



## Research paper

### **Environmental Reporting Practices: Are CAC 40 firms compliant with the recommendations of the Task Force on Climate-related Financial Disclosures?**

**Samira Demaria**, (University of Côte d'Azur, GREDEG)

**Sandra Rigot**, (University of Paris 13, CEPN UMR)

**Funding:** This work was supported by ANC (The French accounting standard setter).

**Acknowledgments:** We would like to thank Sylvain Borie and Alain Grandjean for their advice.

The views expressed are those of the authors alone.

## **Abstract**

This article examines CAC 40 firms' compliance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). Based on a content analysis of 2015-2017 annual reports, we evaluate whether firms are disclosing information on climate risks and opportunities (CROs) in four areas (governance, strategy, risk management and metrics) and identify the indicators used frequently in their reporting to operationalise the TCFD grid in order to make recommendations for the harmonisation of environmental reporting from the TCFD.

**JEL:** M40, M14

**Keywords:** Environmental disclosures, CSR-reporting, climate-related risk, TCFD recommendations

## List of contents

1. Introduction.....	5
2. The recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).....	7
3. Review of the literature on environmental disclosures.....	9
3.1 The legitimacy theory as a framework for analysing the voluntary disclosure of environmental information .....	9
3.2 Empirical literature review on environmental disclosures .....	10
4. Data and methodology .....	11
4.1 Data .....	11
4.2 Building our TCFD compliance index.....	13
5. Results .....	14
5.1 The trend in CAC 40 companies' Comprehensive Compliance Index (CCI) .....	14
5.2 A satisfactory CCI but with disparities.....	16
5.2.1 By sector .....	16
5.2.2 By company size .....	17
5.3 Comprehensive Compliance Index according to the four TCFD areas....	18
5.3.1 Common characteristics for all CAC 40 companies .....	18
5.3.2 Financial sector .....	19
5.3.3 Energy sector .....	20
5.3.4 Building and materials sector .....	20
5.3.5 Transport sector .....	21
5.3.6 Food sector .....	21
5.3.7 Low impact sectors .....	21
6. Conclusion.....	22
Bibliography.....	24
Appendix 1: coding grid extract .....	27
Appendix 2: CCI and market capitalisation .....	28
Appendix 3: CCI scores (by area and by company) .....	28
Appendix 4: Statistics regarding TCFD areas and sub-areas .....	30

## 1. Introduction

The issues of global warming and the energy transition are a crucial challenge for our societies. Indeed, while a large number of scientific works (IPCC 2012) have shown the link between the acceleration of climate change and emissions of greenhouse gases (GHG) from productive process, other studies have highlighted that these significant climate changes would lead to increased risks for economic and financial activity and could have serious effects on a human level (Burke and Hsiang 2015; Stern 2013). According to the International Energy Agency, nearly 60% of anthropogenic GHG emissions currently come from the energy sector, and 86% of the primary energy consumed in the world is of fossil origin (IEA 2016). Thus, the pursuit of high growth based on fossil energy would lead economies into a worst-case scenario. Despite the high uncertainty about the quantity of GHGs that will be emitted into the atmosphere in the coming decades, the IPCC estimates that several scenarios are possible. In the worst scenarios, global temperatures could rise by 4.8°C compared to the average of the 1986-2005 period, with water levels rising to close to one metre (threatening densely-populated coastal territories), not to mention the upsurge of extreme weather events. In the most optimistic scenario, the warming of the Earth is estimated at 0.3°C, and only this would make it possible to hold the temperature increase to 2°C maximum. These dire predictions demonstrate the urgent need to attempt to limit global warming.

In this context, COP 21 (2015) was an historic moment when 175 countries committed to complying with the Paris Agreement to maintain the global temperature increase to below 2°C by 2100. Such a transition towards a low-carbon trajectory requires taking up new challenges, including a substantial and sustainable reduction of GHG emissions via greater energy efficiency,<sup>1</sup> a reduction<sup>2</sup> of carbon intensity in production systems and the development of renewable energies.<sup>3</sup> These challenges involve many risks related to the resilience of producers, technological capabilities, the nature of policy instruments (carbon market, carbon taxation, CO<sub>2</sub> emission quotas, green taxation, more or less compulsory information disclosure, etc.) and their calibration to guide the transition. Thus, climate change and the low-carbon transition involve two types of risk that can coexist: physical risks that result from the damage caused directly by weather and climate phenomena triggered by changes in the climate system, and transition risks resulting from the adjustments made for the transition to a low-carbon economy particularly, when these are poorly anticipated or occur suddenly (ACPR and Direction générale du trésor 2017).

---

<sup>1</sup> It aims to reduce environmental, economic and social (direct and indirect) costs, resulting from production, transportation and consumption of energy.

<sup>2</sup> The purpose is to replace the existing carbon-intensive physical capital by more restrained use of carbon capital (which leads to depreciating the former).

<sup>3</sup> Solar and wind energy, hydraulics, biomass, geothermal.

At COP 21, the Financial Stability Board (FSB) launched an international initiative to introduce the Task Force on Climate-related Financial Disclosures (TCFD).<sup>4</sup> The objective of the TCFD was to develop recommendations about financial transparency to help companies identify and disclose information to investors on climate risks and opportunities (CROs). This working group, made up of account users (e.g. analysts), account preparers, and international experts from different sectors issued its final recommendations in June 2017. These recommendations specify the elements of environmental reporting expected in the annual reports<sup>5</sup> of all types of companies with regard to governance, strategy, risk management and environmental metrics. The aim is to improve the quality, relevance and reliability of the information provided by companies on how they integrate CROs in these four areas (see Section 1 below). These disclosure recommendations – which are a first step towards acknowledging the climate change risk – must be incorporated into the efficient markets theory framework via the market discipline mechanism.

This new reference system aims at harmonising environmental reporting according to an international consensus, and taking into account specific sector features (materials and buildings, transport, energy, food and finance) with adjustments where necessary. Another benefit of the TCFD recommendations is that firms are required to disclose environmental information in terms of managerial field. In addition, environmental disclosures are part of Corporate and Social Responsibility (CSR). Until now, this field has been more the prerogative of private and international organisations such as the Global Reporting Initiative (GRI) and the International Integrated Reporting Council (IIRC), which provide companies with non-accounting reporting grids to record their overall sustainable development performance (not just their environmental performance).

After receiving support from the French Government and the European Union's HLEG<sup>6</sup> group (2016), the TCFD grid seems to have become a global reference (albeit not binding) for financial transparency related to climate risk. At a 2017 One Planet Summit, 237 companies, including 20 CAC 40 firms (with total market capitalisation of \$6.3 trillion and \$81.7 trillion in assets under management) pledged to follow the TCFD's recommendations (Henze, 2017).

This paper investigates the environmental reporting practices of French companies. Indeed, since 2000, France has been at the forefront in promoting energy transition, with the promulgation of a wide series of environmental laws included more stringent disclosure requirements. The New Economic Regulations Act (NER Act, 2001) required listed companies to publish an extra-financial report. Subsequently, the Grenelle II Bill (2010) and the Energy Transition and Green Growth Act (2015)

---

<sup>4</sup> <https://www.fsb-tcfid.org/>

<sup>5</sup> The TCFD requires environmental disclosures in financial filings within a five-year period.

<sup>6</sup> High-Level Expert Group on Sustainable Finance

extended the extra-financial reporting requirements to large unlisted companies and to the financial sector, respectively. While such information is necessary to improve transparency related to GHG emissions generated by business activities, it also provides a first step to acknowledging the measure of vulnerability risk to their investments and activities related to climate change. More specifically, this paper endeavours to analyse CAC 40 firms' compliance with the TCFD by building a new index to measure the disclosure of environmental information. Based on content analysis of firms' reference documents over 2015-2017, it evaluates firms' disclosure on climate risks in the four TCFD areas (governance, strategy, risk management, metrics) and identifies the most frequent indicators used in their reporting to operationalise the TCFD grid. Lastly, we put forth recommendations for the harmonisation of environmental reporting from the TCFD.

This article contributes to the literature on environmental disclosure in several ways. Firstly, it focuses on public firms in France, a country at the forefront in promoting the energy transition. To our knowledge, this is the first academic study to analyse environmental information disclosures regarding the TCFD recommendations; all other studies generally focus on the NER Act requirements or on the GRI grid. Then, we build a new index to measure the environmental disclosures that adopt a very accurate approach to business activity by identifying CRO indicators at the senior management level. And lastly, the results allow for a more detailed analysis of the French case than those published in September 2018 by the FSB<sup>7</sup> on the application of the recommendations for the 2017 fiscal year.

Section 2 details the TCFD recommendations, Section 3 reviews the academic literature on environmental disclosures, Section 4 describes the data and methodology, Section 5 presents the results and Section 6 gives our conclusions.

## **2. The recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)**

The 2007-2008 financial crisis was an important reminder of the repercussions that weak corporate governance and risk management practices can have on asset values. This resulted in increased demand for transparency from organisations on their governance structures, strategies and risk management practices. Without the right information, investors and others may incorrectly price or value assets, leading to a misallocation of capital. Hence the objective of the Task Force on TCFD is to develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers and other stakeholders. The Task Force will consider the physical, liability and transition risks

---

<sup>7</sup> The FSB certainly proposes an initial assessment of the compliance levels of firms on an international scale, but these are very approximate (a little, a few, the majority...) and too imprecise to draw conclusions and make recommendations. (<https://www.fsb-tcf.org/wp-content/uploads/2018/09/FINAL-2018-TCFD-Status-Report-092618.pdf>)

associated with climate change and what constitutes effective financial disclosures across industries. In June 2017, the TCFD published a final report that established recommendations for disclosing clear, comparable and consistent information about CROs. The recommendations take the form of a grid of themes for which companies may provide information on their practices in terms of governance, strategy, risk management and environmental indicators ([www.fsb-tcfd.org](http://www.fsb-tcfd.org)).

Table 1: Areas and sub-areas of the TCFD recommendations grid

Areas	Governance	Strategy	Risk management	Metrics and objectives
Sub-areas	Vision of the Board of Directors on climate issues	Identification of the CRO in the short, medium and long term	Description of the process to identify and evaluate the CRO	Dissemination of information on the metrics used to evaluate the CRO
	Role of management in the assessment of the climatic risks and opportunities	Description of the impacts of the CRO on business, strategy, and financial planning	Description of the CRO management process	Dissemination of information on the Scopes 1, 2 and if relevant of scope 3
		Description of the potential impacts of different scenarios, including 2°, on the business of Organization, strategy, and financial planning	Description of how the process of identification and evaluation of the CRO are integrated into the overall risk management	Description of the objectives used to manage the CRO and the performance in relation to these objectives

Source: TCFD

In the governance area, the objective is to know whether the company's reporting accurately describes: (a) if the Board of Directors is informed about CROs and to what extent; (b) the role of managers in the evaluation and management of CROs. In the strategy area, this involves making sure that the company discloses information on: (a) the CROs it has identified in the short term, medium term and long term; (b) the impacts of the CROs on the organisation, strategy and financial planning; and (c) the resilience of the organisation's strategy, taking into account different scenarios including that of a 2°C rise in temperatures. For the area of risk management, the aim is to ensure that the company correctly describes: (a) the process or procedures implemented by the organisation to identify and evaluate climate risks; (b) procedures to manage these risks; and (c) how these procedures are integrated into the overall risk management organisation.

For the metrics and objectives (targets) area, the objective is to know whether the company uses statements that: (a) give metrics to evaluate the CROs in line with its strategy and its risk management process; and (b) describe the procedures for managing climate risks by disclosing information on emissions, namely, the company's Scope 1 & 2 emissions and, where relevant, its most significant Scope 3 emissions, as well as the trend in these indicators over time; and (c) describe how the procedures to identify, assess and manage climate risks are integrated into overall risk management. For each of these sub-areas, the TCFD analysis grid suggests one or more questions to help companies define their issue.



### **3. Review of the literature on environmental disclosures**

#### **3.1 The legitimacy theory as a framework for analysing the voluntary disclosure of environmental information**

This research is in the line with academic articles on environmental disclosures that are based on the legitimacy theory (Deegan et al. 2002; O'Donovan 2002; Cormier et al. 2005; Hummel and Schlick 2016; Nègre et al. 2017; Russo-Spena et al. 2018). The main concept of this theory is defined by Suchman (1995) as “a generalised perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially-constructed system of norms, values, beliefs and definitions. In order to assert their legitimacy, companies must act within the limits that society identifies as socially acceptable”. The legitimacy theory makes it possible to understand companies' practices by analysing managers' strategic choices to meet society's expectations (Deegan et al. 2002). This leads O'Donovan (2002) to estimate that legitimacy theory posits that “the greater the likelihood of adverse shifts in the social perceptions of how an organisation is acting, the greater the desirability on the part of the organisation to attempt to manage these shifts”. This point of view is explained by the fact that the various stakeholders perceive the legitimate organisation not only as more worthy, but also as more meaningful, more predictable and more trustworthy (Suchman 1995). There would therefore be a kind of social contract established between organisations and society. According to Shocker and Sethi (1973), all organisations are linked to society by a social contract (expressed or implied), whereby the organisation's survival and growth are based on first, the delivery of some socially desirable ends to society in general, and second by the distribution of economic, social or political benefits to groups from which it derives its power. Therefore, organisational legitimacy and social contract compliance go hand in hand, and a breach of the contract may lead to a perception by society that the organisation is not legitimate (Nègre et al. 2017). With regard to environmental information, Depoers and Jérôme (2017) consider that legitimacy theory places organisations within a socio-political framework and environmental disclosure is a means for managers to establish and maintain a firm's legitimacy. Companies can manage their legitimacy by increasing the volume of information, using narrative and positive language, or avoiding alarmist information (Albertini 2014).

In this perspective, companies are required to disclose environmental information according to the image they want to project to the market. If environmental legitimacy is not a priority, a company may not comply with it (Larrinaga et al. 2002; Chelli et al. 2014; Depoers and Jérôme 2017). In other words, legitimacy theory suggests that particularly poorly performing companies use sustainability disclosure as a legitimisation tactic to influence public perceptions regarding their sustainability performance (O'Donovan 2002; Deegan et al. 2002). Hummel and Schlick (2016) specifically assert that companies with high environmental performance will disclose good-quality information (accurate and quantified), while those with poor

environmental performance, poor-quality information (fuzzy, descriptive and unquantified). In short, environmental disclosures are often linked to legitimization intentions.

### 3.2 Empirical literature review on environmental disclosures

There are two types of academic works on environmental disclosure: i) studies which aim at describing disclosure of information practices from descriptive statistics based on content analysis of annual/sustainable development reports. There are two ways of viewing the type of information to be disseminated: the amount of disseminated information relating to the presence of indicators and/or the quality regarding the information's relevance (detailed and/or quantitative); ii) empirical studies on the determinants of environmental disclosure based on an econometric model which aims to explain a performance score according to the company's characteristics (sector, size, debt, media pressure, reputation, etc.). This article falls into the first category of studies because our objective is to measure the compliance level of the CAC 40 companies by building an index based on the TCFD recommendations.

In France, work on environmental disclosure developed following the publication of the NER Act (2001).<sup>8</sup> Since its introduction, several studies have sought to identify French companies'<sup>9</sup> level of compliance with this law's requirements and have investigated the reliability of information (Ben Rhouma and Cormier 2007; Delbard 2008; Damak-Ayadi 2010). This research has generally shown that, in the first few years of application of the law, the level of compliance was relatively low, regardless of the sector of activity. These French studies echo research conducted in Spain in 1997 by Larrinaga et al. (2002), who show that firms do not comply with accounting standards.<sup>10</sup> Furthermore, several studies have highlighted that the disclosed information is mostly descriptive and positive, but rarely quantitative and negative, whether on a sample of British and German companies between 2000 and 2004 (Beck et al. 2010) or Indian firms in 2009 (Sen et al. 2011).

Ten years after the introduction of the NER Act, studies<sup>11</sup> have been undertaken to analyse the trend in environmental information disclosure by French companies. While these studies highlight an indisputable increase in environmental disclosures for listed companies (Chelli et al. 2014; Albertini 2014; Chauvey et al. 2015), they also reveal that these disclosures are often descriptive, non-quantitative and they favour optimistic information on environmental practices while negative impacts are

---

<sup>8</sup> Before this first law, disclosures by listed companies (CAC 40) were almost non-existent (Mikol 2000).

<sup>9</sup> CAC 40 or SBF 120

<sup>10</sup>The disclosure requirements of the accounting standards 437/98 are: current expenses with the aim of environmental protection; risks and expenses covered with provisions related to environmental actions, contingent liabilities related to environmental protection and improvement.

<sup>11</sup> Using the legitimacy theory as a conceptual framework.

largely ignored. Chauvey et al. (2015) emphasise that very few companies disclose negative information on their environmental activities. For example, Albertini's article (2014) points out that these disclosures always present very positive, even flattering, views of companies' activities, and carefully avoid the negative points on environmental practices. More recently, Depoers and Jérôme (2017), who focus on environmental expenditure (a compulsory disclosure requirement), show that more than half of the French companies in their sample do not communicate this amount and only 20% provide a substantive response (i.e. argued and quantified). It follows that the NER Act is not sufficient to ensure widespread disclosure of relevant information since the majority of companies choose either not to fulfil the requirement or to disclose irrelevant information.

Another area of research focuses on environmental information disclosure by firms with regard to the GRI guidelines. These guidelines propose the introduction of benchmark indicators for sustainable development reporting. Most of this research, also rooted in the theory of legitimacy, identifies a relation between the level of disclosure and the environmental performance of firms. Thus, both Clarkson et al. (2008) on an American sample and Melloni et al. (2017) on an international sample assert that firms with poor environmental performance or belonging to the most polluting sectors tend to disseminate more concise and less precise information on their environmental impacts. These findings are particularly interesting because they highlight that the strategies for environmental communication are established by the most polluting companies.

Thus, different research on the disclosure of environmental information, whether in France or at the international level, indicates that companies adopt real strategies of environmental information disclosure in order to meet stakeholders' expectations. However, the majority of studies show that companies disclose information according to their interests and do not strictly follow regulatory requirements (especially in France with the NER Act). Therefore, the search for legitimacy plays a fundamental role in strategic choices regarding environmental disclosure. Our research is in line with this literature by analysing the trend in French annual reports complying with a grid of international recommendations.

## **4. Data and methodology**

### **4.1 Data**

Our sample includes the 40 largest market capitalisations on Euronext Paris (the CAC 40 index) from 2015 to 2017.<sup>12</sup> The choice of studying French companies is explained by the fact that France is regarded as a country with a considerable number of regulations regarding mandatory environmental disclosures. We focused

---

<sup>12</sup> The reference documents are available approximately three months after the end of the fiscal year.

more specifically on the CAC 40 companies, which are those that are subject to the most stringent environmental legislation: the NER Act and the Energy Transition Act. In addition, these companies sometimes go further than the regulations by disclosing voluntary information because they may be subject to pressure from stakeholders (NGOs, analysts, the general public, etc.) regarding the dissemination of environmental information. This is particularly important in the context of our study for two reasons. Firstly, for the period 2015-2016, the TCFD recommendations had not yet been issued, so only the firms reporting significant disclosure can be studied. On the other hand, for 2017, the TCFD recommendations were not binding, so only large companies could be expected required to change their disclosure policies (due to the aforementioned external stakeholder pressure). Our longitudinal study shows the trend in environmental disclosures in the light of the TCFD's recommendations.

To assess French firms' compliance with the TCFD's guidelines, we have built an index. To do this, we relied on the reference documents published each year by the companies. In general, these reports provide very detailed information (on the firm's financial situation, its CSR, etc.) and are subject to oversight by a market regulator. Reference documents are recognised as the main channel for a company to communicate with its shareholders (Wiseman 1982). In addition, some companies publish a report specifically dedicated to CSR or sustainable development;<sup>13</sup> such reports are not mandatory and publication frequency is at the discretion of the firms.

According to Michelin et al. (2015), the information in the independent CSR reports is more unclear than in the CSR section of the annual report. Hence the choice to collect and analyse information in the reference documents<sup>14</sup> audited annually and containing more structured, comprehensive and therefore more reliable information (Beck et al. 2010). This positioning is consistent with most studies of voluntary or mandatory environmental disclosure (Wiseman 1982; Damak-Ayadi 2010; Chelli et al. 2014; Chauvey et al. 2015). Moreover, for Buisson (2008), the content analysis of annual reports is an integral part of research on the management of corporate legitimacy. Lastly, to identify sector reporting differences, we adopt the sector categorisation proposed by the TCFD:<sup>15</sup> high impact sectors (energy, transport, food & agriculture, materials & building, and finance) and low impact sectors (i.e. all other sectors).

---

<sup>13</sup>It includes information on the company's economic situation, employment figures and the company's social situation, but also all information related to environmental protection (particularly CO<sub>2</sub> emissions) or the company's actions in terms of sustainable development, the results of these actions, as well as the guidelines and objectives set by the company for the future.

<sup>14</sup> It includes the entire annual report, not just the specific sections on the environment.

<sup>15</sup> This allocation was subject to a consultation which involved over 200 responses.

Table 2: Descriptive statistics for fiscal year 2017

Sectors	No. of firms	Market capitalization (in € m)	Turnover (in € m)	References to TCFD in reference document	No. of CSR reports published
<b>Low impact sectors</b>	13	587,023	280,779	3	4
<b>Energy</b>	3	163,377	201,871	2	1
<b>Finance</b>	4	211,758	339,516	4	1
<b>Food</b>	4	112,654	135,360	-	1
<b>Materials and Building</b>	10	244,560	239,916	3	5
<b>Transport</b>	6	176,481	245,243	2	3
<b>Total</b>	40	1,495,853.961	1,442,684	14	15

Table 2 shows that the low impact sectors include some 33% of firms (39% based on market capitalisation).<sup>16</sup> Some sectors include only a few firms but represent higher market capitalisations (e.g. finance and energy) and *vice versa* (e.g. food, building & materials and transport). It is also interesting to note that in 2017, 14 CAC 40 firms mentioned the TCFD's recommendations in their reference documents, committing themselves more or less explicitly to implement these recommendations.<sup>17</sup> Finally, only 15 companies published an independent sustainable development report.

#### 4.2 Building our TCFD compliance index

We decided to use content analysis to determine the compliance of CAC 40 companies with the TCFD's recommendations. This research method is widely used in studies on environmental information disclosure (Beck et al. 2010; Hooks and van Staden 2011; Bouten et al. 2011). Bardin (2013) defines it as a group of communication analysis techniques that, by systematic and objective message content description procedures, seeks to gather indicators enabling inference. We have followed the recommendations of Krippendorff (2012) to achieve a stable, reliable and reproducible content analysis. Firstly, to ensure the stability and accuracy of the study, the coding grid was carried out by four encoders including two experts who are specialists in the work of the TCFD. Then, several encoders coded

---

<sup>16</sup> Among the high impact sectors, building and finance are those with the highest market capitalisations.

<sup>17</sup> Note that the financial sector is particularly committed to the application of this standard, with the four firms belonging to the sector indicating their determination to apply it.

the same report simultaneously, and the results were assessed to guarantee the coherency of the study.

To build our compliance index, we created a specific database indicating whether or not the information required by the TCFD's recommendations is available in the four areas (i.e. governance, strategy, risk management, and metrics & targets) and in their sub-areas. To translate its recommendations for each sub-area into practical terms, the TCFD suggests one or more questions to help companies define the problem. We noted 8 questions for governance, 13 for strategy, 7 for risk management and 10 for metrics & targets. Overall, we counted 38 questions, assigning each question a value of 1 point, to create an overall compliance index on a scale of 38. We can see that there is an imbalance in the number of questions in favour of strategy and metrics & targets; this corresponds to the relative importance of these concerns according to the TCFD. To the extent that information may be qualitative and quantitative, we chose to transform the questions asked by the TCFD into closed-ended questions with a positive or negative answer. The coding depends on whether or not the firm discloses the information (i.e. the presence of information) and on the degree of detail, not on its relevance. More specifically, each question is assigned a score of 1, 0.5 or 0 according to the relative presence of disclosed information. A score of 1 corresponds to full compliance, a score of 0.5 partial compliance (information is not detailed) and a score of 0 to a lack of required information. Overall, the database includes compliance scores per firm and per question, backed systematically by one or more quotes from the reference document (with a page number) to justify the coding.

According to these coding criteria, scores per area range from 0 to 8 for governance, from 0 to 13 for strategy, from 0 to 7 for risk management, and from 0 to 10 for metrics & targets. Each company therefore has a score per sub-domain (governance (a) and governance (b), for example), a score per domain (governance) and a total compliance score. From these scores, we calculated a ratio of information disclosures that comply with the TCFD for each company by sub-area and area; this allows us to have an overall ratio per area and sub-area. This ratio corresponds to the firm's TCFD disclosure compliance index.

Based on the quotes identified to support the coding, we propose to identify the most cited indicators in terms of governance, strategy, risk management and metrics in order to suggest an operational grid of indicators per domain allowing climate reporting to be harmonised.

## **5. Results**

### **5.1 The trend in CAC 40 companies' Comprehensive Compliance Index (CCI)**

Table 4 shows a gradual improvement in CAC 40 companies' environmental disclosure over the three years. The CCI stood at 59% in 2017 against 48% in 2016

and 37% in 2015, representing a growth rate of 38% between 2015 and 2017. The level of the index in 2015 and 2016 is relatively good to the extent that the TCFD report had not yet been published. The main explanation for this high score may be that France has required CSR disclosure since 2001: while the NER Act laid the foundations for improving environmental reporting, the Energy Transition Act (2015)<sup>18</sup> consolidates it by implementing more specific environmental requirements. Efforts initiated in early 2016 for the Energy Transition Act continued with the commitment of companies<sup>19</sup> to comply with the TCFD's international initiative. However, these results mask disparities across sectors and by company size.

Table 3: Comprehensive Compliance Index (CCI) per sector

Comprehensive Compliance Index (CCI)	All sectors	Energy	Low impact	Finance	Food	Building & Materials	Transport
<b>No. firms</b>	40	3	13	4	4	10	6
<b>Mean 2015</b>	37.48%	55.87%	30.89%	31.94%	34.92%	44.76%	35.86%
<b>Mean 2016</b>	48.77%	49.99%	39.58%	57.57%	43.96%	55.58%	45.95%
<b>Mean 2017</b>	<b>59.94%</b>	<b>61.91%</b>	<b>53.19%</b>	<b>67.97%</b>	<b>61.21%</b>	<b>65.13%</b>	<b>58.73%</b>
<b>% Chg., 2015-2017</b>	<b>37.46%</b>	<b>9.75%</b>	<b>41.93%</b>	<b>53.00%</b>	<b>42.95%</b>	<b>31.27%</b>	<b>38.94%</b>
<b>Median 2015</b>	35.96%	49.13%	32.64%	32.73%	36.83%	53.67%	35.74%
<b>Median 2016</b>	47.27%	73.22%	38.19%	57.05%	49.24%	66.28%	48.13%
<b>Median 2017</b>	67.30%	81.21%	52.30%	72.01%	65.95%	75.24%	66.49%
<b>Min 2015</b>	0.00%	43.79%	0.00%	25.52%	9.81%	12.24%	8.51%
<b>Min 2016</b>	8.51%	0.00%	9.81%	40.10%	13.63%	10.42%	8.51%
<b>Min 2017</b>	9.81%	13.48%	9.81%	46.35%	30.73%	12.24%	22.01%
<b>Max 2015</b>	74.69%	74.69%	63.54%	36.81%	56.21%	74.52%	62.20%
<b>Max 2016</b>	84.07%	74.69%	77.65%	76.09%	63.72%	79.34%	84.07%
<b>Max 2017</b>	92.71%	76.74%	81.81%	81.51%	82.20%	82.64%	85.63%
<b>Std. deviation 2015</b>	18.84%	13.48%	17.36%	4.09%	16.72%	20.47%	18.66%
<b>Std deviation 2016</b>	22.09%	35.37%	16.27%	15.70%	20.09%	23.39%	26.26%
<b>Std deviation 2017</b>	22.54%	35.74%	18.52%	13.56%	19.50%	23.07%	23.50%

<sup>18</sup> Which came into force in 2016.

<sup>19</sup> 14 firms have committed to comply with the recommendations (see Table 2)

## 5.2 A satisfactory CCI but with disparities

### 5.2.1 By sector

Descriptive statistics (Table 4) reveal that the financial sector had the highest CCI in 2017 and the highest growth (+53%) over the period 2015-2017 (from 31% to 67%). We observe that the materials & building and energy sectors have good CCI levels, with 65% and 61%, respectively, but the latter would have been better if it had not been driven down by the low rates of three companies (Technip,<sup>20</sup> ArcelorMittal and Lafarge). The food sector has an average CCI of 61% in 2017 and a good growth rate of 43% over the period. The transport and low impact sectors are lagging behind, with an index below the overall CAC 40 average (58% and 53%, respectively) despite significant growth rates (42% and 39%).

Sectors with high environmental impact have a higher index (62%) than the low impact sectors (53%). This first result is in line with the research that shows stronger disclosure of environmental information by firms in ecologically sensitive sectors (Depoers 2010; Albertini 2014). This can be explained by the media exposure of these sectors and their determination to reassure stakeholders by disclosing a significant amount of environmental information (Aerts and Cormier 2009; Depoers and Jérôme 2017). Moreover, the score for the building & materials sector can be explained by the restrictive French regulatory<sup>21</sup> context, which requires companies to use more environmentally-friendly alternative solutions. Among the ten companies in this sector, eight have an average score of 69%, and only two (ArcelorMittal and Lafarge) have scores below (12% and 28%). Concerning the energy sector, the great deal of media attention it attracts encourages these companies (Total and Engie) to be leaders for environmental security and renewable energy. Conversely, there is one exception: the transport sector, which has the lowest CCI (58%) amongst the sectors with high environmental impact. The distinction between the two sub-sectors (automotive and aerospace) can explain the disparity in scores. While the scores of Airbus and Safran improved over the period, they remain very low. To the extent that these firms have a significant share of business-to-business (BtoB) activity, they are less sensitive to consumer expectations than firms in the automotive sector, which are more business-to-customer (BtoC) oriented and under media pressure.

Similarly, scores in the food sector are relatively low, such as for Sodexo (37%) – a BtoB player with low exposure to consumer expectations. Lastly, the high score of the financial sector reveals a relatively recent awareness which can be explained by Article 173 of the Energy Transition Act (2015). This article compels banks and

---

<sup>20</sup> Technip did not publish an annual report in 2016 (year of the acquisition by FMC) and its score was 49% in 2015 and only 12% in 2017.

<sup>21</sup> Including the TR 2012 regulation relating to thermal protection, which limits the energy consumption of new buildings to 50 kilowatt-hours per square metre per year, or the National Low Carbon Strategy, which commits France to an 88% reduction in building sector emissions by 2050 compared to 1990.



investors to report on how they are addressing climate change. Similar to the Paris Agreement signed at Cop 21, the TCFD considers that the financial sphere has a huge responsibility as a motivator, and significant capacity to move the economy towards a low-carbon trajectory.

### 5.2.2 By company size

Table 4: CCI by size (market capitalisation) – 2017

CCI	2015	2016	2017
5 largest firms	34%	48%	61%
5 smallest firms	54%	52%	64%
10 largest firms	37%	49%	64%
10 smallest firms	45%	51%	64%

According to Table 5, we observe that the five smallest CAC 40 companies (Solvay, Veolia Environnement, Technip, Accor and Atos<sup>22</sup>) have a higher CCI than the five largest (LVMH, Total, L'Oréal, Sanofi and BNP Paribas<sup>23</sup>) over the period (despite Technip's very low score in 2016 and 2017). This gap narrows in 2016 if we look at the ten largest companies compared to the ten smallest, and it disappears entirely in 2017. In short, the firms with the smallest market capitalisations have the highest CCI scores. This result seems relatively counter-intuitive insofar as the literature shows that there is a size effect in favour of large companies (Albertini 2014; Chauvey et al. 2015) because they generally have more financial resources to devote to environmental communication. However, this may be due to sector composition effects. Three of the five smallest companies belong to sectors with high environmental impact. Conversely, the majority of large companies have low environmental impact (with the exceptions of Total and BNP Paribas). In addition, over the period, there was some consistency among companies with the highest (lowest) CCI, such as Renault, Veolia Environnement, Schneider Electric, Saint Gobain and Accor (Technip, Vivendi, Airbus, Lafarge, Nokia, Safran and Sodexo).

These low scores can be partly explained by the different environmental regulations in the home country. ArcelorMittal and Airbus are domiciled in Luxembourg and the Netherlands, respectively. Four other firms came under French regulations prior to cross-border mergers: Solvay (merged with Rhodia), Nokia (merged with Alcatel-Lucent), Lafarge-Holcim and TechnipFMC. These four firms now have their headquarters in Belgium, Finland, Switzerland and the UK, in that order. Thus, there are wide disparities within Europe despite the CSR Directive, which came into force in 2014. Furthermore, four companies (Total, Société Générale, Unibail-Rodamco-

<sup>22</sup> Totalling an average capitalisation of €11.971bn.

<sup>23</sup> Totalling an average capitalisation of €102.553bn.

Westfield and Pernod Ricard) stand out by joining the virtuous group in 2017 in terms of environmental reporting (see Appendix 3 on the CCI of CAC 40 companies)..

### 5.3 Comprehensive Compliance Index according to the four TCFD areas

To analyse the results with respect to the TCFD areas, we adopted a sector-based approach since this criterion seems to be decisive for the level of disclosure of firms.

Table 6 : CCI according to the four TCFD areas by sectors<sup>24</sup>

GCI 2017	All sectors	Energy	Faible Enjeu	Finance	Food	Building	Transport
<b>Gouvernance total</b>	<b>60,20%</b>	<b>66,15%</b>	<b>45,55%</b>	<b>67,19%</b>	<b>72,27%</b>	<b>72,19%</b>	<b>56,25%</b>
Gouvernance a)	66,17%	65,63%	50,24%	78,13%	72,66%	78,75%	67,71%
Gouvernance b)	54,22%	66,67%	40,87%	56,25%	71,88%	65,63%	44,79%
<b>Strategy total</b>	<b>37,11%</b>	<b>62,04%</b>	<b>28,42%</b>	<b>53,13%</b>	<b>29,86%</b>	<b>37,29%</b>	<b>37,34%</b>
Strategy a)	34,51%	58,33%	23,08%	37,50%	37,50%	38,33%	37,03%
Strategy b)	54,79%	77,78%	54,49%	75,00%	33,33%	51,67%	50,00%
Strategy c)	22,03%	50,00%	7,69%	46,88%	18,75%	21,88%	25,00%
<b>Risk total</b>	<b>71,67%</b>	<b>54,17%</b>	<b>70,83%</b>	<b>78,13%</b>	<b>58,33%</b>	<b>80,83%</b>	<b>71,53%</b>
Risk a)	70,63%	45,83%	68,27%	71,88%	62,50%	82,50%	72,92%
Risk b)	70,63%	50,00%	75,00%	62,50%	37,50%	90,00%	66,67%
Risk c)	73,75%	66,67%	69,23%	100,00%	75,00%	70,00%	75,00%
<b>Metrics total</b>	<b>70,78%</b>	<b>65,28%</b>	<b>67,95%</b>	<b>73,44%</b>	<b>84,38%</b>	<b>70,21%</b>	<b>69,79%</b>
Metrics a)	67,34%	58,33%	60,58%	73,44%	78,13%	68,13%	73,96%
Metrics b)	78,44%	62,50%	83,65%	78,13%	87,50%	73,75%	77,08%
Metrics c)	66,56%	75,00%	59,62%	68,75%	87,50%	68,75%	58,33%

#### 5.3.1 Common characteristics for all CAC 40 companies

In 2017, CAC 40 companies communicated the most in the areas of risk management (71%), metrics (70%) and governance (60%), far ahead of strategy (37%), and there was an improvement in the environmental disclosure in each area.

In terms of governance related to CROs, the Board of Directors is informed more or less directly via a committee dedicated to CSR<sup>25</sup> which meets 1 to 6 times a year. It should be noted environmental performance criteria are very rarely included in the

<sup>24</sup> Appendix 4 presents the CCI over the three years by sector and by TCFD area and sub-area.

<sup>25</sup> Its name may vary according to the firm (Ethics and Corporate Social Responsibility Committee, CSR Committee, Committee/Sustainable Development Department).

criteria for the variable remuneration of top management. Regarding the inclusion of climate risk in the strategy, while companies identify climate change risks as physical and/or transitional in nature, there is little information on the time period over which these risks can arise (short, medium or long term). Similarly, the opportunities associated with climate change on business and strategy are rarely explicitly mentioned, nor is the quantification of CROs by activity and geographical area.

In terms of risk management, firms set up very diversified specific processes to identify and assess climate risks, in particular through the use of environmental risk maps and materiality matrices. At the metric level, while companies communicate very well on the environmental indicators related to energy, water and waste management consumption and their trends, they also quantify GHG emissions under Scopes 1 and 2, and to a lesser extent under Scope 3, by specifying more or less the significant proportion of these emissions. In addition, they communicate little about the use of an internal carbon price.

### **5.3.2 Financial sector**

In 2017, AXA and Société Générale recorded the best CCI (81%, 77%) followed by Crédit Agricole (66%) and BNP Paribas (46%); and it is in the areas of risk management (78%), metrics (70%) and governance (67%) that the financial sector communicates the most, far ahead of strategy (53%), with a clear increase in disclosure in this area (from 21% to 53%). In this sector, climate risks are linked to physical and transition risks. The latter are taken into account through responsible investment strategies that include divesting from carbon-based sectors, environmental investments involving the financing of green projects (renewable energies, in the case of Crédit Agricole, BNP Paribas and AXA) through green bonds or bank loans. In addition, Crédit Agricole and AXA state that they are aligning their portfolios with the 2°C climate scenarios but without giving details of their analysis.

Regarding risk management, the sector is very good at describing how CRO identification and assessment processes are integrated into overall risk management. For example, AXA models climate risks to study the impact of natural disasters on its active portfolios. Crédit Agricole integrates the identification of climate risks into the group's risk mapping, just as Société Générale takes these risks into account in credit risk analysis and through sector policies (coal, oil and gas). Finally, concerning metrics, sector companies report all their GHG emissions at the level of Scopes 1 and 2. Only three firms present a figure for Scope 3 by specifying significant components (such as business travel or paper consumption). It can be noted that Société Générale and BNP Paribas are assessing the impact of an internal carbon price on their activities.

### **5.3.3 Energy sector**

While Engie records a very good level of CCI over the period (75% to 81%), Total has the highest score in 2017 (92%) with a significant improvement in its communication over the three years. Technip is well behind with the lowest score (12%). Engie and Total communicate the least in the area of risk management (54%), compared to governance (66%), strategy (62%) and metrics (65%). Regarding governance, Engie and Total communicate that climate issues are taken into account in evaluating and guiding their strategies, by setting up variable remuneration linked to CSR indicators. Their climate risks are physical risks (temperature variations, floods, wind and drought) and transition risks. They have the merit of specifying the time period (short, medium or long term) over which these risks may impact the group's activities, as well as identifying climate opportunities mainly based on the development of new products and services. The description of CROs on business, strategy and financial planning requires the recognition of provisions for risks related to environmental litigation and the quantification of environmental expenses. In addition, both companies claim to be determined to follow a trajectory compatible with the 2°C scenario (albeit without presenting the details of their analyses), in particular by using an internal carbon price in the decision-making process for new projects.

### **5.3.4 Building and materials sector**

Accor<sup>26</sup> has the highest score in 2017 (82%), followed by Schneider Electric, Bouygues and Solvay. The lowest scores are for ArcelorMittal and Lafarge, with 12% and 28%, respectively. The sector communicates the most in the areas of risk management (80%), governance (72%) and metrics (70%), far ahead of strategy (37%). The risks identified by companies in this sector are mainly physical risks (effects of climate disasters on raw materials, in particular) and transition risks (changes in green building regulations and rising insurance costs). It should be noted that no industry group discloses information on the financial impacts of CROs, and only Solvay is carrying out an impact study of a 2°C scenario on its activity. Finally, with regard to metrics, we observe that companies' disclosure has significantly increased over the period (54% to 70%). They consistently communicate on the three scopes relating to GHG emissions, as well as on various energy consumption indicators and on future objectives. Legrand, Saint Gobain and Solvay include an internal carbon price calculation in the investment process.

---

<sup>26</sup> Accor has been classified in the building sector as it faces high environmental impacts through its hotel complexes.

### **5.3.5 Transport sector**

Renault had the highest score in 2017, with 85%, followed by Michelin (78%), Valeo (74%) and PSA (58%). The lowest two scores were Safran (18%) and Airbus (33%) in 2017. The sector communicates the most in the areas of risk management (71%) and metrics (69%), far ahead of governance (56%) and strategy (37%). The main risks identified in this sector concern the regulation of GHG emissions, along with the effects of climate change on resources (particularly rubber for Michelin). In addition, Renault and Michelin believe that climate change can be a source of opportunities in terms of low-carbon mobility (electric vehicles). Overall, companies in this sector clearly specify the processes set up to identify or map climate risks alongside other risks through information feedback tools within the group (Airbus, Michelin and Renault). Since 2016, the four companies in the automotive sector have been communicating their three scopes, specifying their composition and costing methods.

### **5.3.6 Food sector**

Pernod Ricard achieved the highest score in 2017 with 82%, followed by Danone (76%) and Carrefour (58%), well ahead of Sodexo (30%), whose level was low over the entire period. The sector communicates the most in the areas of metrics (84%), governance (72%) and risk management (58%), far ahead of strategy (29%). This sector is particularly affected by climate risks in terms of raw material supply and exposure to natural disasters. It should be noted that Danone identifies changes in consumer expectations (given the importance of its BtoC activity) as its main environmental risk. Concerning the metrics, only a few firms (Carrefour and Danone) communicate their Scope 3 emissions and disclose the relevant components.

### **5.3.7 Low impact sectors**

This very mixed category of sectors with low environmental impact has the particularity of recording a low CCI level, with the exception of Veolia Environnement, which had the highest score in 2017 (81%), followed by Valeo (74%) and Kering (73%). The two lowest scores were Vivendi (9%) and Nokia (26%), both of which showed very low scores throughout the period. In 2017, these companies communicate the most in the areas of risk management (70%), far ahead of metrics (46%), governance (45%) and strategy (37%). Given the low environmental impact of these firms, the main risks identified are more transition risks (regulatory changes) and to a lesser extent physical risks. We notice that several companies claim to adopt a global risk management approach that integrates climate risks (e.g. L'Oréal and Orange) or creates a materiality matrix (e.g. Publicis, Sanofi and Valeo). Only Valeo and Atos identify opportunities related to climate change by anticipating changes in consumer behaviour that are seen as business opportunities.

## 6. Conclusion

Our results highlight a gradual improvement in environmental disclosure by CAC 40 companies over the three years. CCI levels in 2015 and 2016 were relatively satisfactory to the extent that the TCFD report had not yet been published, but it masks discrepancies. Sectors with high environmental impact have higher index scores (62%) than low impact sectors (53%). This first result is in line with the research that shows a stronger disclosure of environmental information by firms in ecologically sensitive sectors (Depoers 2010; Albertini 2014). This can be explained by the media exposure of these sectors and their determination to reassure stakeholders by disclosing a significant amount of environmental information (Aerts and Cormier 2009; Depoers and Jérôme 2017). Our results reveal that the financial sector has the highest CCI, followed by the building & materials and energy sectors, highlighting that the strategies for environmental communication are established by the most polluting companies. Moreover, our results show the five smallest market capitalisations meet the TCFD's recommendations better than the five largest. This result seems counter-intuitive insofar as the literature shows that there is a size effect in favour of large companies (Albertini 2014; Chauvey et al. 2015).

The analysis of annual reports leads us to identify some limitations in terms of company communication and concerning the TCFD's grid.

First, with regard to the presentation of information in the reference document, one of the main limitations is that environmental information is scattered across various sections of the report (CSR section, corporate governance section, risk management or financial statements, etc.). For example, financial impacts such as environmental expenses and provisions are rarely detailed in the environment section, but are more generally quantified in the financial section (for ArcelorMittal, for example). This issue is exacerbated if companies publish most of the CRO information in an independent sustainable development report to the detriment of the CSR section of the annual report. In addition, we note that not all firms interpret the acronym "CSR" in the same way. While most companies consider CSR to encompass both social and environmental responsibility, some (such as Vivendi) interpret it more narrowly and therefore do not address environmental issues in the reference document.

For companies in the former category, environmental issues are "lost" amidst social and governance ones without a systematically dedicated section. It is difficult to assess the importance given to these issues in relation to other non-financial criteria. It follows that there is a need for a more harmonised presentation to improve environmental communication. The idea is to gather all the information relating to the TCFD's requirements into a single "Environment and Climate Change" section of the CSRchapter.

Lastly, regarding the TCFD's grid, it seems to us that the suggested questions to help companies view the recommendations in operational terms are sometimes too precise and especially redundant because very similar information is found in the different sub-areas. For example, there is an overlap between the third governance question (how climate issues are taken into account in guiding and evaluating the strategy) and the questions related to the identification of risks in the short, medium and long terms, and the impact on business, strategies, etc. The recommendations published by the TCFD in 2017 are an undeniable step forward in making the environmental information published by companies better and more transparent. It is now time to improve its large-scale implementation by giving companies the operational tools to use it.

## Bibliography

- ACPR and Direction générale du trésor (2017). Le secteur bancaire face au changement climatique.
- Albertini, E. (2014). A Descriptive Analysis of Environmental Disclosure: A Longitudinal Study of French Companies. *Journal of Business Ethics*, 233-254.
- Bardin, L. (2013). *L'analyse de contenu* (Quadrige): PUF.
- Beck, A. C., Campbell, D., & Shrives, P. J. (2010). Content analysis in environmental reporting research: Enrichment and rehearsal of the method in a British–German context. *The British Accounting Review*, 42, 207-222, doi:10.1016/j.bar.2010.05.002.
- Ben Rhouma, A., & Cormier, D. (2007). *Déterminants de la communication sociale et environnementale des entreprises françaises*.
- Bouten, L., Everaert, P., Van Liedekerke, L., De Moor, L., & Christiaens, J. (2011). Corporate social responsibility reporting: A comprehensive picture? *Special issue: Social and Environmental Accounting and Accountability*, 35, 187-204, doi:10.1016/j.accfor.2011.06.007.
- Burke, M., & Hsiang, S. (2015). Global non-linear effect of temperature on economic production. *Nature*, 527(7577), 235-239.
- Chauvey, J.-N., Giordano-Spring, S., Cho, C., & Patten, D. (2015). The Normativity and Legitimacy of CSR Disclosure: Evidence from France. *Journal of Business Ethics*, 130, 789-803.
- Chelli, M., Richard, J., & Durocher, S. (2014). France's new economic regulations: insights from institutional legitimacy theory. *Accounting, Auditing & Accountability Journal*, 27, 283-316.
- Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, Organizations and Society*, 33, 303-327, doi:10.1016/j.aos.2007.05.003.
- Cormier, D., Magnan, M., & Van Velthoven, B. (2005). Environmental disclosure quality in large German companies: Economic incentives, public pressures or institutional conditions? [Article]. *European Accounting Review*, 14(1), 3-39, doi:10.1080/0963818042000339617.
- Damak-Ayadi, S. (2010). Le reporting social et environnemental suite à l'application de la loi NRE en France. *Comptabilité - Contrôle - Audit*, 16, 53-81.
- Deegan, C., Rankin, M., & Tobin, J. (2002). An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory. *Accounting, Auditing & Accountability Journal*, 15(3), 312-343, doi:doi:10.1108/09513570210435861.



- Delbard, O. (2008). CSR legislation in France and the European regulatory paradox: An analysis of EU CSR policy and sustainability. *Corporate Governance: The international journal of business in society*, 8, 397–405.
- Depoers, F., & Jérôme, T. (2017). Stratégies de publication des dépenses environnementales dans un cadre réglementaire. *Comptabilité - Contrôle - Audit*, 23, 41-74, doi:10.3917/cca.231.0041.
- Hooks, J., & van Staden, C. J. (2011). Evaluating environmental disclosures: The relationship between quality and extent measures. *The British Accounting Review*, 43, 200-213, doi:10.1016/j.bar.2011.06.005.
- Hummel, K., & Schlick, C. (2016). The relationship between sustainability performance and sustainability disclosure – Reconciling voluntary disclosure theory and legitimacy theory. *Journal of Accounting and Public Policy*, 35(5), 455-476, doi:<https://doi.org/10.1016/j.jaccpubpol.2016.06.001>.
- IEA (2016). CO2 emissions from fuel combustion: Highlights. Paris.
- IPCC (2012). Renewable Energy Sources and Climate Change Mitigation : Special Report of the Intergovernmental Panel on Climate Change. . *Cambridge University Press*.
- Krippendorff, K. (2012). *Content Analysis: An introduction to its methodology* (SAGE Publications Inc ed.): 3rd Revised edition.
- Larrinaga, C., Carrasco, F., Correa, C., Llena, F., & Moneva, J. (2002). Accountability and accounting regulation: the case of the Spanish environmental disclosure standard. *European Accounting Review*, 11, 723-740.
- Melloni, G., Caglio, A., & Perego, P. (2017). Saying more with less? Disclosure conciseness, completeness and balance in Integrated Reports. *Sustainability Accounting, Reporting and Assurance*, 36, 220-238, doi:10.1016/j.jaccpubpol.2017.03.001.
- Michelon, G., Pilonato, S., & Ricceri, F. (2015). CSR reporting practices and the quality of disclosure: An empirical analysis. *Critical Perspectives on Accounting*, 33, 59-78, doi:10.1016/j.cpa.2014.10.003.
- Mikol, A. L'information environnementale publiée par les sociétés du CAC40 de 1992 à 1998 comparée à une information type. In *21ème Congrès de l'AFC, 2000 2000*. France
- Nègre, E., Verdier, M.-A., Cho, C. H., & Patten, D. M. (2017). Disclosure strategies and investor reactions to downsizing announcements: A legitimacy perspective. *Journal of Accounting and Public Policy*, 36(3), 239-257, doi:<https://doi.org/10.1016/j.jaccpubpol.2017.03.003>.
- O'Donovan, G. (2002). Environmental disclosures in the annual report: Extending the applicability and predictive power of legitimacy theory. *Accounting, Auditing & Accountability Journal*, 15(3), 344-371, doi:doi:10.1108/09513570210435870.

- Russo-Spena, T., Tregua, M., & De Chiara, A. (2018). Trends and Drivers in CSR Disclosure: A Focus on Reporting Practices in the Automotive Industry. [Article]. *Journal of Business Ethics*, 151(2), 563-578, doi:10.1007/s10551-016-3235-2.
- Sen, M., Mukherjee, K., & Pattanayak, J. K. (2011). Corporate environmental disclosure practices in India. *Journal of Applied Accounting Research*, 12, 139-156, doi:10.1108/09675421111160709.
- Shocker, A. D., & Sethi, S. P. (1973). An Approach to Incorporating Societal Preferences in Developing Corporate Action Strategies. *California Management Review*, 15(4), 97-105, doi:10.2307/41164466.
- Stern, N. (2013). The Structure of Economic Modeling of the Potential Impacts of Climate Change: Grafting Gross Underestimation of Risk onto Already Narrow Science Models. *Journal of Economic Literature*, 51(3), 838-859.
- Suchman, M. C. (1995). Managing legitimacy: strategic and institutional approaches. *Academy of Management Review*, 20(3), 571-610.
- Wiseman, J. (1982). An evaluation of environmental disclosures made in corporate annual reports. *Accounting, Organizations & Society*, 7, 53-63.

**Appendix 1: coding grid extract**

Coding grid extract and score calculation			"TCFD" mentioned in the report	Are current and future regulations included in this risk evaluation?		Scope 1 & 2 emissions		Governance 8 questions		Strategy 13 questions				Risk management 2017	Risk management 2017		Total Governance 2017	Total Strategy 2017	Total Risk 2017	Total Metrics 2017	Total performance 2017
Company name	Coder	Year	1 or 0	1 or 0	Quote + source	1 or 0	Quote + source	a) 4 pt	b) 4 pt	a) 6 pt	b) 3 pt	c) 4 pt	(...)	a) %	b) %	(...)	%	%	%	%	%
ArcelorMittal	QCR	2017	0	1.0	"ArcelorMittal is subject to changing and increasingly stringent environmental laws and regulations concerning air emissions, water discharges and waste disposal, as well as certain remediation activities that involve the clean-up of soil and groundwater" p167	0.5	"the Company's emission footprint in 2016 was approximately 200 million tonnes" p263	0.0	0	1.0	1	0	(...)	25%	50%	(...)	3%	17%	25%	4%	12%

## Appendix 2: CCI and market capitalisation

Comprehensive Compliance Index (%)	No. of firms	% of total market cap
<10%	2	6%
<20%	4	11%
<30%	5	12%
<40%	11	31%
<50%	19	52%
<60%	24	69%
<70%	25	70%
<80%	35	98%
<90%	36	100%

## Appendix 3: CCI scores (by area and by company)

		CCI 2015	CCI 2016	CCI 2017	Trend 2015-2017	Market Cap 2017 (€ m)	References to TCFD 2017
<b>Engie SA</b>	Energy	74.69%	73.22%	81.21%	8%	34,910	1
<b>Technip</b>	Energy	49.13%	0.00%	11.81%	-316%	12,142	0
<b>Total</b>	Energy	43.79%	76.74%	92.71%	53%	116,325	1
<b>AXA</b>	Finance	36.81%	70.05%	81.51%	55%	59,986	1
<b>BNP Paribas</b>	Finance	32.12%	40.10%	46.35%	31%	77,715	1
<b>Crédit Agricole</b>	Finance	25.52%	44.05%	66.88%	62%	39,276	1
<b>Société Générale</b>	Finance	33.33%	76.09%	77.13%	57%	34,781	1
<b>Carrefour</b>	Food	33.16%	38.11%	58.68%	43%	13,975	0
<b>Danone</b>	Food	56.21%	60.37%	73.22%	23%	46,916	0
<b>Pernod Ricard</b>	Food	40.49%	63.72%	82.20%	51%	34,862	0
<b>Sodexo</b>	Food	9.81%	13.63%	30.73%	68%	16,901	0
<b>Air Liquide</b>	Low impact	32.64%	38.19%	64.24%	49%	44,990	0
<b>Atos</b>	Low impact	45.31%	47.27%	66.93%	32%	12,766	1
<b>Capgemini</b>	Low impact	38.02%	39.45%	52.30%	27%	16,661	0

*Environmental Reporting Practices: Are CAC 40 firms compliant with the Recommendations of the Task Force on Climate-related Financial Disclosures  
Samira Demaria et Sandra Rigot*

		CCI 2015	CCI 2016	CCI 2017	Trend 2015-2017	Market Cap 2017 (€ m)	References to TCFD 2017
Essilor	Low impact	30.69%	29.38%	49.44%	38%	25,181	0
Kering	Low impact	53.13%	57.38%	73.13%	27%	49,628	0
L'Oréal	Low impact	27.95%	33.29%	56.03%	50%	103,551	0
LVMH	Low impact	32.99%	37.15%	44.31%	26%	124,416	0
Nokia	Low impact	0.00%	19.88%	26.52%	100%	26,515	0
Orange	Low impact	26.78%	40.71%	48.65%	45%	38,504	1
Publicis	Low impact	10.42%	32.90%	50.61%	79%	13,048	0
Sanofi	Low impact	35.11%	51.52%	67.66%	48%	90,756	0
Veolia Environnement	Low impact	63.54%	77.65%	81.81%	22%	11,986	1
Vivendi	Low impact	4.95%	9.81%	9.81%	50%	29,021	0
Accor	Materials & Building	60.50%	71.01%	82.64%	27%	12,418	0
ArcelorMittal	Materials & Building	13.19%	10.42%	12.24%	-8%	27,582	0
Bouygues	Materials & Building	56.81%	67.93%	79.04%	28%	15,630	0
Lafarge Holcim	Materials & Building	12.24%	25.87%	28.65%	57%	22,279	0
Legrand	Materials & Building	24.48%	29.82%	69.18%	65%	17,076	0
Saint Gobain	Materials & Building	59.68%	76.00%	73.91%	19%	25,448	1
Schneider Electric	Materials & Building	74.52%	76.26%	82.16%	9%	42,279	1
Solvay	Materials & Building	50.52%	64.63%	77.91%	35%	10,545	1

*Environmental Reporting Practices: Are CAC 40 firms compliant with the Recommendations of the Task Force on Climate-related Financial Disclosures  
Samira Demaria et Sandra Rigot*

		CCI 2015	CCI 2016	CCI 2017	Trend 2015-2017	Market Cap 2017 (€ m)	References to TCFD 2017
<b>Unibail-Rodamco</b>	Materials & Building	57.12%	79.34%	76.56%	25%	20,967	0
<b>Vinci</b>	Materials & Building	38.54%	54.51%	69.01%	44%	50,336	0
<b>Airbus Group</b>	Transport	8.51%	8.51%	33.62%	75%	64,288	0
<b>Michelin</b>	Transport	41.32%	49.35%	78.13%	47%	21,452	0
<b>PSA Group</b>	Transport	30.16%	46.92%	58.94%	49%	15,341	1
<b>Renault</b>	Transport	62.20%	84.07%	85.63%	27%	24,814	0
<b>Safran</b>	Transport	19.40%	18.36%	22.01%	12%	35,663	0
<b>Valeo</b>	Transport	53.56%	68.49%	74.05%	28%	14,923	1

#### Appendix 4: Statistics regarding TCFD areas and sub-areas

Mean score (%)	Energy	Low impact	Finance	Food	Materials	Transport
<b>Governance total 2015</b>	56.35%	18.37%	29.69%	42.97%	48.28%	27.34%
<b>Governance total 2016</b>	53.65%	21.88%	42.97%	49.61%	56.41%	35.42%
<b>Governance total 2017</b>	66.15%	45.55%	67.19%	72.27%	72.19%	56.25%
<b>Governance (a) 2015</b>	54.38%	23.75%	40.63%	45.31%	45.31%	29.69%
<b>Governance (a) 2016</b>	57.29%	27.88%	54.69%	49.22%	56.56%	31.25%
<b>Governance (a) 2017</b>	65.63%	50.24%	78.13%	72.66%	78.75%	67.71%
<b>Governance (b) 2015</b>	58.33%	12.98%	18.75%	40.63%	51.25%	25.00%
<b>Governance (b) 2016</b>	50.00%	15.87%	31.25%	50.00%	56.25%	39.58%
<b>Governance (b) 2017</b>	66.67%	40.87%	56.25%	71.88%	65.63%	44.79%

Mean score (%)	Energy	Low impact	Finance	Food	Materials	Transport
<b>Strategy total 2015</b>	37.96%	14.32%	21.53%	20.14%	44.44%	18.52%
<b>Strategy total 2016</b>	35.19%	18.91%	44.10%	21.53%	27.78%	26.85%
<b>Strategy total 2017</b>	62.04%	28.42%	53.13%	29.86%	37.29%	37.34%
<b>Strategy (a) 2015</b>	38.89%	13.46%	14.58%	27.08%	27.08%	16.67%
<b>Strategy (a) 2016</b>	22.22%	16.03%	29.17%	31.25%	31.67%	27.78%
<b>Strategy (a) 2017</b>	58.33%	23.08%	37.50%	37.50%	38.33%	37.03%
<b>Strategy (b) 2015</b>	66.67%	29.49%	50.00%	33.33%	43.33%	0.00%

*Environmental Reporting Practices: Are CAC 40 firms compliant with the Recommendations of the Task Force on Climate-related Financial Disclosures  
Samira Demaria et Sandra Rigot*

Mean score (%)	Energy	Low impact	Finance	Food	Materials	Transport
Strategy (b) 2016	50.00%	39.74%	75.00%	33.33%	49.17%	44.44%
Strategy (b) 2017	77.78%	54.49%	75.00%	33.33%	51.67%	50.00%
Strategy (c) 2015	8.33%	0.00%	0.00%	0.00%	0.00%	0.00%
Strategy (c) 2016	33.33%	0.96%	28.13%	0.00%	2.50%	8.33%
Strategy (c) 2017	50.00%	7.69%	46.88%	18.75%	21.88%	25.00%

Mean score (%)	Energy	Low impact	Finance	Food	Materials	Transport
Risk total 2015	61.11%	43.91%	29.17%	32.29%	53.33%	38.19%
Risk total 2016	55.56%	59.29%	72.92%	48.96%	75.83%	52.08%
Risk total 2017	54.17%	70.83%	78.13%	58.33%	80.83%	71.53%
Risk (a) 2015	50.00%	47.12%	50.00%	46.88%	65.00%	39.58%
Risk (a) 2016	33.33%	47.12%	68.75%	46.88%	82.50%	47.92%
Risk (a) 2017	45.83%	68.27%	71.88%	62.50%	82.50%	72.92%
Risk (b) 2015	66.67%	46.15%	12.50%	12.50%	55.00%	25.00%
Risk (b) 2016	66.67%	69.23%	50.00%	25.00%	75.00%	58.33%
Risk (b) 2017	50.00%	75.00%	62.50%	37.50%	90.00%	66.67%
Risk (c) 2015	66.67%	38.46%	25.00%	37.50%	40.00%	50.00%
Risk (c) 2016	66.67%	61.54%	100.00%	75.00%	70.00%	50.00%
Risk (c) 2017	66.67%	69.23%	100.00%	75.00%	70.00%	75.00%

Mean score (%)	Energy	Low impact	Finance	Food	Materials	Transport
Metrics total 2015	68.06%	46.96%	47.40%	44.27%	53.96%	59.38%
Metrics total 2016	55.56%	58.25%	70.31%	55.73%	62.29%	69.44%
Metrics total 2017	65.28%	67.95%	73.44%	84.38%	70.21%	69.79%
Metrics (a) 2015	83.33%	47.60%	60.94%	60.94%	55.63%	69.79%
Metrics (a) 2016	58.33%	57.45%	67.19%	67.19%	65.63%	70.83%
Metrics (a) 2017	58.33%	60.58%	73.44%	78.13%	68.13%	73.96%
Metrics (b) 2015	54.17%	60.58%	31.25%	40.63%	56.25%	54.17%
Metrics (b) 2016	58.33%	75.00%	81.25%	68.75%	63.75%	70.83%
Metrics (b) 2017	62.50%	83.65%	78.13%	87.50%	73.75%	77.08%
Metrics (c) 2015	66.67%	32.69%	50.00%	31.25%	50.00%	54.17%

*Environmental Reporting Practices: Are CAC 40 firms compliant with the  
Recommendations of the Task Force on Climate-related Financial Disclosures  
Samira Demaria et Sandra Rigot*

Mean score (%)	Energy	Low impact	Finance	Food	Materials	Transport
Metrics (c) 2016	50.00%	42.31%	62.50%	31.25%	57.50%	66.67%
Metrics (c) 2017	75.00%	59.62%	68.75%	87.50%	68.75%	58.33%