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Successful Patterns in Corporate Social Responsibility in Information Technologies

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.

ABSTRACT

California State University of Long Beach
Engineering/Computer Science Department
PERCCOM Master Program

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Master's Thesis

76 pages, 13 figures, 8 tables, 4 appendixes

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Context: In order to show their compliance with Corporate Social Responsibility goals, companies report their "sustainable initiatives" into their CSR reports. However, from small companies to multinational, it is hard to see the real benefits of sustainable strategies' implementation. Since there are actually no general patterns defined which can ensure high impacts on sustainability. Moreover, there are neither common metrics nor process to assess the efficiency of a sustainability strategy. Therefore, in this paper, we contribute a pattern approach to implementing sustainability in a company. To do that, we performed an analysis of the 25 CSR reports coming from the 25 biggest companies in the IT sector based on their annual turnover. In order to extract sustainability patterns that are provided in an online catalog in order to (1) give first tracks to companies which would engage in sustainability initiatives and don't really know where to start; and (2) to give an indicator to companies who already have taken up sustainability initiatives and would like to establish an evaluation of it. The final outcomes of the thesis are a set of 21 patterns extracted from the CSR referenced in an online catalog.

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"Fluctuat Nec Mergitur"

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LIST OF SYMBOLS AND ABBREVIATIONS

CSR	Corporate Social Responsibility
GRI	Global Reporting Initiative
ISO	International Organization for Standardization
SDG	Sustainable Development Goal
UN	United Nations

1 INTRODUCTION

In this chapter, the different concepts are defined from Corporate Social Responsibility (CSR) to the sustainable business practice passing by patterns.

The research gaps and research questions are exposed to establish a base of research alongside the methodology that has been used to research the different aspects of the present work. To finish the chapter the structure of the thesis is highlighted to establish the layout it will follow during the document.

1.1 Background

Corporate Social Responsibility (CSR) has been a constant source of interrogations since the beginning of the 50's. According to Carroll's literature review (1999) [2], the first definition of CSR was given by Bowen (1953) [3]. In this definition, Bowen considered the 100 biggest corporate as "a vital point of power and decision making", therefore any actions or initiatives of this "vital point" would obviously have an effect on citizens. In other words, this first definition only takes into account social impacts as direct responsibility from corporations.

After this first definition, the concept of CSR went a long way and began to include economic impacts in addition to the social ones. In 1991, Carroll defined CSR as a pyramid build built around 4 pillars [4]: Philanthropical, Ethical, Legal and Economic. Moreover, Moir (2001) [5] went a bit further and defined 3 theories to define CSR. The stakeholder theory, which implies that corporates have only an impact on their different stakeholders, and, therefore, that companies should then just try to improve themselves on their effect in this category; the social contract theory which estimates that businesses should consider what matters prior to the society and act depending on society's expectations, this theory is quite linked to the following; the legitimacy theory which says that corporates should only consider the actions and initiatives that influence their legitimacy, in order to use it as a publicity [5].

In the beginning of the millennium, the international community started to strongly consider climate change as a global and urgent threat which should be fought by inverting its process, this consideration was, especially translated by the ratification to the protocol of Kyoto (1997, applied in 2005). Therefore, the concept of corporate social responsibility had to evolve in order to integrate these environmental aspects and match the political expectations of society. This has led to a huge proliferation of definitions of CSR between 2000 and 2005 [6]. In order to get an unbiased definition of CSR, Dahlsrud (2008) [6] decided to perform a content analysis of 37 definitions of CSR, definitions, which were dated from 1980 to 2003. He concluded that CSR is composed of 5 dimensions as shown in Table 1:

Dimensions	The definition is coded to the dimension if it refers to	Example phrases
The environmental dimension	The natural environment	'a cleaner environment' 'environmental stewardship' 'environmental concerns in business operations'
The social dimension	The relationship between business and society	'contribute to a better society' 'integrate social concerns in their business operations' 'consider the full scope of their impact on communities'
The economic dimension	Socio-economic or financial aspects, including describing CSR in terms of a business operation	'contribute to economic development' 'preserving the profitability' 'business operations'
The stakeholder dimension	Stakeholders or stakeholder groups	'interaction with their stakeholders' 'how organizations interact with their employees, suppliers, customers and communities' 'treating the stakeholders of the firm'
The voluntariness dimension	Actions not prescribed by law	'based on ethical values' 'beyond legal obligations' 'voluntary'

Table 1. The five dimensions of CSR coming from [6]

We can already notice that Corporate Social Responsibility is deriving from the concept of sustainable development at a level of a company.

In the very beginning of the decade the norm ISO 26000 was published (2010). Herciu (2016) proposed an analysis of this norm [7]. According to her, this norm has the objective to define Corporate Social Responsibility, describing then the different categories of impact of Corporate Responsibility, which are Community involvement, Labor

Practices, Environmental, Governance, Fair Operating Practices, Human Rights and Consumer Issues, as shown on Figure 1:

Figure 1. Corporate Social Responsibility Core Subjects according to ISO2600 [7]

Moreover, the author suggests that the application of this norm would maximize contribution of companies to sustainable development. This contribution is most of the time translated by the implementation of sustainable business practices.

This concept of sustainable business practice is closely related to the concept of sustainable business model. Indeed, the implementation of a sustainable business practice can lead to the emergence of a sustainable business model. A sustainable business model require innovation to be fully efficient [8] and is defined as "*business models that incorporate pro-active multi-stakeholder management, the creation of monetary and nonmonetary value for a broad range of stakeholders, and hold a long-term perspective*" [8]. According to [9] there is a long way between formulation of a sustainable strategy and its implementation that induce a delay between the conception of a sustainable business practice and its implementation. Moreover, the conception of a particular sustainable business practice may not be mature enough for implementation and requires a maturity measurement which consumes even more time. Finally, even if the publication of article related to sustainable strategy investigation from a project point of view is emerging recently [10], most of them are coming from the literature and not from a company perspective. Therefore, it could be interesting to provide a set of mature sustainable strategies for a company which would like to start engaging into sustainable development. In order to be easily broadcasted and to be simple to reproduce we decided to orient ourselves into a pattern approach for sustainable development strategy.

In fact, we are surrounded by patterns. They can be found approximately everywhere, in a natural state in fields like genetic, biology or chemistry for example; or at an artificial state in architecture, software or electronic. Historically, patterns were mostly used in architectural design [11] which explains the two first definitions of patterns provided in Oxford English Dictionary [12]:

- "A repeated decorative design"
- "A model or design used as a guide in needlework and other crafts"

Then, patterns started to be used in engineering which explains the third definition contained in Oxford English Dictionary: "An example for others to follow" [12]. Therefore, according to these three definitions, we can consider a pattern as something "repeatable" which is used as "a model" created in order to be broadcasted for "others to follow". These definitions of a pattern are easy to understand; however, we are using them to give a general idea of what is a pattern. In order to get a more precise idea of it, we went to the side of Tešanovic [13]. She describes pattern as an artifact which is made of three components: a context, which refers to the scope of the pattern; a problem which refers to a set of forces which appears in the context; and, finally, a solution, the which, refers to a configuration adopted to resolve forces generated by the problem. Obviously, additional components can be added to a pattern structure (such as benefits, consequences, relations with other patterns, etc.) depending on their fields and specificities. In our case, a pattern will be considered as successful when it has a positive impact on one of the categories defined in ISO 26000. In case of two patterns affecting the same metric, we will keep the one with the highest impact on this metric.

To conclude on this part, we can notice that we set up an innovative approach compare to other studies. Indeed, we based our analysis on CSR reports, meaning that these reports are considered as raw materials for our study. Moreover, we mainly focus on the whole content of CSR and not only focus on specific initiatives, as well as we are interested by all the three aspects of sustainability (Social, economic and environmental) and not a particular one.

1.2 Goals and delimitations

According to the 2015 Centre for Energy- Efficient Telecommunications (CEET) report [14], ICT represents around 2% of the global CO2 emissions. If we look at the energy consumption of the Internet, it represents between 1.5% and 2% of the world energy consumption, meaning that if the Internet were a country, it would be ranked as the fifth largest energy consumer in the world. This energy consumption is expected to double by 2020 if no actions are taken to reduce it. Moreover, from a social point of view, the increasing level of new technologies released in that sector induces a higher level of complexity in the education for future and current workers.

Behind Information and Communication Technology (ICT) and the Internet, there are all the IT companies which are the entity that can help solve these issues. Unfortunately, it is hard for a company to implement strategies to increase their sustainability since it is time consuming and has a lot of parameters (social, environmental, economic) on the which a company can have positive impacts. Moreover, most of the recent studies related to companies' sustainability through the topic of Corporate Social Responsibility (CSR) mainly focus either on economic aspects, such as financial performance [15-17] or marketing [18-21]; or on the performance of specific CSR strategy (employee voluntariness [22], consumer engagement [23], anti-corruption policy [24], etc.). But there are no studies about general CSR strategies that can promise a significant impact on corporates' actions on sustainable development. In other words, there are no CSR patterns for companies that would like to engage into sustainable development. Thus, we identified 2 main research gaps. First, there are no studies analyzing the actual content of CSR reports in an IT company context. Meaning that there is no research investigating best practices in CSR strategies. Second, which is quite related to the first one, we realized that there are no general set of ready-to-implement sustainable strategies at a global level, most of the research focusing on the impact of a specific initiative or on a specific impact coming from different initiatives. Therefore, our research objective is to extract general patterns showing high impacts on sustainability at an IT company level. Therefore, our main research question will be what an IT company can do as a mean to improve its sustainability. We divided this question into 6 sub-questions:

1. What are the different sustainability initiatives and strategies coming from the best IT companies regarding the different dimensions of CSR?
2. What are the success patterns in these strategies and initiatives?
3. What are the different (potential) benefits and outcomes?
4. How to assess or evaluate them using metric?
5. How to adequately represent this information in a reference catalogue?
6. How to best represent that in a software tool?

In order to answer these questions, we decided to collect the CSR reports coming from the 25 best IT companies regarding their annual turnover based on [25] available in **Appendix A**. Our objective is to explore these reports to extract repeatable sustainable strategies regarding the categories defined on ISO 26000 [7], these repeatable strategies will then form a set of sustainability patterns. We then can investigate the different compositions of these patterns and cover all the issues described in the precedent paragraphs. We should also find a way on how we can best represent the data model defined in this research, in order to be able to represent the results in an online catalog in the future. In other words, this research aims to carry out an analysis of 25 CSR reports to extract sustainability patterns for sharing them through an online catalog in the future. The study claims that this should help and guide companies willing to engage in sustainability initiatives, but also provides them with an indicator for sustainability evaluation purposes.

1.3 Structure of the thesis

Chapter 1: Introduction, presents the basic information about the research topic at hand giving a background on Corporate Social Responsibility with an historical approach of the evolution of the concept of CSR, sustainable business practices and patterns. Then we define the goals and delimitations of current work by presenting the research gaps that we identified to conduct this research and expose our different research questions.

Chapter 2: Research Design, gives detailed information about the analysis conducted in this research. We first define our waterfall methodology step by step. Then we present and justify the different evaluation criteria to perform our analysis. Then we give information about the material we used to perform this analysis.

Chapter 3: Results, shows the results of this research. Starting by the results of the different analysis performed during this research. Then we present our approach to evaluate the impact of the different patterns. Based on this approach and on our results, we present our data-model used to define patterns. Finally, we provide some discussion about the different results and first limitations of the thesis.

Chapter 4: Implementation, where the characteristics of the online catalog are shown in order to broadcast the patterns to the industry community.

Chapter 5: Conclusions, where the different outcomes of this research are synthetized and some tracks on potential future work related to this issue are pointed.

2 RESEARCH DESIGN

In this section, we will define our research design. We will first look at the methods we used to conduct the patterns' extraction from our set of reports. Then we will have some interests for the evaluation criteria we used to perform this analysis. Finally, we will enumerate and describe the different materials we used to conduct the analysis.

2.1 Methodology

As we stated at the end of our introduction, our objective, at first, is to extract repeatable strategies in CSR reports coming from the 25 best IT companies, in order to build pattern from it. We designed, then, a set of different steps which are the following: first, we gathered a list of companies in order to collect their CSR reports. If we look at **Appendix A**, we can notice that we collected 20 reports out of 25, these 5 missing reports either did not exist or were not accessible publicly.

Once we will aggregate the reports, we will need to define evaluation criteria to evaluate their quality and classify and categorize the contents as well as the strategies. Using these criteria, we will perform a qualitative and quantitative analysis for each report, to finally analyze the repeatability of each strategy and then build patterns. In this research, we only consider information which are referenced in CSR reports, meaning that, if a company does not speak about a strategy that it implements, this strategy will not be taken into account.

2.2 Evaluation Criteria

Before starting our analysis, we define different evaluation criteria on the which it will relies on. We will define 2 different types of criteria, which are shown in **Appendix B**.

First, the content criteria, this one served us to categorize the content of each reports and classify the strategies regarding the categories. We developed these categories on the basis of the seven ones defined in ISO 26000. We could have used another popular standard which is the GRI Guidelines for CSR reporting which is very used among the reports, but

our choice of ISO 26000 was motivated by a comparison study [26] which shows that ISO is the most complete evaluation criteria to compare different CSR. However, the norm is not totally complete and misses a component: the employee social responsibility as suggested in [27]. To overcome this lack, we decided to add this employee responsibility into the labor practices category. We then referenced all the strategies contained in each report regarding these categories (**Appendix B, Table B1**) in the analysis.

Second, according to [5], companies might use these CSR reports to gain some positive advertisement and communicate around it. Moreover, the investigated companies and the authors who wrote these reports represent the same entity. Thus, we needed to define quality criteria to evaluate the quality of each report in order to have trust in the strategies and results described in them. Habek and Wolniak came up with a factorial analysis on quality evaluation criteria for CSR reports [28]. This analysis followed a previous framework developed by the duo (2015) [29] in the which they explain how to use the criteria to evaluate the quality of CSR by scoring from 0 to 4 (0: no information about the criterion, 1: little mention, 2: most important aspects included, 3: detailed information included, 4: best practices/original practice), on one hand, the credibility of information; the relevance of information (**Appendix B, Table B2**) on the other one. After what they calculate the mean of the credibility score (Cm) (1) and the mean of the relevance score (Rm) (2), to finally calculate the quality score (Qs) (3) of the report by calculating the mean of Cm and Rm's sums.

$$Cm = (C1 + C2 + \ldots + C5 + C6) / 6, \quad (1)$$

$$Rm = (R1 + R2 + \ldots + R10 + R11) / 11, \quad (2)$$

$$Qs = (Cm + Rm) /2. \quad (3)$$

2.3 Materials

Once our criteria were defined, we performed a content analysis for each report according to the ISO 26000 categories they are impacting. In other words, we investigated all the reports and referenced all the strategies described inside it. We referenced the pages regarding the information they were containing: the one describing the different strategies, those including the data associated with the strategies, those providing concrete examples of a given strategy and finally those describing the outcomes of the strategy as shown in

Table 2. Then we evaluated the repeatability of each strategies among the reports to define patterns.

Community	labor practices	governance	environmental	fair operating practices	consumer issues
Develop Sensitization campain p8	provide employee training p8	Collaborate with other companies/create international standards p9,14,16	Implement energy efficiency project p9 d9	Encourage suppliers to track their GHGe(env) p15 o15	Provide online instructions for use p8
Fund/participate to educational program/project p10 d10 17 18	employee reward program p8	Set clear sustainability objectives p11-19	Carbon savings program p9 o12	Sustainability code of conduct for suppliers p15	Provide online references for product environmental impacts (env) p9,12,13 o12,13
Provide their own teaching platform p10 d10	Employee volunteering program (comm) p8 d8,17		Reduce energy consumption of the company p12 o12	Supplier scorecard p15	Provide products/services which help customers to increase their sustainability p14
enhance people connectivity to internet p12 o12	Build diverse and inclusive workforce p8		Use/produce their own renewable ernergy p12		Propose a devices retake program to recycle them p13 o13
Connect disadvantaged people p12 o12,18			use/promote alternative vehicles p12 o12		
Fund social actions /programs p17 18,9			Design energy efficient products/services p9		
Build their own charity foundation p10					

Table 2. Example of the strategies referencing of AT&T's CSR report using the ISO26000 criteria[1]

After the repeatability analysis had been done, carried out a qualitative analysis on the different report, using the quality criteria described in the previous section. Thus, we used a qualitative coding software: Saturateapp [30]. We chose this software because it is an online tool, which allows users to share their coding with peers if they request it. We used this tool to code each paragraph of each CSR report which is in relation with the quality

[1] This report didn't mention any strategy about human rights this is why the category does not appear in the table

criteria. In order, at the end, to get an overview of the quality of each report and, then, distribute the quality score among the reports.

3 RESULTS

In this section, we will present the different results of our analysis. First, we will look at the content analysis we performed with the different categories we defined based on ISO 26000 (cf. Section **2**). From the output coming from the content analysis we will then present the repeatability results for a set of 36 strategies. Second, we will evaluate the quality of each reports with the quality evaluation framework defined in [29]. From the quality score given to each report we will define a new metric to evaluate the relevance of our patterns with the level of confidence. Finally, we will define how we are going to evaluate the impacts of the different strategies.

3.1 Content analysis

We counted the number of strategies shown in each category in each report. If every category had the same weight in terms of consideration, we would have an occurrence frequency around 15%. As we can see in **Table 3**, Consumer issues and Human rights are particularly underrepresented in the reports and that Fair operating practices are lightly took into account. Despite that, we can see that the four remaining categories are more or less equally distributed.

Category	**Total**	**Frequency of occurrence (%)**
Community	115	16.55
Labor Practices	131	18.85
Governance	142	20.43
Environmental	147	21.15
Fair Operating Practices	78	11.22
Human Rights	34	4.89
Consumer Issues	48	6.93
Total	695	100

Table 3. Number of strategies per category in all the reports and the frequency of occurrence of each category.

After that we analyzed the repeatability of 36 strategies which seemed to be reiterated in a sufficient sample of reports. Each strategy has an identifier defined by the category it is impacting and possibly 2 numbers, as following: CAT XY, CAT is the name of the category, X is the number of the strategy in this category, and, optionally, Y the number of the sub-initiative of the strategy X, this sub-initiative will be considered as an additional component of a particular strategy. We defined repeatability as a percentage representing the number of reports mentioning this strategy out of the total number of reports. We set up a repeatability threshold (75%) under the which we estimate that the strategy is not repeatable enough to be taken into consideration. All the strategies satisfying this threshold are surrounded in green, except for the one that reach exactly 75%.

As shown below on Table 4, and with more detailed results on **Appendix C**, (Table C1), out of the 36 evaluated strategies (without the additional components), 16 were above the threshold and 5 exactly reaching 75% for a total of 21 potential strategies. But, repeatability should not be considered as the only metric to include a strategy into the patterns building process. We will combine this repeatability with the mean of the quality score of the reports containing it to define a new metric: the level of confidence.

ID	COM1	COM11	COM12	COM2	COM21	COM22	COM23	COM24
Name	Support educational projects/actions	Create their own educational platform	Provide scholarships	Support Social projects/actions, non profit organizations	Health	Undeserved peoples	Environmental	Societal
Repeatability(%)	90	45	35	95	35	65	50	35

ID	COM25	COM26	COM27	COM3	COM4	COM5	LP1	LP11	LP12
Name	Create their own charity fundation	Participate to sensitization campaign	Employee donations	Enhance access to technology in the community	Donations after humanitarian disaster	Economic empowerement of the community	Provide training to employees	skills	Carreer
Repeatability(%)	45	35	35	60	45	45	85	80	70

ID	LP2	LP3	LP4	LP41	LP42	LP5	LP6	LP7	G1
Name	Encourage employee to volunteer	Employee reward ceremony	Employee Well being program	Health and safety management	Compensations program	Sensitize employee to environmental issues	Build diverse and inclusive workforce	Employee feedback	Set Clear sustainability objectives
Repeatability(%)	90	40	80	80	60	80	85	65	90

ID	G2	G3	G31	G32	G33	G4	G41	G42
Name	Use standardized measurements tools/methods	Collaborate with peers	Comply with regulations/laws/ norms	Participate to the creation of regulations, law, standards	Stakeholder engagement	Sustainable Management	Implement Risk Management	Implement Environmental Management System
Repeatability(%)	45	90	80	85	55	75	50	70

ID	G5	G51	G52	G53	G6	ENV1	ENV2	ENV21	ENV22	ENV23
Name	Transparency	Report environmental impacts	Report political contributions	Report Donations for charity	Create Code of Conduct	Produce/use renewable energy	Energy efficiency	Products, services	Facilities	Projects in the company
Repeatability(%)	100	100	35	70	65	90	90	60	75	60

ID	ENV3	ENV31	ENV32	ENV4	ENV41	ENV42	ENV43	ENV5	ENV51	ENV52	ENV53
Name	Design ecological products	Circular economy	Hazardous material	Ressource efficiency	Paper	Water	Waste Generation	Propose alternative solutions for comuting, transportation	Alternative vehicles	Air travel reduction	Car pooling
Repeatability(%)	85	70	65	90	55	70	85	75	60	40	30

ID	ENV6	FOP1	FOP2	FOP3	FOP4	FOP5	HR1	HR2
Name	Involve in biodiversity, nature conservation	Supplier Code of conduct	Sensitize supply chain to sustainability issues	Build a diverse supply chain	Proceed audits in the supply chain	Avoid conflict mineral usage	Conflict free mineral policy	Data Privacy and security policy
Repeatability(%)	40	75	95	60	45	60	60	75

ID	HR3	CONS1	CONS2	CONS3	CONS4
Name	Sensitize employees, suppliers to HR	Provide end of life management	Provide products or services which help customers to increase their own sustainability	Design accessible products	Provide information about environmental impacts of products
Repeatability(%)	50	75	85	35	30

Table 4. Repeatability in percentage of each of the 36 evaluated strategies

3.2 Quality analysis

To define the level of confidence, we performed a quality analysis. This analysis allowed us to give a quality score, between 0 and 4, to each report. The main results of this analysis are shown in Table 5, and the full results are shown in **Appendix C** (Table C2). We can see that the average of the quality of our reports is 2.1975. Meaning that our reports include, in average, the most important aspects of the different quality criteria. Even if some criteria are poorly covered among the reports especially for C5 (possibility to give feedback) and C6 (independent verification).

Company	Credibility Score	Relevance Score	Quality Score
HP	2.67	3.36	**3.12**
Microsoft	2.17	3.64	**3.12**
Cisco	2.50	3.36	**3.06**
Intel	2.67	3.38	**3**

Xerox	1.5	3.09	**2.53**
Qualcomm	2.17	2.55	**2.41**
IBM	1.5	2.82	**2.35**
CSC	1.83	2.55	**2.29**
Cognizant	1.67	2.55	**2.24**
Verizon	1.67	2.55	**2.24**
EMC	2	2.77	**2.18**
Oracle	1.5	2.36	**2.06**
AT&T	1.33	2.18	**1.88**
Western Digital	1.67	1.91	**1.82**
Apple	2	1.64	**1.76**
Arrow	1.5	1.82	**1.71**
Google	1.5	1.82	**1.71**
Comcast	1.5	1.73	**1.65**
Avnet	1.17	1.64	**1.47**
Century Link	0.83	1.64	**1.35**
Average	**1.7675**	**2.433**	**2.1975**

Table 5. Quality score of the reports from the highest to the lowest and all the different quality criteria

The level of confidence is defined as following: for each strategy we will calculate the mean of the quality score of the report containing it. In other words, if a strategy is contained in **n** reports we will we will add the quality score of these n reports divided by the number n of report to obtain the quality mean of a strategy (Qtm) (4). Then, we combine Qtm with the repeatability of the strategy among the reports to obtain the level of confidence (Lc) (5) of a particular strategy **k**.

$$Qtm = (Q1 + Q2 + \ldots + Q(n-1) + Qn) / n, \quad (4)$$

$$Lc\ (k) = Repeatability(k) \times Qtm(k). \quad (5)$$

Then we define our thresholds using the previous one for the repeatability (75%), and the average of the quality of the reports (Table5) which is 2.1975. Thus, our level of

confidence threshold to consider a strategy will be 1.648125 (6), under the which a strategy will not be used to build a pattern.

$$Lc\ (k) \geq 0.75 \times 2.1975. \tag{6}$$

If we look now at Table 6, we can see that we obtained very similar results than with the repeatability analysis since only 1 strategy (ENV 5) did not reach the threshold. But we can now be able to rank our strategies regarding their level of confidence, and, then, define the most appropriate one in case of 2 patterns affecting the same metrics. In order to get a scoring which speaks better, we also defined a relative level of confidence (Confidence score), which represents the ratio between the level of confidence and the maximum level of confidence reachable (2.1975) expressed with a 0 to 10.

ID	COM1	COM11	COM12	COM2	COM21	COM22	COM23	COM24
Name	Support educational projects/actions	Create their own educational platform	Provide scholarships	Support Social projects/actions, non profit organizations	Health	Undeserved peoples	Environmental	Societal
Global level of confidence	2,02	1,06	0,75	2,11	0,78	1,47	1,07	0,67
Confidence score (out of 10)	9,18	4,82	3,41	9,59	3,55	6,68	4,86	3,05

ID	COM25	COM26	COM27	COM3	COM4	COM5	LP1	LP11	LP12
Name	Create their own charity fundation	Participate to sensitization campaign	Employee donations	Enhance access to technology in the community	Donations after humanitarian disaster	Economic empowerement of the community	Provide training to employees	skills	Carreer
Global level of confidence	1,05	0,69	0,75	1,37	1,09	1,11	1,94	1,87	1,62
Confidence score (out of 10)	4,77	3,14	3,41	6,23	4,95	5,05	8,82	8,5	7,36

ID	LP2	LP3	LP4	LP41	LP42	LP5	LP6	LP7	G1
Name	Encourage employee to volunteer	Employee reward ceremony	Employee Well being program	Health and safety management	Compensations program	Sensitize employee to environmental issues	Build diverse and inclusive workforce	Employee feedback	Set Clear sustainability objectives through dedicated team
Global level of confidence	2,02	0,87	1,82	1,82	1,47	1,82	1,94	1,54	2,04
Confidence score (out of 10)	9,18	3,95	8,27	8,27	6,68	8,27	8,82	7	9,27

ID	G2	G3	G31	G32	G33	G4	G41	G42
Name	Use standardized measurements tools/methods	Collaborate with peers	Comply with regulations/laws/ norms	Participate to the creation of regulations, law, standards	Stakeholder engagement	Sustainable Management	Implement Risk Management	Implement Environmental Management System
Global level of confidence	0,95	2	1,8	1,89	1,39	1,72	1,21	1,61
Confidence score (out of 10)	4,32	9,09	8,18	8,59	6,32	7,82	5,5	7,32

ID	G5	G51	G52	G53	G6	ENV1	ENV2	ENV21	ENV22	ENV23
Name	Transparency	Report environmental impacts	Report political contributions	Report Donations for charity	Create Code of Conduct	Produce/use renewable energy	Energy efficiency	Products, services	Facilities	Projects in the company
Global level of confidence	2,2	2,2	0,89	1,61	1,51	1,99	2	1,41	1,69	1,44
Confidence score (out of 10)	10	10	4,05	7,32	6,86	9,05	9,09	6,41	7,68	6,55

ID	ENV3	ENV31	ENV32	ENV4	ENV41	ENV42	ENV43	ENV5	ENV51	ENV52	ENV53
Name	Design ecological products	Circular economy	Hazardous material	Ressource efficiency	Paper	Water	Waste Generation	Propose alternative solutions for comuting, transportation	Alternativ e vehicles	Air travel reduction	Car pooling
Global level of confidence	1,95	1,68	1,53	1,98	1,17	1,61	1,87	1,55	1,23	0,84	0,58
Confidence score (out of 10)	8,86	7,64	6,95	9	5,32	7,32	8,5	7,05	5,59	3,82	2,64

ID	ENV6	FOP1	FOP2	FOP3	FOP4	FOP5	HR1	HR2
Name	Involve in biodiversity, nature conservation	Supplier Code of conduct	Sensitize supply chain to sustainability issues	Build a diverse supply chain	Proceed audits in the supply chain	Avoid conflict mineral usage	Conflict free mineral policy	Data Privacy and security policy
Global level of confidence	0,94	1,74	2,11	1,46	1,14	1,44	1,44	1,77
Confidence score (out of 10)	4,27	7,91	9,59	6,64	5,18	6,55	6,55	8,05

ID	HR3	CONS1	CONS2	CONS3	CONS4
Name	Sensitize employees, suppliers to HR	Provide end of life management	Provide products or services which help customers to increase their own sustainability	Design accessible products	Provide information about environmental impacts of products
Global level of confidence	1,25	1,67	1,85	0,83	0,69
Confidence score (out of 10)	5,68	7,59	8,41	3,77	3,14

Table 6. Level of confidence of each strategy based on a 0 to 4 scale for the global level of confidence and on a 0 to 10 for the confidence score.

3.3 Evaluating the impacts

For the set of 20 strategies, we evaluated their impact on sustainability so that future users, can predict and assess the application of one of these strategies. The metrics will be social, economic or environmental, according to the dimensions. Most of them are included in the CSR reports themselves and directly linked to the strategy they are related. For example, Table 7 shows the one used for the pattern ENV1.

Moreover, as suggested in [31], we also evaluated sustainability by assessing Sustainable Development goals (SDG) defined by United Nations [32], we referenced them in **Appendix B**. We decided to extend this methodology by including the evaluation of the Paris Agreement Objectives [33] when it is possible. In other words, we provide

conventional metrics to measure sustainability impacts of the repeatable strategies, but we also link these strategies to the UN SDGs and/or the Paris Agreement objectives that they are impacting. So, if we keep taking take the example of ENV1 the related SGD will be: UN Sustainable Development Goal 7: "Affordable and clean energy" and, for the Paris Agreement, Paris Agreement Article 2 b and c.

ID	Name	Metric	Problematic
ENV1	Produce or use renewable energy	CO2 emissions per year(tons/year) Part of renewable energy in the energy mix (%)	Paris Agreement Article 2b Paris Agreement Article 2c
		kWh of renewable energy produced (kWh/year) kWh of renewable energy bough (kWh/year)	UN Sustainable Development Goal 7

Table 7. Example of metrics to evaluate strategies with the example of ENV 1

3.4 Defining our pattern structure

As a final step, we defined our pattern structure, or, more precisely, our data-model. As a reminder, a pattern is defined around 3 mains components [13]: context, problem and solution. In our case we decided to define each component with several artifacts which are shown on Table 8. Then, the context is defined by 4 artifacts: its name, its Level of confidence among the set of reports, its time of effectiveness (short, mid , and long term) and its ISO 26000 category; then, the problem is represented by 3 artifacts: the international regulations it impacts (Paris Agreement, SDGs), the metrics needed to evaluate the impacts and the outcomes of the pattern; finally, the solution is modelized by 3 artifacts: the description of the pattern, the examples of its application coming from the reports and the potential additional components related to the pattern.

Component	Artifacts
Solution Solution	Description Examples Additional Components
Problem	International Regulation Metrics Outcomes
Solution	Name Time of effectiveness Repeatability ISO26000 category

Table 8. Definition of the different components of our patterns

We then developed an UML representation of our pattern structure using these 10 artifacts as shown in Figure 2.

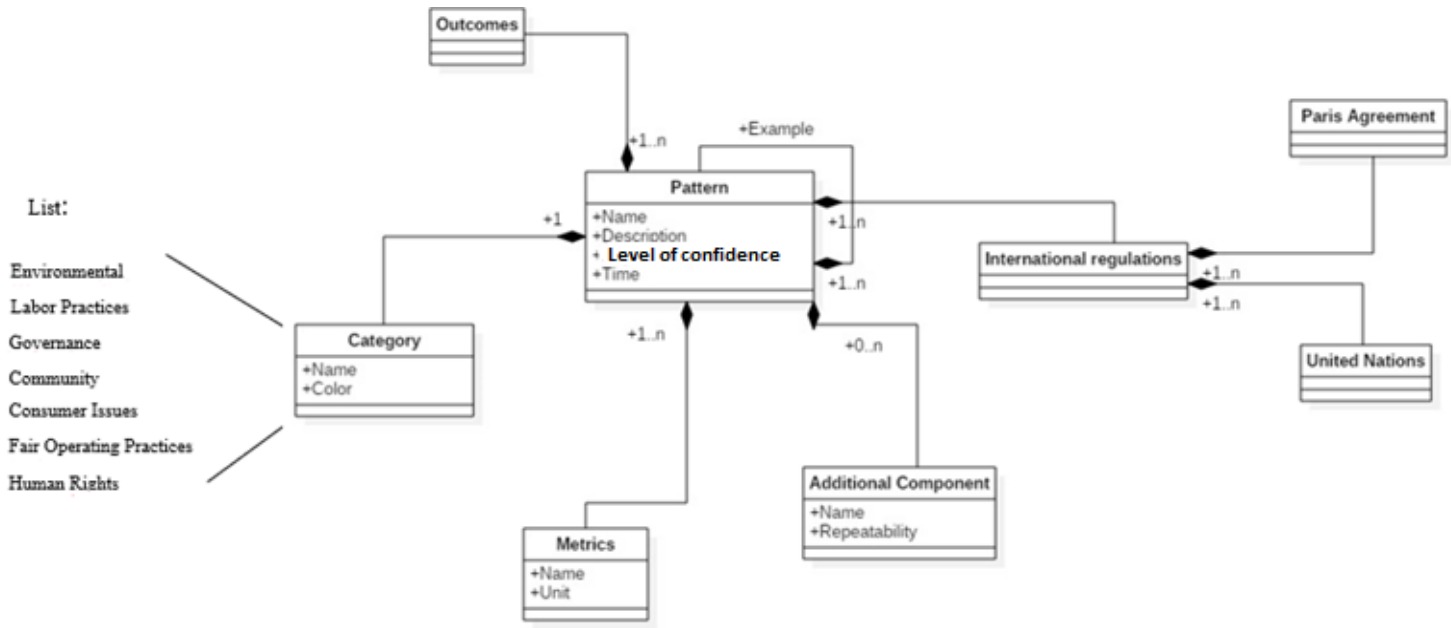

Figure 2. UML representation of the pattern structure

The class “category” can take only 1 of the 7 values defined in its list, the class “example” is considered as an instantiation of the class “pattern” since it represents example of application of the pattern. This representation will be used to define our data-model for the future implementation of an online reference catalog.

3.5 Discussions of the analysis

In this last part we will discuss the different results and contributions highlighted in this analysis. First, we set out a method to evaluate CSR reports. We based this on two frameworks evaluating different aspects of the reports, the quality and the content. Regarding the quality, our set of reports had, in average, a good quality since the average quality score indicates that the reports were including the most important aspects of credibility and relevance of information defined in the framework [28] (shown in **Appendix B**) even if some aspects were poorly covered (e.g., Possibility to give feedback, Independent verification). For the content analysis, depending on the categories we looked at, the results were satisfactory. Indeed, most of the reports were focusing on environmental, labor practices, governance and community’s strategy, which explains why we were able to extract more patterns for these categories. Based on the results of this analysis we were able to classify our different strategies to rank them using the level of confidence we defined. Based on our results, we defined a data-model that we can apply to all our patterns. As shown below with the example of *“LP6: Build a diverse and inclusive workforce”*, the complete list of patterns with their different components is shown in **Appendix C**.

LP6: Build Diverse and Inclusive Workforce

Time of Effectiveness	Mid-term Long-term
Repeatability	85% (17 reports out of 20)
Level of Confidence	**8.82/10**
Category	Labor Practices
Outcomes	• Promote Connection between employees with the same culture • Allows employee to have a more diverse point of view in their decision making • Give opportunity to undeserved communities • Promote equality between human beings
Metrics	• Part of employee by ethnicity per position (%/ethnicity/position) • Part of women per level of position (%/position) • Satisfaction and engagement of employees who followed the trainings (survey)
Problematic	• UN SDG 5: Gender Equality • UN SDG 8: Decent work and economic growth • UN SDG 10: Reduced inequalities
Additional Components	None

Description

Nowadays, diversity and inclusivity started to be crucial aspects and challenges of our society. Inclusivity concerns every action which is taken in order to reach a better representativity of women in a company; diversity is the same idea applied to ethnicity. In order to promote it, and also to show the way in those fields, companies implemented measures and policy to apply these aspects. The policies can vary depending on the company but most of the time concern: men/women parity and equality of salary, employment programs for undeserved communities, ethnic diversity in the leading positions or the creation of community-based research groups.

Example

Intel:

Intel took several initiatives in order to create a more inclusive workforce. They created a Network of Executive Women, in 2015 the memberships to that network increased by 35%. They also claim that they reached a 100% pay parity between men and women. Regarding diversity, they organized different diverse hiring events and were hoping to reach 40% of diverse hiring for 2015, they exceeded that goal and reached 43.1%. Moreover, they created different research group to link employees with common interest and became then more attractive for underrepresented peoples. In terms of statistics, the progress regarding diversity and inclusivity at Intel are shown on the table on the right coming from Intel report.

U.S. Representation

	EOY 2014	EOY 2015
Female	23.5%	24.8%
Technical Female	19.0%	20.1%
Non-technical Female	51.8%	50.7%
Underrepresented Minorities	12.3%	12.4%
Technical African American	3.3%	3.3%
Technical Hispanic	8.1%	8.1%
Technical Native American	0.5%	0.5%
Non-technical African American	4.1%	4.4%
Non-technical Hispanic	9.6%	9.9%
Non-technical Native American	0.5%	0.6%

Figure 3. Example of a referencing document with the example of LP6

Regarding the limitations and different challenges faced in this research, we can first notice that our scope of research was based on a particular ranking of IT companies and is only based on annual turnover of the companies. It could be interesting to proceed a similar work with different type of ranking like most innovative companies for example and compare both results. Moreover, our quality analysis might have been corrupted by an individual bias. In other words, the results of our analysis were influenced by the individual perception of the author, since it is my understanding of the framework that was applied. We could have overcome this obstacle by asking an external peer to perform the different analysis which were proceeded in order to compare both results and then neglect the individual bias. Unfortunately, it was not possible to do it in our context. This individual bias also occurred in the content analysis. Indeed, for some strategies it was hard to determine the related ISO 26000 category. If we take the example of "*LP2: encourage employee to volunteer*", which consists in encouraging employee to provide voluntary activities for the community such as teaching or helping associations without getting paid for it. We can see that this particular strategy is between the categories "Community involvement and development" because the volunteer activity has obviously social impacts and "Labor Practices" because this is employees who are providing the volunteering. So, for this particular pattern, we decided to put it under the category of "Labor practices" but in its description we mention the strong relation between *"LP2: encourage employee to volunteer*" and *"COM2: Support social projects, actions, non-profit organizations"*. A deeper analysis investigating the relation between patterns would be interesting to proceed.

Finally, the biggest challenge we face was during the extraction of the different strategies and their definition. Indeed, it was hard to determine the good level of granularity under the which we should not fall in order to not go through very specific initiatives. We decided then to stay into a high level of generalization, and, if a very particular initiative was stated a lot of times among the reports we decided to define it as an additional component of a specific pattern. For example, "*ENV3: Design ecological products*" includes two additional components: reusing material by applying circular economy and reduce the part of hazardous material in the manufacturing of the products. We can see that

even if these two initiatives do not seem very close to each other, but they both fall under the general idea of designing ecological products.

4 ONLINE CATALOG

In this part we will speak about the implementation of our online catalog. We will first present the different needs associated with our catalog in the form of a list of features that our catalog should provide and the different aspects that were taken into account during the development of the catalog. We will also describe the technologies that we used to develop the catalog. Then, we will take a look at the structure of our application, to finally show all the different features' working. To conclude this part, we will speak about the further work needed to totally complete the catalog by the end of this research.

4.1 Features of the catalog

Now that we have results, it would be appropriated to develop a tool to represent them for broadcasting. We decided, therefore, to develop an online catalog that references the whole of our 21 patterns regarding their categories, impacts and outcomes. This online catalog should implement several features which corresponds to different needs:

1. The catalog should display the list of all the patterns and offer different possibilities of sorting depending on their different components,

2. The possibility to add patterns should be implemented like this, a similar research topic could be given and then extends the pattern set of the catalog,

3. The catalog should include a description about the context of this research and how to use the catalog in order to facilitate its utilization,

4. The catalog should partially implement an example of a tool based on its content. We decided to develop a partial implementation of a decision-making tool based on a survey of the users in order to present them a customized list of patterns which responds to their needs.

4.2 Technologies used

To develop this catalog, we decided to use Javascript and html as programming languages and decided to couple it with mongo DB database. We decided to use Javascript because there was no language constraints and it was the one on the which we had the most experience; as to mongodb we chose it because it is a non-relational database which makes it easier to process data like ours which are more similar to a document. To summarize, the different technologies we used to develop this web application were the frameworks Bootstrap for the design, Nodejs on the server side, which use JavaScript to establish the different transition between the different views and jQuery to implement few dynamic options on the different web pages. For the prototype development, Express was used for a local server connection. For the database, we used mongo DB with the which we interact through the library mongoose.

The patterns are stored in a no-SQL database [31] and then can be either retrieved when the users want to display the full list of patterns or stored when they want to add a new pattern and this in a fast way. The architecture of the application regarding these two use is shown on Figure 4 and 5.

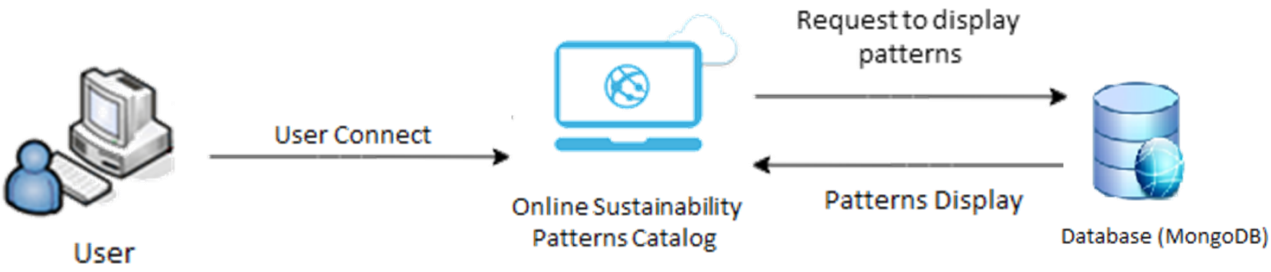

Figure 4. Architecture of the catalog when a user want to display the full list of patterns

Figure 5. Architecture of the catalog when a user wants to add a pattern in the catalog

4.3 Structure of the catalog

In this part we will speak about the technical implementation of our online catalog. First we will simply describe its functioning. Then we will take a look to the folder organization of the application.

For this application we inspired ourselves with the different search engine developed for academia. In other words, when a user connects to our website, he looks for specific type of pattern regarding the different categories. Then, he will have a shot overview of the different patterns and their information. Finally, if he is interested by one of the pattern, he can download a PDF file, based on the model of Figure 3 (cf. Section **3.5**), containing detailed information about the pattern. This way of functioning allows us to not flood the users with a huge quantity of information that might not interest them and, therefore, allows them to focus on what they really need and want.

Regarding the organization of the application, index.js is the main file around the which all the other files are connected and organized. Then, we created a dedicated view for each of the features defined in 4.1. The folder data contains our database for the which we defined two data models, one for the patterns and one for the ISO 26000 categories. The definition of the data- model for the patterns is very logic but might be confusing for the categories. We did that because our categories are very specific, and, in case a user would like to add a pattern in the future we don't want him to enter wrong categories. Finally, the folder "sources" is the one that will contain the PDF file specific to each patterns that users can download. This organization is shown on Figure 6.

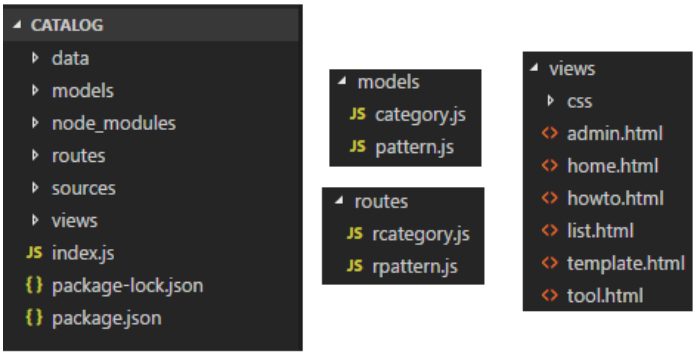

Figure 6. Files' organization of our online catalog

4.4 Working of the catalog

In this part we will show the implementation of the different features that we developed in our catalog and how they look.

First, we will start with the core feature of our catalog, displaying the list of patterns. We decomposed it into several smaller features. First, the user should have the possibility to display the full list of patterns, for that, he just has to click on “List of Patterns” and will get the full list of patterns as shown in Figure 7.

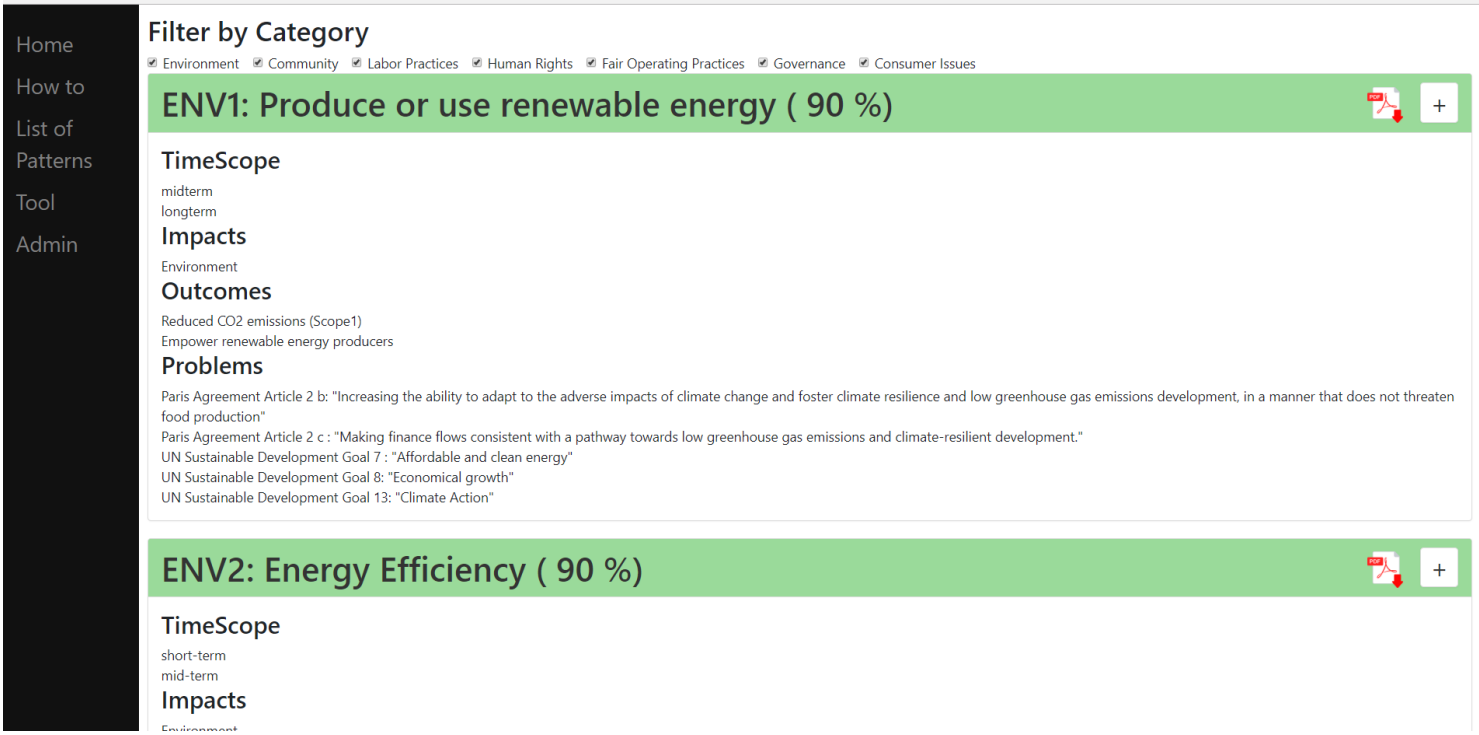

Figure 7. Working of the " displaying the list of patterns" feature

Then, the users can have several options. Display more information by clicking on the cross on the top right corner, and if they are still interested by this pattern, download the PDF file related to it by clicking the PDF icon as shown on Figure 8.

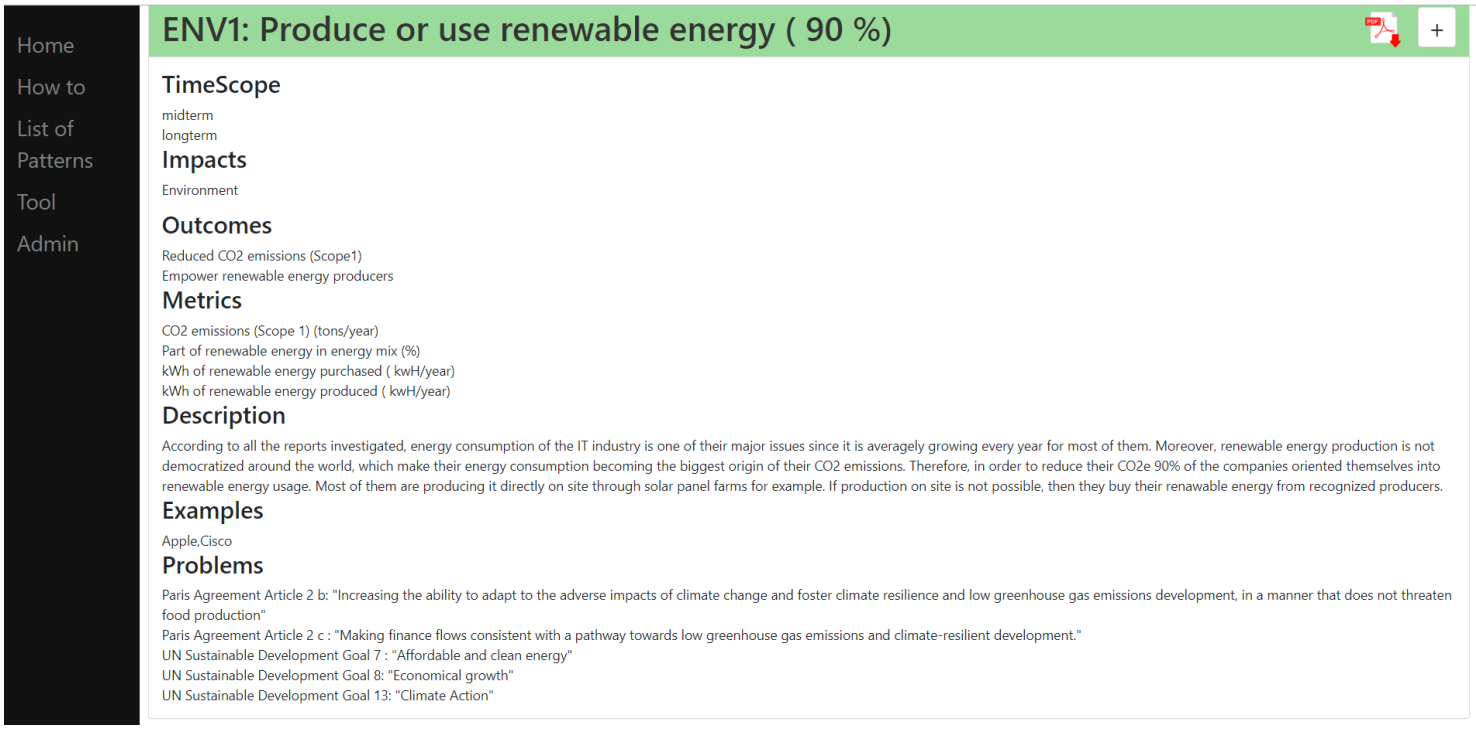

Figure 8. Working of the more detailed information displaying after clicking the cross

Or, sort the patterns to only see the categories which complies with their inetrests by checking or unchecking the categories as shown on Figure 9.

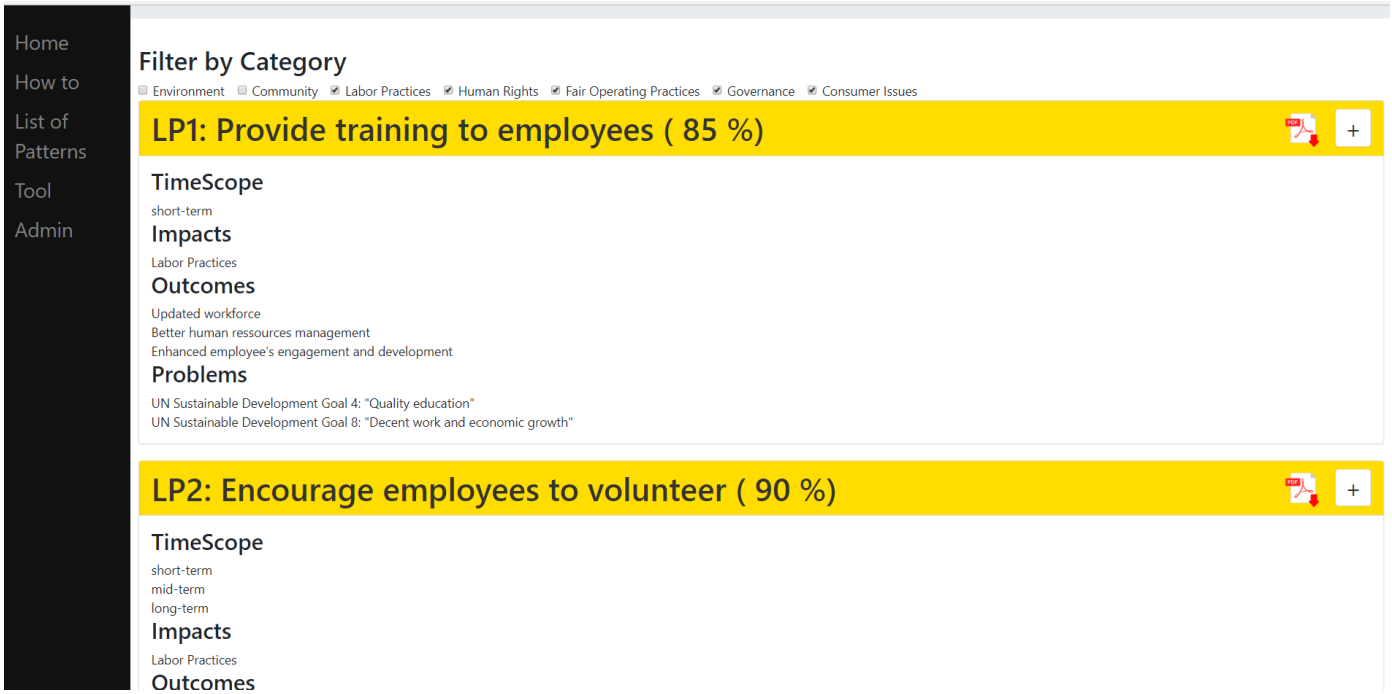

Figure 9. Working of the sorting of the pattern displaying

Regarding the possibility for special users to add some pattern, which is motivated by the fact that a similar topic could be given to someone else in the future in order to grow the set of patterns in the catalog, we decided to develop a simple formulary in the view admin.html as shown in Figure 10.

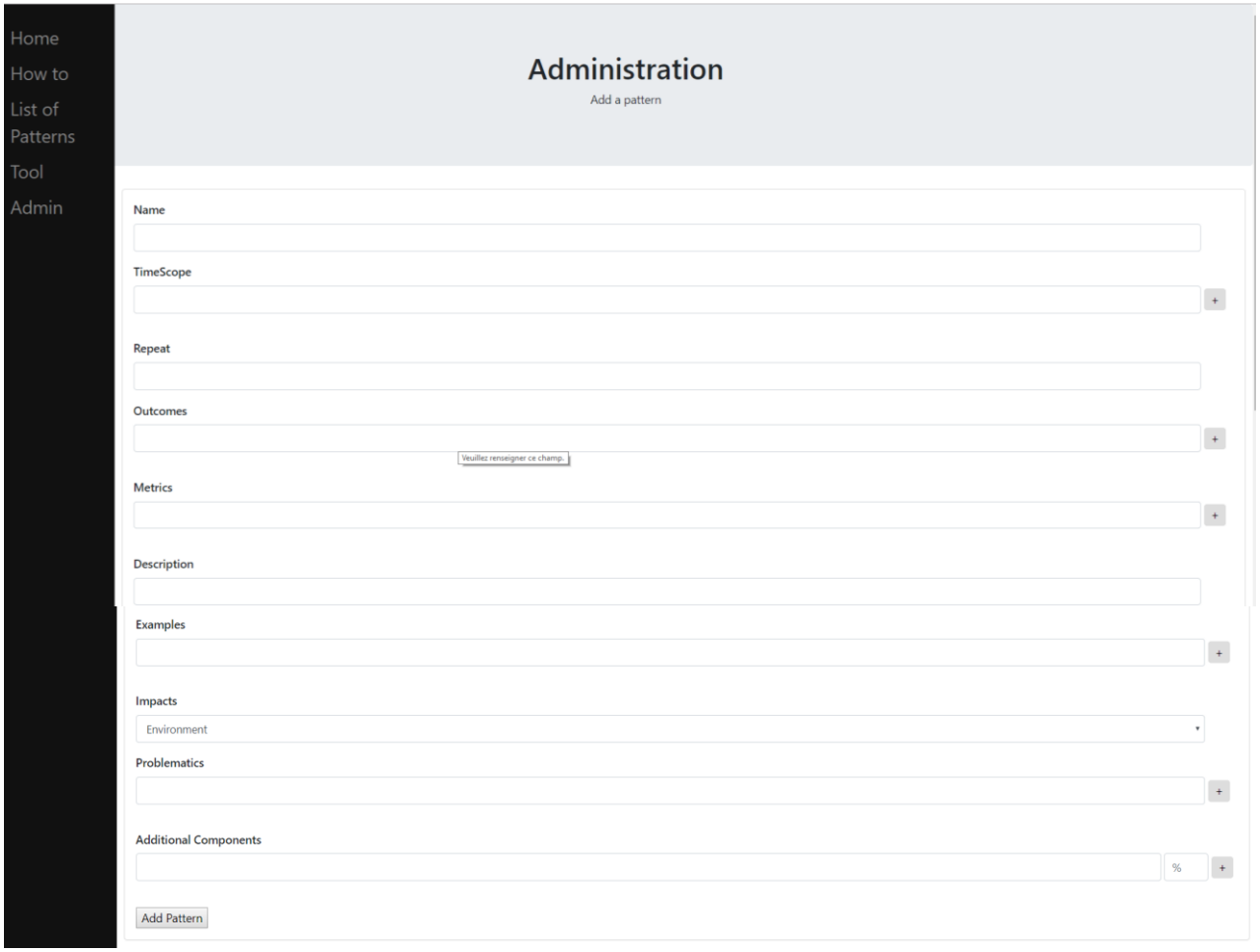

Figure 10. Possibility to add new patterns in the database directly through the application

We can notice that all the components of our data model are included in the formulary. Moreover, we do not allow users to use different categories than the one we defined during our analysis.

Finally, in order to facilitate the user experience, we decided to partially implement a tool that can give a personalized set of patterns to the users. We based it on a quiz composed of yes or no questions. Depending on his answer, the web application will give him a set of patterns by eliminating the one he is already implementing. We implemented this feature for 2 patterns:" *ENV1: Produce or use renewable energy"* and" *ENV2: Energy Efficiency*". So, when the user accesses the page" tool.html", he will have to answer a quiz. First, we

ask if he buys or produces renewable energy and if he has any energy efficiency policies which are set in his company as shown on Figure 11.

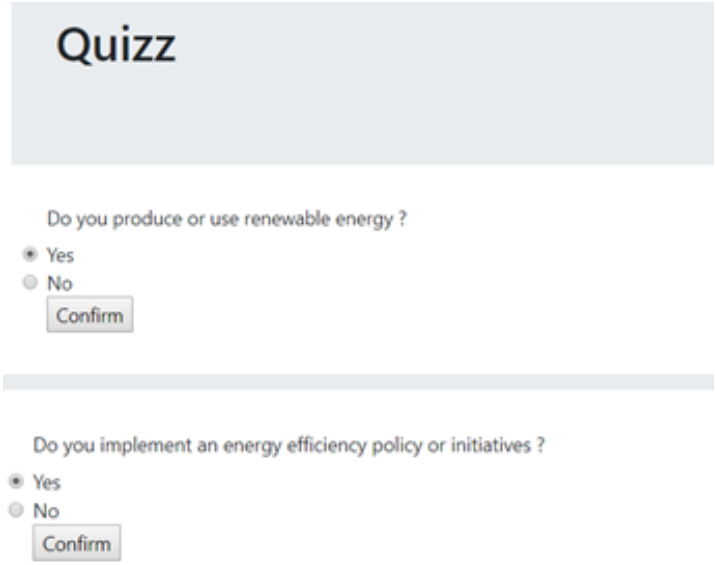

Figure 11. Quiz on the which is based the tool that we partially implemented for ENV 1 and ENV 2 to give a personalized set of patterns

If the user had answered" no" then the quiz would have been over and both patterns would have been displayed. So, let's imagine that the user answers" yes" to both questions, if. Then, since" *ENV2: Energy Efficiency*" has additional components, we ask him at which level he is implementing energy efficiency policies or initiatives as shown on Figure 12.

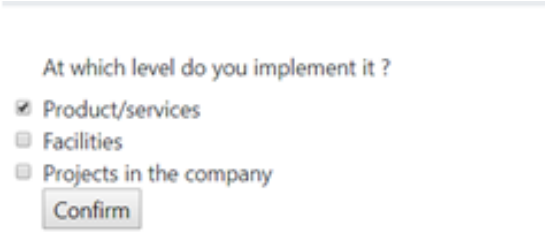

Figure 12. Second question related to ENV2 in order to determinate the level of achievement in the implementation of the pattern

So, this time the user did only implement it at the level of his product and services. Regarding the percentage of repeatability of these 2 patterns, we can conclude that he is

not fully implementing this pattern. We will then show it to him in order to allow him to fully implement this pattern.

4.5 Further Work

To fully implement the catalog, we need to fully enter the data in the data base which is done by 70% now and should not take that much time since we have the possibility to enter data directly from the application now. When this would be done, the local prototype will be finalized and fully tested to verify that it doesn't contain any mistakes. After the final development of the local prototype we will need to host our website in order to make it accessible for our potential users. We are investigating several solutions such as Google Engine, Amazon Web Services or Herokuapp. But it seems like our choice will end on this last one, because Heroku is a free hosting service which uses Amazon cloud, along with database as a service provided by mongo DB Atlas, which also uses Amazon cloud as their infrastructure.

Finally, to evaluate the value of our solution we would like to perform a a qualitative survey on the potential users of this website which are people working at an executive level or who has responsibility in the field of sustainability in an IT company. But we might not find a significant enough number of potential users to perform it.

5 CONCLUSIONS

The last section of this document is dedicated to the conclusion of this work. We will divide this conclusion into two sub-section First, since we are in a program with a strong constitutive in sustainability, we will give our predictions about the potential sustainability outcomes of our initiatives through a sustainability analysis. Finally, we will highlight our contributions and give answer to our research questions, then we will present the limitations intrinsic to our work and try to estimate its potential for future research work on the topic of CSR.

5.1 Sustainability

In this part we will discuss the different potential sustainability outcomes of our online pattern catalog. To highlight these outcomes, we will use a sustainability analysis framework for software engineering presented in [35]. This framework is based on the consideration of five different dimensions which are social, economic, technical, environmental and individual for the which we evaluate three different types of impacts which are the **immediate effect**, which relates to the direct impacts on these dimensions, **the enabling effect**, which concerns the indirect effect that our solution can have on these dimensions and the potential outcomes it can enable, and the **structural effect**, which relates to the macroscopic effects of our solution.

In our case, we assume that our solution will have one main immediate effect on social sustainability, since the broadcasting of our catalog and its usage will increase the sustainability awareness at a company level. As enabling effects, we allow users to implement patterns which can have different impacts on sustainability (Economic, environmental, Social and individual). Finally, depending on the implementation of the patterns we can have different types of structural effects which depends on the outcomes identified in the different strategy. But, in a company point of view which are the users in our case, the most important structural impacts that our solution will have is economic. Because it will allow companies to communicate more on their sustainability and then perform positive advertisement around it. Finally, regarding the technical sustainability of

our solution, we designed it in order to be easy to reuse. To achieve that, we designed our catalog, by considering the possibility that in the future someone would perform the same analysis and then use this tool again to represent his results. Therefore, all the features needed for the addition of patterns has been developed. Moreover, as we seen in the background part (cf. Section **1.2**), the concept of CSR is very dynamic, and its different dimensions might change with the time. Thus, we commented our code as much as possible in order for it to be easy to maintain. We summarize this in Figure 13. The structural effects mentioned in the figure are not exhaustive.

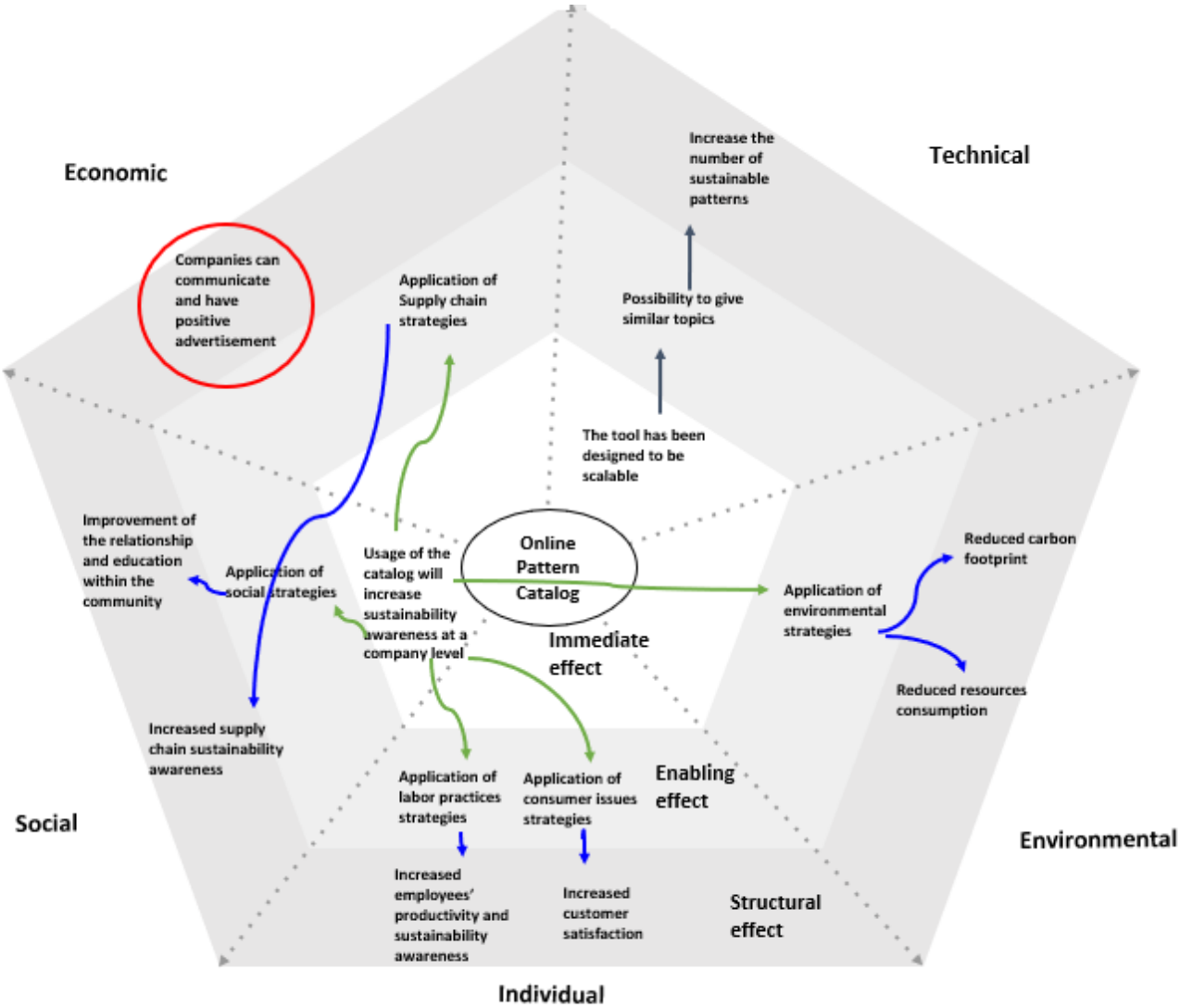

Figure 13. Sustainability analysis of our online pattern catalog based on the framework defined on [35]

5.2 Contributions, limitations and future work

In this part we will recapitulate the different limitations of our research that have been already little discussed in the previous sections of this report. Then we will highlight the different contributions of our work and give answers to the research questions we exposed in the introduction (cf. **Section 1.2**).

The first limitation we can observe are related to the analysis we performed. As me mentioned earlier, (cf. **Section 3.5**). Indeed, the research might have been corrupted by an individual bias. Moreover, regarding our technical solution, the impacts we exposed in the previous section are conditioned by its number of users. Obviously, the impacts would be much more significative if we would have 10 000 users than if we would have 100.

Regarding our contributions, we developed a method based on two different frameworks to extract patterns from CSR. This method led us to the performing of our two analyses. These analyses allowed us to extract the different sustainability initiatives and strategies coming from the biggest IT companies (**RQ1**) and to evaluate the one which are the most successful (**RQ2**). In order to define the different outcomes of our strategies, we used most of the time the one defined in the different reports themselves (**RQ3**) and use some different approaches to assess these outcomes (**RQ4**) that link the different UN SDGs, and Paris Agreement sections to the different strategies we extracted. Finally, we developed a data-model, in the format of an UML representation, in order to represent in the next step our patterns in a reference catalogue (**RQ5**). Based on this data-model we developed an online catalog which aims to share the best practices in CSR in IT (**RQ6**). This online catalog is fully developed locally for the moment and will be published online at the end of September 2018 at latest. Finally, this research has been subject to the publication of an article in an MDPI journal Special Issue [36].

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APPENDIX A. IT companies investigated during this study

Company	CSR available	CSR Link
Apple	Y	https://www.apple.com/environment/pdf/Apple_Environmental_Responsibility_Report_2015.pdf
AT&T	Y	http://about.att.com/content/dam/csr/sustainability-reporting/PDF/2016/ATT-Annual-Update.pdf
Verizon	Y	http://www.verizon.com/about/sites/default/files/annual/verizon-annual-2015/downloads/2015_Verizon_Corporate_Responsibility_Supplement.pdf
Amazon	N	
Hewlett Packard	Y	http://www8.hp.com/h20195/v2/GetPDF.aspx/c05154920.pdf
Microsoft	Y	https://www.microsoft.com/about/csr/downloadhandler.ashx?Id=02-01-12
IBM	Y	https://www.ibm.com/ibm/responsibility/2015/assets/downloads/IBM_2015_CR_report.pdf
Alphabet (Google)	Y	https://abc.xyz/investor/pdf/google-2016-environmental-report.pdf
Comcast	Y	http://corporate.comcast.com/images/2015-Corporate-Social-Responsibility-Report.pdf
Intel	Y	http://csrreportbuilder.intel.com/PDFfiles/CSR-2015_Full-Report.pdf
Cisco	Y	http://www.cisco.com/assets/csr/pdf/CSR_Report_2015.pdf
Ingram Micro	N	
Oracle	Y	http://www.oracle.com/us/corporate/citizenship/corporate-citizenship-report-2563684.pdf
Avnet	Y(2014)	http://www.avnet.com/en-us/who-we-are/Documents/Avnet-CSR-Report.pdf
TechData	N	
Qualcomm	Y	https://www.qualcomm.com/media/documents/files/2015-qualcomm-sustainability-report.pdf
EMC	Y	http://www.emc.com/collateral/sustainability/emc-2015-annual-report.pdf
Arrow Electronics	Y	http://community.arrow.com/activities/custom/pdf/csr-report-15online-final.pdf
Xerox	Y	https://www.xerox.com/corporate-citizenship-2015/Xerox-2015-Global-Citizenship-Report.pdf
Century Link	Y	http://www.centurylink.com/aboutus/docs/Corporate-Social-Responsibility-Report.pdf
Western Digital	Y (2012)	https://www.wdc.com/content/dam/wdc/website/about-wd/press-room/annoucements/WDC%20Acquires%20SanDisk/corporate-responsibility-report.pdf
Synnex	N	
CDW	N	
Cognizant	Y	https://www.cognizant.com/about-cognizant-resources/cognizant-sustainability-report2015.pdf
CSC	Y	http://assets1.csc.com/cr/downloads/CSC_2015_CorporateResponsibilityReport.pdf

Table A1. List of the 25 IT companies and the existence of their CSR reports (Y for yes, N for no) coming from [25] from 2015 if year not mentioned

APPENDIX B. Evaluation Criteria used during the analysis

Category	Definition
Community	Every strategies or initiatives which impacts the community outside the company. (example: educational project, association funding, etc.)
Labor Practices	Every strategy or initiatives which has an impact on the workplace and/or on the employees (example: employees training, diversity in the company, etc.)
Governance	Every strategies or initiative which relates to laws, management or reporting (example: participating to the creation of regulations, organizing a stakeholderdialogue)
Environmental	Every strategies or initiatives which help to reduce negative impacts on environment (example build ecological products, produce or use renewable energy,etc.)
Fair Operating Practices	Every strategies or initiatives which impacts the supply chain sustainability (example: creation of a Supplier code of conduct, proceed internal audits of the supplu chain, etc.)
Human Rights	Every strategies or initiatives which impacts human rights and their diffusion (example: Conflict free mineral policy, data privacy and security policy)
Consumer Issues	Every strategies or initiatives which impacts customer and help them reduce their problems (example: design accessible products, provide end of life management, etc.)

Table B1. Content classification criteria based on ISO 26000

Assessment criteria		Comments
Relevance of information		
R1	Sustainability strategy	The report presents the business strategy which relates to the aspects of sustainable development
R2	Key stakeholders	The report contains identification of organization's stakeholders, their expectations and a way of engagement with individual groups
R3	Targets	The report presents targets for the future, targets set in the previous reporting period and the level of their achievements
R4	Trends over time	The report contains indicators shown over several reporting periods indicating this way direction of change and ensuring their comparability
R5, R6, R7, R8	Performance indicators: R5 market place, R6 workplace, R7 environment, R8 community	The report contains quantitative information concerning organization's performance achieved in particular areas (market place, workplace, environment, community).
R9	Improvement actions	The report describes improvement activities undertaken by the organization to meet the objectives of sustainable development; e.g. programs to increase resource efficiency, reduction of emission etc.
R10	Integration with business processes	The report contains information confirming that the aspects of sustainable development are included in the decision making process and implemented in the basic processes (purchasing, sales, marketing, production, etc.)
R11	Executive summary	The report provides a concise and balanced overview of key information and indicators from the reporting period
Credibility of information		
C1	Readability	The report has a logical structure, uses a graphical presentation of the data, drawings, and explanations where required or uses other tools to help navigate through the document
C2	Basic reporting principles	The reporting period, scope and entity is defined in the report as well as limitations and target audience
C3	Quality of data	The report describes the processes, procedures of collection, aggregation and transformation of data and determines the source of the data
C4	Stakeholder dialogue outcomes	The report contains a description of the stakeholders' dialogue and the results of this dialogue in relation to aspects of sustainable development (surveys, consultations, focus groups, round tables, programs, engagement, etc.)
C5	Feedback	The report contains a mechanism that allows feedback process (contact point for suggestions or questions, hotline, e-mail, reply card, questionnaire etc.)
C6	Independent verification	The report contains a statement of independent body attesting the authenticity of data presented in the report as well as proposals for future improvements

Table B2. Quality criteria coming from [28]

APPENDIX C. Detailed results of the different analysis

COMMUNITY(5)		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	Total(%)
COM1 (90%)	Support educational projects/actions	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	90
COM11(45%)	Create their own educational platform	0	0	1	0	0	1	1	1	0	0	0	1	0	0	1	1	0	1	1	0	45
COM12 (35%)	Provide scholarships	0	0	1	1	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1	35

		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
COM2(95%)	Support Social projects/actions, non profit organizations	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	95
COM21 (35%)	Health	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0	1	1	0	35
COM22 (65%)	Undeserved peoples	0	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	0	1	65
COM23 (50%)	Environmental	0	1	1	1	0	0	1	0	0	0	1	0	1	1	0	1	1			1	50
COM24 (35%)	Societal	0	0	0	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	1	0	35
COM25 (45%)	Create their own charity fundation	0	0	1	0	0	0	1	1	1	0	0	1	0	1	0	0	1	0	1	1	45
COM26 (35%)	Participate to sensitization campaign	0	0	1	1	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	35
COM27 (35%)	Employee donations	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	1	0	0	1	0	35

		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
COM3 (60%)	Enhance access to technology in the community	0	0	1	0	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	60
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
COM4 (45%)	Donations after humanitarian disaster	0	0	0	1	0	1	1	0	0	0	0	1	1	0	1	1	0	0	1	1	45
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
COM5 (45%)	Economic empowerement of the community	0	0	0	0	0	1	0	1	1	0	1	1	1	1	0	0	1	0	0	1	45

LABOR PRACTICES(7)		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
LP1(85%)	Provide training to employees	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	85
LP11(80%)	skills	0	0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	80
LP12(70%)	Carreer	0	0	0	1	1	1	1	1	1	0	0	1	0	1	1	1	1	1	1	1	70
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
LP2(90%)	Encourage employee to volunteer	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	90

		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
LP3(40%)	Employee reward ceremony	0	0	1	1	0	0	1	1	1	0	0	1	0	1	0	0	0	0	1	0	40
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
LP4(80%)	Employee Well being program	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	80
LP41(80%)	Health and safety management	0	1	0	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	80
LP42(60%)	Compensations program	0	0	0	1	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	60

		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
LP5(80%)	Sensitize employee to environmental issues	0	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	80
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
LP6(85%)	Build diverse and inclusive workforce	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	85
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
LP7(65%)	Employee feedback	0	0	0	1	0	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	65

GOVERNANCE(6)		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
G1(90%)	Set Clear sustainability objectives through dedicated team	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	90
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
G2(45%)	Use standardized measurements tools/methods	1	1	0	1	1	1	0	0	1	0	1	1	0	0	0	0	0	0	0	1	45
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
G3(90%)	Collaborate with peers	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	90
G31(80%)	Comply with regulations/laws/ norms	0	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	80
G32(85%)	Participate to the creation of regulations/law/s tandard	0	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	85
G33(55%)	Stakeholder engagement	0	0	0	0	0	1	0	0	1	1	0	1	0	1	1	1	1	1	1	1	55
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
G4(75%)	Sustainable Management	1	1	0	1	0	1	1	0	1	0	1	1	1	1	1	1	0	1	1	1	75
G41(50%)	Implement Risk Management	0	0	0	1	0	1	1	0	1	0	0	1	1	1	0	0	0	1	1	1	50
G42(70%)	Implement Environmental Management System	1	1	0	1	0	1	1	0	1	0	1	1	1	1	1	1	0	0	1	1	70
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
G5(100%)	Transparency	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
G51(100%)	Report environmental impacts	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
G52(35%)	Report political contributions	0	0	0	0	1	1	0	0	0	0	0	1	0	1	0	0	1	1	0	1	35
G53(70%)	Report Donations for charity	0		1		1	1	1	1			1	1		1	1	1	1	1	1	1	70
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
G6(65%)	Create Code of Conduct	0	0	0	1	1	1	0	1	1	0	0	1	0	1	1	1	1	1	1	1	65

ENVIRONMENTAL(6)		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
ENV1(90%)	Produce/use renewable energy	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	90
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
ENV2(90%)	Energy efficiency	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	90
ENV21(60%)	Products/services	1	0	1	0	0	1	0	1	0	1	1	1	1	1	1	0	0	0	1	1	60
ENV22(75%)	Facilities	1	1	0	0	1	1	0	1	1	0	1	1	1	1	1	1	0	1	1	1	75
	Projects in the	Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
ENV4(85%)	Ressource efficiency	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	90
ENV41(55%)	Paper	1	1	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	1	0	1	55
ENV42(70%)	Water	1	0	0	1	0	1	1	1	0	0	1	1	1	1	1	1	0	1	1	1	70
ENV43(85%)	Waste Generation	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	85
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
ENV5(75%)	Propose alternative solutions for comuting/transportation	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	1	0	1	1	1	75
ENV51(60%)	Alternative vehicles	1	1	1	1	1	1	0	1	0	0	1	1			0	1	0	1	0	1	60
ENV52(40%)	Air travel reduction	1	1	0	0	0	1	1	0	0	0	1	0			0	1	0	0	1	1	40
ENV53(30%)	Car pooling	1	0	0	1	1	0	1	0	0	0	1	1			0	0	0	0	0	0	30
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
ENV6(40%)	Involve in biodiversity/nature conservation	1	0	0	1	0	1	0	0	0	0	1	1		1	0	1	0	0		1	40

FAIR OPERATING PRACTICES(5)		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
FOP1(75%)	Supplier Code of conduct	0	0	1	1	1	1	1	0	1	1	0	1		1	1	1	1	1	1	1	75
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
FOP2(95%)	Sensitize supply chain to sustainability issues	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	95
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
FOP3(60%)	Build a diverse supply chain	0	0			1	1	0	1	1		0	1	1	1	1	1	1	1		1	60
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
FOP4(45%)	Proceed audits in the supply chain	0	0			0	1	0	1	0		0	1	1	1	1	0	0	1	1	1	45
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
FOP5(60%)	Avoid conflict mineral usage	0	1		1	0	1	0	0	0		0	1	1	1	1	1	1	1	1	1	60

HUMAN RIGHTS (3)		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
HR1(60%)	Conflict free mineral policy	0	1		1	0	1	0	0	0		0	1	1	1	1	1	1	1	1	1	60
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
HR2(75%)	Data Privacy and security policy	0	0			1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	75
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
HR3(50%)	Sensitize employees/suppliers to HR	0	0	0	0	1	1	1	0	0	1	0	1		1	1	1	1	0	0	1	50
CONSUMER ISSUES(4)		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
CONS1(75%)	Provide end of life management	1	1	1	1	0	1		0	1	1	1	1	1		1	1		1	1	1	75
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
CONS2(85%)	Provide products/services which help customers to increase their own sustainability	1	1	1	1	1	1			1	1	1	1	1		1	1	1	1	1	1	85
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
CONS3(35%)	Design accessible products	0	0	1		0	1		1	0						1	1		1		1	35
		Apple	Arrow	ATT	Avnet	Century link	cisco	cognizant	comcast	csc	emc	google	hp	ibm	intel	microsoft	oracle	qualcomm	verizon	western digital	xerox	
CONS4(30%)	Provide information about environmental impacts of products	1	0	1		0	0		0	0			1	1			0		1		1	30

Table C1. Full results of the repeatability analysis "1" means that a strategy is at least cited in the report of the company and "0" that it is not

Criterion / Company	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	C1	C2	C3	C4	C5	C6	Quality	Credibility	Relevance
HP	4	3	4	4	1	3	4	4	3	3	4	3	4	3	3	1	2	3,12	2,67	3,36
Microsoft	4	4	3	4	2	3	4	4	4	4	4	4	3	3	3	0	0	3,12	2,17	3,64
Cisco	4	3	4	3	3	3	4	3	3	3	4	4	3	2	3	2	1	3,06	2,5	3,36
Intel	4	3	4	4	2	4	2	3	3	3	3	4	3	2	3	2	2	3	2,67	3,18
Xerox	4	2	3	3	2	3	4	4	3	3	3	3	2	2	2	0	0	2,53	1,5	3,09
Qualcomm	3	4	3	3	3	3	2	2	2	2	1	3	4	4	1	1	0	2,41	2,17	2,55
IBM	3	2	3	4	1	4	3	3	3	2	3	4	2	2	1	0	0	2,35	1,5	2,82
CSC	3	2	2	2	2	3	4	4	2	2	2	3	3	2	3	0	0	2,29	1,83	2,55
Cognizant	3	1	1	4	3	3	4	4	2	2	1	3	4	1	1	1	0	2,24	1,67	2,55
Verizon	3	1	4	2	0	2	4	3	3	3	3	3	3	2	2	0	0	2,24	1,67	2,55
EMC	3	0	4	1	2	1	3	3	2	3	3	3	3	2	3	1	0	2,18	2	2,27
Oracle	4	2	1	2	0	3	3	4	3	3	1	2	3	1	2	1	0	2,06	1,5	2,36
ATT	2	1	4	1	0	2	3	3	2	2	4	4	2	1	1	0	0	1,88	1,33	2,18
Western Digital	3	2	2	2	0	1	2	2	3	3	1	2	3	2	2	1	0	1,82	1,67	1,91
Apple	4	1	1	1	0	0	4	0	3	3	1	3	3	2	0	0	4	1,76	2	1,64
Arrow	2	3	2	1	0	0	3	3	2	2	2	3	3	2	0	1	0	1,71	1,5	1,82
Google	3	0	3	3	1	0	1	4	2	3	0	3	3	3	0	0	0	1,71	1,5	1,82
Comcast	2	2	0	1	0	2	4	2	2	2	2	3	3	1	2	0	0	1,65	1,5	1,73
Avnet	3	0	0	2	2	2	1	3	2	1	2	3	2	1	1	0	0	1,47	1,17	1,64
Century Link	3	2	1	0	0	1	4	2	3	2	0	2	2	1	0	0	0	1,35	0,83	1,64
Average	3,05	1,8	2,4	2,35	1,2	2,1	2,95	2,9	2,45	2,45	2,2	3	2,8	1,9	1,65	0,55	0,45	2,1975	1,7675	2,433

Table C2. Full results of the quality analysis with the quality score for each criterion

APPENDIX D. List of all the patterns extracted during this work with their different components

COM1: Support Educational Projects

Time of Effectiveness	Mid-Term Long term
Repeatability	90% (18 reports out of 20)
Level of Confidence	**9.18/10**
Category	Community Involvement and Development
Outcomes	• Better level of education • Familiarize future workers with the company technology • Spot talented peoples • Give more opportunities to the community
Metrics	• Donations ($) • Part of people who succeeded after getting involved in projects compare to people who did not (%) • Part of workers who have been involved in a program (%)
Problematic	• UN SDG 4: Quality Education • UN SDG 5: Reduced inequalities • UN SDG 8: Decent work and economic growth
Additional Components	• Create their own educational platform (**50%**) • Provide scholarships (**40%**)

Description

In order to enhance educational level and to detect young talents, 90% of the companies developed a support to educational projects from financial to in kind donations passing by events held by the company. It allows companies to familiarize future workers with their technologies and to spot talented people earlier. Moreover, it allows companies to get some positive advertisement in the community in the which they implement it. Finally, half of the company which implemented this strategy also developed their own educational platform (Cisco Networking Academy, ATT Aspire, HP Netu, etc.).

Example: Oracle (p.75-77)

Oracle support around 2.2 million of student in the world through their online educational platform or through their educational foundation, they also train more than 8000 teachers around the world in order to deliver high quality education and industry relevant skills. This engagement is mainly translated by the organization of different type of events such as workshops or hackathons. Most of the time these events are organized in partnership with educational NGOs, Oracle then send their expert into these events to share their knowledge. It allows Oracle to spot talented people very early, in the point of view of the students they can take advantage of the experience of these experts. Finally, Oracle also engage in education through different scholarships granting.

COM2: Support social projects, actions or NGOs

Time of Effectiveness	Mid-Term Short term Long term
Repeatability	95% (19 reports out of 20)
Level of Confidence	**9.59/10**
Category	Community
Outcomes	• Enhanced image in the public opinion • Better connections with local community • Enabling effects on the community
Metrics	• Donations ($) • Public opinion (survey)
Problematic	• Paris Agreement article 12 • UN SDG 1: No Poverty • UN SDG 3: Good Health • UN SDG 11: Sustainable Cities and Communities
Additional Components	• Health activities (36%) • Help to undeserved people (68%) • Sensitization to environment campaign (52%) • Societal activities (36%) • Create their own charity foundation (47%) • Employee donations (36%)

Description

In order to create connections with civil society and to enable opportunities in different fields, 95% of the companies decided to invest in social projects and non-profit organizations. This investment can cover various aspects depending on companies' sensitivity and on local community's wishes. We can still notice that two fields are highlighted in these different additional components, which are the help to undeserved people and involvement into environmental activities such as sensitization campaigns or tree planting events. The final impacts of this strategy can be various and highly depends on the companies' choices. Nevertheless, we can see that in term of social impacts, it allows the community to, first, reach higher opportunities and, second, to feel supported by the company.

Example: Comcast (p21-29,45)

Comcast is one of the biggest company in the audiovisual field in the world. Aware of this status, they do not hesitate to use their channel of communication to give opportunities for different NGOs to have a wider audience. For example, they created a show to give the speech to Native Americans that reached several millions of American citizens in order to change the US citizens perception of these peoples (Undeserved peoples). They also launched a campaign against online bullying that aims to promote good online behavior (societal). Moreover, they launched an employee donations program which help them to give to the cause they are sensitive to. In a more global perspective, Comcast gave around $478 million in different ways to different NGOs through their charity foundation.

CONS1: Provide End of life Management

Time of Effectiveness	Mid-Term Long term
Repeatability	75% (15 reports out of 20)
Level of Confidence	**7.59/10**
Category	Consumer Issues
Outcomes	• Increased customer satisfaction • Reduction of customer waste generation • Possibility to apply circular economy to reduce raw materials costs
Metrics	• Customer satisfaction (survey) • Waste diverted from landfill (tons) • E-waste collected (tons) • Proportion of recycled e-waste
Problematic	• UN SDG 9: Industry, Innovation, Infrastructure • UN SDG 12: Responsible consumption
Additional Components	**NONE**

Description

E-waste generation is one of the most negative impacts that IT companies can have on environment, especially for manufacturers. Moreover, this is an issue for customers to recycle their different IT equipment since they do not really know to whom give it. To reduce this generation, three quarter of the companies created an end-of-life management system. This system allows customers to send back their obsolete IT equipment to the company which will take the recycling under its responsibility. The application of this strategy can be combine with a circular economy policy (**ENV3**) that will give the opportunity to companies to reuse their old equipment and then reduce their raw materials' costs.

Example: Avnet (p.12)

In order to help their customer to manage their devices along their lifetime, Avnet implemented different services to repair or refurbish the different devices of their users in order to extend their lifetime, as well as disposal services which allows users to return their obsolete device, in that case Avnet takes charge of the recycling of the product. This center helped Avnet to avoid around 126 tons of e-waste to enter landfill. They also took the opportunity to implement some circular economy policies (**ENV3**) in order to reuse the materials they recycled from old products.

CONS2: Involve in projects that improve customer sustainability

Time of Effectiveness	Mid-Term Long term
Repeatability	85% (17 reports out of 20)
Level of Confidence	**8.41/10**
Category	Consumer Issues
Outcomes	• Increased customer satisfaction • Enhanced public opinion • Increased customer sustainability awareness
Metrics	• Customer satisfaction (survey) • Customer sustainability awareness (survey)
Problematic	• UN SDG 12: Responsible consumption • UN SDG 17: Partnerships for the goals
Additional Components	**NONE**

Description

To have some more impacts on sustainability, 85% of the companies got involved into sustainability projects with their customers which are most the time companies or national agencies. These sustainability projects can take several forms even if they are related to environmental purpose most the times. Moreover, the projects are, most of the time, very specific and, therefore, unique. This makes them very hard to duplicate due to the technical complexity of these. Nevertheless, this strategy has led the companies to an increased customer satisfaction and an enhanced public opinion since they can easily communicate on these projects which can be very complex and innovative.

Example CSC (p.10-13)

At CSC, they got involved in a lot of different sustainability projects. Regarding environmental sustainability, they helped the NASA by developing high performance CPU to generate climate model faster. They also provide technical and logistical support the Environmental Protection Agency (EPA) in the U.S. to restore Superfund hazardous waste sites.

Regarding social sustainability, they got involved in the creation of severe weather alert application in collaboration with the U.S. National Weather Service, which allows mass-media to be informed faster about weather risks. Moreover, they also developed a real time patient monitoring system in a hospital in Spain.

Finally, they are also putting their technology to the service of their actual customer's sustainability and propose different sustainable services which are based on the different functions they developed during their bigger projects. The communication they made around these different projects allowed them to gain in credibility as well as increasing their customer satisfaction by proposing the practices they learned into their catalog of services.

ENV1: Produce or Use Renewable Energy

Time of Effectiveness	Mid-Term Long term
Repeatability	90% (18 reports out of 20)
Level of Confidence	**9.05/10**
Category	Environment
Outcomes	• Reduced CO2 emissions (Scope 1 and 2) • Empower renewable energy producer
Metrics	• Scope1 CO2 emissions (tons/year) • Part of renewable energy in the energy mix (%) • kWh of renewable energy purchased (kwH/year) • kWh of renewable energy produced (kwH/year)
Problematic	• Paris Agreement Article 2.b • Paris Agreement Article 2.c • UN SDG 7: Affordable and clean energy • UN SDG 8: Economic growth • UN SDG 13: Climate action
Additional Components	**NONE**

Description

According to all the reports investigated, energy consumption of the IT industry is one of their major issues since it is averagely growing every year for most of them. Moreover, renewable energy production is not democratized around the world, which make their energy consumption becoming the biggest origin of their CO2 emissions.

Therefore, in order to reduce their CO2 emissions, 90% of the companies oriented themselves into renewable energy usage. Most of them are producing it directly on site through solar panel farms for example. If production on site is not possible, then they buy their renewable energy from recognized producers.

Example: Apple (p. 3,6,7,12-16)

In order to reduce their Scope 1 and 2 CO2 emissions, Apple decided to implement a renewable energy consumption policy. This policy consists in producing their own renewable energy on site and allows them to power 100% of their datacenter with 100% of renewable energy, using wind, solar panels, geothermal or fuel cell energy depending on the localization of their datacenter. They provide the energy mix for their datacenter in the report. Their next objective is to power 100% of their retail store with renewable energy as well. On the table below, we can see the outcomes of the implementation of this renewable energy strategy regarding the CO2 emissions of Apple.

ENV2: Energy efficiency

Time of Effectiveness	Mid-Term Long term
Repeatability	90% (18 reports out of 20)
Level of Confidence	**9.09/10**
Category	Environment
Outcomes	• Decreased energy consumption • Reduction of CO2 emissions (Scope 1 & 2) • Economical savings • Increased customer satisfaction
Metrics	• Energy consumption (kWh/year) • Economical savings ($/year) • CO2 emissions (Scope 1,2 and 3) (tons/year) • Customer satisfaction (survey)
Problematic	• Paris Agreement Article 6. p.4 • UN SDG 7: Affordable and clean energy • UN SDG 9: Industry, Innovation and Infrastructure • UN SDG 12: Responsible production and consumption
Additional Components	• Products/services **(67%)** • **Facilities (83%)**[1] • Projects in the company **(67%)**

Description

In order to reduce their energy consumption, 90% of the investigated companies implemented energy efficiency policies. Most of them decided to focus on their facilities energy efficiency, which represents the building owned by the company (offices, factories, retail stores, etc.). However, more than half of these companies also invested in the energy efficiency of their products or services as well as energy efficiency projects in the company. The application of such strategies is directly translated into a reduced energy consumption. This reduced energy consumption induces indirect effects such as economical savings and CO2 emissions reduction since it represents the energy that you "do not consume". Finally, the energy efficiency aspects can be used as a marketing tool and then increase customer satisfaction.

Example: Cisco (p.82,93,99,101-103,105,111-115,139)

At Cisco they consider all the aspects of energy efficiency. First, in the level of their facilities, their two last data centers have a Leadership in Energy and Environmental Design (LEED)-NC Gold certification, which evaluates the global efficiency of a building. Moreover, they created a team dedicated to implement energy efficiency program across the company which allows them to slightly decrease their energy consumption as shown on the table below:

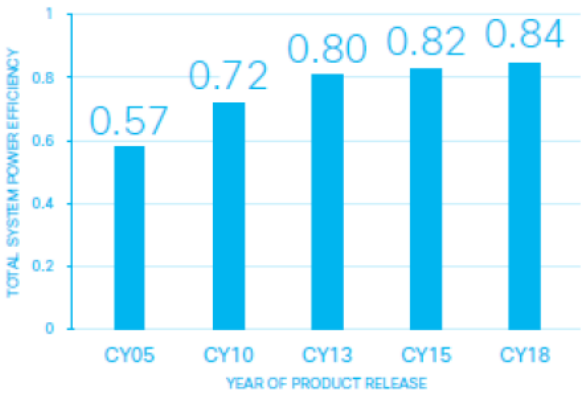
Table 8. Energy and GHG Emission Reduction Projects

KPI	FY11	FY12	FY13	FY14	FY15
Number of projects implemented	19	26	103	90	148
Annual energy avoided, GWh/yr	16.8	15.6	76.5	27.2	41.4
Total estimated annual CO_2e savings, tCO_2e/yr	7400	7300	34,000	14,100	19,100

[1] This additional component had a high level of confidence (7.68) compare to others in every category

Finally, they constantly improve the energy efficiency of their different products. First, they conceive their products to do more with the same amount of energy used which make them indirectly more energy efficient. Then, they also think about reducing the energy consumption of their products. For example, by analyzing the energy consumption of each component and each functions of the products to identify way to optimize. All these efforts are translated with a constant increase of the power efficiency of their products as shown in the figure below. This power efficiency allows then Cisco to reduce their Scope3 CO2 emissions by reducing those coming from their product usage.

Figure 4: Total System Power Efficiency* (Percent Improvement)



* Total internal system power conversion and distribution from plug to ASIC; covers the complete internal power system conversion.

ENV3: Design Ecological Products

Time of Effectiveness	Mid-Term
Repeatability	85% (17 reports out of 20)
Level of Confidence	**8.86/10**
Category	Environment
Outcomes	• More efficient management of raw materials • Reduced cost of raw materials • Less toxic or harmful products • Increased customer satisfaction • Reduced waste generation from operation • Reduced generation of e-waste
Metrics	• Proportion of reused materials in products (%) • Hazardous waste generation from operations (tons/year) • Non-Hazardous waste generation from operations (tons/year) • Amount of reused, refurbished or diverted products (tons/year) • Customer satisfaction (survey) • Money spent in raw materials ($/year)
Problematic	• UN SDG 12: Responsible consumption and production • UN SDG 13: Affordable and clean energy • UN SDG 15: Life on land
Additional Components	• **Circular Economy (83%)**[1] • Reduce hazardous material (**76%**)

Description

In order to reduce their environmental impacts, companies decided to design more ecological products regarding the materials used to build them. This is concretely translated in two ways. First, reuse materials into the manufacturing process, also known as circular economy. Second, reduce or eliminate the proportion of toxic or harmful materials from the products. In order to be even more efficient, this strategy is most of the time combined with the implementation of an end of life management program (**CONS1**) which allows companies to directly refurbish, recycle or reuse the products they sold.

Example: Apple (p.18-21,23,24)

At Apple, they implement both aspects of designing ecological products. Indeed, they reduced their harmful or toxic material usage in their product. They claim that this reduction of materials, are better for the environment (air, water pollution), for the people who make them and those who use them by reducing their exposure to toxic products. The figure below shows all the different policies they took to reduce their use of what they identify as their most toxic materials.

[1] This additional component had a high level of confidence (7.64) compare to others in every category

ENV4: Resource Efficiency

Time of Effectiveness	Mid-Term
Repeatability	90% (17 reports out of 20)
Level of Confidence	**9/10**
Category	Environment
Outcomes	• Reduced usage of water • Reduced paper usage • Reduced waste generation (from office) • Slight Increase of employee sustainability awareness
Metrics	• Water usage (galons/year) • Paper usage (tons/year) • Waste generation from office (tons/year)
Problematic	• Paris Agreement: Article 2 b,c • Paris Agreement: Article 6 p.4 • UN SDG 12: Responsible production and consumption
Additional Components	• Paper efficiency (**65%**) • Water efficiency (**82%**) • **Waste efficiency (94%)**[1]

Description

To limit their resources' consumption companies, and then reduce their environmental negative impacts, companies decided to set up initiatives to economize different type of resources. Most of them decided to focus on waste generation from office and water efficiency both from office and from operations. We can also notice that more than half of the companies decided to set up paper efficiency strategy, mainly by optimizing their printing policies. To maximize the impacts of this strategy, employees need to be fully aware with environmental issues (**LP5**).

Example: Google (p.12,17,21-25,46,51,52)

At Google, they took several initiatives regarding resources' efficiency. Regarding water efficiency, they reuse wastewater to cool their datacenter, they designed some of their buildings (up to 41% water reduction at their Bay Area location in California). Some of their different initiatives are shown in the figure below:

[1] This additional component had a high level of confidence (8.5) compare to others in every category

FOP1: Supplier Code of Conduct

Time of Effectiveness	Mid-Term Long term
Repeatability	75% (15 reports out of 20)
Level of Confidence	**7.91/10**
Category	Fair Operating Practices
Outcomes	• More responsible supply chain • Possibility to rank suppliers by compliance • Easier identification of high risks suppliers • Increased supply chain sustainability awareness
Metrics	• Compliance with the code of conduct (audits) • Number of sanctions given to suppliers by gravity • Number of regulations or laws infractions per year in the supply chain
Problematic	• Paris Agreement Article 11 • UN SDG 8: Good Jobs and Economic Growth • UN SDG 10: Reduced Inequalities • UN SDG 16: Peace and Justice
Additional Components	**NONE**

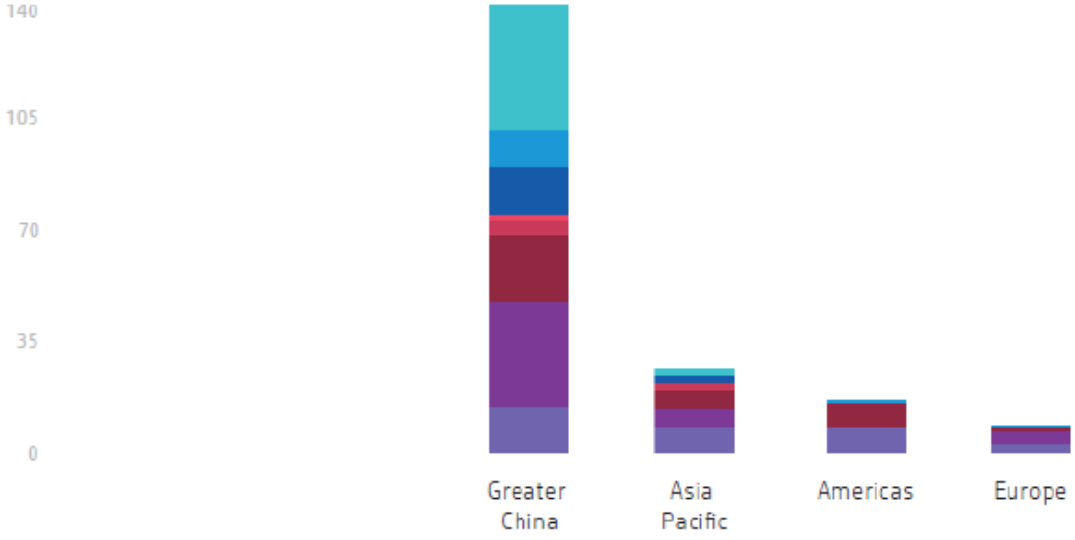
Description

The supply chain of an IT company represents its main activity, especially for manufacturers. In order to ensure that their sustainability will not be pulled down by their supply chain, 75% of the companies decided to establish a "Supplier Code of Conduct" which contains all the different policies required by the company for its supply chain regarding employees' treatment, sustainability management and way of operating. Then the company proceed internal as well as external audits to evaluate the compliance of the suppliers. It allows companies to establish an heatmap of their supply regarding sustainability and then identify high risks suppliers.

Example HP (p.83-87,111)

In order to integrates sustainable development in their supply chain, HP edited a Supplier Code of Conduct. This Code of Conduct contains every mandatory compliance required by HP in order to be one of their suppliers, such as laws compliance, environmental policies, employees' treatment or human rights requirements. In order to verify the compliance with the Code of Conduct, they proceed audits in their supply chain which are shown in the figure below, the detailed results are shown in HP's report from page 109 to 111. These audits help HP to identify their high-risk suppliers regarding their Code of Conduct, which gives them the opportunity to identify the different misconducts of their supply chain and fix it as fast as possible.

SER audits and assessments conducted per region, 2015



	Greater China	Asia Pacific	Americas	Europe
Health and safety assessments	40	2	0	0
On-boarding assessments	12	0	1	1
Vulnerable worker group (student and foreign worker) assessments	15	3	0	0
Allegation investigations	2	0	0	0
Environmental assessments	4	2	0	0
Full re-audits	22	6	8	1
Follow-up audits	33	6	0	4
Initial audits	14	7	7	2

Results of Social and Environmental Responsibility (SER) audits in HP Supply Chain

FOP 2: Accompany supply chain in sustainability

Time of Effectiveness	Long term
Repeatability	95% (19 reports out of 20)
Level of Confidence	**9.59/10**
Category	Fair Operating Practices
Outcomes	• Increased supply chain sustainability awareness • Enabling effects for the company and its supply chain sustainability
Metrics	• Supplier's sustainability awareness (survey, audits, interviews) • Time provided to sensitize suppliers (hours/year)
Problematic	• Paris Agreement Article 11 • UN SDG 10: Reduced Inequalities • UN SDG 17: Partnerships for the Goals
Additional Components	**NONE**

Description

In order to increase their own sustainability, most of the companies decided to have an effect on their own supply chain by accompanying them towards sustainability. To achieve that, they decided to sensitize supply chain employees with training on different major issues such as environmental and human rights. Moreover, they also broadcast their own working sustainability initiatives to the supply chain such as transparency, employees' treatment, environmental efficiency initiatives and so on. This strategy is then supposed to increase sustainability awareness of the supply chain as well as their global sustainability depending on the field of sensitization defined by the company.

Example: IBM (p.12,50,59,60,77-79)

If we look at IBM's example, they first implemented a code of conduct (FOP1) which is the basis of their sustainability strategy in the supply chain. Then, they decided to incorporate sustainability in the supply chain little by little with the time, because suppliers need to be trained on these new practices and also because they need to adapt their sustainable initiatives to their suppliers which operates in different countries and cultures.

G1: Set Clear Sustainability Objectives

Time of Effectiveness	Mid-Term Short term Long term
Repeatability	90% (18 reports out of 20)
Level of Confidence	**9.27/10**
Category	Governance
Outcomes	• Enhanced sustainability management • Opportunities to match companies' objectives to stakeholder expectations • Enhanced employee engagement due to a better understanding • Increased sustainability awareness
Metrics	• Employees' understanding of sustainability objectives (survey, interviews) • Matching of companies' objectives and stakeholder expectations (Table)
Problematic	**NONE**
Additional Components	**NONE**

Description

In order to focus on the field where they can have the best impacts, companies decided to create one or several sustainability teams which set the different sustainability objectives of the company. Most of the time they compare these sustainability objectives with stakeholders' expectations in order to find the best compromise and hierarchize their objectives from the most to the least crucial. This strategy allows companies to have a smoother sustainability management, give a concrete response to their stakeholder's expectations and have realistic deadlines to respect. Moreover, it allows employees to get a better understanding on the different sustainability objectives and strategies set by the company.

Example: Intel (p.14-19,25,32,45,58,68)

In the case of Intel, they started to identify their stakeholders' expectations and then focus on the ones that can be interesting in a business perspective as shown in the table below.

1. IDENTIFY

Identify issues from a wide range of stakeholders and sources.

Primary Sources

- Employee blogs and forums
- Customer concerns
- Corporate Responsibility website e-mails and CSR@Intel blog
- Social media channels
- Results of community advisory panels and community perception surveys
- Meetings/feedback sessions with investors
- Proxy resolution negotiations
- Ethics and Compliance Oversight Committee
- Strategic chemical review process
- Community relations
- Corporate responsibility/ sustainability conferences
- Market research on reputation issues
- Meetings with government officials
- Review of external standards
- Participation in industry working groups
- Scan of industry trends

Issues

- Climate change
- Water conservation
- Air emissions/quality
- Education
- Employee relations
- Fair compensation
- Stock price performance
- Energy efficiency
- Labor unions
- Materials restrictions
- Employee health
- Privacy and data security
- Political contributions
- Taxes/incentives
- Diversity
- E-waste
- EHS/human rights in the supply chain
- Conflict minerals
- Product-related human rights concerns
- Sexual orientation and gender equality

2. PRIORITIZE

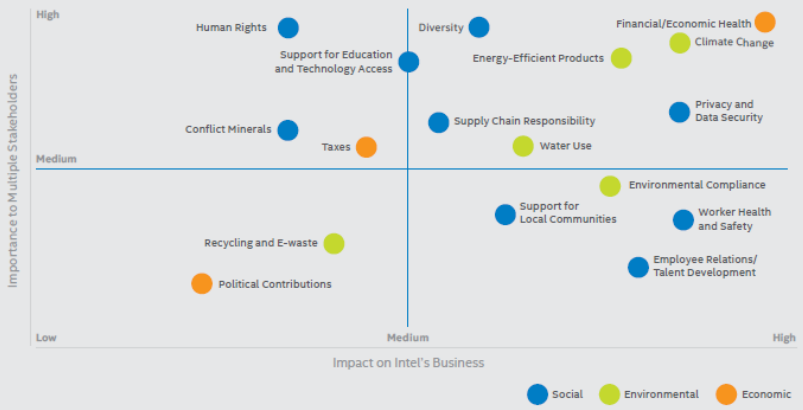
Use a consistent set of filters to determine the significance of each issue and develop a list of the most material issues.

Key Criteria

- Business continuity
- Impact to brand/reputation
- Applicability to multiple regions
- Alignment with Intel's business strategies
- Impact on the community
- Ability to attract and retain talent
- Regulatory impacts

This materiality matrix illustrates the topics that we believe are of greatest interest to our stakeholders, who want to make informed decisions about Intel's environmental, social, and economic performance.

Corporate Responsibility Materiality Matrix



3. REVIEW

Embed the process in internal decision-making and external review.

Internal Review

- Board of Directors and Management Review Committee (MRC) reviews
- Corporate strategic discussions
- Business group MRC/planning

External Review

- Outreach to socially responsible investors
- Corporate Responsibility Report review

Decisions

- Set new performance goals
- Initiate new projects or develop new policy
- Communicate with stakeholders
- Include in Corporate Responsibility Report, site/ local reports, Corporate Responsibility website

Definition of the sustainability priorities at Intel

Then for any fields of sustainability where they can have impacts, they detail their organization composed in different boards. If we take for example the environmental sustainability, the organization handle it through the boards shown below. This board is in charge to set up and track the progress of environmental sustainability objectives of Intel.

Governance and Management

ENVIRONMENTAL SUSTAINABILITY

CEO | **Board of Directors, Corporate Governance and Nominating Committee**

Since 2003, we have formalized responsibility for oversight of corporate responsibility issues (including environmental sustainability) with our CEO and the Board of Directors Corporate Governance and Nominating Committee.

Sustainability Committee

Our Sustainability Committee, chaired by our CEO, President, and the Senior Vice President and General Manager of the Sales and Marketing organization, meets quarterly and is responsible for general oversight of our corporate-wide sustainability strategy, policies, and management processes.

Management Review Committees | **Business Groups**

Management Review Committees retain decision-making authority for specific issues such as energy conservation and goal setting. Management teams within our various business groups are responsible for conducting due diligence and implementing policies and procedures for specific environmental sustainability issues.

Employee-Driven Initiatives

Employees play a crucial role in managing environmental sustainability at Intel. For more information, see "Employee Engagement" in this section of the report.

We have integrated oversight and management responsibility for environmental sustainability issues at multiple levels of the company, and across the countries where we operate.

These different sustainability boards allow Intel to set up clear and realistic objectives which lead to a better understanding for employees. Moreover, it allows Intel to show to their stakeholders that they are listened and that actions are taken to satisfy their expectations.

G3: Collaborate with peers

Time of Effectiveness	Long term
Repeatability	90% (18 reports out of 20)
Level of Confidence	**9.09/10**
Category	Governance
Outcomes	• Enable other companies to gain from their experience • Promote the company as an example to follow in the different sustainability fields
Metrics	• List of laws, international associations or governmental actions they are involved into • Credibility of the company at an international level (survey)
Problematic	• Paris Agreement Article 7 p.7 • UN SDG 17: Partnerships for the Goals
Additional Components	• **Go further than local regulations (89%)**[1] • **Participate to the creation of laws, standards (94%)**[2] • Engage stakeholder into sustainability objectives **(61%)**

Description

According to UN, collaboration is one of the key to meet Sustainable Development Goals. By participating to the creation of laws or standards companies, most of the companies try to increase their cooperativity. Moreover, most of the companies also decided to go further than local regulation in different places where they operate, especially when they are in the third world. These initiatives can lead to an international recognition in specific fields for companies, and even sometimes to be defined as "an example to follow". Finally, local and internal cooperation is also very important this is why more than half of the companies implemented stakeholder engagement mechanisms to define their own sustainability objectives (G1).

Example: Google (p.20,25,33,39,45,47)

At Google they try to collaborate with peers as much as possible in order to promote their sustainable practices and establish norms and laws in their field. For example, during the application of their different energy efficiency initiatives, they managed to save up to $1 billion. Instead of keeping their solutions for them, they share it among their industry through white paper and case study in order for everyone to be able to be more sustainable. At an International level, they join their strength with other big corporate in their field, to establish norms and law. For example, they collaborated with Amazon, Apple and Microsoft to promote governmental policies to grow cleaner energy sources in Asia, USA and European Union. Finally, at a more global level they participate to different UN initiatives like the COP21.

These different collaborations allow the industry to be more sustainable since they have concrete example of application. Moreover, they also benefit from an international recognition of their expertise in sustainability aspects.

[1] This additional component had a high level of confidence (8.18) compare to others in every category
[2] This additional component had a high level of confidence (8.59) compare to others in every category

G4: Sustainable Management

Time of Effectiveness	Mid-term Long term
Repeatability	75% (15 reports out of 20)
Level of Confidence	**7.82/10**
Category	Governance
Outcomes	• Better documentation for the sustainability strategies • Better evaluation of the different sustainability risks • Better planification for sustainability • Increased resilience
Metrics	• Understanding of the strategies (interviews) • Sustainability awareness (interviews) • ISO certifications
Problematic	• Paris Agreement Article 8 p.4
Additional Components	• Implement Risk Management (66%) • Implement Environmental Management System (93%)

Description

The idea behind this strategy is to provide structure for sustainability strategies to be created and broadcasted among the workforce. In most of the companies, this structure mostly refers to an implementation of an Environmental Management System (ISO14001), it consists in a system and database that contains different types of data related to environment (procedures to train employees, monitoring and reporting environmental performance). Moreover, two third of the companies implemented Risk Management (ISO 31000) that helps them to identify the potential risks related to sustainability and treat them as early as possible.

Example: IBM (p.12,45-46,100-102)

To ensure a good understanding of the different policies undertaken by their different sustainability leader boards, IBM decided to implement a global Environmental Management System (EMS). This EMS is ISO 14001 certified in 20 different locations and provide all the policies concerning sustainability at IBM such as procedures, product stewardship, energy conservation policies or pollution prevention for examples.

Moreover, in order to identify the potential risks for the company and increase their resilience, they developed a framework for Risk Management (ISO 31000) based on industry standards and shown on figure below. It consists in a collaborative approach of senior management people who conduct periodical review about risks identification, this around 15 000 people who participated in the proceeding of these different reviews.

G5: Transparency

Time of Effectiveness	Short term
Repeatability	100% (20 reports out of 20)
Level of Confidence	**10/10**
Category	Governance
Outcomes	• Possibility for companies and any individual to track the trend and progress in the different aspects of sustainability • Increased customer satisfaction • Possibility to compare data with similar companies • More accurate estimation the level of accomplishment of the strategies
Metrics	• Customer Satisfaction (survey) • Level of accomplishment of a strategy (%)
Problematic	• Paris Agreement article 4 p.9 • Paris Agreement article 7 p10 and 11 • Paris Agreement article 13 • UN SDG 17: Partnerships for the goals
Additional Components	• **Report environmental impacts (100%)**[1] • Report political contributions **(35%)** • Report donations **(70%)**

Description

All investigated companies did implement a transparency policy. Meaning that they publish different types of data to the public audience. All of them provided environmental data such as (CO2 emissions, electricity consumption, resources consumption, etc.) at a more or less deep level. They also published their different donations, and few even reported their political contributions or stated that they weren't involved in it.

In one hand, this practice, allows companies to keep a track on the level of advancement of their different sustainability strategies and give the possibility for public institutions to confirm it. On the other hand, they can inform customers about their different impacts on sustainability.

Example: Xerox (p.32-35,127-129,132-140)

Xerox provided a huge set of data regarding their sustainability from 2010 to 2014. For environmental sustainability, they provide data about their end of life management (part of material reused, recycled, etc.), as well as their energy and water consumption, their CO2 emissions and their waste generation.

Regarding social sustainability they also report all their political contributions by indicating the candidate they supported and the amount of money they gave as well as the different donations they made to associations or NGOs.

Finally, at the end of their report they provide a whole overview of their achievements regarding their sustainability goals. This transparent behavior allows them to evaluate their progress in their different sustainability objectives and to get some review on it from external experts.

[1] This additional component had a high level of confidence (10) compare to others in every category

HR2: Data Privacy and Security Policy

Time of Effectiveness	Mid-Term
Repeatability	75% (15 reports out of 20)
Level of Confidence	**8.05/10**
Category	Human Rights
Outcomes	• Increased trust of the customers • Increased security of the products or services
Metrics	• Trust of the customers (survey)
Problematic	• UN SDG 16: Peace and Justice
Additional Components	**NONE**

Description

With the raise of the Internet of Everything (IoE), people can now share and access business or personal data from anywhere at any time. Therefore, data privacy and especially security is a huge concern in the world, especially for the IT industry that is at the basis of this IoE. To fight these issues, 75% of the companies established a Data Privacy statement where they explain how they use our data. These statements constantly evolve to meet the new regulations as we saw recently in Europe. Moreover, since the most private data is the one that is unreachable, companies also include Data Security in the conception of their products or services that allows them to increase the trust of their customer.

Example: Cisco (p.24,25)

At Cisco, as major actors in the IoE, they have huge consideration for data privacy and security. First, they created a Trust and Transparency Center, where customers can see the different policies undertaken by Cisco regarding data privacy and security which makes it very transparent. Thus, this center details their different commitments towards data protection, their approaches to guarantee the highest level of security they can, as well as a transparency report which contains Cisco's policies and data regarding customer's data request. Moreover, they provide training to their employees in the integration of Data Privacy and Security principles into their day to day operations as well as when they conceive the different Cisco products. Finally, they also got involved into different Industry initiatives about Data Privacy and Security such as the Online Privacy Alliance or TRUSTe.

LP1: Provide training to employees

Time of Effectiveness	Short term
Repeatability	85% (17 reports out of 20)
Level of confidence	**8.82/10**
Category	Labor Practices
Outcomes	• Updated workforce • Better career planification for employees • Enhanced employee's engagement
Metrics	• Part of the employees who followed training (**%**) • Time spent into training (**hours/employees/year**) • Satisfaction and engagement of employees who followed the trainings (survey) • Compared satisfaction between employees who received training and employees who did not
Problematic	• UN SDG 4: Quality Education • UN SDG 8: Good Jobs and Economic Growth
Additional Components	• Training on career opportunity (**65%**) • **Training on skills (83%)**[1]

Description

In order to keep a competitive workforce, a majority of the companies indicated that they provided training to their employees. There are, most of the time, two types of training which are given.

First, skills training, which allows employees to develop their skills, and, therefore, to make the company more competitive. Second, career opportunity training, which consists in giving feedback to employees about what opportunity they can target and prepare them to their future position which increase their engagement for the company.

Example: Cognizant (p.4,30,31,46,56)

At Cognizant they implement both additional components. For the skill training they implemented their own educational platform for their employees (Cognizant Academy) in the which they provided 16.2 million hours of training with an average of 75 hours per employee in 2015. They also use an internal social network in order to strengthen employees' collaboration and knowledge sharing.

Regarding the career opportunities training, they organized a program called Cognizant Career Architecture (CCA) which provides an individual career framework in order for employees to identify their best career path. This program has also interactions with the Cognizant Academy in order to plan training session specific to the career plan considered by the employee.

This allows Cognizant's workforce to stay competitive among the years with highly qualified employees. Moreover, it helps employee to feel more recognized by the company and allow them to bloom at their workplace.

[1] This additional component had a high level of confidence (8.5) compare to others in every category

LP2: Encourage Employees to Volunteer

Time of Effectiveness	Short term Mid-term Long-term
Repeatability	90% (18 reports out of 20)
Level of confidence	**9.18/10**
Category	Labor Practices
Outcomes	• Enhanced employee's engagement • Enhanced relationship with the local community • Better image in the public opinion
Metrics	• Global time of volunteering (hours/year) • Part of the workforce who took part into volunteering activities (%) • Satisfaction and engagement of employees who followed the trainings (survey) • Local community perception
Problematic	• UN SDG 4: Quality Education • UN SDG 8: Decent work and economic growth • UN SDG 11: Sustainable Cities and Communities
Additional Components	None

Description

Give opportunity to employees to empower and to integrate the local community is a challenging objective for companies. In order to face it and to actively engage in the community where they are located, 90% of the companies decided to encourage employee volunteering.

From mentoring to teaching passing by implication into social events, this strategy allows company to have impact on both employees and people who take advantage from this volunteering. This strategy is most of the time combined with an active support to educational projects (**COM1**) and social projects (**COM2**).

Examples: Cisco (p.68)

In order to encourage their employees to volunteer, Cisco developed an internal community connection tool. This tool allows employees to find non-profit organizations to support and track their volunteering time. Moreover, they developed regional civic councils ran by employees in order to identify volunteering opportunities. Finally, they offer the possibility to match employees' donations among 2900 organizations in 45 countries, meaning that if an employee gives 1000$ Cisco matches the fund and gives 1000$ to the same organization. As shown on the table below, the number of volunteer hours is constantly increasing at Cisco since 2012.

Table 1. Performance Summary

	FY12	FY13	FY14	FY15
Number of hours volunteered by employees	107,150	129,000	136,000	155,600

LP4: Employee well-being program

Time of Effectiveness	Mid-Term Long term
Repeatability	80% (16 reports out of 20)
Level of Confidence	**8.27/10**
Category	Labor Practices
Outcomes	• Enhanced employee engagement and satisfaction • Increased attractiveness of the company on the job market • Enhanced employee productivity • Reduced or constant number of illness and injuries
Metrics	• Employee satisfaction (survey) • Employee engagement (survey) • Time to perform a task (sec, min, hours, days, etc.) • Number of accident, illness, injuries
Problematic	• UN SDG 3: Good Health • UN SDG 8: Good Work and Economic Growth
Additional Components	• **Health and Safety Management (100%)**[1] • Compensations program **(75%)**

Description

Productivity is one of the key aspects in any business. Indeed, a decrease of the productivity induces less revenue for a company. To get a productive workforce and to reduce illness time, injuries or even accidents, 80% of the companies implemented a well-being program for their employees. They all implemented a Health and Safety Management System that were most of the time certified with ISO 9001. This was, three quarter of the time, combined with a compensations program which allows employee to get different type of advantage like health insurance, flexible working hours to adjust family time or retirement planification. The objective of this strategy is to first, create a blooming workplace where employees can give and will to do their best. Then to create also an attractive workplace for talented people in the job market.

Example: HP (p.100-102,112-113)

At Hewlett-Packard, they focus their employee well-being strategy around four aspects: physical health, emotional resilience, financial wellness and stress management. Regarding physical health, they organized sports challenge among 60 000 employees, provided cancer prevention to 140 000 employees and offer every year a biometric scan. For stress management they implemented a self-assessing stress platform and train managers to face extreme situations. They also provide financial counseling to their employees. Finally, they provide safety sensitization to all their employees which has led to a constant lost work-day since 2012.

HP claims that these different policies helped them to strengthen their employee engagement and satisfaction

[1] This additional component had a high level of confidence (8.27) compare to others in every category

LP5: Sensitize employees to environmental issues

Time of Effectiveness	Short-term
Repeatability	80% (16 reports out of 20)
Level of Confidence	**8.27/10**
Category	Labor Practices
Outcomes	• Increased environmental awareness • Enable individual initiatives for sustainability
Metrics	• Environmental Awareness (survey) • Evaluate individual actions made by employees
Problematic	• UN SDG 6: Clean Water Sanitation • UN SDG 13: Climate actions
Additional Components	**NONE**

Description

Sustainability awareness is one of the key enabler to implement sustainability strategies. Indeed, you can have all the measures and actions to be more sustainable, if the workforce is not sensitized it will never reach its full potential.

Therefore, 80% of the investigated companies decided to sensitize their employees to environmental concerns. From active participation into environmental projects (planting trees event, Earth Day, recycling events, etc.) to formal environmental training, companies provide keys to a better understanding and awareness of sustainability impacts. It allows employees to be more respectful towards the environment and integrate these principles in their day to day operations.

Example: Cognizant (p24-27)

To sensitize its workforce to sustainability, Cognizant decided to engage employees into sustainability events. This sensitization is translated there by the implementation of the Go Green program which aims to increase sustainability awareness inside the companies. In this program, they 6 000 volunteers associate who engage in sustainability activities which are published on social media. Among these activities, we can cite the participation to planting tree campaign, the organization of Greenathon campaigns or nature preservation activities.

These different initiatives allowed employees to get more aware about sustainability and to be able to propose their own initiatives to the sustainability boards of Cognizant. As a result of these initiatives they show their ranking in different companies' green ranking.

LP6: Build Diverse and Inclusive Workforce

Time of Effectiveness	Mid-term Long-term
Repeatability	85% (17 reports out of 20)
Level of Confidence	**8.82/10**
Category	Labor Practices
Outcomes	• Promote Connection between employees with the same culture • Allows employee to have a more diverse point of view in their decision making • Give opportunity to undeserved communities • Promote equality between human beings
Metrics	• Part of employee by ethnicity per position (%/ethnicity/position) • Part of women per level of position (%/position) • Satisfaction and engagement of employees who followed the trainings (survey)
Problematic	• UN SDG 5: Gender Equality • UN SDG 8: Decent work and economic growth • UN SDG 10: Reduced inequalities
Additional Components	None

Description

Nowadays, diversity and inclusivity started to be crucial aspects and challenges of our society. Inclusivity concerns every action which is taken in order to reach a better representativity of women in a company; diversity is the same idea applied to ethnicity. In order to promote it, and also to show the way in those fields, companies implemented measures and policy to apply these aspects. The policies can vary depending on the company but most of the time concern: men/women parity and equality of salary, employment programs for undeserved communities, ethnic diversity in the leading positions or the creation of community-based research groups.

Example: Intel (p.34-36, 41)

Intel took several initiatives in order to create a more inclusive workforce. They created a Network of Executive Women, in 2015 the memberships to that network increased by 35%. They also claim that they reached a 100% pay parity between men and women. Regarding diversity, they organized different diverse hiring events and were hoping to reach 40% of diverse hiring for 2015, they exceeded that goal and reached 43.1%. Moreover, they created different research group to link employees with common interest and became then more attractive for underrepresented peoples. In terms of statistics, the progress regarding diversity and inclusivity at Intel are shown on the table on the right coming from Intel report.

U.S. Representation versus Intel Market Av

	EOY 2014	EOY 2015
Female	23.5%	24.8%
Technical Female	19.0%	20.1%
Non-technical Female	51.8%	50.7%
Underrepresented Minorities	12.3%	12.4%
Technical African American	3.3%	3.3%
Technical Hispanic	8.1%	8.1%
Technical Native American	0.5%	0.5%
Non-technical African American	4.1%	4.4%
Non-technical Hispanic	9.6%	9.9%
Non-technical Native American	0.5%	0.6%