

Avram, Viorel; Calu, Daniela Artemisa; Dumitru, Valentin Florentin; Dănescu, Tatiana

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THE CLARITY OF THE INFORMATION REGARDING THE BIOECONOMY: AN ANALYSIS OF THE REPORTS PUBLISHED BY THE ORGANIZATIONS

Viorel Avram¹, Daniela Artemisa Calu^{2*}, Valentin Florentin Dumitru³
and Tatiana Dănescu⁴

¹⁾²⁾³⁾ *The Bucharest University of Economic Studies, Romania*

⁴⁾ *University of Medicine, Pharmacy, Sciences and Technology of Târgu Mureș*

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Abstract

Bioeconomy is a material potential source of sustainable growth that calls for new approaches in research and innovation to bring about concrete improvements in Europe's social, economic and environmental welfare. The purpose of our research is to evaluate the clarity of reports published by organizations. The assessment of the clarity of the published reports is done for both financial and non-financial information (containing elements related to bioeconomy). The steps of this research are: (i) the investigation of the clarity of the information included in the sustainability reports, and (ii) explanation of the atypical evolution of the clarity score, using the characteristics of the cultural dimensions of the home country. We analysed 77 reports published on the websites of 17 organizations in three environmentally-sensitive activity domains in 11 countries. Using content analysis, we determine an annual score of information clarity for each organization. The results of the research show that after switching to integrated reporting in 2013 the score of information clarity was improved for 65% of the companies. Eleven organizations have a degree of information clarity for the reports published in 2013 and 2016 better than for those published in 2010. We find five atypical cases for which the score of information clarity remains the same for all the three periods under investigation. These cases have been analyzed from the point of view of the cultural characteristics existing in the organization's home country. Through our research we provide feedback to organizations on how they can improve the clarity of their published reports.

Keywords: bioeconomy, sustainability reporting, integrated reporting, clarity of information.

JEL Classification: Q56

* Corresponding author, **Daniela Artemisa Calu** – daniela.calu@cig.ase.ro.

Introduction

Contemporary society is no longer alien to terms such as sustainability, environmental protection, sustainable consumption, clean technology, sustainable agriculture, biodiversity, food security, fair jobs, fair trade, green biotechnology, recycling, reuse, renewable energy, and so on (Dinu, 2012; Laroche et al., 2001). All of these concepts are used more and more to describe the long-term sustainability of society, a central component of EU bioeconomy policies. According to the European Commission, bioeconomics includes “the production of renewable biological resources and the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products and bioenergy” (European Commission, 2012, p. 3). Representing an important potential source of sustainable growth for the European Union, the bioeconomy (as defined by the European Commission) includes any use of biomass, respecting the three sustainability objectives: economic, social and environmental. Bioeconomy calls for new approaches that come from research and innovation and supports scientific and technological leadership to bring about concrete improvements in Europe’s social, economic and environmental welfare. As sustainability reporting becomes a component of global action to address environmental and social issues, policies, regulations, standards, and other tools that require and encourage entities to report are also integrated.

The purpose of our research is to evaluate the clarity of reports published by organizations. The assessment of the clarity of the published reports is made for financial and non-financial information (containing elements of bioeconomy).

The steps of this research are: (i) the investigation of the clarity of the information included in the sustainability reports, and (ii) explanation of the atypical evolution of the clarity score, using the characteristics of the cultural dimensions suggested by Hofstede (1980, 2010). In order to do this, we analysed the information published by 17 organizations in environmentally-sensitive industries. Starting from the clarity test suggested by GRI, we determined an annual score of information clarity for each organization. We explained the atypical cases of reporting using Hofstede’s approach (1980, 2010) regarding the cultural dimensions.

The structure of the paper is the following: literature review; research method; the results and discussions; conclusions.

1. Literature review

1.1. Reporting of Information – tool of bioeconomy

Due to the wide scope and different stimulants, the bioeconomy’s sustainability is expected to pose major challenges related to social, economic and environmental issues (Knudsen et al., 2015). An organization’s concerns about various aspects of economic sustainability are reflected in the sustainability reports or, more recently, in integrated reports. Research in integrated reporting is important for several reasons. Today, only about 20% of an organization’s market value can be accounted for through its financial and physical assets (as opposed to 80% in the 1970s). Other factors, such as inter-company relationships, intellectual and human capital, form a large part of the company’s value. In addition, the pressure of current social and environmental problems (environmental degradation, pollution, global warming, waste of resources, population growth, adolescence, inequality, work accidents,

discrimination, etc.) is felt. Other types of information than financial ones have become more and more demanded by information users and are important for decision-making. This has led to an increase in the amount of information presented in the annual reports, especially in notes and management comments, but the presentation is in unconnected and disordered sections. Integrated reporting facilitates access to capital, as responsible investment funds manage larger amounts of money (Koellner et al., 2005). Last but not least, the publication of reports with a high degree of clarity of information emphasizing bioeconomic progress indicates that there is a change in the level of providers of such information that is capable of influencing public opinion and social preference for bioeconomy, a “stimulus-response” effect.

The volume of non-financial information published by organizations has increased much in recent years, but mainly as a result of the publication of voluntary information (Verschoor, 2011; Ernst & Young, 2017). Continuous changes and lack of mandatory reporting requirements can reduce the clarity of the information presented.

In order to homogenize non-financial reporting, there have been several initiatives, of which the Global Reporting Initiative (GRI) is a major player. This body has published several versions of the reporting guidelines relevant to our research being the following: G 3.1, G4 and Sustainability Reporting Standards (SRS). Although the GRI guidelines have managed to provide a friendly alternative for sustainable reporting, yet there remain a number of outstanding issues (Rowbottom and Locke, 2013), the issue of homogenizing sustainable reporting remains a challenge.

Another important step towards improving sustainable reporting is the appearance of the International Integrated Reporting Council (IIRC), which in 2013 developed a International <Integrated Reporting> Framework – IIRF (2013a). On its grounds, the companies can publish integrated reports which connect information regarding the financial and sustainability aspects, and implicitly the bioeconomy. The integrated reporting is at present the most comprehensive reporting paradigm practiced by companies, and the information connectivity takes an important place. The two bodies (GRI and IIRC) collaborate in order to improve reporting. Thus, IIRC doesn't have an own set of key performance indicators and it encourages the organizations to use the GRI sustainability reporting guidelines (with the related indicators) (GRI & IIRC, 2013). IIRC regroups or has the broad support of a number of pre-existing bodies, claiming that they will coordinate and preserve what has been done before, adopting the ‘path of convergence’ (Bebbington et al., 2012).

GRI establishes the following principles for defining report quality: accuracy, balance, clarity, comparability, reliability and timeliness. We will only consider Clarity in this research. According to GRI Sustainability Reporting Standards 2016 (GRI, 2016, p. 13-16) this principle is thus defined: ‘The report is expected to present information in a way that is understandable, accessible, and usable by the organization’s range of stakeholders, whether in print form or through other channels. It is important that stakeholders are able to find the information they want without unreasonable effort’.

Regarding the clarity there is a gap in specific literature. There are studies that deal with the transparency of information (Bergson, 2006; Ștefănescu and Tănase, 2016, Fuente et al., 2017) or readability (Du Toit, 2017). However, clarity means more than transparency and readability.

With regard to bioeconomy issues, as in the case of clarity of information presented in the reports published by organizations, there is a gap in the literature. Most studies only show general aspects of sustainability. Currently, a way to improve the clarity of information is the use of information technologies, for example for the preparation of integrated reports.

1.2. The impact of the cultural factors on reporting

Understanding the cultural peculiarities which influence the reporting, implicitly the ones which target aspects related with the bioeconomics, is an important aspect both from the perspective of the stakeholders and from the perspective of the companies publishing the respective reports. The best known approach of the cultural dimensions is the one advanced by Hofstede (1980, 2010). Hofstede (1980) defines culture as ‘the collective programming of the mind distinguishing the members of one group or category of people from others’. According to Hofstede’s (2010) approach, the cultural dimensions are: Power Distance Index (PDI), Individualism versus Collectivism (IDV), Masculinity versus Femininity (MAS), Uncertainty Avoidance Index (UAI), Long Term Orientation versus Short Term Normative Orientation (LTO), Indulgence versus Restraint (IND). The last cultural dimension (IND) was not tested by Hofstede. It was only mentioned among the cultural dimensions.

During the last years, there was a series of studies which tried to identify the type of connection which exists between the sustainability reporting and the cultural dimensions suggested by Hofstede. Some empirical studies have shown that there are differences between how managers in different regions perceive the importance of sustainability reporting. In this regard, Furrer et al. (2010) identified differences in perceptions about existing CSR reporting in Eastern and Western European countries. Baughn and McIntosh (2007) identified differences in how companies in Asian countries submit CSR information compared to companies in other regions (Western Europe, East/Central Europe, Australia/New Zealand, US/Canada, Middle East and Africa). Tsakumis (2007) has demonstrated the link between cultural dimensions and stakeholder preferences and actions.

Starting from the cultural dimensions proposed by Hofstede, Gray (1988) suggested a set of accounting dimensions: professional self-regulation versus legal control, uniformity versus flexibility, prudence versus optimism, transparency vs. discretion. Of these accounting dimensions, the transparency versus discretionary pair is representative for testing the clarity of reports published by organizations. In this respect, Hope (2008) has developed a discretionary index calculated as a sum of existing uncertainty scores (UAI) with the existing one for the hierarchical distance to power (PDI) from which the score for individualism was subtracted (IDV). In table no 1 we presented the significant characteristics of the five cultural dimensions tested by Hofstede, their applicability and the studies which consider the influence of the cultural dimensions on the sustainability reporting.

In this article we analysed the atypical cases regarding the clarity of the information disclosed by the investigated companies through the cultural dimensions specific to the countries in which the respective companies are based, respectively from the perspective of the clarity score obtained by them.

Table no. 1. Review of the significance of the cultural dimensions and application in the sustainability reporting

Dimension	Definitions (Hofstede, 2010)	Applicability	Studies
PDI	‘The degree to which the less powerful members of a society accept and expect that power is distributed unequally’	<i>High PDI</i> : people accept a hierarchical order in which everybody has a place and which needs no further justification <i>Low PDI</i> : people strive to equalise the distribution of power and demand justification for inequalities of power	Negative association between PDI and the environmental reporting (Gallego-Álvarez and Ortas, 2017)
IDV	<i>Individualism</i> : ‘a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families’ <i>Collectivism</i> : ‘a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular ingroup to look after them in exchange for unquestioning loyalty’	People’s self-image is defined in terms of ‘I’ or ‘we’	IDV is positively associated with the increase in the information published regarding the environmental reporting (Khlif, 2016)
MAS	<i>Masculinity</i> : ‘a preference in society for achievement, heroism, assertiveness, and material rewards for success’ <i>Femininity</i> : ‘a preference for cooperation, modesty, caring for the weak and quality of life.’	<i>Masculine</i> : more competitive society <i>Femininity</i> : generally more consensus-oriented society	The positive association between femininity and environmental performance (Roy and Goll, 2014), respectively the CSR practices (Miska, 2018) Negative association between masculinity and environmental reporting (Gallego-Álvarez and Ortas, 2017)
UAI	‘The degree to which the members of a society feel uncomfortable with uncertainty and ambiguity’	<i>Strong UAI</i> : rigid codes of belief and behaviour, intolerant of unorthodox behaviour and ideas <i>Weak UAI</i> : a more relaxed attitude in which practice counts more than principles	Positive association between UAI and environmental reporting (Gallego-Álvarez and Ortas, 2017)
LTO	‘Every society has to maintain some links with its own past while dealing with the challenges of the present and the future’	<i>Low LTO</i> : prefer to maintain traditions and norms; treats societal change with suspicion <i>High LTO</i> : encourage thrift and efforts in	LTO is positively associated with the increase in the quantity of information regarding the environmental reporting

Dimension	Definitions (Hofstede, 2010)	Applicability	Studies
		modern education as a way to prepare for the future	and the sustainable practices Khlif (2016); Miska (2018)

Source: Authors' compilation

2. Research Method

For this investigation we considered 99 organizations included in the GRI database as well as in the IIRC's pilot program. Starting from the classifications of the IIRC (2011; 2013b) and Barbu et al. (2014), we selected only the environmentally-sensitive industries because "environmentally sensitive businesses are likely to report more environmental information than those that are less sensitive to the environment," indicating that there is a premise to find more information on bioeconomy issues in the published reports. As a consequence of applying the selection criteria, 17 companies remained in the following industries: Basic Materials (Chemicals – 3, Industrial mining & metals – 4), Industrials (Steel producers – 1, Transportation services – 4), Oil & Gas (Oil – 5). From the point of view of the countries the situation is the following: Belgium (1), Brazil (2), Canada (1), Germany (2), India (1), Italy (3), the Netherlands (2), Russian Federation (1), South Africa (2), Spain (1) and the United States of America (1).

The information was collected from July 2017 to August 2018. We surveyed the reports published in 2010, 2013 and 2016 by the selected organizations. The year 2013 was chosen to capture the moment when organizations migrated to integrated reporting (2013). Given that the published information does not change substantially from one year to the next, we have kept a 3-year interval (2010 and 2016 respectively) to observe more clearly the differences.

Considering the fact that an investor analyses the non-financial information in correlation with the financial one (Ernst & Young, 2014; 2017), we searched for financial as well in order to determine the clarity score. Consequently, 77 reports published in the three investigated years were analysed in total for 17 organizations. Because environmental information is industry-specific (Freedman and Jaggi, 2005; Eccles et al., 2012), the analysis of reports and implicitly the results was grouped on industries, as it follows: 30 reports were published by the 7 organizations included in Basic Materials, 21 reports were published by the 5 organizations included in Industrials, while 26 reports were published by the 5 organizations in Oil & Gas. We used content analysis in our research.

In the first step of our analysis (the investigation of the clarity of the information included in the sustainability reports), we verified that for the consolidated financial statements published by the organizations under review, the accounting standards in accordance with which they have been prepared is specified and the information presented is explicitly explained in the notes. Regarding the clarity of the non-financial information (which include bioeconomics items), we prepared *ex ante* a list of items and searched for their presence in the text. We included the following items in the list: (a) information related explicitly with the bioeconomic aspects that are currently reported (environmental, economic and social indicators existing in the GRI reporting guidelines used in the three investigated years); (b) other information that may be reported under the current approach of the bioeconomy (wood-based materials, polymers, biocomposites, textiles, biopolymers, new biomass sources and

biorefining) (EEA, 2018). This information is searched for in the annual reports and afterwards we selected various aspects which were analysed in correlation with the cultural characteristics of the companies' home countries.

In line with the tests suggested by GRI for the clarity principle (GRI, 2011a, p. 16), we designed the scoring system presented in table 2.

Table no. 2. Scoring system

Test of clarity (GRI 2011a, p. 16)	Aspect	Score granted
'The report contains the level of information required by stakeholders, but avoids excessive and unnecessary detail'	A1: Number of reports where to search for the financial and nonfinancial information	1 point if all information is within one report, 0 points for collecting information from two reports or more.
'The data and information in the report is available to stakeholders, including those with particular accessibility needs (such as differing abilities, language, or technology)'	A2: On-line availability of the report, in a form which exhibits a high connectivity of information (there are links for the connection of the details).	1 point for the on-line form, 0 points for lack of on-line presentation.
'Stakeholders can find the specific information they want without unreasonable effort through tables of contents, maps, links, or other aids'	A3: Pointing out the version of the GRI references according to which the reporting is made	1 point if the version is mentioned, 0 points if it is not mentioned.
	A4: Existence of a GRI index to present the indicators	1 point if the GRI index is published, 0 points if it is not published.
'The report avoids technical terms, acronyms, jargon, or other content likely to be unfamiliar to stakeholders, and should include explanations (where necessary) in the relevant section or in a glossary'	A5: Use of symbols and names for the reported environmental indicators	1 point for the use of symbols in correlation with the names of the indicators, 0 points if symbols are not used.
	A6: The clear presentation of the information regarding the bioeconomy	1 point for the explicit presentation of other information regarding the bioeconomy, 0 points for a disclosure based mainly in technical terms (for instance, chemical formulas)

Source: Authors' compilation

The best annual information clarity score that could be obtained by an organization is 6. The worst clarity score is 0. Based on the score obtained we established a ranking regarding the clarity of the information at the organization's level. The first place was granted to the year in which the lowest score was registered.

For the second stage (explanation of the atypical evolution of the clarity score, using the characteristics of the cultural dimensions of the home country) we built a correlation matrix with the following two axes: on the vertical axis we presented the cumulative score of the clarity score obtained by each organization for the three investigated years, and on the horizontal axis we presented the score obtained by each country for the discretion measure using the Hope (2008) algorithm of calculation (UAI + PDI – IDV). Depending on the

average of the clarity score and the average of the discretion measure, four quadrants were delineated. Each organization was placed in one of these. Starting from GRI’s premise that “all principles (including clarity) are fundamental to ensuring transparency” (GRI, 2011b, p.17), we considered normal the associations between: a high clarity score and a measure of the low transparency (high transparency), low score of clarity and a high discretion measure (low transparency). If some organizations (i) scored consistently in each of the three years, and (ii) they were placed in one of the two quadrants where the score of clarity and the degree of transparency had divergent developments or were placed at the extremes of both dimensions, these organizations were considered to have an atypical evolution. These cases were analyzed from the perspective of Hofstede’s five cultural dimensions.

3. Results and discussions

3.1 The investigation of the clarity of the information included in the sustainability reports

With regard to financial reporting, 15 organizations included in the selected sample use International Financial Reporting Standards (IFRS), an organization (E) uses US GAAP and an organisation (L) partly uses IFRS and partly GAAPs in India. For all organizations, the information was presented in detail in the notes to the financial statements, being understandable, so financial reporting did not affect the clarity of the information.

Based on the information collected (Annex no. 1) the ranking of the organizations concerning the clarity of the information is presented in figure no. 1.

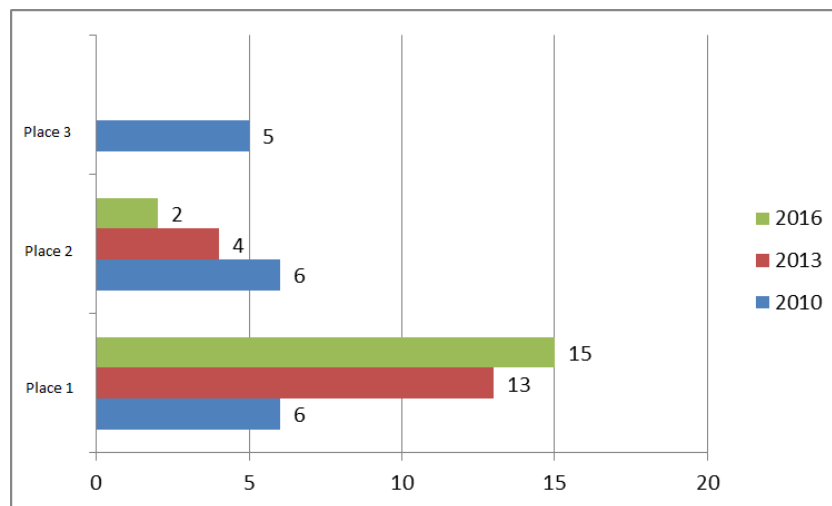


Figure no. 1. The clarity of the information disclosed

Source: authors’ compilation

The way in which each of the aspects investigated influenced the clarity of the information on bioeconomy is presented below.

- *A1 and A2*

If there were several reports published annually, a part of the bioeconomic information was presented simultaneously in two reports and another part was presented in one report. A relevant example is the following: “C processes and solutions are used to produce energy from biomass” (Annual Report, 2013 p. 11 and Sustainable Development Report, 2013, p. 7). In this case, as expected, the sustainability report contains much more information on bioeconomy, receiving the prize Best Sustainability Report from the Belgian Institute of Company Auditors. For an uninformed user, who is limited to studying the annual report, the reported bioeconomic information appears to be much more limited. We note that, from a cultural point of view, Belgium has a large LTO score (83), a dimension that has been positively associated with the publication of information on environmental reporting and sustainable practices (Khlif, 2016; Miska, 2018). The on-line availability of the report, in a form that has a high connectivity of information, has eliminated such situations.

• *A3, A4 and A5*

The clarity of the information is affected by the fact that some organizations have not used the symbols of the indicators, or if they have used them, they have changed from year to year. For example, in the case of the analysis of GRI indicators, in two different reporting versions, the same symbol was associated with either a name referring to biodiversity (e.g. the number of threatened species on the IUCN list), or a name referring to the amount of greenhouse gases. The presence of the GRI index, which clearly shows an association between the symbol and the name of the indicators presented in the reports, is an important factor in increasing the clarity of the information. It can be noted that within the Oil and Gas Industry and the Air Transport industry (except H), all organizations have used the GRI index, unlike the Basic Materials industry where there is no homogeneity in this respect. Given that there is a homogeneity in the use of the GRI index at the level of the two above-mentioned industries for 9 out of 10 organizations, there is a homogeneity in the use of the GRI index over all three years. The use of the GRI index does not seem to be influenced by the culture of the organization’s home country.

• *A6*

The disclosure in the published reports of other information that could be reported under the bioeconomy (wood-based materials, polymers, biocomposites, textiles, biopolymers, new biomass sources and biorefineries) did not alter the clarity of reporting. This is due to the fact that all organizations have achieved the highest score in all years. The explanation is a dual one. In some cases, no other information was reported referring to elements specific to the bioeconomy except the information described in the reported indicators, the clarity of the information not being affected. In cases where such information was published, the reporting was made in an intelligible way: “it would build a next-generation biomass fuel production facility near Marquette, Michigan” (E, 2010, p.34), respectively “We continued our efforts to develop new bio-based products based on renewables and were delighted to win the company’s internal BU Sustainability Award for our carbon footprint work” (A, 2010, p.40). The two examples were selected from organizations in countries with a high degree of transparency (-5 US, 11, the Netherlands), but with the other two cultural dimensions having opposite values (MAS: 14 the Netherlands, 62 – the US and the LTO: 67 Netherlands and 26 – US). Although both are understandable, we notice that in the case of the US company (country which has a high MAS index, characteristic to a society where competitiveness is appreciated) that it did not present retrospective information on the bioeconomy in that report. It focuses on projects they intend to pursue in the future. On the other hand, we note that the

information on bioeconomy presented by company A (the Netherlands), which is the country with the smallest MAS in the sample (14), characteristic of the countries where modesty is appreciated, is for the most part presented in the past, which highlights concrete aspects.

At the level of the 17 investigated organizations, the values obtained regarding the score of clarity are between 0 and 6, with a mean of the clarity score of 3.80. Two of the organizations registered an extreme score (F in 2016 – 6 points and L in 2010 – 0 points). The best clarity score of information was registered in 2016 (with an average of 4.24), at close distance from the year 2013 (with an average of 4.06). On the last place in terms of clarity there was the year 2010 at a distance of one point away from the year 2016, with a mean of information clarity of 3.06. This aspect indicates the fact that bringing forward the integrated reporting, the clarity of information improved.

We notice that for eleven organizations (65%) out of the 17 investigated organizations there was obtained a better information clarity index in comparison with the year 2010. It is interesting the fact that out of the eleven organizations, five organizations (A, B, K, L and O) turned to the online integrated reporting beginning with 2013, other three organizations displaying online integrated reports starting with 2016 (C, D and F). For four organizations (A, Q, H and K), the information clarity was not modified between 2013 and 2016.

A particular case is J from Germany for which the lowest score of clarity during the three investigated years was in 2016. This is generated by the fact that, unlike the previous year when the information was displayed into a single report, in 2016 the organization divided the disclosure of the financial and non-financial information in two reports: Financial Report and Sustainable Development. Yet, in 2013, along with switching to integrated reports, an improvement of the clarity score as compared to 2010 was registered.

We notice five cases (I and N from Brazil, E from USA, P from the Russian Federation and G from Canada), for which the clarity score remained constant during the investigated period, regardless of the changes in the guidelines used for sustainability reporting and the appearance of the integrated reporting. The scores obtained by these organizations were high: in the case of two organizations (I and N) the score of clarity was 4, and in the case of three organizations (E, G and P) the score of clarity was 3. On the basis of the criteria set out in the Research Methodology section, during the second stage of the research, we will identify whether all five situations are atypical cases and will explain the situation based on the cultural characteristics of the countries of origin of the investigated organizations.

3.2. Explaining the atypical evolution of the clarity score through the lens of the cultural characteristics

The scores obtained by Hofstede (2010) for the five cultural dimensions investigated as well as the score for the discretion measurement suggested by Hope (2008) for the countries in which the companies included in our sample are based, are presented in table 3.

Table no. 3. Scores of the cultural dimension and of the transparency index

Countries	UAI (112 – 8)	PDI (104 – 11)	IDV (91 – 6)	MAS (110 – 5)	LTO (100 – 0)	Discretion
Belgium	93 – French 97 – Netherlands	67 – French 61 – Netherlands	72 – French 78 – Netherlands	60 – French 78 – Netherlands	82	88 – French 80 – Netherlands

Countries	UAI (112 – 8)	PDI (104 – 11)	IDV (91 – 6)	MAS (110 – 5)	LTO (100 – 0)	Discretion
Brazil	76	69	38	49	44	107
Canada	60 – French 48 – Total	54 – French 39 – Total	80	45 – French 50 – Total	36	3 – French 7 – Total
Germany	65	35	67	66	83	33
India	40	77	48	56	51	69
Italy	75	50	76	70	61	49
Netherlands	53	38	80	14	67	11
Russian Federation	95	93	39	36	81	149
South Africa	49 (white)	49	65 (white)	63 (white)	34	33
Spain	86	57	51	42	48	92
USA	46	40	91	62	26	(5)

Source: Based on Hofstede (2010) and Hope (2008)

In order to identify and analyze atypical situations, we have built a correlation matrix that shows the positioning of the countries according to the discretionary score (SD) score, respectively the average score of the companies for the three years of the clarity index (Table 4).

Table no. 4. Correlation matrix between the discretion score and the clarity index

SD PC	(5)	7	11	33	49	69	80	92	107	149
3	E	G		D	L	L				P
3.33					H		C			
3.67					Q					
4				B				O	I, N	
4.33			A							
4.67			K	J	M					
5				F						

Source: Authors' compilation

• *Organizations included in quadrant I*

This category includes organizations with an aggregate score of less than 4 and a discretionary index lower than 72. Specifically, there were six organizations, namely: two organizations based in Italy (H and Q), D from South Africa, E from USA, G from Canada and L from India. It can be noted that all organizations that have parent companies in countries outside Europe that are part of the investigated sample (except organization F) are ranked in the same quadrant, characterized by a high degree of transparency (index of small

discretion) and a low degree of clarity. Of these, E from US and G from Canada recorded consistent values of the clarity score over the three investigated years. They are considered atypical cases.

Company E in the United States is also placed at the extremes of both dimensions. It had a constant score of information clarity in time, generated by the fact that none of the criteria analyzed changed over the three periods. In addition, we note that, after switching to integrated reporting, the disclosure was done only in the classic format (pdf file) without an on-line presentation of the information. This can be explained by the fact that, apart from the cultural values taken into account in determining the discretion score, the US is a country with a fairly high masculinity index (62), and the previous studies have demonstrated the existence of a negative association between masculinity and environmental reporting (Roy and Goll, 2014; Gallego-Álvarez and Ortas, 2017). In addition, the US legal system allows organizations to be sued very easily, which has contributed to a high consistency in reporting.

Another atypical case is Canada's company G. It remained constant in terms of clarity of information, regardless of changes in sustainable reporting. Although it has an average score (3) lower than the average (3,8) which would normally indicate a low clarity of information correlating with Canada's cultural values, the score should not be interpreted as one indicating a lack clarity of information, but on the contrary. As far as cultural influences are concerned, Canada has a PDI score of 39, indicating an accentuated trend of disclosure: "With respect to communication, Canadians value a straightforward exchange of information" (Hofstede, 2010). This led to a separate presentation of the information in each year in two reports and, therefore, to the increase in the clarity of the information. Another fact that led to the increase in the clarity of the information was the absence of a standard presentation of the information over the three years. In this respect, the presentation of the indicators was not achieved through the use of precise symbols and names, which could be explained by the UAI score of 48 indicating the existence of "freedom of expression" and the fact that, as regards the Canadian culture, this is "non-rule-oriented" (Hofstede, 2010). In addition, with regard to another cultural dimension, Canada's LTO score is 36, indicating that it is a society that "prefer to maintain time-honoured traditions and norms while viewing societal change with suspicion" (Hofstede, 2010). These issues explain the homogeneity in the clarity of G information, even though the versions of the reporting guidelines and the type of reporting changed in time.

- *Organizations included in quadrant Q2*

This category includes organizations with a cumulative score of less than 4 and a discretionary measurement index greater than 72. These are C in Belgium and P in the Russian Federation. Although the association between low information clarity (low clarity index) and low transparency (high discretion measure) is considered by us to be a normal situation, organization P has (i) constant scores and (ii) extreme values for both dimensions considered, being considered an atypical case.

Analyzing this case from the point of view of cultural values, the Russian Federation has a very high uncertainty avoidance score (95) (Hofstede, 2010). Organization P does not submit online integrated reports in any of the three years and does not use a standard indicator presentation correlated with the symbols proposed in the GRI reporting guidelines, although it displays information about them. In addition, it can be noted that P reports mention that some data is secret. For example, in the 2010 Annual Report (p. 153) it is stressed that "The

Company provides timely and full disclosure of information on all aspects of its business (except for instances where the information represents a commercial secret or other legally protected information)", and in 2016 it is underlined that the disclosure of information is carried out in such a way as to ensure "compliance with state secret" (P, 2016, p. 31). These results are convergent with those presented by Calu (2015). The Russian Federation was part of the communist countries, which led to changes in cultural values and, implicitly, to specific disclosure of information in the sustainability reports. The degree of transparency is currently reduced in some cases, the secrecy of information being a peculiarity of reporting during the communist era. This result is convergent with that obtained by Furrer et al. (2010), which found that there are differences between Western and Eastern European countries in terms of sustainability.

• *Organizations included in quadrant III*

This category includes organizations with an aggregate score of 4 or less, and a discretionary index lower than 72. Six organizations were included in this category: two in the Netherlands (A and K), two in Germany (B and J), one in South Africa (F) and one in Italy (M). The combination of high clarity of information (high clarity index) and high transparency (low discretion measure) is considered by us to be a normal situation.

• *Organizations included in quadrant IV*

This category includes organizations with an average clarity score of 4 or more and a discretion index greater than 72. Three organizations are included in this category: two in Brazil (I and N) and one in Spain (O). Given that Brazilian organizations have scored a constant score over the three years, and that the clarity index and the degree of transparency have diverged, they are considered atypical.

A specific feature is that the organizations I and N from Brazil disclose an identical clarity score for both organizations during the three years, for each of the sixS criteria taken into account. Although they belong to different industries, we notice the preference for the standardized and clear disclosure of information in the case of both organizations, in each of the three years. They use signs for the indicators described in the text, mentioning the version of the used GRI guidelines, as well as the use of the GRI indicator. The preference for the standardized presentation during the three years could be considered a cultural influence. For the Uncertainty Avoidance cultural dimension Brazil has a very high score (76), score considered characteristic to the societies that "show a strong need for rules and elaborate legal systems in order to structure life [...] bureaucracy, laws and rules are very important to make the world a safer place to live in" (Hofstede, 2010).

These results are convergent with those obtained by Baughn and McIntosh (2007) and Furrer et al. (2010) on the existence of differences in sustainable reporting. In addition, these aspects are complementary to those achieved by Romero and Fernandez-Feijoo (2015), which found that, as far as the desire for credibility of sustainability reports is concerned, the culture of countries plays an important role. Also, the study of the cultural dimension of the sustainability reporting is underdeveloped (Dragomir, 2018).

Conclusions

In order to achieve the research objective, we determined an annual score of information clarity for the disclosures included in the annual reports by each organization and an index of discretion measurement, according to the algorithm suggested by Hope (2008). We analysed the data on industries, in line with previous research (Freedman and Jaggi, 2005; Gao et al., 2005; Eccles et al., 2012). We noticed that for most of the organizations (65%), the degree of information clarity increased after the inclusion in 2013 in the IIRC's Pilot Program. Eleven of the organizations have a degree of information clarity for the reports published in 2013 and 2016 better than for those published in 2010. For five organizations (29%) the score of information clarity remained the same for all the three periods under investigation. In respect of the online integrated reporting, six organizations (A, B, K, L, M and O) presented online integrated reports both for 2013 and 2016, and three organizations (C, D and F) presented online integrated reports only for 2016. Moreover, all three organizations belonging to the Basic materials/Chemistry industry had online integrated reporting in 2016. The results of this research are complementary with those achieved by Calu (2015).

Analyzing the value of the clarity score has led to the conclusion that for the eight European Union companies in 2013, with the shift to integrated reporting, there was an improvement in the score of clarity, indifferent to whether or not there was a change of the GRI reference version used. The same trend was found for D and F in South Africa and for L from India. The similarity between the existing European and South African companies' trend can be argued by the fact that the cultural values tested by Hofstede do not show deviations from the average within the same value range. Also, the cultural values specific to India (except for PDI) are close to the average of the values in the West European countries. Moreover, the cultural exposure of D and F (from South Africa), respectively L (from India) is quite large. These companies operate on many continents, their shares being listed on several stock exchanges. The other five companies (atypical cases) were: I and N (Brazil), P (Russian Federation), E (USA) and G (Canada). In the case of I and N, the fact that there was no improvement in the clarity score after switching to integrated reporting can be explained by the UAI score. Brazil has a very high score (76), considered characteristic to the societies that show a strong need for rules. In the case of P (Russian Federation), the non-modulation of the clarity score with the transition to integrated reporting or the use of another version of the GRI guides can be explained by the extreme high score of UAI (95 out of 112). According to Hofstede (2010), such a score can be interpreted by existence of 'rigid codes of belief and behaviour, intolerant of unorthodox behaviour and ideas'. For G (Canada), according to Hofstede (2010) the PDI score was under the average of the interval (39), which indicates an accentuated trend for information disclosure: 'with respect to communication, Canadians value a straight forward exchange of information'. For E (USA), the existence of a consistent clarity score over the three periods can be explained by the lowest LTO score (26) recorded in the analyzed countries. This score indicates a preference for maintaining traditions.

We also found a cultural influence of the masculinity – femininity dimension. Thus, for USA's E organization, a country with a high MAS index (62), characteristic of societies where competitiveness is appreciated, it is noticed that the focus is on the future projects it intends to carry out. On the other hand, for organization A in the Netherlands, the country with the smallest MAS in the sample (14), characteristic of societies where modesty is

appreciated, the information about bioeconomy is mostly presented based on concrete achievements.

Our study shows that the principle of clarity is not fully observed by the companies included in our sample. We noticed that one factor which affects the clarity is the culture of the country in which the company is located. Taking into account the above issues, we consider that we contributed to the scarce literature in the domain of the application of the sustainability reporting's principles.

The publication of reports with a high degree of clarity of information emphasizing bioeconomic progress indicates that there is a transformation at the level of providers of such information, which is capable of influencing public opinion and social preference for bioeconomy, generating a "stimulus-response" type effect.

In the future we aim to continue to explore the degree in which the companies observe the principles of the GRI's guidelines in order to analyse more aspects that influence information regarding bioeconomy aspects published by companies.

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Annex no. 1. The clarity of information

Companies	Country	Year	GRI Index	A1	A2	A3	A4	A5	A6	Total	Rank
Basic Materials / Chemicals (3)											
A	Netherlands	2010	Citing GRI	1	1	0	0	0	1	3	2
		2013	G3.1	1	1	1	1	0	1	5	1
		2016	G4	1	1	1	1	0	1	5	1
B	Germany	2010	G3	1	0	1	0	0	1	3	3
		2013	G3.1	1	1	1	1	0	1	5	1
		2016	G4	1	1	1	0	0	1	4	2
C	Belgium	2010	Citing GRI	0	0	0	0	1	1	2	3
		2013	G4	0	0	1	1	0	1	3	2
		2016	SRS	1	1	1	1	0	1	5	1
Basic Materials / Industrial Mining & Metals (4)											
D	South Africa	2010	G3	0	0	1	0	0	1	2	3
		2013	G4	0	0	1	1	0	1	3	2
		2016	G4	1	1	1	0	0	1	4	1
E	USA	2010	G3	1	0	1	0	0	1	3	1
		2013	G3.1	1	0	1	0	0	1	3	1
		2016	G4	1	0	1	0	0	1	3	1
F	South Africa	2010	G3	0	0	1	1	1	1	4	3
		2013	G3.1	1	0	1	1	1	1	5	2
		2016	G4	1	0	1	0	0	1	6	1
G	Canada	2010	G3	0	0	1	1	0	1	3	1
		2013	G3	0	0	1	1	0	1	3	1
		2016	SRS	0	0	1	1	0	1	3	1
Industrials/ Air Transportation (4)											
H	Italy	2010	-	1	0	0	0	0	1	2	2
		2013	G3.1	0	0	1	1	1	1	4	1
		2016	G4	0	0	1	1	1	1	4	1
I	Brazil	2010	G3	0	0	1	1	1	1	4	1
		2013	G3.1	0	0	1	1	1	1	4	1
		2016	G4	0	0	1	1	1	1	4	1

Companies	Country	Year	GRI Index	A1	A2	A3	A4	A5	A6	Total	Rank
J	Germany	2010	G3	1	0	1	1	1	1	5	1
		2013	G3.1	1	0	1	1	1	1	5	1
		2016	SRS	0	0	1	1	1	1	4	2
K	Netherlands	2010	G3	1	0	1	1	0	1	4	2
		2013	G3.1	1	1	1	1	0	1	5	1
		2016	G4	1	1	1	1	0	1	5	1
Industrials/ Steel Producers (1)											
L	India	2010	-	0	0	0	0	0	1	1	2
		2013	G3.1	1	1	1	0	0	1	4	1
		2016	G4	1	1	1	0	0	1	4	1
Oil & Gas (5)											
M	Italy	2010	G3	0	0	1	1	1	1	4	2
		2013	G3.1	1	1	1	1	0	1	5	1
		2016	G4	1	1	1	1	0	1	5	1
N	Brazil	2010	G3	0	0	1	1	1	1	4	1
		2013	G4	0	0	1	1	1	1	4	1
		2016	G4	0	0	1	1	1	1	4	1
O	Spain	2010	G3	0	0	1	1	0	1	3	3
		2013	G3.1	0	1	1	1	0	1	4	2
		2016	G4	0	1	1	1	1	1	5	1
P	Russian Federation	2010	G3	0	0	1	1	0	1	3	1
		2013	G4	0	0	1	1	0	1	3	1
		2016	G4	0	0	1	1	0	1	3	1
Q	Italy	2010	G3	0	0	1	1	0	1	3	2
		2013	G4	0	0	1	1	1	1	4	1
		2016	G4	0	0	1	1	1		3	1

Source: authors' compilation