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ISO 26000 for Corporate Social Responsibility: Guidance and Practices applied in ICT Companies

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ISO 26000 for Corporate Social Responsibility: Guidance and Practices applied in ICT Companies

Zompras Angelos

Abstract

Corporate Social Responsibility (CSR) concerns the way in which organizations achieve their goals by promoting sustainability in all dimensions across business operations. In recent years, various organizations and companies have been involved in frequent corporate scandals related to safety, health and global environmental problems. Organizations are required not only to pursue profits, but also to consider consumer health, safety on the working environment and protection of the environment. CSR has become an important issue for companies, shareholders and stakeholders since it impacts all the aspects of organization's activities.

This degree essay focuses on the overview of the CSR as well as the endpoint of the continuous development of CSR, the ISO 26000 standard and its seven core subjects. The standard divides the topic of social responsibility into seven components: organizational management, human rights, labor practices, the environment, good business practices, interaction with consumers, participation in the life of local communities and their development. Understanding the ISO 26000 standard will give ICT professionals a set of guiding principles in order to define what CSR means to them.

Afterward, the degree essay investigates some corporate social responsibility reports, published by companies via corporate websites with the goal of sharing their corporate social responsibility actions and results. I choose some of the top ICT companies in order to identify issues that these companies deal with as well as in which issues related to the core subject of ISO 26000, they primary focus. Then, I compare these findings with older investigations on social responsibility reports that have been done 5 years ago to conclude if these companies changed their procedures and their operations throughout the years.

The last chapter of this degree essay provides an overview on how IT/ICT companies can shift towards social responsibility by integrating practices and technologies that benefit community, environment and stakeholders. Best practices and procedures such as Green Data center, Cloud Computing, Virtualization, Green Software Engineering etc. are analyzed for their potential impact and contribution on sustainability, thus social responsibility.

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1. Introduction

We have entered an era in which sustainable consideration for products and services is required as the environment of the Earth deteriorates and consumers and users who demand safety and security increased, hence they differentiate brands according to the degree of social responsibility they present. For the successful and sustainable development of its business, a company must not only produce goods and provide services that satisfy the client, but at the same time must ensure environmental safety and guarantee social responsibility. Cases and events like the economic crisis of 2008 or Covid-19 contributed to the development of opportunistic behavior of business structures, thus negative impact on CSR has increased.

CSR is the voluntary consideration of social and environmental issues that arise in business operations and relationships with stakeholders. Social responsibility means investing in human capital and in the environment as well as relationships with stakeholders beyond what is required by law. This is voluntary, but unless you do it reliably, you will not be able to build trust and credibility with your stakeholders. Through social contribution activities, an organization optimizes the relationship with the stakeholders (interested parties) surrounding the organization and improves its corporate image.

The question in the continuous exploration of social responsibility was if it should be a legally binding or voluntarily accepted document. As an actual endpoint of this exploration, the ISO 26000 is integrating previous theoretical and practical insights, and is combining expert knowledge with the legitimization of an international standard. The main goal of the ISO 26000 standard is to strengthen the social position of the organization and increase its social activity by providing guidelines and practical indications for implementing and integrating social responsibility in organization's policies, activities, guidelines, objectives and strategies, performance evaluation, reporting and communication. ISO 26000 aims to increase the information transparency of an organization and improving its corporate governance.

Over the past few decades, ICT technologies have been settled in people's daily life. Developing exponentially, they are able to directly and indirectly affect and bring consequences in society, hence the problem of social responsibility in the field of information and communication technology is quite new and little investigated. Issues of privacy, ethics of behavior on the Internet, intellectual property, energy consumption, e-waste and others require careful study by specialists of different disciplinary areas. Today, social responsibility is becoming a requirement of society for organizations of all forms of ownership around the world. CSR should:

- enable the organization first of all to go beyond its legal obligations. It would not be not just to comply with legal obligations, but to go beyond,
- to cooperate closely with its stakeholders and shareholders,
- finally, to broaden its objectives to include extra-financial issues.

In the next chapter (chapter 2) I will introduce viewers to the concept of Social Responsibility. Firstly, I will review the history of Social Responsibility and its current place in the business world. Then, I analyze the essential components of Social Responsibility such as the stakeholders, the sustainable development and other topics related to. Viewers should understand after this chapter the meaning of Social Responsibility and its correlation with sustainability and ISO 26000.

2. Corporate Social Responsibility

2.1 Definition of Social Responsibility

CSR is an acronym for "Corporate Social Responsibility," which refers to social responsibility in the business and entrepreneurship industry. It means that a company does not lean only toward profit supremacy but takes voluntary action with a strategy in order to fulfill its responsibilities to stakeholders i.e. of all the figures with whom they interact in various capacities: shareholders, investors, workers, customers, suppliers, citizens, distributors, competitors, communities, institutions, physical environment, associations, mass media, banks, insurance companies, and to society as a whole. Simply put, it's not just about a company pursuing its own interests, but acting to improve society. A CSR approach means that an organization must make appropriate decisions while considering a wide range of matters, that is consideration for employees, consumers, investors, the environment, to social contribution. In some cases, a company makes use of its strengths to work for the benefit of the local community, and in other cases engages in social contribution activities that are not directly related to the business. While a company is a profit-making organization and it has a mission to pursue profits, there is an increasing idea that it should fulfill its social responsibilities, including not only profits but also consideration for consumer health and environmental maintenance. In addition, the explosive increase in the amount of information distributed due to the spread of the Internet quickly spreads the negative image of companies. Thus, a socially responsible approach to doing business includes but not limited to:

- ✓ high-quality satisfaction of the needs of consumers using organization’s services and products;
- ✓ strict compliance with the law;
- ✓ ensuring labor safety and investing in human development;
- ✓ care for the environment and sustainability;
- ✓ effective investments in the development of production aimed at increasing competitiveness in the interests of the organization and society;
- ✓ openness and transparency of social reporting, development of the organization’s activities in the field of CSR;
- ✓ considering the expectations and opinions of stakeholders by making a systematic approach to building mutually beneficial relationships with them, based on ethical requirements.

Although from time to time different definitions have been given for the definition of Corporate Social Responsibility (CSR), there is not an internationally accepted definition to describe it. In most definitions it has the meaning of practices; that is the measures taken voluntarily by an organization for the welfare of society both in living conditions and environmental issues. The relevant literature is extensive and every scholar or organization that has dealt with the subject has develop a different definition. This happens because of the multidimensional character of the concept, its complexity and the wide range of topics and issues that tries to address. In addition to this, CSR has a strongly subjective element regarding the measurements and evaluation of the results of the actions and policies that companies implement.

In view of its complex and broad range of issues: business ethics, human rights, environmental management, community development and more, there is no single, commonly accepted definition of CSR [1].

business ethics	corporate citizenship
corporate social investment	corporate social performance
corporate philanthropy	corporate social rectitude
corporate social responsibility	corporate social responsiveness
organizational citizenship	organizational ethics
social accountability	social impact investment
socially responsible investment	Social responsibility of business
sustainable business	sustainable development
sustainable development	

Figure 1: various definitions of CSR

CSR is a modern trend of business. However, it concerns researchers for several decades, business executives, company shareholders and ordinary citizens. The notion of CSR and the meaning of the social responsibility begun during 1950 and 1960. There were some organizations that contribute to charitable work and donations before 1950 but not in the context of social responsibility. The term Corporate Social Responsibility was officially coined in 1953 by American economist Howard Bowen in his publication Social Responsibilities of the Businessman. As such, Bowen is often referred to as the father of CSR [2]. In [3] authors provide a distinctive historical perspective on the evolution of CSR:

i) 1950's and 1960's: the early days of the modern era of social responsibility

ii) The 1970's: CSR and management

iii) The 1980's: the operationalization of CSR

iv) The 1990's: globalization and CSR

v) 2000's: recognition and implementation of CSR

vi) 2010's: CSR and the creation of shared value

There are a number of ways to communicate and promote a responsible business, some of which they are not financially or time consuming for organizations:

- CSR report announced on corporate web-sites
- Internet - publication of CSR activities on the company's website, contributions on company blogs, etc.
- Internal or external newsletter and magazine
- Notifications sent by e-mail and regular mail

- Staff training
- Company information boards
- Admissions
- Code of ethics
- Speech and presentations
- Press release and conference
- Standards and norms - ISO 9000, ISO 14000, SA 8000, EMAS and others
- Product packaging, ecologically friendly product
- Awards received such as Socially responsible company, Employer of the Year, Top corporate philanthropist
- Responsibilities of the company and others
- Active communication with the media
- Advertising

2.2 The Triple Bottom Line (TBL)

Organizations can only survive in the medium to long term if they are economically viable, environmentally sustainable and socially responsible. In the conception of Triple Bottom Line (TBL) there are three lines that represent society, economy and environment. The notion of Triple Bottom Line (TBL) is one of the ideas by which sustainable development is reflected within a company. The term developed by John Elkington, founder of the international organization "SustainAbility". This methodology is already known as Triple Balance or Triple Results Account, and in English it is usually called "Triple Bottom Line", "TBL" or "3BL", and it is also associated with the expression "People. Profit. Planet". Promoters of TBL believe that social and environmental performance can be measured objectively and that companies should use these results to improve their social and environmental performance.

In relation to CSR, TBL refers to business activities as environmental value, economic value and social value. Starting from the definition of sustainability, TBL seeks to measure the performance of an organization not only for its economic management, as is usually done, but also from its social and environmental impact. The three dimensions are derived from make up the 3 Pillars of Corporate Sustainability and illustrated in figure 2 [4]. These three variables are explained below:

- SOCIAL (people): The organization's ability to establish good relationships with the main stakeholders and to communicate with integrity, paying attention to their demands and their expectations, positively affects the performance of an organization.
- EVNIRONMENTAL (planet): The adoption of a guiding environmental management system an organization achieves better performance. The commitment to reduction of energy consumption and polluting emissions and the efficient use of natural resources have a positive effect on the performance of an organization.

- GOVERNANCE (profit): A solid and transparent organizational structure increases the value of an organization. Organization's performance is directly influenced by its own governance structure.

Figure 2: The interconnection of the elements of the Triple Bottom Line concept

The adoption of the Triple Bottom Line concept guides an organization towards sustainability. The commitment in the reduction of energy consumption, polluting emissions and in the efficient use of natural resources they are the vehicle of a positive effect on the performance of an organization.

2.3 Stakeholders

The term stakeholder is used to refer to individuals and corporations or institutions (interested parties) that have an interest in the management activities of an organization and the survival and development of the organization as well as in reports on corporate social responsibility (CSR reports) and environmental reports. Stakeholders are a business term that refers to all stakeholders affected by the activities of an organization in which they have expectations. It is crucial for business to implement an effective stakeholders' engagement and prioritize the stakeholder's dependence, responsibility, influence, etc. on its business activities.

An organization must work together with various stakeholder groups to identify issues that play a key role in sustainable development. As long as each stakeholder is satisfied with the interaction with the organization, the organization will survive and thrive and this relationship will continue because each other is satisfied with each other's relationship. We can see some examples of these relationships below:

- The dissatisfaction of an employee stakeholder with a company means that he or she will leave the company or that potential future employees will not select the company as a place of employment.

- If the stakeholder of the business partner is not satisfied with the relationship with the company, it means that the business partner may be switch to another company in the same industry.

- If a shareholder is not satisfied with the relationship with a company, it may mean that the shareholder sells his shares, or urges the company to make concrete improvements.

- A supplier stakeholder who carries out due diligence and opts only for partners and organizations that adopts a sustainable model, may favors other companies.

All in all, the failure of an organization to maintain good relationships with its stakeholders is nothing more than a threat to the survival of the organization itself.

It is possible to distinguish between primary stakeholders and secondary stakeholders. Primary stakeholders are those groups of stakeholders where the company could not continue operating without them. Secondary stakeholders are those that are not directly involved in the economic activities of the company, but they can exert some kind of influence on it, in any case, be affected by the activity of the company or organization. This distinction is represented in the figure 3 [5].

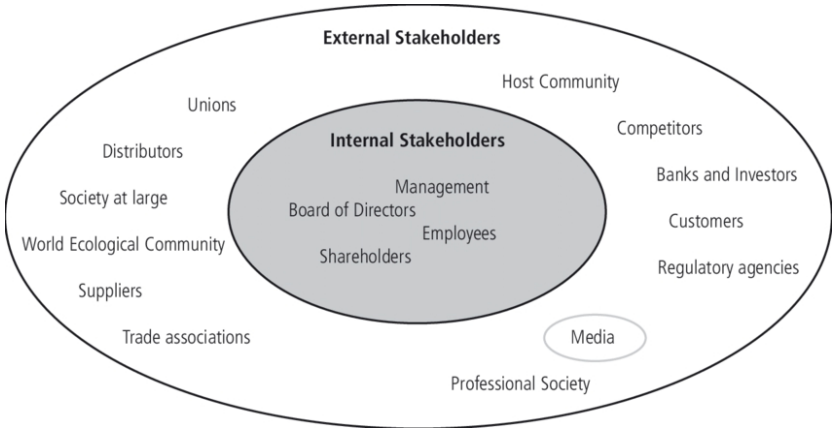

Figure 3: An example of a model for external and internal stakeholders

Below I present some types of stakeholders and their relationship with the organization:

- Beneficiaries and investors have a direct interest in the long-term sustainable growth of the organization, its ability to manage and minimize risks, openness and ethics of the principles and practices of corporate governance.

- State authorities and local self-government bodies are interested in the completeness and stimulating nature of taxation, adequate participation of the company in the implementation of priority strategies for the social, economic and cultural development of the country and regions.

- Clients and consumers are interested in the quality of products, improvement, implementation of high-tech and innovative solutions offered by the company in order to increase their own efficiency or competitiveness, as well as legal mechanisms to protect their rights.

- Employees are interested in the full implementation of legislative norms related to labour relations, the provisions of individual and collective labour contracts, respectful attitude of management to the rights and dignity of the individual; daily concern for minimizing harmful to health and the environment, targeted assistance in the development of qualifications and the direct impact of business success on wages and the size / nature of the additional social package.
- Public organizations are interested in implementing strategies for the social, economic and cultural development of the country and society, communications and mass media, the company's participation in socially significant campaigns and compliance with the declared principles of CSR.
- There is also the notion that not only people and organizations but also the global environment is one of the stakeholders.

2.4 Benefits of CSR

Every organization, either a private company or a public organization has the need of communication in order to gain reputation as well as to protect and promote its image throughout the world. By building and maintaining relationships of trust with its customers, its employees and be able to offer products and services with respect to sustainability, an organization can ensure its viability and bring positive results. Implementing a CSR program therefore, provides multiple benefits for both the organization's status as well as for its financial performance.

Consumers tend to trust corporations that commit to sustainable environment and human rights. The increased awareness about the environment and the need to cut emissions have led consumers to become more aware and informed of products and services that make use. Consumers “punish” companies they believe are behaving socially irresponsibly through product boycotts and encouraging others to do the same [6]. Additionally, consumers dealing with socially irresponsible corporate brands were more likely to punish and less likely to reward [7].

In [6], authors found from the literature that organizations who value corporate social responsibility, stand the chance of having the following advantages:

1. Enhanced Brand and Reputation
2. Reduction in Operation Costs
3. Attracting New Customers
4. It balances Power with Responsibility
5. It Discourages Government Regulation
6. It Promotes Long Run Profit
7. Recognizes Business Moral Obligations
8. Improved Relations with the Investment Community and Better Access to Capital
9. Enhanced Employee Relations, Productivity and Innovation
10. Stronger Relations within Communities through Stakeholder Engagement

In other literature [8] we see in figure 4 the multi- benefits of CSR and numerous positive after-effects that can bring to organization.

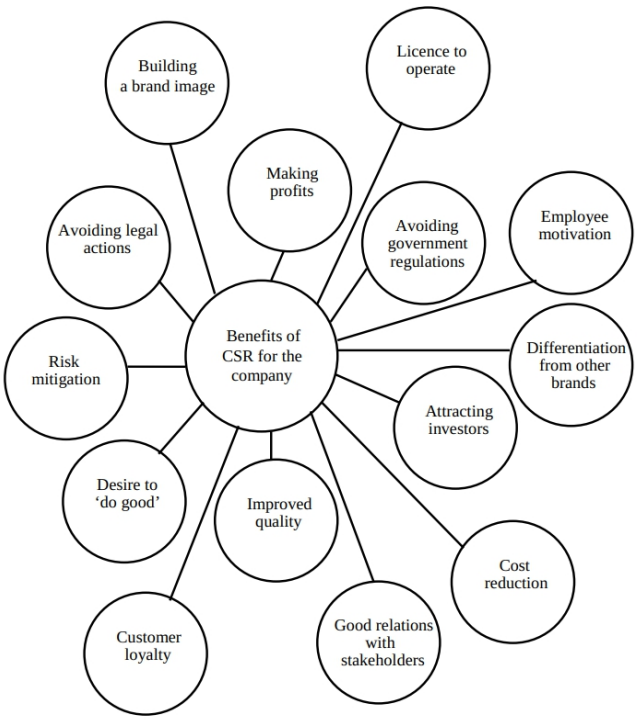

Figure 4: multi-benefits of CSR

Another point of interest is the internal marketing which refers to employee engagement and CSR. Internal marketing is the promotion of a company's objectives, products and services to employees within the organization. The purpose is to increase employee engagement with the company's goals and fostering brand advocacy. Employees want to be proud of their company, and they are also more loyal to an employer with a good reputation. Reputation is therefore a wild card in "war for talents" The goal of internal marketing – to attract and motivate employees to adequately serve to the stakeholders, and whom themselves are a group of stakeholders. Through CSR, communication as an internal marketing tool, has four objectives [9]:

- To form a good opinion of the employees about the company. The British Institute's Market and Opinion Research International study found out that 85 % of employees involved in CSR initiatives, respond positively about the company. 65 % of employees who were informed about the company's CSR policy positively evaluated the company.

- To promote employees' satisfaction and loyalty to the company. Employees are more likely to devote if company is socially responsible.

- To attract potential employees. "U.S. researches show that CSR can be a weapon in battles for talented workers".

- To reduce employees' turnover. Employees who relate company with socially responsible behavior are less likely to leave the work place.

2.5 Drawbacks of CSR and criticism

Even though CSR has been recognized by literature as an important key factor and an essential element in businesses with many positive impacts, nevertheless there is a point of criticism. The most important factor is the cost to implement CSR policies which may be not affordable especially for smaller companies. The reason for the increase in costs is that they carry out activities that are not directly linked to profits in the short term. For example, if environmental protection activities are carried out, the costs involved will be added, but profits will decrease because will not come in. However, in the long run, the above-mentioned merits in chapter 2.4 can be enjoyed. Therefore, it is necessary to carry out CSR activities from a long-term perspective after understanding the temporary decrease in profits. Also, some organizations consider CSR as marketing actions that companies carry out sporadically and in isolation without a strategic plan. Moreover, companies that initially implemented CSR policies may not be able to sustain these policies in the near future. In [10] author outlines some cost components of CSR strategy:

- Cost of Strategy Development
- Cost of Alignment with CSR Strategy
- Cost of CSR Activities
- Cost of Operations
- Cost of CSR Management System and Analytics
- Cost of Participating in Global Value Chains
- Opportunity Costs

2.6 CSR and Sustainable Environment

“Sustainability describes the ability to maintain various systems and processes — environmentally, socially, and economically — over time. Sustainability originated in natural resource economics, but has since gained broader currency in terms of sustainable development and social equality. Corporate Social Responsibility, or CSR, usually refers to a company’s commitment to practice environmental and social sustainability and to be good stewards of the environment and the social landscapes in which they operate.” [11]. The concept of sustainable development focuses on responsibility for global environmental issues, the balance between development and environmental conservation, the environmental pollutants, bio-availability and consideration for future generations. Social responsibility brings the socio-economic factor in the equation which was excluded in the initial concept of sustainability. Hence, in response to the increasing social influence of companies, there is a need to achieve social fairness in the workplace, eliminate sweatshops in developing countries, solve community problems, support developing countries, etc. The aim of social responsibility is to promote sustainable development; in other words social responsibility includes sustainable development. To make things even more clear about this, we can see if someone looks into ISO 26000, the environment issue is only one of its seven core principles.

2.7 ISO 26000 and GDPR compliance

How can ISO 26000 help in achieving GDPR compliance? The General Data Protection Regulation or GDPR is a piece of EU legislation passed by the European Parliament in 2016 and May 25, 2018

marks the first day of implementation of the General Data Protection Regulation (GDPR). The GDPR, creates a single framework for all companies that processes or holds personal data, operating in the European Union but it will also apply to companies outside of the EU region if they offer goods or services to. Companies that need to comply with GDPR must apply procedures and policies and take some extra steps regarding personal data on EU citizens. Personal data is any information that relates to an identified or identifiable living individual. Personal data includes things like:

- Name and surname, date of birth
- Gender, sexual orientation, religion, ethnicity
- Email address
- Internet Protocol (IP) address
- Geolocation
- Identification card number
- Other factors can identify an individual

It's crucial for any business with EU consumers to understand this concept for GDPR compliance. There is a correlation between GDPR principles and CSR which extends to ISO 26000. GDPR impacts CSR and vice versa. The main key factor here is data protection which represents a new aspect of CSR. The common point between GDPR and CSR -including ISO 26000- is the topic of ethics and data protection. As the GDPR provides regulations on the proper management of personal data it promotes some CSR principles, thus GDPR is now integrated and embedded in corporate strategy and is increasingly linked to corporate social responsibility.

2.8 Social Responsibility Reports

Sustainability report serves, on the one hand, to ability to implement the sustainability concept (operational, strategic) in organizations and, on the other hand it is seen as a communication platform for stakeholder dialogues and interaction with stakeholder groups. A CSR report shall include topics of environmental protection, social and personnel, human rights, fight against corruption and information related to bribery issues. CSR reports are annual and often referred as corporate citizenship, sustainability or social performance reports and widely used from many organizations from various type of business, small to large industries. In addition to this, authors in [12] reported that findings from their research indicated that that companies in controversial industries are more active in CSR communication than the companies in non-controversial industries.

The following are mentioned as possible positive contributions from sustainability reports:

- Fulfilling social demands
- Ensuring credibility
- Building reputation
- Internal information and management
- Comparisons between companies
- Sharing responsibility with stakeholders

- Maintaining relationships
- Innovation potential

Corporate CSR reports vary greatly in format, length and detail. There are, however, certain elements and disclosures that consistently appear in such reports. Those elements and disclosures include [13]:

i. an opening letter from the company's chief executive officer and/or chief CSR executive (noting the company's commitment to CSR issues and its willingness to discuss challenges and promote successes relating thereto).

ii. the company's CSR policy or mission statement.

iii. a "forward-looking statements" disclaimer.

iv. most significant, disclosures addressing issues most important to each of the company's key stakeholders".

2.9 CSR in Greece

CSR in Greece has gain interest from various companies and industries. In Greece, corporate social responsibility began to be a hot topic after the outbreak of the economic crisis, where such actions with a "social footprint" did have a major impact on Greek society, which was being tested by the crisis. The interesting thing is that it is not only a demand of the consumers from companies to be socially responsible, but, to a greater or lesser extent, companies themselves realize the value of caring for the environment, for the market, for their employees.

Ch. Tsardanidis in [15] made a questionnaire about CSR and asked for a feedback from companies in Greece. The questionnaire was sent to all member companies of the Hellenic Network for Corporate Social Responsibility (CSR Hellas), as well as to the member companies of the «Syndesmos Anonymon Etairion kai EPE». The study was conducted in 2014 and showed that regarding the categories of CSR actions developed by companies, the 20% of CSR actions developed, refer to the environment sector, 15% to the workforce, while 12% to education. Culture and local development follow with 11%.

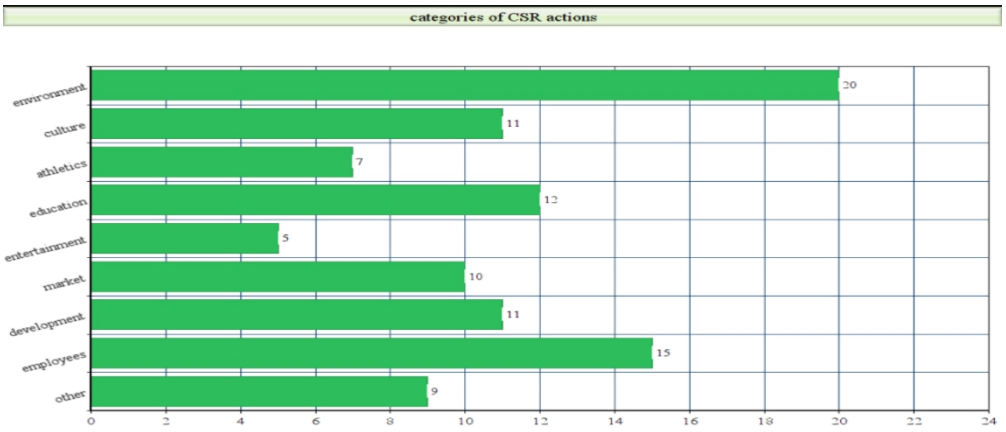

Figure 5: Categories of CSR actions from companies in Greece

CSR practices, therefore, are focused to the environment. At the same time, companies are interested in the education of their current and future employees. In addition, companies take care of their establishment in the local community and local market.

In the next chapter (chapter 3) I will extend the CSR concept in the scope of ISO 26000 with a focus on principles and issues ISO 26000 refers. The seven core principles are presented and analyzed so the viewers can understand what is the purpose of ISO 26000 and the importance of CSR

3. ISO 26000

ISO 26000 for Social Responsibility has been accepted in more than 90 countries worldwide and is expected to be the guideline for Social Responsibility in the future. It is an indicative standard with recommendations for how companies can use the guidelines in their own business. Simply put, it can be said that ISO 26000 describes what a company or an organization can do, to contribute to a sustainable future. In chapter 3 I focus on the ISO 26000 but before that there will be small introduction in the International Organization for Standardization (ISO) and its purpose. Then I will explain thoroughly what ISO 26000 includes and the issues related to CSR.

3.1 International Organization for Standardization ISO

The International Organization for Standardization (ISO) is an independent, non-governmental organization founded in 1947. It brings together standardization organizations from 164 countries around the world and has its headquarters in Geneva (Switzerland). Today, standards development is carried out by ISO members in 164 countries and through 3,368 technical bodies. More than 150 people work full time at the ISO Central Secretariat in Geneva, Switzerland. Their main task is to prepare business standards to facilitate the development and manufacture of products and services.

ISO is the most important organization worldwide for the definition of technical standards and a subject/organization must respect and comply with specific evaluation parameters in order to obtain a specific ISO certification. Adherence to the use of ISO standards is voluntary and is motivated by the improvement of quality and the desire for innovation. ISO performs advisory functions for the United Nations Educational, Scientific and Cultural Organization (UNESCO) and for the United Nations Organization (UN).

From its origins until today, ISO has published over 22,000 standards, each of them deals with a specific aspect of the business. The ultimate aim is to ensure that certain activities comply with the same regulation. Each of these standards can make an important contribution to each individual organization and, therefore, to the whole community, helping to work more efficiently and reduce product failures, reduce environmental impacts (waste, pollution) and be more sustainable, reduce workplace accidents and reduce energy consumption, but also by helping to prevent food contamination or to ensure IT security to protect sensitive information.

Popular ISO standards include:

- 9000 on quality management,
- 13485 on medical devices,

- 14000 on environmental management,
- 20000 on the management of services
- 22000 on food safety,
- 26000 on social responsibility,
- 27001 on information security management,
- 31000 on risk management,
- 45001 on employment in the health field,
- 50001 on energy management.

ISO 26000 is not certifiable in comparison with the other ISO standards but is optional both to use it and to be verified by a third party if the organization wants. For example, ISO 9000 is the quality management standard for companies, and ISO 14000 is the environmental management standard, but the ISO 26000 standard is about to appear as a future international standard for corporate social responsibility from FY 2008. The standard does not offer a process and a systematic approach and is not based on the PDCA cycle, hence social responsibility management is difficult to integrate with the existing most popular management systems set forth in ISO 9001, ISO 14001 and others.

3.2 Definition of ISO 26000

This International Standard was developed using a multi-stakeholder approach involving experts from more than 90 countries and 40 international or broadly-based regional organizations involved in different aspects of social responsibility. These experts were from six different stakeholder groups: consumers, government, industry, labour, non-governmental organizations (NGOs) and service, support, research, academics. In addition, specific provision was made to achieve a balance between developing and developed countries as well as a gender balance in drafting groups [15]. Then in November 2010, the International Organization for Standardization (ISO) published ISO 26000, an international standard for "Social Responsibility" for all types of organizations, not just companies. Unlike the ISO 9000 and 14000 series, this standard was established as a guidance standard (voluntary guide) that is not intended for third-party certification. In the future, ISO 26000 may become a common global guide for various organizations around the world to address their social responsibilities. ISO 26000 describes specific efforts for organizations to practice their social responsibilities, which include seven core principles (organizational governance, human rights, labour practices, environment, fair operating practices and consumer issues). The standard is intended to be useful to private and public sector organizations, large and small, operating in both developed and developing countries. It is worth noting that the developers of ISO 26000 emphasized that this standard is not intended for certification purposes, since this would contradict its purpose and meaning.

Figure 6: ISO 26000[16]

The standard includes:

- Concepts, terms and definitions
- Background, trends and characteristics
- Principles and routines
- Core areas and issues
- Integration, implementation and promotion of socially responsible behaviour throughout your organization, in the form of policies and routines
- Identification and collaboration with stakeholders
- Dissemination of information about commitments, benefits and other things related to social responsibility.

While not all parts of this International Standard will be equally useful for all types of organizations, all of the core topics are applicable to every organization. It is the responsibility of the individual organization to determine, through self-analysis and dialogue with stakeholders, what is applicable and what is important for the organization to respond to. For small and medium-sized organizations, all of the issues listed in the seven core themes will be a guidance in order to help them finding irregularities and issues. ISO 26000 provides both internal and external benefits for companies.

- Internal benefits of ISO 26000 implementation
  - Effective and efficient use of well-established practices of social responsibility
  - Maintaining employee morale, engagement and productivity
  - Improving the ability to attract and retain employees and customers
- External benefits of ISO 26000 implementation
  - Improving reputation and increasing competitive advantage
  - Increasing the confidence of investors, owners, donors, sponsors and the financial community

- Improving image in relationships with companies, governments, media, suppliers, peer organizations, customers and the community
- Additional benefits when participating in important tenders

3.3 Core Subjects of ISO 26000

The ISO 26000 standard defines the main actors of social responsibility. Core topics include a number of issues, but each organization is responsible for identifying issues that are relevant and meaningful to their stakeholders and / or need to be addressed. Core topics provide guidelines and practical indications for implementing and integrating social responsibility in the organization, policies, activities, guidelines, objectives and strategies, performance evaluation, reporting and communication. It is not necessary for an organization to deal with multiple issues indicated by ISO 26000 at the same level, as the relevance varies depending on the company or organization. However, it is important to know each issue and use it as a guideline for each action and they must all be considered, because they are interrelated, complementary and interdependent. The seven core principles represent the framework of CSR activities in the following figure 7 [17].

Figure 7: The seven core subjects of ISO 26000 Social responsibility

3.3.1 Organizational Governance

Organizational governance is the set of processes, customs, policies, laws, and institutions affecting the way a corporation (or company) is directed, administered and/or controlled [18]. The main topic here is how a corporation can govern to benefit people and planet. The answer is through its business activities because socially responsible organizational governance enables corporation to take responsibility for the impacts of its decisions and activities. Board directors and managers are the major players in corporate governance, but employees, vendors and other stakeholders also have a stake in corporate governance. Compliance requirements, regulations and laws ensure that corporations are fair to their shareholders, consumers and employees. Corporate governance also provides a process for corporations to compete fairly within their industries [19].

Organizational governance is a key factor of CSR because it exists in the framework of decision making which affects the impacts of the organization. Therefore, the organization's decision-making

processes should be structured so that the core principles of CSR can be applied. Whether implicit or explicit, much of what is discussed in corporate governance has a moral aspect. This can be seen both directly and indirectly in issues such as Corporate Social Responsibility (CSR) reforms to increase transparency and accountability, the prevention of fraud, the discussions of directors' responsibilities, the rights of shareholders and stakeholders, and ultimately the fundamental questions concerning to whom corporations have obligations and for whose benefit they function [20]. Authors in [21] pointed out that the difference between Corporate Social Responsibility and Corporate Governance as expressed is that "with CG, we are practically applying the letter of the law, whereas CSR represents the spirit of the law." In other words, while CG standards and conformance may be required to ensure protection from abuses, this cannot replace a general sense of responsibility in business that goes beyond the letter of the law as illustrated in voluntary social performance.

Traditionally, corporation's corporate governance aims to financial aspects putting aside social dimensions of workers, customers, suppliers and communities. Now this has changed as it is not enough for a company to provide just a good and affordable product or a service but it has to consider sustainability and social responsibility throughout all stages of its product's/service's development. In other words, consumers tend to trust corporations that commit to sustainable environment and human rights.

Corporate Social Responsibility can be investigated through different channels in corporation's corporate governance [22].

- corporate social responsibility and the board of directors
- corporate social responsibility and executive compensation/incentives
- corporate social responsibility and ownership structure
- corporate social responsibility and accounting and auditing
- corporate social responsibility and firm culture
- corporate social responsibility and law and regulations

The principles of organizational governance are the following:

- Rights and equitable treatment of shareholders: organizations should respect the rights of shareholders and help the to exercise those rights
- Interests of other stakeholders: organizations should consider stakeholders' interests and recognize that they have legal, contractual, social, ethical and market driven obligations to non-shareholder stakeholders.
- Integrity and ethical behavior: a code of conduct should be developed in consultation with relevant stakeholders in order to promote ethical and responsible decision-making.
- Disclosure and transparency: organizations should clarify and make the roles and responsibilities of the board and management publicly known in order to provide stakeholders with a level of accountability.

3.3.2 Human Rights

Human Rights are basic rights and freedoms that all people are entitled to, regardless of nationality, gender, national or ethnic origin, race, religion, language, or other status [18]. ISO 26000 standard directly address issues related to human rights covering civic rights and labour rights of corporation's employees. Emphasis should be given for a human management system that respects human rights and support employees. Moreover, a corporation should promote human rights and protect them throughout its partners, suppliers, customers, governments and any affected group/entity. A code of conduct must address all important issues regarding sustainability and social responsibility while suppliers and business partners commit to upholding the requirements of this code of conduct. As stated in [23] corporation's obligations not only concern direct human rights violations of corporations, but also and perhaps especially indirect ones, i.e. cases in which corporations are not the primary perpetrators, but rather aid and abet human rights abuse committed by third parties such as host governments or suppliers and contractors in the company's value chain. After all, the majority of cases of corporate involvement in human rights violations today are indirect.

ISO 26000 defines eight issues regarding Human Rights:

- Due diligence: an organization should consider means of integrating the human rights policy, means of tracking performance over time, to be able to make necessary adjustments in priorities and actions to address the impacts of its decisions and activities.
- Human rights risk situations: an organization should identify irregularities deriving from political instability, impacts on natural resources, corruption, poverty and manipulation of vulnerable groups, in the area in which it operates.
- Avoidance of complicity: an organization should not stay silent or benefit from potential human rights abuses. Possible actions that an organization can take are to not provide goods or services to businesses which violate human rights and avoid relationships with entities engaged in anti-social activities.
- The meaning and means for resolving grievances: the process of resolving grievances should be clear, predictable and in compliance with legitimate governance structures to prevent unfair management of the process. Moreover, aggrieved parties should have the necessary information process and their existence should be published for a fair and transparent grievance.
- Discrimination and vulnerable groups: an organization should adapt procedures in order to ensure equality and fairness.
- Civil and political rights: an organization should consider and ensure that these rights are followed and protected under any circumstances.
- Economic, social and cultural rights: these rights include rights to education, housing, health, freedom and culture traditions among others. An organization should respect these rights without compromising them for people who are impacted.
- Fundamental principles and rights at work: this issue follows the International Labour Organization (ILO) scope and covers the freedom of association and the right to collective

bargaining, the elimination of forced labour, the abolition of child labour and the elimination of discrimination regarding employment.

3.3.2.1 Human Rights Due Diligence (HRDD)

Nowadays, corporations can operate across national boundaries and political borders making it difficult to regulate them for the respect on human rights and human abuses though their global operation. Human rights due diligence (HRDD) is a risk management tool for organizations. It is the process organizations should carry out to identify, prevent, mitigate and account for how they address actual and potential adverse human rights impacts in their own operations, their supply chain and other business relationships [24]. A Human Rights Due Diligence process includes [25]:

- Assessment of operations and supply chain human rights risks:
- Integration of the findings into decision making;
- Root cause assessment;
- Actions to mitigate the risks/ improve social impacts;
- Tracking the effectiveness of these measures;
- Communicating efforts internally and externally.

Due diligence is at the heart of the United Nations Guiding Principles on Business and Human Rights, which establish the main parameters internationally for considering corporate responsibility for human rights violations. Moreover, the Human Rights Due Diligence Policy (HRDDP), adopted in July 2011, requires all United Nations entities to be diligent in ensuring that support to non-UN security forces is provided in a manner that is consistent with the purposes and principles as set out in the Charter of the United Nations, and is compliant with and promotes respect for international humanitarian, human rights and refugee law.

3.3.3 Labour Practices

Labor practices are practices that affect employee development, security, occupational safety and health, working conditions, promotion and compensation. Topic here is to be a good employer by offering decent working conditions and a working environment characterized by safety, equity, fairness and growth. Employees for companies represent not only human resource, but they are the part of their organizations as stakeholders. Their presence has got an impact on business risk management, because they are combined in the related risks [26].

Some issues covered on human rights section are also presented here, for example if a corporation operates in an international environment it has to set standards regarding labor practices to ensure that ethical responsible behavior is integrated in every region or different country in which operates. Moreover, a corporation should operate with labor laws that differ for country to country and consider cultural differences.

Labor practices can affect tremendously a company's reputation either positively or negatively. In [27], researchers used data of the Spanish firms with a higher Corporate Reputation (CR) and Labor Reputation (LR) between the years from 2006 to 2010 according to Merco’s rankings to test whether

Labor Social Responsibility practices exert a positive influence on building corporate reputation and labor reputation (specifically). The results confirm that Labor Social Responsibility conducted by the company has a directly and positive influence in creating Corporate Reputation (CR) and Labor Social Responsibility.

ISO 26000 refers to the International Labour Organization (ILO) for this principle. There are five main issues regarding labour practices:

- Employment and employment relationships: an organization should ensure equal opportunities for all workers as well as protecting their privacy and personal data. Also, if a supplier or a partner uses unfair labor practices, the organization should not benefit and reprove such practices.
- Conditions of work and social protection: conditions of work must be decent and compliant with local law and international labor standards. With regard to employees, an organization should provide wages in compliance with national laws and respect family responsibilities of workers.
- Social dialogue: an organization should recognize the right of workers to form their own organizations and deal collectively. Also, the existence of worker representatives should be considered, giving as far as possible access to workplaces and in decision-making processes.
- Health and safety at work: an organization should follow the principles of health and safety complying with legal regulations and provide the necessary safety equipment. Potential health issues should be addressed and analyzed as well as examined in order to minimize all incidents.
- Human development and training in the workplace: an organization should help employees and help redundant workers to get assistance.

3.3.3.1 Sustainable Human Resource Management (SHRM)

While products and services produced by the organization are the most important in determining CSR and address issues and irregularities, social responsibility in the working environment also has an important influence on CSR. Today, it has been recognized that the employee is the company's most important, valuable and sensitive corporate resource. “Human Resource Management is an area which witnesses a constant evolution and change. The rationale behind relating the concept of human resource management with environmental issues is that it leads to sustainability and has become a new paradigm in this field [28].

The main components of the Human Resource Management are the following:

- selection, assessment and use of personnel;
- education and development;
- motivation and reward;
- social politics;

- corporate communications.

Sustainable HRM is based on the principles of employee participation, added value, strategic orientation, knowledge and competence generation, the consideration of the interests of various stakeholder groups and the promotion of flexibility. By increasing the organizational commitment of the workers of the company, the effect of lowering the intention to leave the job and the effect of improving the job performance can be achieved. Authors in [29] after reviewing relevant strategic CSR and HRM literature, developed a conceptual model (figure 8), the CSR-HRM co-creation model, which accounts for the potential HRM roles in CSR and identifies a range of outcome values resulting from a more effective integration of the role of HRM within CSR.

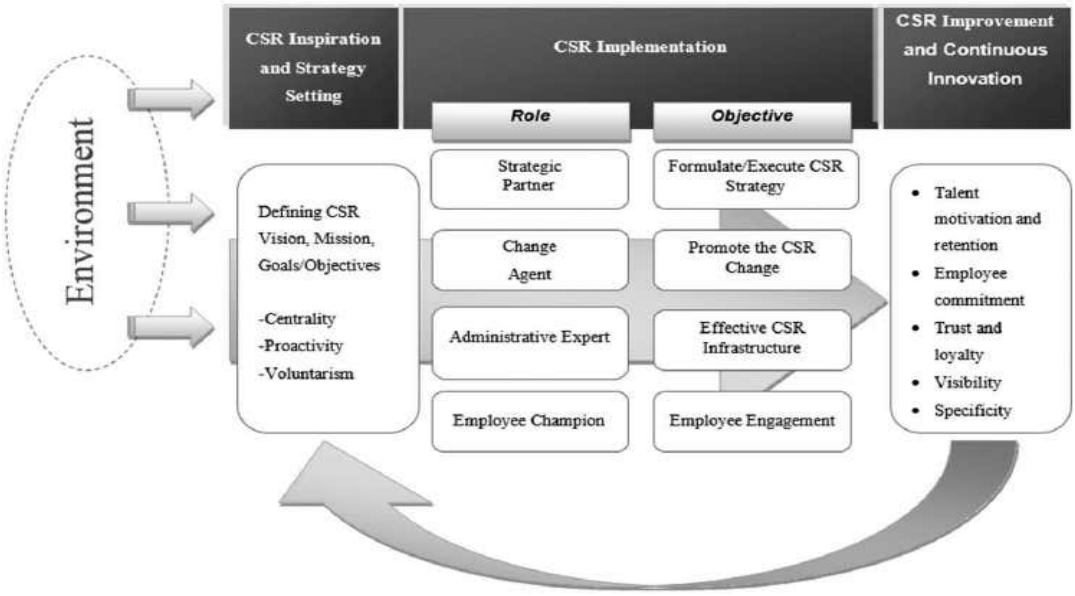

Figure 8: The CSR-HRM co-creation model

SHRM will enable organizations to balance conflicting expectations from different stakeholders such as employees, vendors, customers, shareholders, government, and communities by ensuring that they create a positive impact on organizational, environmental and financial performance. SHRM benefits can be measured by evaluating organizational, social, individual and ecological performance. Measures would need to evaluate outcomes such as quality of the employment relationship, health, and well-being of the workforce, employee productivity, quality of relationships at work, potential employer, being recognized among a range of potential sources of labor (social), job satisfaction, employee motivation, work-life balance (individual), use of resources, such as energy, paper, water, production of green products and services and costs associated with work travel (ecological) [30].

3.3.4 The Environment

In many circumstances, the organization's activities and decisions have impacts (direct or indirect) on the environment due to use of resources, production of pollution and waste, as well as the location of the organization. An organization should take all those necessary measures that will help reduce the environmental footprint of all its corporate activities. Adhering to all the rules and regulations, applying integrated certification systems and comply with national and international standards is a guiding factor to integrate Social Responsibility. Moreover, an organization should extend and

promote these policies to all staff, subcontractors, associates, company suppliers and any other interested parties. Although financial benefits regarding environmental CSR activities may not directly or immediately be visible as they cause extra expenses. Findings in [31] showed that firms with better social performance in the sense that they invest more in environmental activities than what would be expected, have a significantly higher accounting-based financial performance.

There are four issues regarding the environment:

- Prevention of pollution: an organization can improve its environmental performance by preventing pollution, contamination of land and soils, the use and disposal of toxic and hazardous chemicals and noise from its activities, products and services.
- Sustainable resource use: an organization should publish a (sustainability) report, accessible for all the stakeholders, in which it illustrates the use of energy and other resources though measures and metrics. Also, an organization should take initiatives to replace non-renewable resources and promote sustainable procurement.
- Climate change mitigation and adaptation: an organization should decrease the level of its own harmful emission (greenhouse emissions), aim for a carbon neutrality and take advantage of opportunities to adjust to changing climate conditions.
- Protection of the environment, biodiversity and restoration of natural habitats: an organization should contribute to restoration efforts of ecosystems and take initiatives that eliminate or reduce poverty, starvation, greenhouse effect, desertification and usage of non-renewable natural resources.

3.3.5 Fair Operating Practices

The consumer issue advocate that companies have a responsibility to its consumers. Selling a product is not sufficient, the company should additionally promote for the consumer rights, sustainable consumption and educate consumer in the company's products [32]. An organization should have fair operating practices by acting in accordance to laws and regulations and ensuring ethical conduct in its relationships with other organizations. Behaving ethically is imperative for establishing and sustaining productive and legitimate relationships between organizations. Fair operating practices include anti-corruption, fair competition, and sustainable procurement between the organizations and government agencies. ISO 26000 identifies five related issues:

- Anti-corruption: an organization should establish and promote anti-corruption policies and procedures in its operation, as well as encourage other organizations and its supply chain to adopt similar anti-corruption policies.
- Responsible political involvement: an organization should support political processes that benefit society and forbid activities that involve threat or compulsion.
- Fair competition: an organization should comply with competition laws and regulations and create and maintain procedures to prevent anti-competitive behaviour. Support of anti-trust and anti-dumping practices and encouragement of employees to comprehend fair competition is also recommended.

- Promoting SR in the value chain: Organizations can influence other organizations through their purchasing and procurement decisions and consider the impact such decisions may have on other organizations in order to take due care to avoid or minimize negative effects.
- Respect for property rights: physical and intellectual property rights should be respected and not be violated under any circumstances.

3.3.6 Consumer Issues

This principle is vital to the ISO 26000 and refers to the organization's responsibility for quality and reliability for its products and services that reach the customers as well as for the education and information about these products [18].

By addressing consumer issues allows an organization to cater for customers which has a reputation benefit for the organization. ISO 26000 identifies seven related issues aim to protect the consumers by providing safe products, and by protecting their integrity:

- Fair marketing, factual and unbiased information and fair contractual practices: an organization should not engage in practices, which are misleading, unfair or perpetual stereotyping. In addition, an organization should provide sufficient information about products (prices, features, terms) in a manner allowing easy access.
- Protecting consumers' health and safety: the products and services should be safe for the people, their family and the environment. An organization should minimize risks in the design of products and where the risks cannot be eliminated, mechanisms are needed to withdraw and recall products.
- Sustainable consumption: an organization should offer products and services socially and environmentally beneficial including reuse, recycle and disposal services, sustainable suppliers and longer life cycle.
- Consumer service, support, and complaint and dispute resolution: there should be existing effective mechanisms for customers who complain and response to complaints as well as access to after-supply services and support.
- Consumer data protection and privacy: an organization should protect consumer data and not use it for marketing or other purposes without the voluntary consent of consumers.
- Access to essential services: an organization should maintain and upgrade its systems to help preventing disruption of services and provide reasonable time-frames for payments about essential services.
- Education and awareness: consumers should be informed and educated about environmental, social and economic impacts of their choice. Efficient information about the products (labeling, manual, instructions) as well as risks and precautions should be addressed.

3.3.7 Community Involvement and Development

The relationship between organizations and their (local) environment or community is an integral part of their social responsibilities. The goal for organizations in community engagement is to contribute to the social, economic and political development of the communities they operate in, either in developed, developing or underdeveloped countries [33].

ISO 26000 identifies seven related issues:

- Community involvement: the issue requires proactive cooperation with local organizations, groups, stakeholders, consultation of representative community groups for determining priorities and interests for investments and actions.
- Education and culture: an organization should support education development on all levels by providing learning opportunities especially for vulnerable groups and children. Furthermore, cultural activities with respect to the local culture should be encouraged.
- Employment creation and skills development: an organization should analyze the impact of its investment decisions on employment creation, the impact of technology choice on employment and the impact of outsourcing decisions.
- Technology development and access: an organization should provide low cost and innovative technologies that help to eliminate social or environmental issues and should collaborate with other organizations such as universities and research centers to enable new technologies accessible for the community.
- Wealth and income creation: an organization can help in creating wealth in communities through entrepreneurship programs, collaboration with local suppliers and employment of community members.
- Health: an organization should try to remove negative health impacts of anything they produce or of services they provide and consider promoting good health as well as raising awareness about health threats.
- Social investment: an organization should involve in volunteering programs by providing education or essential services and promoting the local community and local development.

In the next chapter (chapter 4) I will present the investigation of CSR reports from some of the top companies in the IT/ICT sector. Following the principles of ISO 26000, I highlighted the issues that companies mostly focus and cover in their CSR reports. In this way, viewers will get an insight of how companies make CSR reports and how themselves can implement similar strategies in their working environment and expand their knowledge about CSR

4. Review of Social Responsibility Reports

There is a growing interest for business to bring out their actions and initiatives that promote social responsibility and sustainability by publishing a CSR report. The purpose of this report is to convey the sustainability of the company and to grow the CSR behavior of the company. “Sustainability

reporting rose dramatically from 2011, when roughly 20% of companies published reports, to 72% just three years later in 2013. From 2013 to 2017, the frequency of reporting increased each year, reaching 85% in 2017" [34].

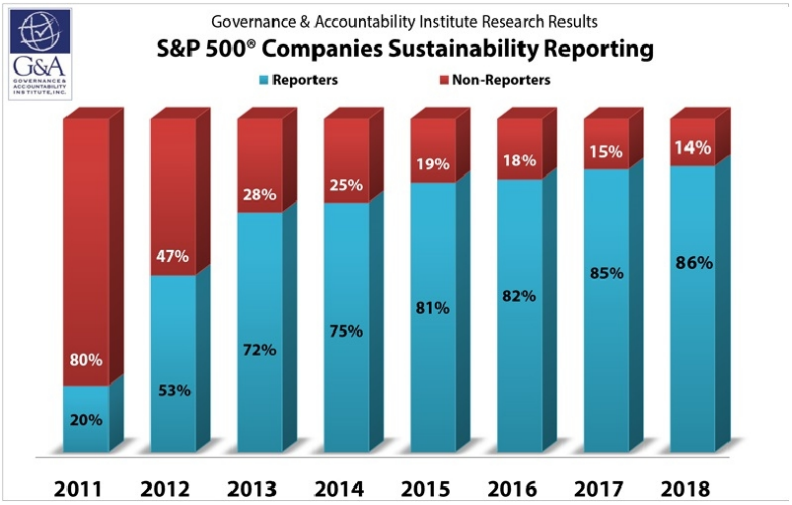

Figure 9: S&P 500 Companies Sustainability Reporting

The publishing of CSR reports strengthens more effectively the relationships with stakeholders as businesses implement CSR actions, publish these actions and utilize stakeholder communication. The review of these reports provided me info about the issues that these companies deal with as well as in which issues related to the core subject of ISO 26000, they primary focus.

4.1 A summary of existing reports identified in corporate Web sites from year 2020

Social responsibility/sustainability reports of seven eminent corporate web-sites were evaluated in order to identify the issues that IT companies deal with, as well as in which issues related to the core subject of ISO 26000, they primary focus. The manner in which information regarding SR is organized though structures and schemes on a web-site determines the usability and accessibility of its content to visitors, but also decides the level of importance within the web-site [35]. After having read every report in the company web-site I created the tables 1 to 7 below that show the principles and issues that the companies have mainly focus with regards to ISO 26000.

The numbering in the headings in table 1 to table 7 corresponds to the following companies: 1 = Microsoft, 2 = Symantec, 3 = CA Technologies (now is Broadcom) 4 = Adobe Systems, 5 = Oracle, 6 = Sony, 7 = Apple.

4.1.1 Organizational Governance outcomes

Organizational governance	1	2	3	4	5	6	7
Organizational governance	✓	✓	✓	✓	✓	✓	✓

Table 1: Organizational Governance

Organizational Governance issue sets companies the challenge to address several issues such as due diligence, sufficient transparency, risk management, stakeholder identification etc. All companies have adopted (more or less) the key principles of organizational governance. Accountability and

transparency are the most prominent principle keys that companies illustrate in CSR reports. Broadcom, Symantec, Sony and Microsoft have mostly focused on Organizational Governance.

4.1.2 Labour Practices outcomes

Labour practices	1	2	3	4	5	6	7
Employment and employment relationships	✓	✓	✓	✓	✓	✓	✓
Conditions of work and social protection	✓	✓	✓	✓	✓	✓	✓
Social dialogue	✓			✓	✓		
Health and safety at work	✓	✓	✓	✓	✓	✓	✓
Human development and training in the workplace	✓	✓	✓	✓	✓	✓	✓

Table 2: Labor Practices

The most covered issues are “employment relationships” and “health and safety at work”. Some companies adopt policies such as “Supplier Code” in order to address labour issues in their supplier chain and protect workers in the supply chain. The issue “Health and safety at work” is covered in reports in all companies. The issue “Conditions of work and social protection” covered mainly for conditions in work environment but regarding “social protection” the issue is covered mainly by Sony only which provides many family benefits for employees. “Social dialogue” which refers to the right of workers to form their own organizations and deal collectively is not explicitly addressed by all companies. Some companies such as Adobe has publish a “public policy and government relations” to address the “social dialogue” (https://www.adobe.com/content/dam/acom/en/corporate-responsibility/pdfs/public-policy-guidelines.pdf). “Human development and training in the workplace” issue is covered from all companies ranging from personal development to job specific technical training and various seminars as well. For example, Sony did an training program that includes the education and training of its procurement staff to raise awareness for socially responsible procurement. Moreover, Oracle offered training programs too for its employees in order to educate them on human right policies.

4.1.3 The environment outcomes

The environment	1	2	3	4	5	6	7
Prevention of pollution	✓	✓	✓	✓	✓	✓	✓
Sustainable resource use	✓	✓	✓	✓	✓	✓	✓
Climate change mitigation and adaptation	✓	✓	✓	✓	✓	✓	✓
Protection of the environment, biodiversity and restoration of natural habitats	✓	✓	✓	✓	✓	✓	✓

Table 3: The environment

The reports showed that all companies are aware of environmental concerns underlying the sustainable use of resources and reduction of greenhouse gas emissions as well as ways of protection. Efforts for the issues of restoration of the environment includes participation in well-known programs ("Fundación Natura", "One Tree Planted", "Conservation International") and voluntary initiatives from the companies. Half of the them (Microsoft, Adobe, Broadcom) did mention restoration programs, although they take other initiatives related to the issue (reduce greenhouse effects, water usage, usage of non-renewable resources). An interesting program from Microsoft is the "The Planetary Computer" which it will be provides data and insights into critical questions that scientists often ask but they cannot find answers (satellite imaginary, machine learning tools, local measurements, terrain information).

4.1.4 Consumer issues outcomes

Consumer issues	1	2	3	4	5	6	7
Fair marketing, factual and unbiased information and fair contractual practices	✓				✓		
Protecting consumers' health and safety	✓	✓	✓	✓	✓	✓	✓
Sustainable consumption	✓	✓	✓	✓	✓	✓	✓
Consumer service, support, and complaint and dispute resolution	✓	✓	✓		✓	✓	
Consumer data protection and privacy	✓	✓	✓	✓	✓	✓	
Access to essential services	✓	✓	✓		✓	✓	✓
Education and awareness	✓			✓		✓	✓

Table 4: Consumer issues

Regarding consumer issues, "Fair marketing" is poorly covered and is mentioned only from Microsoft and Oracle. It seems that most companies do not state that they are not engaging in practices which are misleading or unfair. "Protecting consumers' health and safety" issue is covered especially in the phrase of product development with "Product Safety and Regulations Policy" adopted by companies such as Broadcom (https://docs.broadcom.com/doc/320811). "Sustainable consumption" is covered either directly where companies consider reuse, recycle and disposal services as well as the collaboration with sustainable suppliers, or indirectly by other already covered issues related to product life-cycle in "Protecting consumers' health and safety" issue. The "Consumer data protection and privacy" issue is a hot topic for ICT companies since many companies in this sector have to their possession many personal data of their customers, even some of the products they provide manipulate this kind of data (CRM software, ERP software etc). "Access to essential services" which refers to utility services such as electricity, gas, water, wastewater service is covered from most companies. The efforts on this issue are focused on water supply and management and water supply enhancement programs (for example, Norton and its employees provided a water tower for students: https://www.nortonlifelock.com/blogs/corporate-responsibility/earthday2019). "Education and awareness" issue is partly covered; most companies illustrate this issue on product's health and safety

and on product's quality assurance and monitor feedback from customers. Nevertheless, they do not cover the "awareness" aspect of this issue.

4.1.5 Human rights outcomes

Human rights	1	2	3	4	5	6	7
Due diligence	✓						✓
Human rights risk situations	✓	✓	✓	✓	✓	✓	✓
Avoidance of complicity	✓					✓	✓
Resolving grievances	✓						✓
Discrimination and vulnerable groups	✓	✓	✓	✓	✓	✓	✓
Civil and political rights	✓	✓			✓		✓
Economic, social and cultural rights	✓	✓	✓	✓	✓	✓	✓
Fundamental principles and rights at work	✓	✓		✓	✓		✓

Table 5: Human rights

While due diligence is covered and focused on supply chains, in human rights principle, due diligence is not fully expressed in CSR reports. In other words, companies carry out due diligence for their supplies and the potential human risks in suppliers' chains, they don't do it in the same extent for their own working environment. "Human rights risk situations" is covered from all companies. This issue is extended beyond a company including supply chains where most irregularities are found and expressed in CSR reports. "Avoidance of complicity" is merely covered and is expressed in CSR reports in the context of "avoid human rights abuses". Issues, such as "Avoidance of complicity" and "Resolving grievances" are mostly or totally absent; only Apple and Microsoft covered the issue but mostly on their suppliers' chain and not on their own working environment and their employees. "Discrimination and vulnerable groups" and "Fundamental principles and rights at work" are the most focused issues. Organizations aim to elimination of discrimination regarding employment and adapt procedures in order to ensure equality and fairness. "Civil and political rights" issue is covered and illustrated as the right to freedom or right to life from companies such as Microsoft and Oracle. Other companies such as Sony focus on the right to dignity and personal development. All in all, "Civil and political rights" and "Economic, social and cultural rights" are covered from companies but they cover various and different rights and in different extend.

4.1.6 Fair operating practices outcomes

Fair operating practices	1	2	3	4	5	6	7
Anti-corruption	✓	✓	✓	✓	✓	✓	✓
Responsible political involvement	✓	✓	✓	✓	✓	✓	
Fair competition	✓	✓	✓		✓	✓	
Promoting SR in the value chain	✓	✓	✓	✓	✓	✓	✓
Respect for property rights	✓	✓				✓	

Table 6: Fair operating practices

All companies follow anti-corruption policies and procedures. Corruption and power are closely intertwined and their links have long been recognized as the misuse of one's office for a private gain or unofficial end. Corruption also includes conflict of interest and trading in influence. Anti-corruption means operations against corruption and statements of anti-corruption were identified in the web-site. The "Responsible political involvement" issue is covered in CSR reports by encouraging the development of public policies that benefit society. This includes support and encouragement of public political processes that benefit society at large (e.g. 'Green' Campaigns). Regarding "Fair competition" some companies such as Sony and cover the issue with "legal actions for anti-competitive behavior, anti-trust, and monopoly practices". Fair competition is based on factors of price, quality, and service; not on the abuse of near-monopoly powers, competitor bashing, predatory pricing (an anti-competitive measure employed by a dominant company to protect market share from new or existing companies in the market), etc. "Promoting SR in the value chain" is one of the most focused issue companies announce in their web-sites. For example, Microsoft states in CSR report that by 2030 it will be carbon negative including its supply and its value chain while Sony estimated the greenhouse gas emissions of its whole value chain and plans to build its own system for identifying greenhouse gas emissions over its entire value chain. intellectual rights. "Respect for property rights" is less covered.

4.1.7 Community involvement and development outcomes

Community involvement and development	1	2	3	4	5	6	7
Community involvement	✓	✓	✓	✓	✓	✓	✓
Education and culture	✓	✓	✓	✓	✓	✓	✓
Employment creation and skills development	✓	✓			✓	✓	✓
Technology development and access	✓	✓	✓	✓	✓	✓	✓
Wealth and income creation	✓		✓		✓	✓	✓
Health	✓	✓	✓	✓	✓	✓	✓
Social investment	✓	✓	✓	✓	✓	✓	✓

Table 7: Community involvement and development

"Community involvement" and "Education and culture" issues are more profound in CSR reports than other issues in this principle. All companies offer and support programs and initiatives regarding community by supporting education and providing schools for children contributing to the creation of employment opportunities and the promotion of culture. Microsoft and Sony have most illustrated these topics. "Social investment" is also covered from companies with efforts like water supply, management and water supply enhancement Programs (for example, Norton and its employees provided a water tower for students: https://www.nortonlifelock.com/blogs/corporate-responsibility/earthday2019). Volunteerism which is part of "Social investment" is also promoted from companies in a major level. For example, Oracle supported the efforts to combat COVID-19 by providing digital assets (software, platforms). All companies provide various volunteerism programs to engage and attract their employees to participate such as funding for a specific cause or actively help in restoration projects like tree-planting. "Technology development and access" is covered from companies by providing access to new technologies for community, research centers and universities. For example, Apple has a program where Apple engineers, colleges and interns from universities develop tools to improve the way recyclers process Apple's devices. "Wealth and income creation" issue is indirectly covered by the "Community involvement" and "Technology development and access" issues by providing various entrepreneurship programs. "Health" is an issue which partly overlaps with "Protecting consumers' health and safety" issue in "Consumer Issues" thus, from that point of view is covered as well.

4.2 Outcomes from CSR reports: 2020 and 2015 reports comparison

In the following section I compare the CSR reports from the same companies on 2015 from my previous research in order to investigate whereas these companies have made steps and improvements toward CSR or have aim their focus towards other issues that have previously ignored.

Organisational governance		1	2	3	4	5	6	7
Organisational governance	2015	✓	✓	✓	✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓

Table 8: Organization Governance 2015 and 2020

Labour practices		1	2	3	4	5	6	7
Employment and employment relationships	2015	✓	✓	✓	✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓
Conditions of work and social protection	2015	✓	✓	✓	✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓
Social dialogue	2015	✓				✓		
	2020	✓			✓	✓		
Health and safety at work	2015	✓	✓	✓	✓	✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓
Human development and training in the workplace	2015	✓	✓	✓	✓	✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓

Table 9: Labour Practices 2015 and 2020

The environment		1	2	3	4	5	6	7
Prevention of pollution	2015	✓	✓	✓	✓	✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓
Sustainable resource use	2015	✓	✓	✓	✓	✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓
Climate change mitigation and adaptation	2015	✓	✓	✓	✓	✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓
Protection of the environment, biodiversity and restoration of natural habitats	2015	✓				✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓

Table 10: The environment 2015 and 2020

Consumer issues		1	2	3	4	5	6	7
Fair marketing, factual and unbiased information and fair contractual practices	2015						✓	
	2020	✓				✓		
Protecting consumers' health and safety	2015					✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓
Sustainable consumption	2015	✓	✓	✓	✓	✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓
Consumer service, support, and complaint and dispute resolution	2015	✓	✓			✓	✓	
	2020	✓	✓	✓		✓	✓	
Consumer data protection and privacy	2015	✓	✓		✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	
Access to essential services	2015							
	2020	✓	✓	✓		✓	✓	✓
Education and awareness	2015	✓	✓		✓	✓	✓	
	2020	✓			✓		✓	✓

Table 11: Consumer issues 2015 and 2020

Human rights		1	2	3	4	5	6	7
Due diligence	2015	✓						
	2020	✓						✓
Human rights risk situations	2015	✓			✓	✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓
Avoidance of complicity	2015							
	2020	✓					✓	✓
Resolving grievances	2015					✓		
	2020	✓						✓
Discrimination and vulnerable groups	2015	✓	✓	✓	✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓
Civil and political rights	2015	✓	✓					
	2020	✓	✓			✓		✓
Economic, social and cultural rights	2015	✓	✓					
	2020	✓	✓	✓	✓	✓	✓	✓
Fundamental principles and rights at work	2015	✓	✓			✓	✓	✓
	2020	✓	✓		✓	✓		✓

Table 12: Human rights 2015 and 2020

Anti-corruption	2015	✓	✓			✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓
Responsible political involvement	2015	✓				✓		
	2020	✓	✓	✓	✓	✓	✓	
Fair competition	2015					✓	✓	
	2020	✓	✓	✓		✓	✓	
Promoting SR in the value chain	2015	✓	✓		✓	✓	✓	✓
	2020	✓	✓	✓	✓	✓	✓	✓
Respect for property rights	2015						✓	
	2020	✓	✓				✓	

Table 13: Fair operating practice 2015 and 2020

Community involvement and development		1	2	3	4	5	6	7
Community involvement	2015	✓	✓	✓	✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓
Education and culture	2015	✓	✓	✓	✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓
Employment creation and skills development	2015	✓				✓	✓	✓
	2020	✓	✓			✓	✓	✓
Technology development and access	2015	✓	✓		✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓
Wealth and income creation	2015	✓				✓	✓	
	2020	✓		✓		✓	✓	✓
Health	2015							
	2020	✓	✓	✓	✓	✓	✓	✓
Social investment	2015	✓	✓	✓	✓	✓	✓	
	2020	✓	✓	✓	✓	✓	✓	✓

Table 14: Community involvement and development 2015 and 2020

4.2.1 Findings and Discussion

All the seven companies made improvements and address more issues by adopting new policies. There are very few cases where a company stopped to address an issue which was already covered in 2015. Principles of "Fair operating practices" and "Community involvement and development" have most contributed from 2015 where many issues are now covered. Principles of "Organizational Governance" and "The environment" are already addressed in 2015; they are the most prominent principles for a company to implement in their CSR strategy. Apple has covered many issues which were absent in 2015 report contributing to various principles such as "Community involvement" or "Human Rights". Overall, CSR reports on 2020 are more organized and structured from 201. In both 2015 and 2020 CSR reports focus:

- on the protection of the environment
- waste management - activities and actions required to manage waste
- supply chains and the environmental and social (human rights) risks they have
- community development and social contribution (poverty, hunger, health)

5 How IT/ICT companies can contribute to social responsibility

Nowadays, digital technology affects all aspects of our lives and plays an increasingly important role in society. Information technology and communication technology has changed the way we communicate, learn, socialize and work. In figure 10, many future technologies will impact well-being and our day-to-day life. Originally, ICT sector was to support businesses but now ICT is by itself a major business.

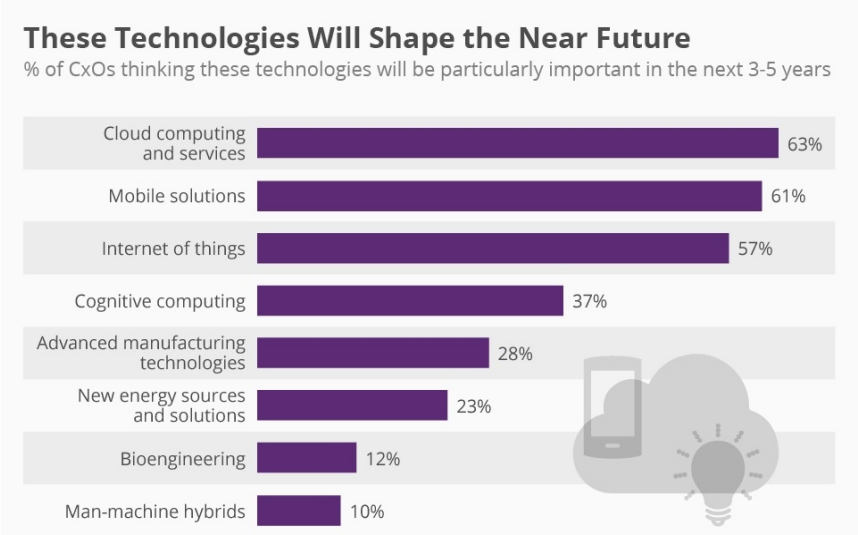

Figure 10: These Technologies Will Shape the Near Future [36]

All these services and applications need infrastructure to be development and operated. All these infrastructures need power, cooling, water supply etc. The digital revolution with its electronic devices, PCs and ICT infrastructure has an impact on the environment that many don't recognize. European Commission stated that "ICT is currently one of the fastest growing greenhouse gas-emitting and energy management sectors" [37]. Energy consumption is not the only related problem related to ICT; the production of IT equipment presents serious related to the environment such as toxic waste materials or production of polluting gases. Terms such as digital pollution refers to the harmful effects on the environment caused by the network and its devices. Data centers consume huge amounts of electricity as well as emitting large quantities of CO_2. Image 2 shows the electricity usage of Data centers which will use 3-13% of global electricity in 2030 compared to 1% in 2010 [38].

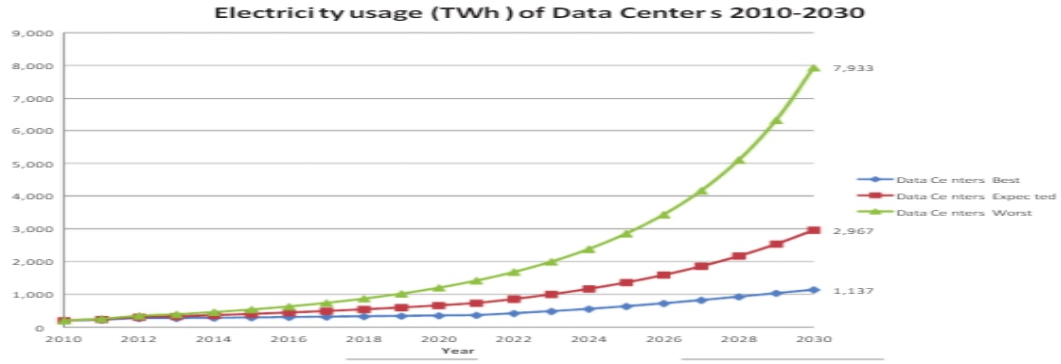

Figure 11: Electricity usage of Data Centers 2010-2030

While some technologies have positive impacts on the environment (reduction in the need for travel, virtual meetings, better energy efficiency in production) some negative impacts may arise such as e-waste and "short" product life cycle. On the one hand, ICT is an essential tool to make innovative solutions such as smart cities projects and bring a great potential to reduce the negative impact in society, on the other hand ICT always wants more and more energy thus increasing environmental impact of the production and use of IT equipment. The impacts of ICT sector on the environment have many aspects either direct derived from its operations either indirect from its suppliers and activities. In [39] authors trying to distinct the complex connection between ICT and sustainability:

(1) Direct effects of ICTs are predominantly negative and stem from the production, use and disposal of hardware such as computers, screens, network cables, etc. They are not greatly different from the environmental effects of many other products, but pose a number of specific problems in terms of both resource use, emissions and waste management.

(2) Indirect effects of ICTs are expected to be largely positive. Two main causes are put forward. Firstly, ICTs contribute to increasing the efficiency of production processes, for example through computer-aided design (CAD), higher production speed and scale, and greater control. Second, it is expected that a wide range of products and services (insurance, access to information, music, etc.) may become fully de-materialized. On the other hand, many of the digital goods and services will come 'in addition to' existing goods and services, adding environmental pressures.

(3) Structural and behavioral effects of ICTs relate to more fundamental processes of change and may have both positive and negative outcomes. On the positive side, the spread of ICTs contributes to a shift from an industrial economy towards a service economy, which will tend to have lower levels of resource and energy use (at the point of use). ICTs can also support behavioral changes in favor of a 'greening' of products and services. On the negative side, efficiency gains could be offset by a so-called 'rebound effect', often observed in the transport and energy sector. This occurs when efficiency gains (directly or indirectly) stimulate growing demand that balances (or even over-compensates for) positive environmental effects.

Pursuing sustainability puts companies in the challenging position to rethink their long-term operations according to the impact of their products and services on our planet. Some main subjects that an IT organization should consider and investigate for irregularities that can potentially impact negatively sustainability include [18]:

- Company's supply chain and other partners
- Software products and services
- Hardware products and systems
- Consumers and Customers
- Employees, workers, Software/Hardware Engineers
- Environmental Issues
- Community engagement and involvement
- Company's governance and practices
- Internal functions (power management, etc.) and systems (private data centers etc.)

In the this chapter (chapter 5) I researched and reviewed current literature about practices, initiatives and policies that an IT/ICT company can follow and implement in their strategy. Most practices are technology-oriented thus most of them referred to IT/ICT sector, but there are concepts such as

virtualization where any type of company can implement and contribute to CSR. The aim of this chapter is to examine current technologies and check if they contribute to social responsibility either directly or indirectly.

5.1 Green Computing

Green Computing or Green IT is a concept which describes all those elements, actions and practices which can contribute positively to sustainable development. The term 'Green Computing' is the study and practices that covers the computing life-cycle from cradle to grave. It starts from design to manufacturing to use of equipment and then safely disposing-off computers, related devices, networking and communications equipment efficiently and effectively with negligible or no impact on the environment [40]. Green computing not only involves thinking about actions that help to reduce the environmental impact generated by the production and the new technologies, but it is a great opportunity for the ICT industry to save costs and optimize efficiency and the management usage of energy and facilitating the development of new products throughout the several different phrases in the product life cycle (development, production, use and disposal). Green IT practices include efficient use of IT resources, reducing energy consumption and maximizing the use of resources. As San Murugesan notes in [41] Green IT spans a number of focus areas and activities, including:

- design for environmental sustainability;
- energy-efficient computing;
- power management;
- data center design, layout, and location;
- server virtualization;
- responsible disposal and recycling;
- regulatory compliance;
- green metrics, assessment tools, methodology;
- environment-related risk mitigation;
- use of renewable energy sources; and
- eco-labeling of IT products.

Some of the core green computing technologies that will be discussed below include Green Data Center, Virtualization, Cloud Computing, Power Optimization and Grid Computing.

5.2 Virtualization

Virtualization technology enable us to abstract the hardware elements (hard disk, ram, CPU, network interfaces) and make them available in the form of virtual resources with advantages that includes management, economic and performance metrics. An organization can greatly benefit from virtualization by reducing costs since a single physical server dedicated to an activity can be divided into several virtual servers eliminating the cost of physical hardware and thus multiplying the work environments. Moreover, virtualization enables rapid deployment and scalability of Servers and reliability of the systems. Virtualization technology is a fast-moving market and is being adopted by many businesses. There are various types of virtualization based on the requirements:

- Server Virtualization: the most common form of virtualization known also as hardware virtualization enables the use of Virtual Machines (VMs). Through the virtualization process, numerous operating systems can run concurrently on a single physical machine. The level of abstraction between the physical base and the virtual system in a hardware virtualization is established by a so-called hypervisor.
- Desktop Virtualization: allows the creation of desktop environments that individual users of a corporate network can view on their client but using the resources of the machine (server) that provides the service. With desktop virtualization, end users are no longer forced to work from one device and one location.
- Network Virtualization: network virtualization combines the available hardware network resources and separate them by combining them programmatically (software define network) creating a more flexible system and reducing networking costs. The way applications run on the virtual network is the same as on the physical network.
- Storage Virtualization: storage virtualization is part of the software-defined storage layer that must deliver performance improvements and efficient use of space without requiring the purchase of additional storage hardware.
- Application Virtualization: refers to the abstraction of individual applications from the underlying operating system

According to Spiceworks research, enterprise adoption of virtualization technology is expected to grow significantly: by 2021, 75% of enterprises expect to use application virtualization and 69% expect to use desktop virtualization [42].

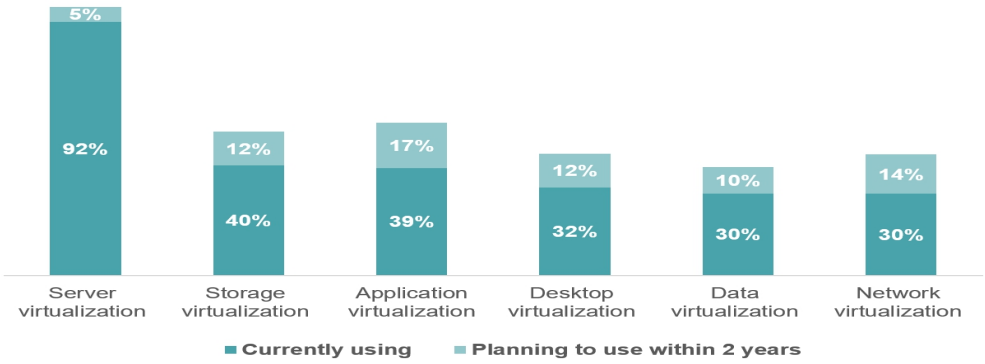

Figure 12: Current and future usage if Virtualization

It is not unquestionable that virtualization has many positive effects for the companies that integrated it. The next step is to investigate where visualization has also positive impacts towards sustainability. It is obvious that virtualization is a major contributor to sustainability since enables organizations running fewer physical servers thus using less energy. These are two positive impacts: less production of servers, less energy usage. VMware, a leader company in cloud computing and virtualization technology summarizes the following key observations (43):

- Server virtualization has positively impacted the industry by enabling customers to reduce server acquisition and life-cycle costs, reducing data center space requirements and most importantly reducing power consumption, cooling, and management demands.

- Reduction of power consumption has a direct effect on the environment, reducing the release of greenhouse gases from power generation and aiding corporate social responsibility initiatives.
- The benefits associated with server consolidation will continue to accrue for many years into the future and are augmented by reduction in cooling energy consumption and related data center equipment that is not needed because of a smaller server count in use.

5.3 Cloud computing

Prior to server virtualization, organizations were faced with a high number of servers, underutilized computing power, ever-increasing energy costs, manual processes, general inefficiency and lack of flexibility in their data center environments. Server virtualization has changed all of that and has been widely adopted. Virtualization is the core technology of the cloud that continues to evolve rapidly. These two concepts are interrelated and, in most cases, there is no cloud without virtualization (although there are some "bare-metal" clouds) whereas virtualization without cloud exists. While virtualization creates virtual IT assets, cloud computing is the service or the environment that results from the virtualization technology. Cloud computing can sometimes be used as a marketing term for virtualization.

In this essay I assume that virtualization is the virtualization on-premises, this means that the organization "virtualizes" its infrastructure and operates the virtual platforms in its own hardware located inside the organization. Cloud refers to the public cloud and means that the organization does not develop the virtualization in its infrastructure but uses cloud services from a public cloud provider like Microsoft Azure or Amazon AWS. In that scenario the organization has a small quantity of hardware on-premises used mainly for back-office purposes and all the rest services are running from on the cloud provider. From this point of view, I investigate whereas cloud is better from on-premises virtualization in terms of sustainability. In other words, should an organization not implement virtualization and drop its (most of it) hardware and move its digital assets (data, IT resources, applications, workloads) on a cloud provider?

Firstly, there is no doubt that the adoption of either virtualization or cloud, the sustainable outcome is way better from the non-use of virtual assets and virtualization. The main difference between these two methods is that cloud computing is developed, provisioned and operated in huge data centers across the globe with huge of amounts of energy used for power and cooling. Virtualization on-premises is developed inside organization's proprietary building/infrastructure and with its own hardware. This infrastructure, albeit much smaller than a data center, still needs some cooling and power for it support. Nevertheless, cloud computing is more sustainable than owning a server room inside every organization. Server consolidation, scaling, energy production, usage management and capacity utilization are more prominent in cloud computing service provider. Some positives characteristics of cloud computing include:

- Capacity and resources utilization: Most organizations have specific time periods of workloads, for example they work on weekdays and not in weekends and nights. That means that a local data center (organizations' on-premises) consumes "pointless" resources when the is no workload. Contrariwise, cloud system has a significantly higher capacity utilization thanks to its worldwide use (even nights in data center workload exists because somewhere

else is day) thus a higher efficiency. Moreover, cloud can provision resources dynamically so the capacity of virtual assets can adapt by increasing or decreasing depending of the workload, thus only the necessary energy will be used, without wasting energy, reducing the ecological footprint. All in all, centralizing data saves energy.

- Hardware efficiency: Cloud Providers can use their purchasing volume to influence the design of the server hardware to an extent that is not possible for smaller companies. Thus, they can get servers that are optimized for the cloud environment with a focus to less energy consumption.
- Pay-per-use and self-service: encourages more efficient behavior and life-cycle management. The pay-as-you-go nature of cloud-based infrastructure encourages users to only consume what they need and nothing more. Combined with self-service, life-cycle management will improve, since users can consume infrastructure resources only when they need it — and "turn off" these resources with set expiration times [44].
- Data center efficiency: Data center is a business with expertise in design and implementing systems that can use less energy for lighting, cooling, and power conditioning resulting in energy savings. Many organizations cannot focus on many aspects regarding their construction of their infrastructure and that means that they don't use state of art technologies because either their budget is limited or their staff has not have the expertise to give special attention to things like cooling and power management.

There are three fundamental models where cloud computing services can be provided [45]:

- Software as a Service (SaaS) offers finished applications that end users can access through a thin client (typically, but not necessarily, a web browser). Prominent examples of SaaS include Gmail, Google Docs, and Salesforce.com. The end user does not exercise any control over the design of the application (aside from some minor customization and configuration options), servers, networking, and storage infrastructure.
- Platform as a Service (PaaS) offers an operating system as well as suites of programming languages and software development tools that customers can use to develop their own applications. Prominent examples include Microsoft Windows Azure and Google AppEngine. PaaS gives end users control over application design, but does not give them control over the physical infrastructure.
- Infrastructure as a Service (IaaS) offers end users direct access to processing, storage, and other computing resources and allows them to configure those resources and run operating systems and software on them as they see fit. Examples of IaaS include Amazon Elastic Compute Cloud (EC2), Rackspace, and IBM Computing on Demand.

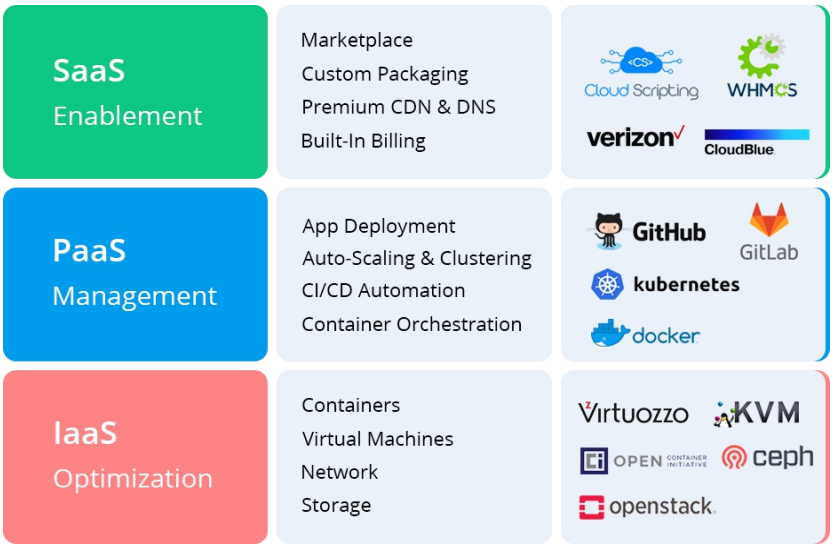

Figure 13: PaaS, IaaS, and SaaS [46]

By using cloud computing, companies become greener because they decrease their energy consumption while they can increase IT capacity without investing in more infrastructure.

5.4 Green Datacenters

Data centers are the basic prerequisite for the digital world, the data factories of the digital age running without interruption, 7 days a week and 365 days a year providing IT services anywhere and at any time in the world. They form the backbone and provide a variety of services such as Web Hosting, e-commerce and platforms like software as a service (SAAS), platform as a service (PAAS). Compared to on-premises where the system is operated by setting up a server in-house, the following factors are expected:

- Maintenance and operation costs can be reduced
- High security against data theft
- Low risk of data corruption in the event of a disaster
- Power supply and communication status are stable
- Can be operated 24 hours a day, 365 days a year

A data center consists of many attributes such as the facility, geographical location, server hardware, OS and server software, applications, power, cooling and network. In a data center, it is necessary to secure a power source, manage the temperature and humidity of the data center, network environment and etc. for stable operation. If a company tries to manage a server room at its own facility, it will be costly, requiring extra personnel.

Data centers have traditionally consumed large amounts of power. Especially traditional datacenters have neither evolved or implement new technologies in energy management and they keep legacy cooling systems and use aging servers. The most contributing factor in energy waste is the use of old legacy server hardware. Figure 14 [47] shows data collected from an actual data center where data center servers older than 2007 consume 60% of the energy, but contribute only an estimated 4% of the compute capability (10).

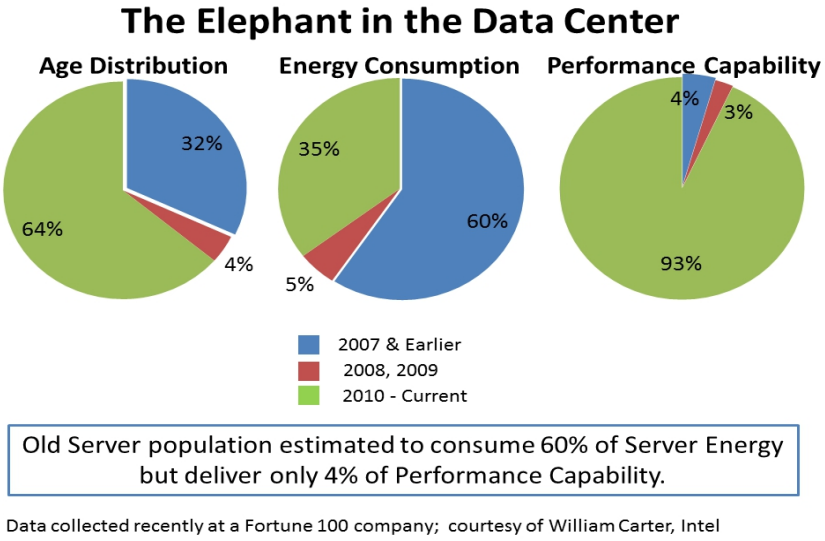

Figure 14: Old server population statistics

The data center industry has traditionally been enthusiastic about reducing power consumption, thereby controlling operating costs and improving price competitiveness and services. However, if the IT power that was previously consumed in the enterprise is concentrated in the data center, the consumption in the data center will increase accordingly. Data centers are now required to solve their enormous power consumption by finding new approaches since there is the negative impact of greenhouse gases on social continuity and the issue of improving sustainability to solve it. Moreover, a data center must comply with increasing governmental regulatory requirements to reduce carbon emissions; therefore, it should implement green initiatives for a greener data center. Figure 15 [48] shows energy demand in data centers for each component.

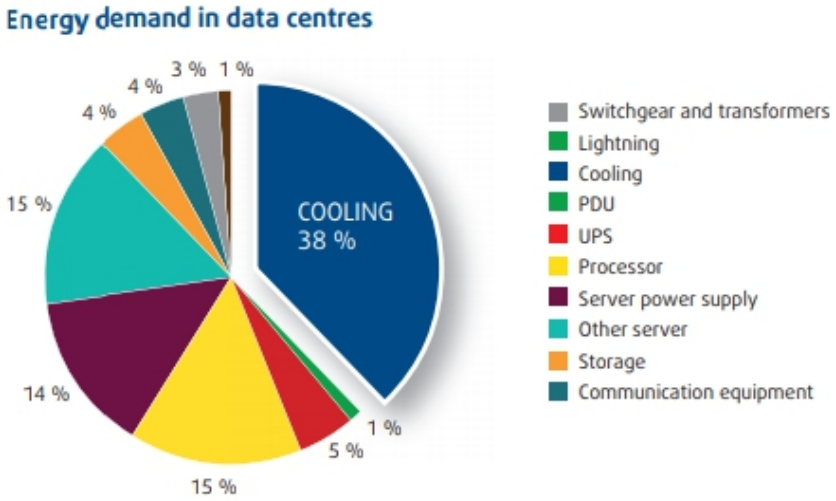

Figure 15: Energy demand in data centers [48]

By building and certifying a green data center, an organization benefits in areas, such as lower cost of operation due to less energy requirements and active role of socially responsible behavior. As a result, an organization contributes to sustainability and provides a better work environment for the employees. A list of some green IT initiatives is presented below:

- Efficient Software and Algorithms
- Multi-core processors
- Server Consolidation
- Sharing architectures
- Server Virtualization
- Data Compression
- Adjust processor speed to demand
- Virtualization of Storage
- Tape drives for long term data storage
- Information, Application & Life Cycle Management: when developing products or services, the effects on the environment and society that may arise throughout product's life cycle must be considered thus, an organization should promote sustainable innovation from design to disposal or recovery. In the design phrase of a product, emphasis must be given to ensure that the product or service has the lowest possible economic, ecological and social outcome with the highest possible benefit. To that end, documenting every single phase of life is important. In figure 16 [49] authors visualize how life cycles, that is 'project lifecycle', 'asset life cycle' and 'product life cycle', interact and relate to each other.

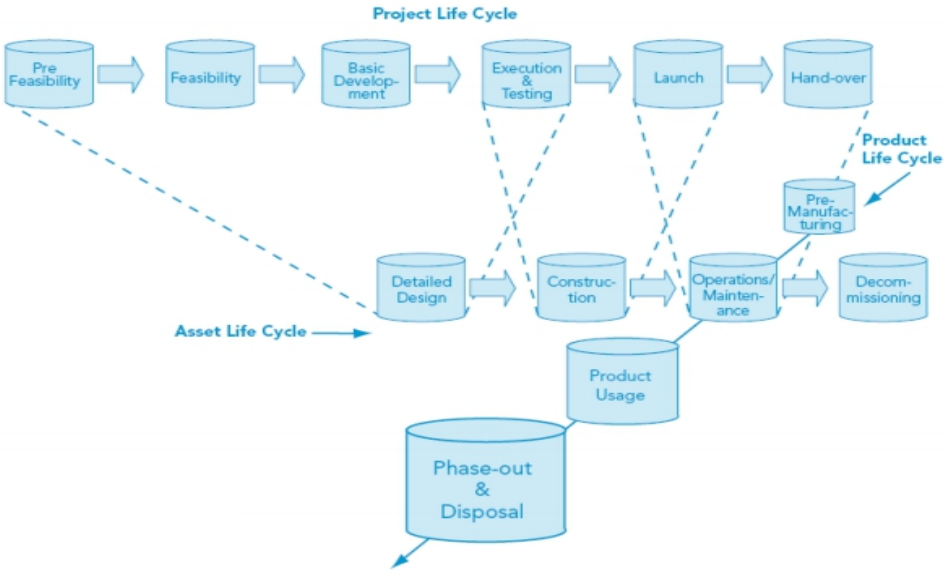

Figure 16: Interaction between life cycles

- Optimal lighting: lighting is responsible for the 3-5% annual energy consumption of a data center. New energy-efficient LED lights can be used for better efficiency. Segmentation of the technical areas to be illuminated and motion-activated detectors activate the lighting as required for accessing the data center. This goes out automatically if there are no people on the technical area and only those areas are illuminated that are necessary for the stay and the safety of the people. This technology is known as "lights off". Another technology is the "follow-me" technology where you put light only where it's needed. In figure 17, there are five different scenarios with different use of lighting technologies [50].

	24x7 Fluorescent	24x7 LED	24x7 LED 20%, Dim +Follow-Me	Lights-Off Fluorescent	LED with Follow-Me Lighting
Annual Operating Hours	8,760	8,760	8,760	300	300
Square Feet Illuminated per Incident	100,000	100,000	100,000	100,000	100
kWatts Used per Hour	90	36	7.24	90	0.04
kWatts Used per Year	788,400	315,360	63,387	27,000	11
Price per kWatt	$0.08	$0.08	$0.08	$0.08	$0.08
Energy Cost per Year	$63,072	$25,229	$5,071	$2,160	$0.86

Figure 17: different scenarios with different use of lighting technologies

- appropriate raised floor: The usual most effective solution for room cooling with air is an arrangement with alternating hot and cold aisles with corresponding cold air supply via a raised floor with appropriately arranged air-permeable raised floor panels.
- use of newer infrastructure products: by using new state-of-art systems including UPS, cooling systems, generators an organization can benefit from the efficiency and low energy consumption than legacy systems.
- balanced cooling and ventilation (Move to hot aisle/cold aisle arrangement): Cooling represents the major contributor of the total cost in energy consumption up to 30% of total annual energy consumption. Hardware operating in a data center generates heat. To operate a data center efficiently, it is necessary to remove the excessive heat of the hardware.
- measure, monitor thermal power loads

In more recent researches, authors in [51] made a literature review and provided a holistic framework that can help to position current and new research on the factors influencing the implementation of green IT in the data center as seen in figure 18.

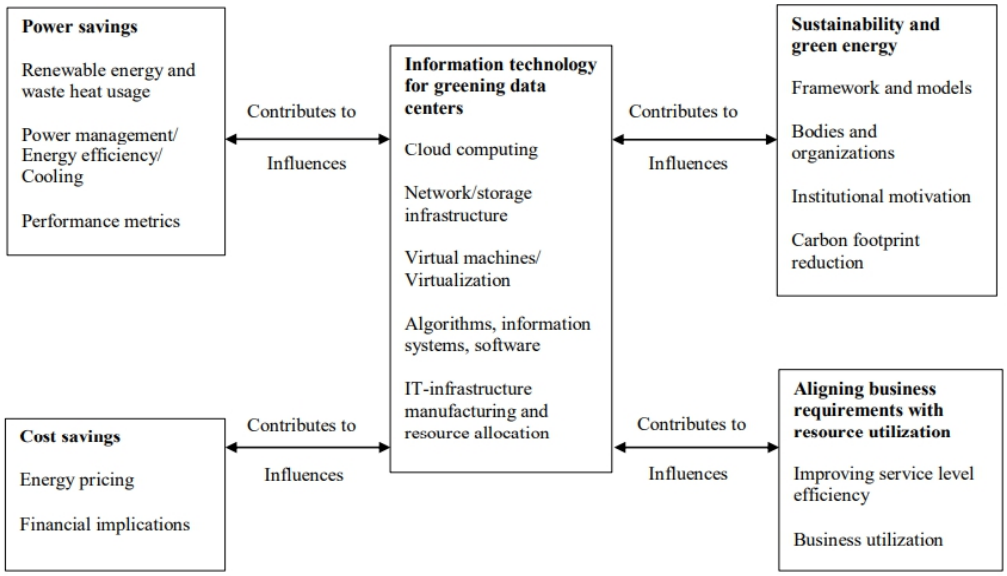

Figure 18: Framework on how data centers advance green IT

5.5 Grid Computing

In grid computing the resources are effectively shared between many users. Grid computing allows the consolidation of a number of virtual servers/computers to one physical server/computer, whilst maintaining the individual properties of each of the systems. Grid computing has already revolutionized the way scientists share and analyze data, enabling researchers to share computer power over the Internet [52]. The migration to a Grid infrastructure can be seen as Green Design of IT systems since enterprises can chose between different types of Grid, such as an Enterprise Grid or a Desktop Grid that can be used to reduce power consumption of IT resources [53].

5.6 Green Software Engineering

While software is considered an intangible asset, can create material and energy flows. Properties of the software decide which hardware capacities are kept and how much electrical energy is used in end devices, networks and data centers. Green in the software processes is an emerging trend and should be considered in each phase of the software development. It seems that sustainability is not supported overall by software engineering procedures because there is a lack of models and instructions to be followed and the resource behavior of software cannot be recognized directly because there are no energy efficiency scales, although there are some efforts to address sustainability. Some examples of efficient and green software engineering are the following:

- a software program/application in an IOT environment that has been optimized to not use (send requests) and activate continuously sensors or devices.
- a courier company that has running a new software application that optimizes delivery times and routes thus minimizes the use of fossil fuels
- a software that has been optimized to use less CPU clock cycles, thus, consuming less resources and saves computing power

Regarding the development and use of software system, there are four aspects of sustainability [54]:

- Development process aspect: Sustainability in the initial software development process (with responsible use of ecological, human, and financial resources).
- Maintenance process aspect: Sustainability of the software system during its maintenance period until replacement by a new system.
- System production aspect: Sustainability of the software system as product with respect to its use of resources for production, for example, by using green IT principles and sustainably produced hardware components.
- System usage aspect: Sustainability in the usage processes in the application domain triggered by the software system as product.

In addition, various initiatives and practices regarding green software are explained below:

- avoid code duplication (refactoring): code duplication is a piece of code (line or block) in the program, file, environment which has note a major contribution and should be removed/changed the need to exist. Duplication makes the program lengthy and uses more CPU cycles.
- minimize memory access / optimize memory access
- source code on the energy efficiency of the application (into account in software development and coding)
- clean code
- resource-saving software
- low-maintenance software
- SPELL Spectrum-based energy leak localization [55]: SPELL is a technique which determines red (aka energy inefficient) areas in software. SPELL runs some test cases which are executed to get energy consumption information and measurements. Then, with a statistical method which is based on spectrum-based fault localization, SPELL relates energy consumption with the system's source code. Results in figure showed that with the SPELL technique, global energy consumption (J) optimized on average by 18% and developers identify an optimize energy problems in 50% less time.

		Original		SPELL – Time taken: 1h04								No SPELL – Time taken: 1h58							
						Gain (%)		Energy Metrics						Gain (%)		Energy Metrics			
	Test	J	ms	J	ms	J	ms	GU	SU	PU	Cat	J	ms	J	ms	GU	SU	PU	Cat
Project P_1	1	13.6	1341	9.7	959	28.3	28	1.39	1.40	1.00	3	13.3	1324	1.7	1	1.02	1.01	0.99	1
	2	4.6	314	4.3	317	4.9	-1	1.05	0.99	0.94	4	4.9	339	-8.3	-8	0.92	0.93	1.00	8
	3	7.0	695	4.9	482	30.0	31	1.43	1.44	1.01	3	7.1	690	-2.2	1	0.98	1.01	1.03	5
	4	7.1	691	6.5	583	8.4	16	1.09	1.19	1.09	3	7.1	683	0.1	1	1.00	1.01	1.01	3
	5	25.8	2557	21.5	1603	16.5	37	1.20	1.59	1.33	3	25.6	2538	0.7	1	1.01	1.01	1.00	3
	6	20.8	1469	18.2	1808	12.5	-23	1.14	0.81	0.71	4	19.4	1923	6.8	-31	1.07	0.76	0.71	4
	7	3.5	315	3.3	283	7.2	10	1.08	1.11	1.03	3	3.1	304	11.0	3	1.12	1.04	0.92	1
	Total	82.4	7381	68.5	6037	16.8	18	1.20	1.22	1.02	3	80.7	7801	2.1	-6	1.02	0.95	0.93	4

Figure 19: Results with SPELL and no SPELL technique

- Leafactor [56]: Leafactor provides a refactoring mechanism for the automatically improvement of energy consumption of Android apps. Leafactor analyzes and rebuilds code to implement Android-specific, energy-efficient optimizations. Authors in [57] detected and

fixed code smells in 45 from the total of 140 free open source apps which analyzed. Moreover, they merged their fixes into the official repository of these open source apps.

Regarding code aspect of software development, energy efficient algorithms should be considered. Regarding efficiency, Kern [58] identifies that the following metrics might be useful.

Aspect →	Metric
• Energy Efficiency	→ Energy / Unit of Work
• CPU-Intensity	→ CPU Cycle Count
• Memory Usage	→ Memory Consumption
• Peripheral Intensity	→ Peripheral Usage Time
• Idleness	→ Idle Time

Figure 20: Metrics for different quality aspects

5.7 Legal, compliance, standards, and risk management.

Authors in [59] reviewed some directives and regulations that contribute to CSR and help organization for guidance:

- WEEE is the 2003 European Waste and Electrical Equipment Directive. It mandates producers take back old equipment free of charge to reduce electronic waste. The overarching goal is Design for Environment (DfE) throughout the product lifecycle. Noncompliance is prosecutable;
- RoHS is the 2007 European directive on the Restriction of Hazardous Sub-stances. It restricts six substances including lead, mercury, and cadmium used in the manufacture of electronics;
- REACH is the EU's 2007 Restriction, Evaluation, and Authorization of Chemicals regulates the production and use of chemicals to minimize their impact on human health and the environment;
- EuP is the EU 2007 Eco-Design of Energy using products directive on the lifecycle energy efficiency of products;
- The Electronic Product Environmental Assessment Tool (EPEAT) is an international product registry (www.epeat.net) that enables buyers to evaluate, compare, and select desktop computers, notebooks, and monitors on environmental criteria.
- The Energy Star 5.0 2009 standard (www.energystar.gove) regulates energy performance for desktop, workstations, and notebooks to help buyers identify the most energy-efficient computers and peripherals. Version 1.0 of the server specification was released in May 2009;
- Efforts are underway to extend the Leadership in Energy and Environmental Design (LEED) program for certifying green buildings to datacenters. A datacenter-specific standard is sought, although, some datacenters have been certified under the existing commercial building standard;

- ISO 14000 is the standard for environmental management systems. The goal of the standard is to reduce the environmental footprints of businesses. It specifies requirements, guidelines and systems for implementation.
- Green Information Infrastructure Library (ITIL) focuses on the creation and delivery of best value IT services that align investments with business performance. The current focus of green ITIL is on green IT efficiency and carbon reduction for datacenters.

5.8 Working Environment and working conditions in IT sector

The working environment can become very demanding for IT professionals. Designing, building and maintaining complex systems can be challenging. Software engineers often face time restrict deadlines resulting in huge stress, extreme workloads, faulty or broken software, etc. Furthermore, the IT career has many evolves due to rapid changes in technology and hence IT professionals should be able to learn and adapt in any environment, acquiring new skills and techniques in a fast-pace manner. All considered, IT professionals cope with increasing demands at work and lose the balance between work and personal life.

An organization should investigate for irregularities in the working environment as well as working conditions and more specific in the following aspects:

- Physical environment, e.g. lack of fresh air, artificial lighting, closed space
- Intense work pressure which may lead in related problems such as burnout syndrome, mobbing syndrome
- Poor management
- Workplace phobia
- Noise levels
- Safety issues
- Amenities that provided
- Poor education
- Any practice or policy that affects the conditions of work (work hours, wages)

Besides national laws and regulations that set the conditions of work and an organization should explicitly follow, there are further enhancements that can be done by an organization to improve the working environment. This is the point where the voluntary characteristic of ISO 26000 and SR is adopted by organizations that are willing to contribute to sustainable development and take initiatives towards social responsibility.

Such initiatives and practices should include:

- Undergo additional training and seminars
- Flexible working hours (work from home, telework)
- Modern technologies/working methods
- Upgrade of work equipment

- Effective communication at work among company, managers and employees
- Ergonomic adaptations of the workplace
- Health promotion
- Reward and Recognition systems
- Personal development and career training opportunities.

5.9 Agile Methods

Agile methods consist of a set of practices for software development that have been created by experienced practitioners, aiming at overcoming the limitations of plan-based approaches through considering changes of the system's requirements [60]. Many companies experience greater job satisfaction among employees, with agile processes and similar forms of work. There are various agile models such as Scrum, SAFE, Agile Unified Process (AUP), XP, Kanban, Lean etc. There is a manifesto for Agile development which was written in 2001 from 17 independent software practitioners and provides a guidance based on the following twelve principles [61]:

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity–the art of maximizing the amount of work not done–is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly

Agile methods can improve quality in software and promote sustainability in many ways; the adaptation of an agile culture within the organization can have sustainable outcomes:

- Stakeholder engagement: During the development of software, the communication of stakeholders (developers, designers, project managers, customers, end users) plays a vital role through all the processes. Thus, an active communication channel can be created where

stakeholders and organization can better understand each other where. Stakeholders can express themselves on key issues and respectively organization recognizes these issues and addresses them.

- Human capital management: agile methods are based on human aspects where stakeholders interacting each other. Thus, Agile methods are not exactly processes. They provide the motivated environment for the developer teams to act in an Agile manner.
- System requirements: Waterfall development expects all the requirements to be known from the start of the project. However, requirements can be changed or be recognized as faulty during the software development making the whole project to fail and start from the beginning. Agile Methods can successfully respond to changes that evolving throughout the project resulting in a continuous delivery of useful software, and thus better customer satisfaction.

5.10 Findings and Discussion

World has already been digitized to such a large extent that the application of the associated technologies accounts for a clearly noticeable part of global electricity consumption. In the era of digital change and the increase of electricity consumption, it is becoming more and more important to think about how global energy consumption can be reduced. Especially year 2020 with covid-19 pandemic has shown that the digital is happening now. With the help of information technology, many business processes have been accelerated and simplified but with the increasing progress, however, awareness of environmental protection also increases.

Renewable resources can make an important contribution to minimizing greenhouse gases. Data centers in particular have been driving up energy consumption for years and should set a good example. There are technologies that can greatly promote sustainability and help organizations by minimizing energy cost. Some other technologies help employees or local communities which can indirectly give back to organization which can potentially attract more customers and hire new talents. I presented some technologies, techniques and practices that organizations in ICT sector can implement so they can address issues that impact negatively sustainability while promoting social responsibility. This chapter is not limited to ICT sector but every organization in other areas (financial, governance, construction etc.) can adopt some practices for their IT operations and IT departments. For example, a financial company may not afford to construct a big state-of-the-art data center but it can implement technologies like virtualization or move (migrate) its infrastructure to a cloud service provider.

Looking through literature there are various papers and researches related to ICT sustainability. Authors in [62] review the research fields relating ICT to sustainability and provided an overview in figure 21.

Name of the field	Main methods	Contribution to sustainable development
Environmental Informatics	Information systems Modeling and simulation Spatial data processing	Monitoring the environment Understanding complex systems Data-sharing and consensus-building
Computational Sustainability	Modeling, optimization Constraint reasoning Machine learning, etc.	Decision support for the management of natural resources "Balancing" conflicting goals
Sustainable HCI	Empirical HCI methods Design research Methods from other fields	Longevity of devices Supporting sustainable lifestyle Promoting sustainable behavior
Green IT/ICT	IT management IT engineering Software engineering	Reducing the environmental impacts of ICT hardware and software (Green *by* ICT covered by other fields)
ICT for Sustainability	Assessment methods (LCA, TA, others) Empirical methods (incl. social sciences) Scenario-building Modeling and simulation	Reducing ICT-induced energy and material flows Enabling sustainable patterns of production and consumption Understanding and using ICT as a transformational technology

Figure 21: Overview of fields relating to ICT to sustainability

Apart from the technologies and practices, a framework; an organic approach and a long-term and wide-ranging strategic vision is important to do sustainable business. When an organization needs to implement an effective model of sustainability it should rethink all its operations, sort out existing ideas and projects, define its priorities, set objectives and an action plan to reach them. As an example, authors in [63] presented an interesting framework for Green ICT strategy focused on higher education institutions in the United Kingdom. For my point of view, this framework is not limited only for education institutions but it can be followed as guidance for ICT sector and any organizations looking for implement green strategies since it defines the green ICT and the relationship between its components. More specifically, the framework gathers all green ICT components into three essential components:

- "Green ICT Strategy" includes targets that need to be achieved,
- "Green ICT Practice" include the practices to be developed in order to achieve green ICT strategy targets and
- "Green ICT Measurement" is the manner to measure practices and strategy and realize the if the efforts are leading to leading to the achievement of Green ICT goals

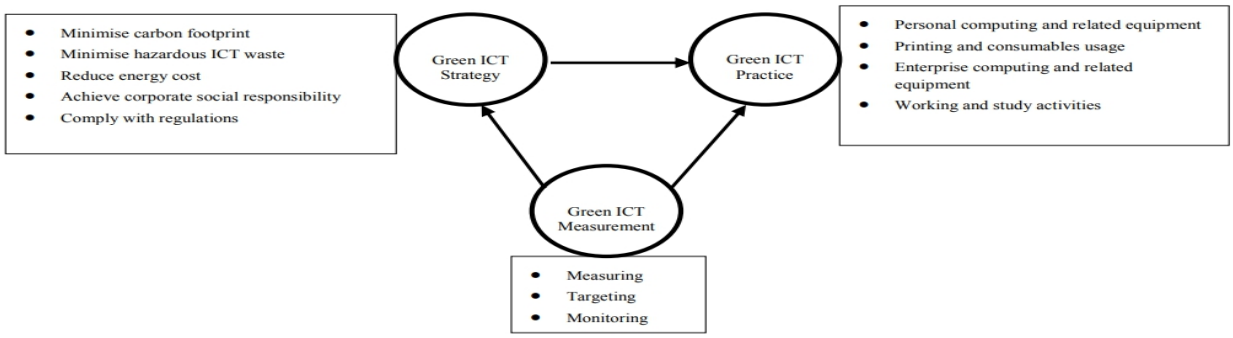

Figure 22: Components of framework for Green ICT

6 Conclusion and further work

- CSR is expected to be a major determining factor in an organization's governance and activities and not just a concept that simply must be followed whenever is deemed occasionally useful. This degree essay calls the organizations to involve sound SR practices in their strategies. ISO 26000 provides guidance on recognizing the core subjects and issues of social responsibility, engaging the organizations to integrate them into their business processes with the inclusion of environmentally relevant, social and economic considerations in their everyday business decisions.
- The foundation for promoting CSR is a system for actively disclosing information (disclosure of corporate information) and implement sound corporate activities. To that end, an organization must comply with laws and regulations and check whether it is conducting sound corporate activities, as well as initiatives (corporate ethics) and implement an operating business model with high ethical standards (corporate governance) functions. Another integral part of CSR is the stakeholders. The application of the CSR concept is a process of building the trust of the stakeholders in the operation of the company. The company gains this trust by constantly striving about understanding the expectations of its stakeholders.
- The investigation from CSR reports in chapter 4 showed that some of the most known IT/ICT companies have an entire department responsible for managing social responsibility and this can be found both on their websites where documents are presented and structured in a formal manner and in the content of these reports. These companies don't provide only a link with a report on their sites but they provide a whole environment for CSR. Both investigations from 2015 and 2020 showed that these companies don't refer in their CSR reports about the ISO 26000 standard, thus the structure in these reports are constructed and presented in various different ways. Only one company (Sony) mentions ISO 26000 but it is not followed as a structure in its CSR report. Further work will concentrate on an investigation involving a bigger sample of corporate reports, adding to the sample more companies. Moreover, a future work should investigate companies that implement and follow strictly ISO 26000 in order to compare them with reports which just based on CSR as a guidance.
- The initiatives, methods and technologies in chapter 5, can help IT companies to meet the sustainability requirements with a major contribution on environmental aspects. Nevertheless, these methods require a proper implementation with the sense of sustainability; otherwise, the potential sustainability benefits may not arise. Further research should be carried out to determine whether the various technologies are actually leading to sustainability achievement.
- All in all, an organization should contribute to the implementation and realization of a safe, secure and prosperous society that connects people, society and the earth. An organization that wants to practice social sustainability must take society's values into account and act in a socially just manner. This refers on the one hand to the directly affected members of a society in the surrounding area, on the other hand in an increasingly global topics such as poverty and misery in the countries of the third world.
- "Sustainability is about leaving the world as a better place for the coming generations. Not only in terms of environmental impact and consumption of resources, but also in terms of the society we are developing. It is important that all stakeholders take their responsibilities: from governments defining appropriate laws, to companies enforcing them but also moving towards a more responsible behavior beyond the mere respect of laws. [64]"

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