasingly

becoming of concern in Portugal and Europe, with potentially serious consequences for the bottle Water Industry.

The bottle water industry impacts at economic, social, and environmental level are significant since their activity depends on a natural resource vital for Human Life. Water is essential for the correct functioning of our organism. Daily the experts recommend drinking between 1.5 and 3 litres of water, the hydration with natural mineral water or spring water represents the choice of a natural drink, provided by nature, in complement, mineral salts and essential trace elements for our organism (Perrier et al. 2020). With underground origin that protects them from external aggressions, mineral and spring waters are microbiologically safe products that do not suffer any human contamination and chemical treatments (PIANSMW 2022).

Additionally, this type of industry bottle a natural resource whose scarcity is considered one of the greatest challenges for the humanity these days, given that over 2 billion people live with high water shortage (United Nations Water 2019; World Economic Forum 2020). Therefore, it's essential the investigation of a reality of an industry, whose sustainability is mostly dependent on its main raw material (water), a resource subject to various climate changes and which it's the heart of the sustainable development for the 2030 Agenda. This value-added resource empowers the socio-economic development, is crucial to the production of energy and food, supports healthy ecosystems and for the existence of the human species (Chen et al. 2020).

This research makes significant scientific contributions to the existing literature by the examination the CSR disclosure in a specific type of industry rarely studied, in one of the smallest OECD countries, expand previous research done in this field. The analysis of online reports published by bottle water companies in Portugal will add to the scant research on SRD in Portugal, offering sector-specific detail and considering also geographic and cultural contexts affecting SRD. By on hand, the study reflects the reality of an industry that depends on the proper management of a resource that is an essential element for the life of all living beings, promoting the geographic development of a country and the sustainability of a planet (Seyedeh 2021; Yang et al. 2021).

The purpose of this research is to assess the digital CSR in Portuguese companies of the Water Industry, through a proposed model which measure the degree of disclosure and the company's commitment to CSR and its subsequent disclosure to stakeholders, according to the main global standard for sustainability reporting, GRI standard. The paper determines in a second way the variables or factors that may influence this CSR disclosure in the company's websites. Thus, the proposed evaluation model contributes to the value importance of strategic CSR, since can be used to identify best practices and to reveal which companies are most strongly committed to these matters.

This knowledge has practical implications for the bottle water sector in Portugal, because they will enable to develop rational CSR disclosure policies on their websites, make them more competitive in the beverage market provide a better reputation for the company in the future, contributing to improve the information to all stakeholders and to increase the rate of CSR disclosure in Portugal which is currently below the global average.

The findings could be useful for the bottle water administrators who don't make any type of disclosure of social responsibility practices on their websites highlighting the importance of developing and supporting policies and incentives to promote CSR disclosure and consequently attract new customers and investors contributing to the sustainable development of this companies.

The research is organized as follows. Section 2 examines factors that impacts on the digital status of the online disclosure to understand how they are using that communication channel. Section 3 presents the product and the sector in study and the research design and method applied. Section 4 discusses research results. Finally, Section 5 presents conclusions, the research implications, limitations, and future perspectives.

4.2. Literature Review

The contextual background of this research focuses on digital CSR disclosure, one of the most debated concepts in the business literature (Newman et al. 2020) since his ability to create enterprise value (Dhaliwal et al. 2014), so it could be considered as an important tool to the sustainability of bottle water companies.

Moreover, corporate social responsibility reporting has been increasing over the last decade and become a matter of strategic importance to business enterprises (KPMG 2020; Stolowy and Paugam 2018), concerned significant attention from several stakeholders (Branco and Rodrigues 2008). This trend of modern companies will maximise the value to shareholders and satisfy expectations to stakeholders, behave in a socially responsible way, and adopt the concept of managing resources for the welfare of present and upcoming generations (Lipunga 2014).

Currently, the authors observe an increase availability of CSR reports, but the level and content of SRD are influenced by some factors, so several problems arise with the quality and the quantity of information disclosed. Besides the company size, number of employees, ownership, profitability, and nature of industry, also, the company age and the presence or absence of social responsibility boards (Akin and Yilmaz 2016) determine the level of digital disclosure. Thus, the following hypothesis are proposed:

H1: CSRD is positively correlated with firms' age.

H2: CSRD is positively correlated with number of employees.

Differences are recognized between the EU countries as evidenced in several investigations by different authors who conclude that CSR reports differs from country to country (Skouloudis et al. 2014; Mio and Venturelli 2013; Sierra et al. 2013; Habek 2014), since the legislation vary widely in several states (Habek and Wolniak 2013a; 2013b).

For this reason, is fundamental to use an internationally recognized tool for the assessment of the information disclosed like the GRI standard used to classify level of disclosure in this research. GRI reporting framework is widely acknowledged as a leader in the international standardization of sustainability reporting (Bebbington et al. 2012; Gray 2010; Mahoney et al. 2013) and it is also considered the primary example of sustainability reporting and have multiple application in firms of several sectors of activity (GRI 2021a; Lipunga 2014).

Previous research suggests that the level CSR policies on large companies are higher than in small ones (Font et al. 2012), in line Branco and Rodrigues (2006) also conclude banks

with higher visibility show more concern for corporate social disclosure to improve their images than banks with lower visibility. Similarly, Cuganesana et al. (2010) studied the Australian food and beverage industry and find that firms from industry sub-sectors with innovative CSR profiles comprise a better disclosure. Thus, the following hypothesis are proposed:

H3: CSR is positively correlated with firm's size.

H4: CSR is positively correlated with the turnover.

In addition, previous research has also reported that companies with larger ownership have the highest disclosure levels and respond proactively to stakeholder concerns (e.g., Burritt et al. 2016; Paek et al. 2013; Scholtens and Kang 2013; Barnea and Rubin 2010). By other hand, Shnayde et al. (2016) show that motivations of CSR disclosure in packaged food industry depends on intrinsic factors and can be explained by external pressures, regulation, normative obligations, and social pressure (Shnayder et al. 2016).

Other previous studies focus on the relation between CSR and accounting or finance variables, most of them determine that CSR disclosure improves financial performance of the companies (Kartasmita 2020; Nair et al. 2019). Thus, the following hypothesis are proposed:

H5: CSR is positively correlated with the ROE.

H6: CSR is positively correlated with the ROA.

However, the new trends of the companies in disseminate online information change the line of the research in this field, previously studies were focused on the annual reporting. Currently, studies are also based on company's online reporting (e.g. Esrock and Leichty 2000; Campbell and Beck 2004; Capriotti and Moreno 2007).

For this reason, the companies' websites have a significant role in CSR through the easy access of CSR agenda, circulation of updated data about social and environmental management performance to a varied group of internal and external stakeholders accessible twenty-four hours a day, seven days a week (Gautam and Shagun 2018; Hinson 2011).

For this reason, the online channels are an important tool for the bottle water companies, since researchers have suggested that companies' websites could provide organizations

with numerous opportunities to present and explain their CSR identity, product sales and management subjects to their stakeholders (Campbell et al. 2011, Rolland and Bazzoni 2009).

Its unquestionable, that communication through the websites is crucial in today's globalisation and liberalisation (Lipunga 2014; Dehkordi et al. 2012) an extremely powerful tool to influence the success of companies increasing their visibility and disclose information in a cost-efficient way to a target audience that are more aware with CSR and to potential financial investors that pretend to capitalise companies with better environmental and social performance (Penczar 2003; O'Rourke 2004). It is clear, the company's website image has a considerable influence on stakeholder's behaviour (Chen and Lee 2005).

Effectively, the research of digital information is of particular interest since web offers several benefits for communication purposes which can increase the information that is communicated to the customers and other stakeholders (Amran 2012). The internet and its channels have opened the track for personalization of messages and real interaction with both existing and potential customers could lead to a better fit between customers' expectations and firms' growth (Dutot et al. 2016). However, contents of websites are not standardized, and companies have voluntary determination to provide information that desires to disclose (Amran 2012). This provides opportunity from the academic point of view to research the CSR online disclosure phenomenon particularly from bottle Water Company's context. For that reason, bottle water industry must develop high quality websites that provide a better online experience to attract all stakeholders, which explain the identity of the brand and simplify the access to the information in a perceivable, operable, comprehensible, and robust way (Chen and Lee 2005).

On the wider society, digital SR disclosure is on the rise, and Portugal is no exception (Branco 2015). While in a few years ago, Branco and Rodrigues (2006) found that most Portuguese companies did not disclose social responsibility information in their websites, small to medium-sized business enterprises are now considered active to CSR agenda (Branco 2015; Coupland 2006). Portugal, similarly, to other EU countries such as: Italy and Spain, has adopted CSR policies that most of the time depend on the promotion of government initiatives (Maon et al. 2017; Knudsen et al. 2015), few

Portuguese companies are included in sustainability internationally indexes (e.g., Dow Jones Sustainability Index (DJSI) or the FTSE4Good Index) and most of them have low classification in terms of CSR reporting and in the inclusion of voluntary CSR standards in his business (Branco 2015, Moon et al. 2012; Branco and Delgado 2011).

Therefore, it is important to know the Portuguese reality. The data presented below pretend to evaluating the recent level of CSR reporting in Portuguese field in the context online disclosure of bottle water companies and identify the aspects that influence this disclosure in a sector of extreme economic importance for the country and in the worldwide consider a global industry (Carlucci et al. 2016), but due the recently pressures of the market and their stakeholders, the fulfilment with the environmental laws, needs to demonstrate its commitment to the environment, the preservation of a pure and natural resource bottle in 100% recyclable packaging with the incorporation of recyclable materials, factors that are under CSR agenda nowadays.

4.3. Research Methodology and Hypothesis

Study Product and Sector

In recent decades, water has turned from an essential good, unbranded commodity to being considered a premium, gourmet product with commercial value. Bottled water consumption in Portugal, gaining a prominent place in the beverage sector, considered the fourth country in the European Union where the most bottled water is consumed per habitant. Exports from this sector represent 3% of the total Portuguese production (PIANSMW 2022).

However, environmental impact is the biggest enemy of this industry, coming from the manufacturing process, transport, and the water packages, which requires more 2000 times the energy cost that tap water (Greibitus et al. 2020). Sill, packaging from this type of industry is the most recycled plastic packaging in the EU, achieving recycling rates above the average. In turn, the sector is determined to give a second life to every bottle through the circular economy project. In 2018, the bottled water industry committed to achieving a packaging take-back rate of 90% and using at least 25% recycled PET in its packaging by 2025. Additionally, the reduction in packaging weight in recent years has

provided relevant environmental advantages in the production and transport using smaller quantity raw materials looking for new packaging solutions through the design and innovation (PIANSMW 2022).

The sustainable water resource management is the priority of this industry through the protection of the water source areas avoiding contaminations, preserve and improve the biodiversity in the areas where our sector operates and use efficiently the water in all the operations to ensure its natural renewal, in quantity and in quality (NMWE 2022). Considered the heart of the bottle water industry, this scarce resource, vital for the human being, must be used without compromising the future needs, the ecosystems and the continuity of water courses (Barnes and Alatout 2012).

For these reasons, bottled water is an important topic for research on CSR disclosure, since the environmental, economic, and social consequences of this sector have an increasing attention from the society, governments, policymakers, and stakeholders. Concerns about waste discharge, proper use of groundwater, hydrologic effects on local surface and groundwater, economic costs, energy used in production and transport can influence the sustainability of this business (Gleick and Cooley 2009). These factors bring hard goals on packaging, carbon-neutrality, resource-efficiency, and biodiversity commitment to the bottle water sector (NMWE 2022). To overcome these challenges the sector must develop their activity including CSR practices in this business strategy, focus on the innovation of their products, efficiency of their process and investing in new technology to guarantee their sustainability.

In view with the above considerations, the next research's questions arise:

R1: What is the current state of digital CSR report in bottle water companies in Portugal?

R2: What are the factors that influence the level of CSR disclosure in bottle water companies in Portugal?

To answer these questions, the following approach was adopted.

Sample and Data Collection

This section aims to detail the research methodology developed to get answers to this research focus about all companies of the water industry that operate in Portugal in 2021. The population has a total of 20 companies, but only 15 had accessible websites. The data of the research was based on the digital CSR information provided in each company websites.

The analysis of the web pages was done in the most objective and rigorous way possible, and all web pages were analysed in a similar way to avoid subjective analysis (Hackson et al. 1996). The content analysis of the companies' websites was performed from March 8th to 12th, 2021.

For the construction of our CSR disclosure index, the authors used data hand-collected from firms' voluntary CSR information provided within the firms' web pages of bottle water companies, which published annual reports, follow-ups documents of standards certification, news, brochures, prints, bulletins, and others) available on webpages, as well as evidence contained in other related pages whose access link is expressly mentioned in the companies' pages.

After collecting the digital data of the bottle water companies based on Hinson et al. (2010) has been built a scoring method to assess the measure with quantitative index level of CSR disclosure. The scoring system involved assigning a point for each corporate social responsibility disclosure theme connect to any of the categories based on a list of 20 items, divided into 4 categories or blocks of information: general information, economic, environmental, and social information, in accordance with the GRI food sector guidelines presented in Table 4.

Table 4. Categories of GRI food sector guidelines

Category	Item
1: General Information	Organizational Profile Strategy and Analysis Stakeholder Engagement Ethics, Integrity, and Transparency
2: Economic Information	Economic Performance Market Presence
3: Environmental Information	Energy Water Emissions Effluents and Waste Compliance Transport Overall Supplier Environmental Assessment Environmental Grievance Mechanisms
4: Social Information	Labour Practices and Decent Work Human Rights Society Local Communities Product Responsibility

Figure 4. Proposed CSR Disclosure Model

This research employs a model adopted from by the Hossain and Reaz (2007) and Lipunga (2014) based on the dichotomous procedure: a score of —1 was awarded if an item was reported; if not, a score of zero was awarded as the model presented above in figure 4.

$$CSR\ Score = \sum_{j=1}^n \frac{d_j}{n}$$

Where: $d_j = 1$ if item j is disclosed; 0 if item j is not disclosed and $n =$ number of items

Hypothesis

The authors test statistically the relationship between CSRD (score of disclosure per company) as the dependent variable with the following independent variables: firm age, number of employees, turnover, return on equity (ROE), return on assets (ROA) and size of the company. The information on the independent variables was collected from the

base Balance Sheet Analysis System Iberians (SABI). The Statistical Package for Social Sciences (SPSS: version 23) was used to analyse the collected data and to examine the variables in research. All statistical and econometric analysis developed has been based on Greene (2018) and Hair et al. (2018).

Pearson correlation was done to find the association between variables in each case before determining the regression model. The research only considered independent variables that showed a significant correlation ($p > 0,05$) with the dependent variable CSRD. In table 5 are presented the correlation test (Greene, 2018). According with Table 2 the variables that presents significant correlations are: company size (COMPS), employees and turnover. Company Size (COMPS): The National Statistics Institute (NSI 2021), defined the size of the companies in accordance with Decree-Law N° 372/2007. Thus, a large company is defined as a company that employs more than 250; a medium company is defined as a company that employs more than 50; small company is defined as a company that employs less than 50; and a micro company is defined as a company that employs less than 10 people. The number of employees is characterized by the number of persons employed at full time in one year (Baehr and Renck 1958). The turnover is the measure for business's performance and reflects the total sales made by a business in a certain period (Burja and Burja 2009).

Table 5. Pearson correlation test

		FIRMA GE	EMPLOYEEES	COMP D	TURN OVER	ROE	ROA	CSR D
FIRMA GE	Pearson Correlation Sig. (bilateral) N	1 20						
EMPLOYEEES	Pearson Correlation Sig. (bilateral) N	,064 ,789 20	1 20					
COMP D	Pearson Correlation Sig. (bilateral) N	,304 ,192 20	,678** ,001 20	1 20				
TURN OVER	Pearson Correlation Sig. (bilateral) N	-,051 ,830 20	,965** ,000 20	,591** ,006 20	1 20			
ROE	Pearson Correlation Sig. (bilateral) N	-,097 ,683 20	-,104 ,663 20	-,193 ,414 20	-,083 ,729 20	1 20		
ROA	Pearson Correlation Sig. (bilateral) N	-,044 ,854 20	,102 ,669 20	,259 ,269 20	,152 ,522 20	,018 ,941 20	1 20	
CSR D	Pearson Correlation Sig. (bilateral) N	,127 ,595 20	,466* ,039 20	,545* ,013 20	,550* ,012 20	-,257 ,273 20	,045 ,849 20	1 20

Legend: ** Sig correlation at 0,01 level, * Sig correlation at 0,05 level

A regression model was developed to measure the factors that influence the CSRD in bottle water companies. The multiple linear regression analysis is a technique for modelling the linear relationship between a dependent and one or more independent variables, which is one of the most widely used of all statistical methods (Ongore and Kusa 2013; Sharifi and Akhter 2016; Nataraja 2018). The following research model was utilized to test the causal hypotheses of the research which is presented in an econometric form showed above.

Figure 5. Regression Model of the CSR Disclosure Model

$$CSR D = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k + \epsilon$$

Where: Y = dependent (explained variable) and Xi = ith independent (explanatory variable), i = 1, 2...k

$\beta_0, \beta_1, \beta_2, \beta_3 \dots \beta_k$ are the partial regression coefficients of independent variables. The coefficient of independent variable reflects how dependent variable Y changes when the

independent variable, X_i ($i = 1, 2 \dots k$), changes by one unit, while the other independent variables continue constant (Nataraja 2018).

4.4. Result Analysis

Exploratory Analysis

The variables distribution of the CSR Disclosure Model is presented in Table 6. The most relevant are summarized: 15 companies of bottle water industry, in a total of 20 have an accessible website, 25% of bottle water companies are not emphasizing their websites as a tool for improving this communication with their stakeholders.

The authors find that, in terms of space devoted to topics, organization profile (85,71%), market presence (71,43%), effluents and waste (71,43%), environmental information overall (78,57%) and society information (71,43%), as opposed to Environmental Grievance Mechanisms (0,00%), Ethics, Integrity and Transparency (7,14%) Stakeholder Engagement, Labour Practices and Decent Work, Human Rights and Product Responsibility (14,29%) are the most prominent.

Finally, the research finds a lack of CSR reporting since the total of the information disclosed is 27% mainly in aspects related to Stakeholder Engagement, Labour Practices and Decent Work, Human Rights and Product Responsibility. It's clear the sector in research is very related with environmental aspects and in the last years the companies of bottle water have developed several activity's in this field. By other hand it's clear the last EU legislation about the plastic packaging and the led companies to disclose more information related to environmental aspects.

Table 6. Variables distribution by the CSR Disclosure Model

Category	Item	CSR disclosure (%)
1: General Information	Organizational Profile	85,71
	Strategy and Analysis	57,14
	Stakeholder Engagement	14,29
	Ethics, Integrity and Transparency	7,14
2: Economic Information	Economic Performance	21,43
	Market Presence	71,43
3: Environmental Information	Energy	57,14
	Water	35,71
	Emissions	28,57
	Effluents and Waste	71,43
	Compliance	42,86
	Transport	21,43
	Overall	78,57
	Supplier Environmental Assessment	21,43
	Environmental Grievance Mechanisms	0,00
4: Social Information	Labour Practices and Decent Work	14,29
	Human Rights	14,29
	Society	71,43
	Local Communities	42,86
	Product Responsibility	14,29

Confirmatory Analysis

The confirmatory analysis has been supported on the methods propose by Greene (2018) and Hair et al. (2018). From Table 7, it is evident that CSRD has positive correlation with all other explanatory variables. This indicates that CSRD increases when the variables company size (COMPS), employees and turnover increases.

Table 7. Summary of the CSR Disclosure Model

Model	R	R square	Adjusted square R	Standard error of estimate	Durbin-Watson
1	,758a	,575	,495	19,81448	2,150

Where:

- a. Predictors: (Constant), TURNOVER, COMPD, EMPLOYEES

The adjusted R2 value in the above Table 4 clearly tells us that 57,50% of variation in the dependent variable (CSRD) is explained by the explanatory variables. This indicates a reasonably good power of the regression model (Greene 2018; Hair et al. 2018). The value

obtained in Durbin-Watson test ($1,5 < 2,150 < 2,5$) also indicates the independence of the residuals, that is, the differences between the predicted value and the observed value. Table 8 gives the results of the ANOVA technique applied to test our hypothesis against the null hypothesis. The sig. value clearly indicates that model is significant at 5% chosen level of significant ($0,003 < 0,05$).

Table 8. ANOVA results of the CSR Disclosure Model

Model		Total Squares	gl	Medium Square	F	Sig.
1	Regression	8488,183	3	2829,394	7,207	,003 ^b
	Residual	6281,817	16	392,614		
	Total	14770,000	19			

Where:

a. Dependent Variable: CSRD

b. Predictors: (Constant), TURNOVER, COMPD, EMPLOYEES

Thus, the hypothesis number 2, 3 and 4 are accepted which states that turnover, company size and the number of employees have significant impact on CSRD of bottle water companies. Further, the significance of each explanatory variable on CSRD can be also assessed through t sig value provided in the Table 9. Table 9 tells us that the explanatory variables turnover, company size and the number of employees have significant impact on CSRD (t sig values $< 0,05$).

Table 9. Coefficient test of the CSR Disclosure Model

Model	Nonstandard coefficients		Standardized coefficients	t	Sig.	Correlations		Collinearity Statistics	
	B	Standard Error	Beta			Zero order	Partial	Tolerance	VIF
(Constant)	-29,709	21,182	-1,959	-1,403	,180				
EMPLOYEES	-,287	,105		-2,730	,015	,466	-,564	,052	19,369
COMPS	26,885	9,521	,662	2,824	,012	,545	,460	,484	2,067
TURNOVER	1,106E-6	,000	2,049	3,133	,006	,550	,617	,062	16,091

According with the results in figure 6, the histogram for the residues has a normal distribution.

Figure 6. Histogram of the CSR Disclosure Model

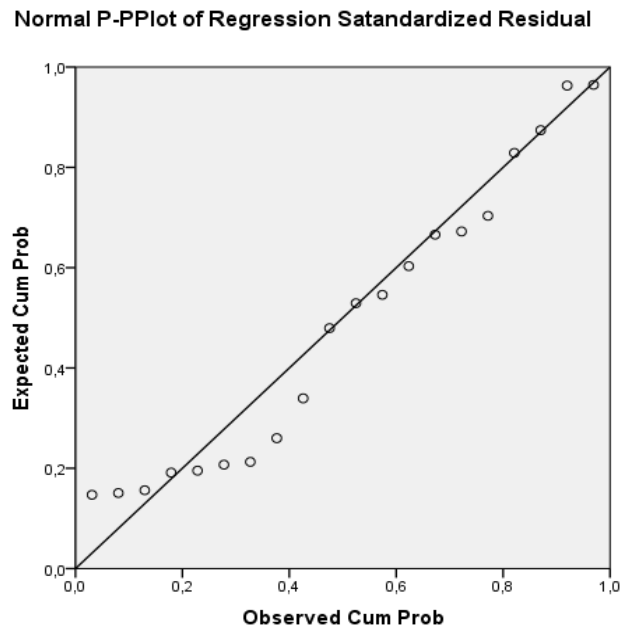
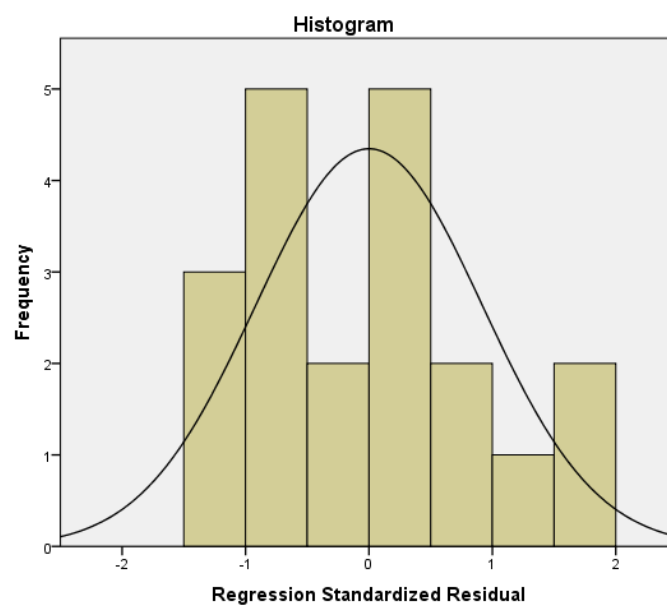
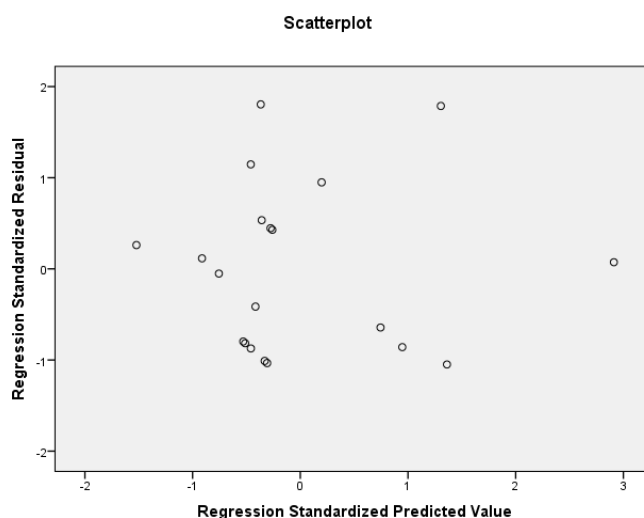


Figure 7. P-PPlot Regression of the CSR Disclosure Model



According with the results in figure 7 presents the residues have proximity to the normal distribution.

Figure 8. Scatterplot of the CSR Disclosure Model



According with the results in figure 8 reveals the existence of homoscedasticity, so the statistical inference is valid.

As per the results obtained, the model can be fit as:

$$CSR D = \beta_0 + \beta_1 \text{ EMPLOYEES} + \beta_2 \text{ COMPD} + \beta_3 \text{ TURNOVER} + \varepsilon$$

The analysis developed allows to summarize results of all hypotheses expressed in table 10.

Table 10: Summary of hypotheses results of the CSR Disclosure Model

Hypotheses	Related variables	Expected sign	Actual sign	Supported or not
1	CSR D Firm's Age	Positive (+)	Negative (-)	Akin and Yilmaz, 2016
2	CSR D Employees	Positive (+)	Positive (+)	Akin and Yilmaz, 2016
3	CSR D Firm's Size	Positive (+)	Positive (+)	Font et al. 2012
4	CSR D Turnover	Positive (+)	Positive (+)	Font et al. 2012
5	CSR D ROE	Positive (+)	Negative (-)	Not
6	CSR D ROA	Positive (+)	Negative (-)	Not

4.5. Final Considerations

The results indicate low level of disclosure on websites of the Portuguese bottle water companies. Thus, these companies are not emphasizing their websites as a tool for improving CSR practices, as well as, managers of bottle water companies do not see the dissemination of social responsibility information on their companies' websites as a competitive advantage and an important tool to demonstrate to their stakeholders their commitment with the social, environmental and financial aspects.

The authors suggested Portuguese Bottle Water Companies should adapt to the modern market requirements, and improve their websites, introducing CSR elements into their vision, mission, values, objective statements, and provide CSR reports with, social, environmental, and economic aspects. Consider that 25% of companies do not have website, the first step is to introduce it and to follow recommendations provided in this paper. The companies would increase their visibility and therefore more business opportunities and new clients.

This paper contributes to the literature by researching about the relevance of strategic CSR disclosures in the websites of bottle water companies under the background of GRI standard in the context of an important market for the Portuguese economy. Our findings have practical implications for Portuguese regulators of bottle water companies, since the research presents important conclusions to understand their influence on the level of digital CSR disclosure in their companies and underreporting areas that they need to be improved.

In line, this paper has an important scientific contribution to stakeholder theory by proposing a model to assess the CSR disclosure in the websites of companies, based on needs to meet stakeholders' expectations, which can be used by the scientific community to other research, and empower CSR policies in the academic field to achieving a more sustainable business.

Our results suggest that the Portuguese government needs to provide more detailed guidance regarding CSR activities and disclosures to firms to proactively integrate CSR into business, since the importance for CSR disclosure for the sustainability of a business,

mainly for the bottle water sector whose activity is dependent on environmental protection and from a resource fundamental to life, currently subject to the various climate changes on the planet.

Stakeholders of the Water Bottled Companies benefit from the results of this paper because the findings show the companies with more commitment with CSR practices in a sector frequently related to the impact on the environment, issue with current attention since the launch of 2030 Agenda in the European Union.

This paper is also relevant for entities that promote social responsibility in Portugal (such as APEE - Portuguese Association for Business Ethics, Global Compact Network Portugal, and CEEP Portugal – Services General Interest), which defend the extension of the social responsibility and sustainability practices to small and medium-sized companies, contrary to the existing trend of being applied to large companies, as this paper has shown. Through this investigation, these entities can help their associates to improve the social responsibility practices disclosed on their websites.

However, the conclusions of this paper must be interpreted regarding the following limitations. First, this research has a sample of 15 companies, but this is the total number of Portuguese companies with accessible websites. Indeed, may limit the generalisation of findings to companies outside the Portuguese bottle water market. Furthermore, it is a first study to research in the sector. Second, the variables used on this research are the same used to analyse the social responsibility disclosure on the companies' websites based on the GRI standards.

As future research, the authors will suggest to develop the same model applied to the water industry from another country of the world and, also, consider to extend this research to other beverages.

Chapter 5 – Sustainability Assessment of the Bottle Water Industry in Portugal

5.1. Introduction

This paper contributes to the border of knowledge in accounting concepts and their association to the sustainability of bottled water industry. Companies create value to their shareholders, and they must focus in long-term effort that manager social, environmental, technological, and regulatory trends (McKinsey et al., 2020). Further, the paper demonstrates the role of the ROCE as metric of the sustainability of the company (Wagner et al., 2012) and it could be recognized for the Sustainable Value (SV) of bottled water companies in Portugal. Furthermore, managers must resist to short-term pressure to take decisions based on profit (Penman and Tae-hee, 2015).

The Sustainability and Financial Performance is hardly ever researched non-listed companies, particularly in Portuguese Bottled Water Industry (Zahid et al., 2019; Katmon et al., 2017). The authors research about the Portuguese bottled water companies and the research has been made for two reasons. One reason is because Portugal represents an interesting geographic area to analyse since it is one of the least developed countries in euro-area and on the smallest OECD countries which impacts on the labour market and governance structures, providing sustainability as driver to lower developed country, despite belongs to capital market-oriented countries (Mani, Gunasekaran, Delgado, 2018). The second reason is the water industry knowing that Portugal is the fourth country in the European Union that consumes more bottled water and one of the richest countries in hydromineral resources known since Roman times (APIAM, 2020).

The paper is organized as follows. After this introduction, the second section review presents the literature review and hypothesis development. The third section argues on the research methods, results, and discussions. The fourth section shows conclusions and future research perspectives as recommendations of this paper.

5.2. Literature review and hypotheses development

Sustainability

Sustainable development is a part of strategy of modern company. The knowledge of this conception creates business activity due too social, environment and economic benefits. Sustainable guidelines point ways of exploring natural resources satisfying human needs and enabling business activity and its continuous development (Szczyka, 2015). In this context, the discussions of sustainability on the bottled water companies became part of a new agenda of this industry among leading water company managers. Stakeholders such as customers, landowners, and citizens were implicitly connected to the way that these managers talked about sustainability (Lauesen, 2014). For this reason, aspects of sustainability are becoming more important in the bottled water industry. This is a challenge as sustainability adds less quantifiable aspects to bottled water companies than classic process aspects. On the other side measuring sustainability is crucial for the implementation of modern bottled water companies' management and to manage sustainably in the daily business (Liebetrueth, 2017).

In addition, it is essential that companies respond to these challenges in an innovative way, allowing the efficiency and effectiveness of their business activities, help to maintain and improve natural, social and financial resources (Lozano, 2011; Rifkin, 2014; Shrivastava et al., 2012). To this purpose, the measurement of performance and analysis it's not new and it's crucial for steering the organization to understand its strategic and operational goals. Relevant performance indicators and their relationships to goals and activities need to be determined and analysed (Popova and Sharpanskykh, 2010; Liebetrueth, 2017).

The awareness to measure the performance of companies is not new and plays a significant role in turning organizational goals to reality (Linton et al., 2007; Seuring and Müller, 2008). The performance is frequently evaluated by estimating the values of qualitative and quantitative performance indicators (e.g. sales, costs, clients, products). It is crucial for the company to control the relevant indicators, how they relate to the formulated company goals and how they depend on the performed activities. Currently, managers recognize this relevant strategy and place aware determination in defining

company-specific goals, performance indicators and evaluate them (Popova and Sharpanskykh, 2010).

In this line, key performance indicators (KPI) has been converted as truly relevant analysis which is used by managers to validate decisions on ensuring financial stability and long-term growth prospects (Mysková and Hájek, 2017). There is an important and wide literature on the use of KPI represented by different indicators to assess the sustainability of the company (Gonzalez-Gil et al., 2016). But the literature seems to be focused mostly on the consistency and effectiveness of the financial performance regarded as an indicator of the company's (i.e. ROE) overall (Bunea et al., 2019). There is quite few research and evidence on other financial indicators that could influence the sustainability of the bottled water company and this paper fills the gap.

In order to research financial performance, academics normally used tools such as Balanced Scorecard analysis (Dincer et al., 2019); Economic Value Added (Altaf, 2016) and DuPont analysis (Curtis et al., 2015). These researchers based on financial indicators, and they share the fact that they included the use the sustainability (ROCE). Thus, these analyses aggregate an assessment the sustainable of the company and this is reason that it will use in this paper.

The financial incentives and the risk of corporate occupation emphasis managerial attention on the objective of growing sustainability (ROCE) for the sustainable value (SV). Rather than rely solely on managerial competence what is required are mechanisms, monitoring systems and incentives about the SV indicator's that will bring into line the management actions with the investor interests. Managers are encouraged to deliver SV and are paid bonuses or are allocated share options when they increase return on investor capital (see Fama and Jensen, 1983; Jensen and Meckling, 1976). If managers do not protect increased return on capital for investors there is an active market for corporate control that will discipline unwell performing management (Jensen, 1986, Manne, 1965). For this reason, ROCE became an important indicator for the sustainability of the company as can prove in Andersson et al. (2006) analysis that focus on the ROCE performance of S&P 500 companies and Enyi (2005) develops an empirical evaluation of financial statements of 16 companies listed on the Nigerian Stock Exchange.

The literature review implies that bottled water industry has managed indicators focus on accountability issues that are relevant for the economic, commercial, financial, and operational performance of these companies. Therefore, the objective of this paper is to assesses the sustainability of the Portuguese Bottled Water companies based on the relevant literature, such as: Neves, 2002, Rojo, 2007, Fernández, 2008, Gotze et al., 2008, Pratt and Niculita, 2008, Matos, 2009, Damodaran, 2012, Penman and Tae-hee, 2015, Ross et al., 2015, Brealey et al., 2017, Pike et al., 2018, which allow the authors detail the following hypotheses focus on broader set of stakeholders beyond just its shareholders (McKinsey et al., 2020).

Economic performance

The economic performance expresses the efficiency of using the whole patrimony of a company. This performance reflects the company's management capacity for an efficient management of the available economic goods, or the gains obtained by the invested capital (Burja and Burja, 2009). Summarizing, it could be represented by the difference between the revenue received from the sale of an output and the costs of all inputs used and any opportunity costs (Heo et al., 2020).

The relevance of economic performance to this paper is due the importance for the investors and to amount the financial position of bottled water companies, since this performance indicates how many money units can the business produce for one money unit invested (Fernández, 2008, Damodaran, 2012). A higher rate indicates an increased level of efficiency, as through a smaller capital investment, which indicates the same profit level can be obtained, which is proof of a quality management (Penman and Tae-hee, 2015). Also, a good level of the economic performance gives to bottled water companies' creditors the assurance of the companies' solvency, of the debts recovering (Ross et al., 2015). Similarly, a high economic performance shows to shareholders the capitalization degree caused from patrimony administration (Burja and Burja, 2009). Therefore, the objective of this paper is to assesses the sustainability of the Portuguese bottled water companies and based on the above literature, the authors detail the first hypothesis:

H1: Economic performance (EP) in 2006-2016 positively impact on sustainability (ROCE) of the Portuguese Bottled Water Company.

Commercial Performance

The commercial performance controls the number of days that a customer be able to wait before paying an invoice (Garrett and James, 2013). The performance is especially important because it indicates the amount of working capital that a business is willing to invest in its accounts receivable in order to generate more sales and services (Neves, 2002, Rojo, 2007, Brealey et al., 2017). Thus, a longer credit period equates to a larger investment of the company and may affect the quality of receivables (Stickney et al., 2010) and it can be compared with the industry practices of commercial credit, for example: more and less liberal policy of extending trade credit (Khan and Jain, 2007).

The relevance of commercial performance to this paper is due the fact this performance determines the strength of the bottled water company position in the beverage market and evaluate their attitude about their competitors, their practice in the beverage industry, the attitude to risk and the desire to increase sales (Gotze et al., 2008, Pratt and Niculita, 2008, Matos, 2009, Stickney et al., 2010, Pike et al., 2018). Therefore, the objective of this paper is to assesses the sustainability of the Portuguese Bottled Water companies and based on the relevant literature, such as: Neves, 2002, Rojo, 2007, Fernández, 2008, Gotze et al., 2008, Pratt and Niculita, 2008, Matos, 2009, Damodaran, 2012, Penman and Tae-hee, 2015, Ross et al., 2015, Brealey et al., 2017, Pike et al., 2018, the authors detail the second hypothesis:

H2. Commercial performance (CP) positively impacts on sustainability (ROCE) of the Portuguese Bottled Water Company.

Financial Performance

The financial performance evaluates the bottled water company's capital structure (Ng and Wang, 2010). Also, known as the leverage, is key performance indicator of financial performance that shows how creditor financing or equity capital supports the bottled water company's activities. It presents an indicator that compares borrowed funds to owner's equity (Kassi et al., 2019) and total liabilities with total assets (Psillaki and Daskalakis, 2009; Jõeveer, 2013).

The relevance of the gearing to this paper is due the fact this financial performance shows the extent to which the bottled water companies depends on debt to continue investing and financing current operations (Kara et al., 2019). The information can be used to evaluate the risk of failure of bottled water industry (Stickney et al., 2010). Therefore, the objective of this paper is to assesses the sustainability of the Portuguese Bottled Water companies and based on the relevant literature, such as: Neves, 2002, Rojo, 2007, Fernández, 2008, Gotze et al., 2008, Pratt and Niculita, 2008, Matos, 2009, Damodaran, 2012, Penman and Tae-hee, 2015, Ross et al., 2015, Brealey et al., 2017, Pike et al., 2018, which allow the authors detail the following hypotheses focus on broader set of stakeholders beyond just its shareholders (McKinsey et al., 2020).

H3: Financial performance (G) positively impact on sustainability (ROCE) of the Portuguese Bottled Water Company.

Operational Performance

The operational performance is related with the value of bottled water company's sales and revenues relative to the value of the net assets. This assessment of the operational performance allows to use the net asset turnover as a key performance indicator of the sustainability which bottled water companies may use it as efficiency of the production, knowing that net assets generate sales revenue calculated as sales revenue divided by capital employed (Stickney et al., 2010).

The relevance of operational performance to this paper is due to the fact, that the Net Assets Turnover measures efficiency of the bottled water company in generating revenue to net assets. By one hand, if the bottled water company has a lower net asset turnover, then it does not efficiently use its net assets to generate sales revenue. By the other hand, if the bottled water company has a higher net asset turnover, thus it does efficiently use its net assets. In line, a too high value may indicate too little investment while too low value relative to comparable companies suggests inefficient management (Stickney et al., 2010). Therefore, the objective of this paper is to assesses the sustainability of the Portuguese bottled water companies and based on the relevant literature, such as: Neves, 2002, Rojo, 2007, Fernández, 2008, Gotze et al., 2008, Pratt and Niculita, 2008, Matos,

2009, Damodaran, 2012, Penman and Tae-hee, 2015, Ross et al., 2015, Brealey et al., 2017, Pike et al., 2018, which allow the authors detail the following hypotheses focus on broader set of stakeholders beyond just its shareholders (McKinsey et al., 2020).

H4. Operational performance (NAT) in 2006-2016 positively impact on sustainability (ROCE) of the Portuguese Bottled Water Company.

The status of corporate sustainability practices in Portugal

Corporate sustainability practices have become increasingly important in Portuguese industry (Branco and Rodrigues, 2008; Dias-Sardinha and Reijnders, 2005; KPMG, 2006). However, only few Portuguese companies are included in sustainability indices (e.g. Dow Jones Sustainability Index (DJSI) or the FTSE4Good Index) and most are ranked low in terms of Corporate Social Responsibility (CSR) reporting and the adoption of voluntary standards (Branco and Rodrigues, 2008). Several papers were conducted to analyse the Portuguese reality. Ferreira (2004) appraised in a qualitative way the environmental reporting in Portuguese companies from the accounting perspective, based on the annual reports and accounts of ten companies, from 1997 to 2001.

Therefore, Deloitte (2003) conducted a survey on sustainable development practices in the Portuguese business sector, surveying 35 companies, mainly members of Business Council for Sustainable Development (BCSD) Portugal. Further, KPMG (2007) also carried out a survey on sustainability reporting practices in the major Portuguese companies, offering a more complete study, when compared with the previous ones. Giving the general results of these works the Portuguese scenario on sustainability reporting registers a poor performance, despite several significant initiatives.

Additionally, Branco and Rodrigues (2008) linked the corporate web pages and annual reports as media of social responsibility disclosure and studied what influenced disclosure. Furthermore, Monteiro and Aibar- Guzmán (2010) focused on the environmental disclosures made in the annual reports (financial statements) by a sample of large companies operating in Portugal. Finally, Fifka (2011) conducted an extensive international literature review about corporate sustainability reporting and found that in countries like Portugal, environmentalism and social systems were traditionally weak.

Moreover, Ramos et al. (2013) develop a survey to assess how sustainability measurement and reporting practices have been adopted in organizations that operate in a Southern European country, like Portugal, and to analyse the association between the companies' reporting profile and the environmental management systems (EMS) and environmental performance evaluation (EPE). The paper concludes that most of companies do not disclose their environmental/sustainability performance, but majority indicate that they intend to produce reports in the future and most intend to produce stand-alone reports, with sustainability reports as the first option.

Sustainable bottled water companies' accounting

Since 2015, the research and practice have been increasing their attention to the sustainable performance with the introduction of the 17 Sustainable Development Goals (SDG) Agenda by the United Nations (UN), which goal to promote and develop activities crucial for humanity and the planet over the following 15 years (United Nations, 2016). Over the past two decades an increasing framework of the accounting research for sustainability has been researched on broad concerns focus on water and the water sector (e.g. Chalmers, Godfrey, and Lynch, 2012; Crowther, Carter, and Cooper, 2006; Egan, 2014a; Hazelton, 2013; Jollands and Quinn, 2017).

Water has been the subject of a growing volume and scope of studies in accounting for sustainability (Russell and Lewis, 2014). Water-related accounting research has provided insights into several aspects, including water reporting, water accountability, water and human rights, and the role of accounting in the organisational change of water utilities (Passetti and Rinaldi, 2020). Accounting has also been used to afford the market and industrial orders in support of organisational decisions linking to the long-term economic sustainability of water governance and management. For example, Christ (2014) research about the water management across supply chain and proves that the wine producers are affecting beyond reporting water-related matters to external parties, thus he demonstrates the potential to impact their economic and environmental performance.

Adopting a different perspective, Egan (2014b) analysed the search for water efficiency initiatives during severe scarcity conditions. The analysis discloses that some companies perceived the implementation of a range of practices focused on maximising water

efficiencies as an opportunity to achieve some competitive advantage. Finally, Tello, Hazelton, and Cummings (2016) revealed the perceptions of potential users of water accounting reports prepared under the Australian General-Purpose Water Accounting framework (which regards water as a financial asset). They show that the water accounting framework was considered an instrument to improve managerial performance, rather than to simplify the discharge of duties of water accountability outside organisational limitations (Passetti and Rinaldi, 2020). Nevertheless, most of these studies did not provide facts about bottled water industry, so this paper aims to fill this gap.

5.3. Research methods

Sample and data collection

This paper deals with a sample of companies, but truly is the complete beverage industry, because the other companies do not have accounting data due to close or insolvency. Undeniably, the sample size of the paper is based on 23 bottled water companies with available annual report, 253 company-year observations was used for the analysis of 75 Key Performance Indicators (KPI). The accounting information system used to collect the data was the Balance Analysis System Iberians (BASI), as a web-based platform that provides extensive cross-company financial information over multiple time periods. This paper demands the case study methodology (Yin, 2019) to conjoin the exploratory data from the accounting information system into confirmatory data with panel data methodology (Wooldridge, 2010, Greene, 2018). The SAS 9.4 was used to test the hypothesis (SAS, 2015).

The period of analysis with range of eleven years (2006-2016) is due to the availability and the accessibility of the accounting data that it has been the main difficulty faced, particularly due to retrospective and prospective data to prepare the procedures conducted to ascertain whether the assumptions and development of the econometric model were appropriate.

Research method

Panel data models with fixed effects have strained considerable attention in the last decade (Feng et al., 2019). In macroeconomics, interactive fixed effects can be

incorporated to account for the heterogeneous influences of unobservable common shocks that affect all countries or companies (Floro and Van Roye, 2017; Boneva and Linton, 2017). In microeconomics, panel data models with interactive fixed effects can also find wide applications. For instance, in earning studies, interactive fixed effects can be involved to account for unmeasured skills or unobservable characteristics such as innate ability, perseverance, motivation, and industrious (Bai, 2009). In addition, the model with interactive fixed effects can be commonly used in several sub-fields of economics such as production economics, economic development, international trade, between others (Feng et al., 2019). Consider the issue to be examined in the application of this paper — the issue of sustainable of Portuguese Bottled Water Companies based in the key performance indicators the authors consider the panel data models with fixed effects the most reasonable choice because this paper is not a sample of companies but the complete beverage industry.

Furthermore, founded on whether the individual effects being correlated with the observed explanatory variables of the panel data model can be separated into two classes. One is the random effects panel data model in which the individual effects are random and uncorrelated with the explanatory variables, and the other is the fixed effects panel data model in which the individual effects are not random, or the individual effects are random but are correlated with the explanatory variables (Hu et al., 2014). But, if the individual effects are fixed, using random effects panel data modelling method will result in an inconsistent estimator. If the individual effects are random, using the fixed effects panel data modelling method will still result in a consistent estimator although it is not efficient. Thus, the fixed effects panel data modelling way is more robust than the random effects panel data modelling. Fixed effects panel data modelling has been a hot topic in econometrics since it was proposed (Hu et al., 2014; Baltagi, 2013). For this reason, panel data models with interactive fixed effects have strained considerable attention in the last decade and have been widely used in practice (Feng et al., 2019).

In panel fixed effects models, the idiosyncratic errors are assumed to be mutually independent both within the individual and between individuals. Due to an increasing availability of data, serial correlations and cross-sectional dependences are common in large panel data, where both the cross-section dimension (N) and the time series dimension (T) are large (Qiu et al., 2019). Finally, the observations in panel data can

include at least two dimensions: a cross-sectional dimension and a time series dimension. Such two-dimensional data set makes the researchers be able to construct complex models and conduct efficient statistical implications using pure cross-section data or time-series data (Hu et al., 2014).

Dependent variable

Several studies observe that accounting information system are important since they are used to construct and support the accounting information system of the sustainability presented in financial reports and investor presentations. This accounting information system includes the analyst reports on sustainable performance used to inform asset management (Barth, 2000). These annual reports employ several metrics including the sustainability (ROCE). This metric shares a common platform in that they employ earnings and capital employed in their computations (Andersson et al., 2006). ROCE is a metric normally used to support accounts of the sustainable value presented by management in their financial reports and to investor presentations (Andersson et al., 2006), for this reason deals with accountability in this paper. In addition, ROCE is a measure of a company’ sustainability linked to the capital employed to accomplish this result (that could be positive or negative). This is calculated by dividing the earnings before interest and tax (EBIT) by the capital employed. Capital employed is usually defined as total assets fewer current liabilities. The higher the ROCE, the more efficient the company is in using available capital (MacDiarmid et al., 2018).

Independent variables

This research considers for independent variables the financial performance who present significant correlations ($r > 0.1$) with dependent variable (sustainability (ROCE)). The correlations are presented in table 11.

Table 11. Correlations with dependent variable

Correlations with dependent variable, N = 253										
	EP	CP	CE	CPd	G	NAT	PM	PE	ROA	SR
ROC	0.374	-	-	-	0.130	-	0.465	0.181	0.375	0.102
E	87	0.1577	0.2577	0.4162	43	0.2540	00	56	05	57
		5	8	1		3				

According with Table 11 the variables that presents positive and significant correlations dependent variable (sustainability (ROCE)) are: 0.465 with Profit Margin (PM) characterizes the percentage of sales has turned into results (profit when positive and losses when negative) (Thacker et al., 2020); 0.37505 with ROA (Return on assets) indicates the actual company performance and looks carefully at how efficiently the business is by the shareholder assets to earn returns, his measurement is a well-understood decision of the Board of the company. ROA is established as net income before interest expense for the fiscal period divided by total assets for equal period (Thacker et al, 2020); 0.37487 with Economic profitability (EP) represents the difference between the revenue received from the sale of an output and the costs of all inputs used and any opportunity costs (Heo et al., 2020); 0.18159 with Profit per Employee (PE) roughly measures how much money each employee generates for the company (Garrett and James, 2013); 0.13043 with financial performance (G) is the leverage that shows how creditor financing or equity capital supports the company's activities. It generates information that allow to compare borrowed funds to owner's equity (Kassi et al., 2019); 0.10257 with the Solvency Ratio (SR) measures the total debts (liabilities) by the total assets (e.g., Garman and Forgue, 2018, Garrett and James, 2013, Kim and Lyons, 2008, Lee and Kim, 2016). The higher the result, the greater the debt burden (Heo et al, 2020).

According with Table 11 the variables that presents negative and significant correlations dependent variable (sustainability (ROCE)) are: -0.46121 with Credit period in days (CPd) that control the number of days that a customer is allowed to wait before paying an invoice (Garrett and James, 2013); -0.25778 with Commercial performance (Collection period-CP) that characterizes the amount of time it takes for a business to receive payments owed by its clients in terms of accounts receivable (Garrett and James, 2013); -0.25403 with Operational performance (Net Asset Turnover-NAT) who measures the value of a company's sales or revenues relative to the value of its assets. The asset turnover can be used as an indicator of the efficiency with which a company is using its assets to generate revenue (Thacker et al., 2020); -0.15775 with costs of employee (CE) that determine aspects of the compensation, benefit, and travel and entertainment costs of employees, and aggregate this information by employee (Garrett and James, 2013).

Research model

A pooled fixed effects panel model was developed using sustainability (ROCE) as the dependent variable and an Ordinary Least Squares (OLS) regression test was used to estimate the model. The OLS multiple regression was considered appropriate for the testing hypotheses of the paper. According to Baltagi (2013), Hsiao (2014), Hair et al. (2018) and Wooldridge (2010) the following research model was utilized to test the causal hypotheses of the research which is presented in an econometric form showed in Equation (1).

$$\begin{aligned} ROCE_{it} = & \beta EP_{it} + \beta CE_{it} + \beta CPd_{it} + \beta CP_{it} + \beta G_{it} + \beta PM_{it} \\ & + \beta PE_{it} + \beta ROA_{it} + \beta SR_{it} + \beta NAT_{it} + \alpha_0 \end{aligned} \quad (1)$$

where $ROCE_{it}$ is sustainability (return on capital employed) in year t for company i , βEP_{it} is the economic performance (economic profitability), the βCE_{it} is the costs of employee, βCPd_{it} is the commercial performance (collection period), βCP_{it} is the credit period, βG_{it} represents the financial performance (gearing), βPM_{it} represents the profit margin, βPE_{it} is the profit per employee, βROA_{it} is the return on total assets, the βSR_{it} is the solvency ratio, βNAT_{it} is the operational performance (net assets turnover) and, finally, α_0 indicates the constant term.

5.4. Results and discussions

Descriptive statistical analysis

Table 12 shows the descriptive statistics of variables Economic performance (EP); Commercial performance (Collection period-CP); Costs of employee (CE); Credit Period (CPd); Financial performance (G); Operational performance (NAT); Profit Margin (PM); Profit per Employee (Th.) (PE); Return on Total Assets (ROA) and Solvency Ratio (SR).

The bottled water companies in the sample earned low sustainability level due to the ROA mean was 0.5 percent, and the capacity to generate profit is also low 0.59% (economic profitability). In addition, these companies have a negative percentage of revenue (-5.44) indicated by the profit margin ratio. According to values, this segment of business has a larger mean collection period (186 days) and consequently a higher credit period (113

days), because they have not enough cash to meet their financial obligations since their clients demand considerable amount of time to pay.

Table 12. Descriptive statistics (N=253)

Variable	Mean	Std.	Sum	Minimum	Maximum
EP	0.59	13.20	149.00	-46.00	86.00
CP	186.07	269.22	47.08	0.00	1.74
CE	9.26	15.95	2.34	-32.00	101.00
CPd	113.11	294.84	28.62	0.00	3.86
G	99.76	629.93	25.24	-8,88	2.57
NAT	1.14	2.83	290.00	-32.00	25.00
PM	-5.44	47.39	-1.38	-547.00	165.00
PE	3.83	27.69	971.00	-45.00	237.00
ROA	0.50	13.17	126.00	-46.00	86.00
SR	26.09	38.94	6.60	-238.00	90.00

By other hand, the values of the company's solvency ratio (26.09), indicate a greater the probability that the companies will default on its debt obligations. Finally, the lower ratio (1.14) on net assets turnover shows the inefficiency of companies in generating sales and revenues. These statistics indicate that on mean, the sustainability of the Portuguese bottled water companies has lower level of efficiency.

Pearson correlation coefficients

The Pearson's correlation matrix was performed to test for multicollinearity among the independent variables (Weisberg, 2005). The results of the table 3 reported two collinearities with the variables Profit Margin (PM) and Return on Total Assets (ROA), so they were eliminated.

Table 13. Pearson Correlation Coefficients (N= 253)

	EP	CP	CE	CPd	G	NAT	PM	PE	ROA	SR
EP	1.00000									
CP	-	1.00000								
	0.14414									
CE	-	0.62603	1.00000							
	0.24364									
CPd	-	0.33679	0.19440	1.00000						
	0.29894									
G	0.13859	-	-	-	1.00000					
		0.13047	0.15029	0.01990						
NA	0.05357	0.06684	0.23389	-	-	1.00000				
				0.00030	0.03853					
PM	0.64155	-	-	-	0.12975	-	1.00000			
		0.37378	0.38492	0.76481		0.01413				
PE	0.47199	-	-	-	0.06426	0.08280	0.29307	1.00000		
		0.17797	0.18136	0.12293						
ROA	0.99719	-	-	-	0.13948	0.05297	0.64056	0.46597	1.00000	
		0.14638	0.24089	0.29855						
SR	0.53070	-	0.02194	-	0.02792	0.03188	0.35250	0.25524	0.52504	1.00000
		0.02219		0.23389						

Fixed Two-Way Estimates

The panel data has the time dimension (T period = 11 years) from 2006 to 2016 is smaller than the cross-sectional dimensions (n individuals = 23) with Portuguese Bottled Water Companies. It is appropriate to use the fixed effects regression model rather than the random effects model (Fan et al., 2017). Furthermore, the fixed effects panel model was the more reasonable choice because this is not a sample of individuals but all companies. In addition, the results obtained in F-test confirm that fixed effects model is better than random effects model. The statistical output of the fixed two-way estimates is presented in Table 14.

Table 14. Fixed Two-Way Estimates (N= 253)

Parameter Estimates						
Variable	DF	Estimate	Standard Error	t Value	Pr > t	Label
CS1	1	48.0377	35.9021	1.34	0.1823	Cross Sectional Effect 1
CS2	1	20.8556	34.8509	0.60	0.5502	Cross Sectional Effect 2
CS3	1	2.8597	37.5271	0.08	0.9393	Cross Sectional Effect 3
CS4	1	32.1009	33.7264	0.95	0.3423	Cross Sectional Effect 4
CS5	1	10.7831	33.6237	0.32	0.7488	Cross Sectional Effect 5
CS6	1	16.5697	32.4576	0.51	0.6102	Cross Sectional Effect 6
CS7	1	15.6828	32.8564	0.48	0.6336	Cross Sectional Effect 7
CS8	1	24.8357	32.0018	0.78	0.4386	Cross Sectional Effect 8
CS9	1	42.9201	32.3841	1.33	0.1865	Cross Sectional Effect 9
CS10	1	17.5299	32.9205	0.53	0.5949	Cross Sectional Effect 10
CS11	1	3.3336	32.1909	0.10	0.9176	Cross Sectional Effect 11
CS12	1	0.6679	32.0177	0.02	0.9834	Cross Sectional Effect 12
CS13	1	0.8002	33.7535	0.02	0.9811	Cross Sectional Effect 13
CS14	1	156.4303	38.9591	4.02	<.0001	Cross Sectional Effect 14
CS15	1	24.2334	33.5445	0.72	0.4708	Cross Sectional Effect 15
CS16	1	23.0347	31.9719	0.72	0.4720	Cross Sectional Effect 16
CS17	1	-18.0553	52.3635	-0.34	0.7306	Cross Sectional Effect 17
CS18	1	5.7477	29.6446	0.19	0.8464	Cross Sectional Effect 18
CS19	1	13.7209	32.7666	0.42	0.6758	Cross Sectional Effect 19

CS20	1	-1.4476	34.4112	-0.04	0.9665	Cross Sectional Effect 20
CS21	1	16.8878	31.9722	0.53	0.5979	Cross Sectional Effect 21
CS22	1	-4.7442	30.6502	-0.15	0.8771	Cross Sectional Effect 22
TS1	1	10.2091	21.6058	0.47	0.6370	Time Series Effect 1
TS2	1	12.8192	21.4815	0.60	0.5513	Time Series Effect 2
TS3	1	10.6282	21.7906	0.49	0.6262	Time Series Effect 3
TS4	1	-20.7990	21.5519	-0.97	0.3356	Time Series Effect 4
TS5	1	23.7101	21.2847	1.11	0.2666	Time Series Effect 5
TS6	1	37.9856	20.6207	1.84	0.0669	Time Series Effect 6
TS7	1	13.9595	21.0279	0.66	0.5075	Time Series Effect 7
TS8	1	8.1114	20.8198	0.39	0.6972	Time Series Effect 8
TS9	1	-2.0052	20.2617	-0.10	0.9213	Time Series Effect 9
TS10	1	7.1866	19.9881	0.36	0.7195	Time Series Effect 10
Intercept	1	2.2900	34.4966	0.07	0.9470	Intercept
EP	1	1.3203	0.5712	2.31	0.0218	
CP	1	-0.0207	0.0318	-0.65	0.5150	
CE	1	0.8011	0.7836	1.02	0.3078	
CPd	1	-0.1270	0.0171	-7.44	<.0001	
G	1	0.0151	0.0075	2.01	0.0462	
NAT	1	-8.2618	1.6725	-4.94	<.0001	
PE	1	0.2963	0.1950	1.52	0.1301	
SR	1	-0.3286	0.2067	-1.59	0.1133	

F-test = 1.55 (p-value: 0.0367)

R² = 0.4702

Additionally, with the panel model with two-way effects the authors pretended checking for differences between individuals (cross sectional) and differences in time (time series effects) but the results indicated for time series effects there are not significant differences. But there is significant difference only between two companies: cross-sectional effect 14 and cross-sectional effect 23 which is reference category. Other differences are not significant. These two differences are significant between these two companies because CS14 are a small company, with a few years of existence, therefore having fewer financial data available, unlike the company CS23, which is a large company consolidated in the market for several years, develops its activity also in the tourism area, and is part of a large distribution company. Therefore, the availability of financial data logically constituted a differentiating element between these two companies, leading to the results obtained.

The findings for hypotheses H1, H2, H3 and H4 show that for explanatory variables companies' Economic performance (EP), Commercial performance (Collection period-CP), Financial performance (Gearing-G) and Operational performance (Net Assets Turnover-NAT) are significant drivers of sustainability of Portuguese Bottled Water industry. The variable companies' economic performance (EP) has a significant positive association with sustainability (ROCE) because a higher economic performance (EP) gives a higher return on capital employed. One-unit increase in companies' economic performance (EP) gives 1.32 units increase the sustainability (ROCE).

The variable companies' commercial performance (Collection period-CP) has negative effect with ROCE since a higher credit period results in lower return on capital employed. One-unit increase in commercial performance (Collection period-CP) results in 0.127 units decrease within sustainability (ROCE). Subsequently, the financial performance (Gearing-G) have a significant positive association within sustainability (ROCE) ROCE, because, a higher gearing results in higher return on capital employed. One-unit increase in financial performance (Gearing-G) results in 0.015 increase in ROCE. Finally, the operational performance (NAT) has a negative effect within sustainability (ROCE) since a higher net assets turnover results in lower return on capital employed. One-unit increase in operational performance (NAT) results in 8.26 units decrease the sustainability (ROCE).

The analyses developed allow to summarize the results of the four hypotheses expressed in table 15, based on the methodology of the fixed effects panel model of two-way structure estimates a pooled data composed from 253 company-year observations of 75 Key Performance Indicators (KPI) over the period 2006–2016.

The summary of hypotheses test results of the model indicated that economic (economic profitability) and financial (gearing) performance have a significant positive impact within on sustainability measure by the return on capital employed as the most important KPI to assessment sustainability.

And that commercial (credit period in days) and operational (net assets turnover) performance has a significant negative impact within on sustainability measure by the return on capital employed as the most important KPI to assessment sustainability.

Table 15. The summary of hypotheses test results

Hypotheses	Performance	Dependent variable	Independent variables	Expected sign	Actual sign
1	Economic	Sustainability (ROCE)	EP	Positive (+)	Positive (+)
2	Commercial	Sustainability (ROCE)	CP	Positive (+)	Negative (-)
3	Financial	Sustainability (ROCE)	G	Positive (+)	Positive (+)
4	Operational	Sustainability (ROCE)	NAT	Positive (+)	Negative (-)

However, the positive effect of the on the return on capital employed and economic profitability to assessment sustainability of the Portuguese bottled water companies, due to the determinants of the productivity of the bottled water industry. Thus, the knowledge of the reality of the bottled water industry shows water as a natural resource (Amores et al., 2013). For this reason, the sustainability concerns arise as a strategic decision the bottled water industry that faces challenges as new demands to be more concerned with economic growth (Aras and Crowther, 2009).

Regarding the last hypothesis of the table 6, there are a positive effect of the on the return on capital employed and net assets turnover to assessment sustainability of the Portuguese bottled water companies and the demands for more social equity, respect with the environment, moderate climate changes and limited natural resources as water (Crowther and Rayman-Bacchus, 2004).

5.5. Final Considerations

This research contributes to the literature concerning about how formal and informal factors promote a higher sustainability on the Portuguese Bottled Water Industry. The implementation of good sustainability practices increases transparency of company's operations, ensures accountability, and improves company's profitability. It also helps to defend the attention of the shareholders by supporting their interest with the managers.

This research is relevant to the accounting and finance departments of the Portuguese Bottled Water Industry because it deals with the way how companies are managed and controlled his accountability, so an efficient sustainable practice in bottled water

companies support the business to scope its goals, as well as its economic, commercial, financial and operational performance.

The research assists managers of the Portuguese Bottled Water Industry to understand the influence of the KPI of the performance of the bottled water. Indeed, the challenges of the relationship of the sustainability and ROCE allow managers to develop strategies for improving the overall efficiency of their industry. The results of this research highlighted that economic performance (economic profitability) and financial performance (gearing) have the maximum positive impact on the sustainability (ROCE). This evidence related with two performances demand significant attention for the efficient management. So, the bottled water managers can carry out activities for enhancing and improving the level of efficiency, through a smaller capital investment.

The workers of the bottled water companies benefit from the results of this paper because through this research they took note of the sector's reality in terms of economic performance and the bottled water company's profitability. Also, the company will be able to sustain its employees through better salaries, rewards, working conditions and job security in terms of financial performance. In addition, such bottled water companies can allow clients to delay payments of goods/service to increase sales and services in terms of commercial performance.

The shareholders of the Water Bottled Companies benefit from the results of this paper because the findings show the most suitable key performance indicators to measure the sustainability of these companies, crucial for investment decisions. This investigation also supports in knowing how bottled water companies has been performing. According to the results obtained sustainability (ROCE), Economic performance (EP), Gearing, Credit Period days and Net Assets Turnover are the most important key performance indicators for sustainable value to validate bottled water companies.

Policymakers can also benefit from the results of this paper, following the most suitable financial indicators that effect the performance of bottled water companies in time, they can prove to investors, in their effort to attract them, that the industry is sustainable in the long run. ROCE is arguably the fairest and most important metric of sustainability. Thus,

the annual report of the company will see this indicator as power information to stakeholders.

The society benefits from the results of this paper since this type of industry is rarely studied and this investigation recognise the reality of the sector in terms of sustainability, and the difficulties that the sector is going through, since is a relevant sector for the country and his activity depends for a natural resource with great impact on the environment.

This paper reviews the relevant literature that use sustainability (ROCE) as metric to contribute to the assessment of the sustainability of Portuguese Bottled Water Companies. It also contributes to the sustainability disclosure research by showing that sustainability (ROCE) is related with Economic performance (EP), credit period in days, net assets turnover and gearing. Powerful drivers of sustainability (ROCE) were Economic performance (EP) and gearing with a positive influence and credit period in days and net assets turnover with a negative influence.

The paper highlights the role of the accounting information system in generating relevant information to assessment the performance of the company and their sustainability through fixed effects panel model as legitimacy model to the sustainability accounting research.

This paper demands, despite its importance, several future perspectives of research. First, the paper context was on the Portuguese Bottled Water Industry and, in the future, it will highlight other countries to assess sustainability on the water industry. Undeniably, it is also recommended to research performance integrated in context of the Global Reporting initiative (GRI) and then could incorporate the new corporate sustainability reporting standards.

CONCLUSIONS

Conclusions

The growing number of empirical and theoretical works that analyse sustainable issues are currently receiving more attention in scientific research in various industrial sectors since the heterogeneous results obtained. In order to expand the existing literature, this investigation study a sector under increasing pressure to manage several contemporary factors, such as an exploration of a natural resource identifying the drivers, barriers, and good sustainable practices carried out by bottle water companies from a CSR perspective.

CSR in water sector literature has been discussed from various perspective but these issues are rarely mentioned in context of bottle water industry. The present study addresses this issue by demonstrating the impact of CSR practices employed in bottle water companies in Portugal to overcome the competitive environment challenges and the recent environmental policies in Portugal and Europe.

The implementation of good CSR practices increases transparency of company's operations ensures accountability and improves firm's profitability. It also helps to defend the interest of the shareholders by supporting their interest with the managers. This investigation concludes that the CSR is the main driver of firm performance and that it is an important concept because deals with the way how firms are managed and controlled his accountability, so an efficient CSR business strategy support bottle water companies to scope its financial performance, as well as their sustainability.

The general objective of this doctoral thesis is to study the factors that influence the sustainability of bottle water sector in Portugal in line with the Corporate Social Responsibility (CSR) practices, through a review of the theoretical foundations that support these work, and the methodology used, providing insights on the link between CSR and sustainable development in the bottle water context.

In the first place, the investigation about Water as a Public or Private Good: The Future of Water in Portugal allow to explore the geography of water definitions across the Portuguese region and to identify how water is defined in relevant national legislation.

However, the intense bureaucratic and political context in Portugal difficult the management of water resources, as well as its Mediterranean climate, the limitations of the large river basins common with Spain, and the restrictions subsequent from administrative division and spatial planning.

Additionally, the economic and social development of Portugal in various sectors like irrigation, hydroelectric power generation, ports, water supply and sanitation impact the water policies, but with the consequent Portugal's admission into the European Union (EU) in 1986, water policy progressively shifted to concerns with institutional and normative environmental demands more focused on the sustainable and integrated use of water resources.

Furthermore, the research related with the Digital Corporate Social Responsibility Reporting in the Water Industry, highlighting the websites as a tool for improving CSR practices and to demonstrate to their stakeholders their commitment with the social, environmental, and financial aspects. The results indicate generally low level of disclosure on the websites of the Portuguese bottle water companies, and the main factors that influence the level of disclosure are the companies' size, number of employees and turnover.

The results of this study also indicate, all the CSR practices disclosed are implemented superficially by the companies of bottle water industry, and there are ample opportunities for improvement. In line with the literature review that related an incipient CSR disclosure in Portugal, there is still much to be done to ensure that CSR practices are properly disclosure in bottle water companies and the principles linked to sustainable development need to be correct applied inside to all organizations.

Moreover, the bottle water managers need to understand that the gains due to the disclosure of CSR practices, go far beyond simple social and environmental activities, and allow to improve their communication with the stakeholders, to manage their online reputation, to rise their transparency, to disclosure non-financial information, to demonstrating their commitment with environmental policies since this sector is very compromised with the environmental impacts, principally with the last developments in this field in Europe and Portugal.

The last investigation developed highlighted that economic performance (economic profitability) and financial performance (gearing) have the maximum positive impact on the sustainability (ROCE). This evidence related with two performances demand significant attention for the efficient management. So, the bottled water managers can carry out activities for enhancing and improving the level of efficiency, through a smaller capital investment.

After analysing the different investigations it's evident that CSR is the main tool to implement sustainable development in bottled water companies and ensure their sustainability in implementing the sustainable development goals established by the European Union in the 2030 Agenda.

The dissemination of corporate social responsibility practices in the bottled water sector can create favourable conditions to improve the reputation of these companies, making them more transparent, aiming at sustainable development, especially at an environmental level through increased efficiency in the use of water resources, use of energy in the production process and transport, as well as in packaging. These conclusions suggest the following implications at various standpoints.

Discussion and Implications of the PhD Thesis

This thesis contributes to the literature by investigating the value relevance of strategic CSR disclosures in the websites of bottle water companies under the background of GRI standard in the context of an important market for the Portuguese economy. The findings have practical implications for Portuguese regulators of bottle water companies, since the research presents important conclusions to understand the factors that influence the level of digital CSR disclosure in their companies and areas underreporting that need to be improved.

This research is also relevant to the accounting and finance departments of the Portuguese Bottled Water Industry because it deals with the way how companies are managed and controlled his accountability, so an efficient sustainable practice in bottled water

companies support the business to scope its goals, as well as its economic, commercial, financial, and operational performance.

By other hand, the research assists managers of the Portuguese Bottled Water Industry to understand the influence of the KPI of the performance of the bottled water. Indeed, the challenges of the relationship of the sustainability and ROCE allow managers to develop strategies for improving the overall efficiency of their industry.

The workers of the bottled water companies can benefit from the results of this paper because through this research they took note of the sector's reality in terms of economic performance and the bottled water company's profitability. Also, the company will be able to sustain its employees through better salaries, rewards, working conditions and job security in terms of financial performance. In addition, such bottled water companies can allow clients to delay payments of goods/service to increase sales and services in terms of commercial performance.

Shareholders of the Water Bottled Companies benefit from the results of this paper because the findings show the most suitable key performance indicators to measure the sustainability of these companies, crucial for investment decisions. This investigation also supports in knowing how bottled water companies has been performing. According to the results obtained sustainability (ROCE), Economic performance (EP), Gearing, Credit Period days and Net Assets Turnover are the most important key performance indicators for sustainable value to validate bottled water companies.

Policymakers benefits from the results of this paper, following the most suitable financial indicators that effect the performance of bottled water companies in time, they can prove to investors, in their effort to attract them, that the industry is sustainable in the long run. ROCE is arguably the fairest and most important metric of sustainability. Thus, the annual report of the company will see this indicator as power information to stakeholders.

Society benefits from the results of this paper, since this type of industry is rarely studied and this investigation recognise the reality of the sector in terms of sustainability, and the difficulties that the sector is going through, since is a relevant sector for the country and his activity depends for a natural resource with great impact on the environment.

In line, this investigation has an important scientific contribution to stakeholder theory by proposing a model to evaluate the CSR disclosure in the websites of the companies, based on the need to meet stakeholders' expectations, which can be used by the scientific community to other research, and empower CSR policies in the academic field to achieving a more sustainable business.

Our results suggest that the Portuguese government needs to provide more detailed guidance regarding CSR activities and disclosures to firms to proactively integrate CSR into business, since the importance for CSR disclosure for the sustainability of a business, mainly for the bottle water sector whose activity is dependent on environmental protection and from a resource fundamental to life, currently subject to the various climate changes on the planet.

Stakeholders of the Water Bottled Companies benefit from the results of this paper because the findings show the companies with more commitment with CSR practices in a sector frequently related to the impact on the environment, issue with current attention since the launch of 2030 Agenda in the European Union.

This paper is also relevant for entities that promote social responsibility in Portugal (such as APEE - Portuguese Association for Business Ethics, Global Compact Network Portugal, and CEEP Portugal – Services General Interest), which defend the extension of the social responsibility and sustainability practices to small and medium-sized companies, contrary to the existing trend of only being applied to large companies, as this paper has shown. Through this investigation, these entities can help their associates to improve the social responsibility practices disclosed on their websites.

Limitations of the PhD Thesis

The conclusions of this PhD Thesis must be interpreted regarding the following limitations. First, this research is restricted to a sample of companies that operate in market of bottle water industry, which may limit the generalisation of the findings to companies outside the Portuguese bottle water market.

Second, the limitation could be related with variables, models and standards chosen to develop the current research, however the methodology used are based in the literature review.

Future lines of PhD Thesis

Several future studies can be done on this topic. For example, a larger database including other beverage sector can be combined with other statistical methods, potential variables, methods, and standards. Further research could also be performed in a different country because of the multiplicity of factors that influence the implementation of CSR practices, such as the local cultural context, government support and management skills.

Future research may focus on the effect of the coronavirus crisis or in the recent conflict between Russia and Ukraine in the bottle water sector. Researchers may analyse the challenges this sector are facing in redesigning their business strategy, processes, and key performance indicators, since this situation impacts on their sustainability, affects their productivity at the level of the supply chains and production costs.

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