Does the level of Intellectual Capital Affect Meeting the Information Needs of Social Media Users in the Field of Sustainability? The case of the World's Largest Energy Industry Companies

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Abstract: It is increasingly essential for companies to communicate appropriately about sustainability. In today's world, with the massive spread of social media's popularity as a critical communication channel, sustainability is also present in the Internet disclosure practices of many enterprises. It is also presumed that firms' intellectual capital (IC) plays a vital role in the quality of corporate disclosure. Our paper aims to explore to what extent disclosure practices of firms via social media fulfill the needs of stakeholders for information related to sustainability. We also test how IC impacts this disclosure. We analyze tweets of the world's largest energy industry companies to assess if this disclosure meets the stakeholders' expectations regarding sustainability topics. Using a common measure of IC, we also check whether its level determines sustainability disclosure. This study provides several contributions to the literature. The findings may help understand companies' responsiveness to sustainability information needs. The chief contribution also lies in its focus on how the IC level influences the sustainability disclosure practices via social media. The findings may have implications for organizations in creating and using social media channels when developing a dialogue with stakeholders on topics regarding sustainability. Conclusions also provide new insight on IC's importance in corporate disclosure practices on sustainability.

Keywords: sustainability, disclosure, intellectual capital, social media, Twitter

1. Introduction

The public has never been more engaged in the current debate about the growing importance of sustainability concerning the society, the economy, and the environment. Consequently, the corporate disclosure of sustainability has steadily increased its relevance and perception by stakeholders over the last years. Additionally, in today's world, the communication of companies with their stakeholders has changed significantly. The rapid transformation in technologies and forces of mass communication, together with digitization, provide challenges and opportunities for companies concerning information disclosure and dialogue with stakeholders (Bryl, et al., 2021). Evolutions in technology and the way society communicates are shifting reporting practices from traditional media to online channels, such as websites, Facebook, and Twitter (Lombardi & Dumay 2017). Also, sustainability disclosure is continuously more present in the dynamic social media sphere.

We aim to understand what the companies disclose on sustainability via social media and if the information published is appropriately adjusted to the information needs of its recipients. We assess the content of tweets of energy industry companies to compare it with the stakeholders' expectations regarding sustainability in this specific industry. The stakeholders' needs were determined with the help of the GRI Report (2013), addressing the sustainability reporting needs of the given industry. We base our study on the legitimacy theory, stakeholders' theory, and signaling theory. We also indicate the intellectual capital (IC) as the relevant variable for sustainability disclosure. Drawing on resource-based theory (Penrose 1959), we consider the companies with high IC as those that possess knowledge and awareness together with capabilities that prone them towards better communication with their stakeholders in the sphere of social, environmental, and governance goals. Therefore, the second aim of this paper is to check how the level of IC impacts sustainability disclosure.

The energy sector has been chosen as it devours an inherent responsibility to realize a sustainable world. On the one hand, energy utilities have long played a vital role in the energy transition by contributing to a secure energy supply and decarbonization; this sector is expected to secure the affordable, reliable, and sustainable energy supply to end extreme poverty and promote shared prosperity. On the other hand, practices of some actors in the energy sector, together with the over-reliance on greenhouse gas-intensive fossil fuels, undermine global

efforts to mitigate climate change and maintain healthy ecosystems and populations, which can exacerbate worldwide conflict and inequality. Therefore, the chosen sector is particularly significant in the discourse of sustainability.

This study makes several inputs to the literature. It contributes to enriching the theory with sectoral-sensitive analysis concerning sustainability disclosure. The findings may help to understand what components of sustainability disclosure are perceived by companies as the most important to be communicated to stakeholders and if they match the information needs of their addresses. The results have implications for organizations in creating and using communication channels when developing a dialogue with stakeholders on topics regarding sustainability. They might also be of interest to the regulators of non-financial information.

Despite the increasing importance of sustainability reporting worldwide, to the best of our knowledge, there is currently just one study by Bananuka et al. (2021) that has linked IC and its components to sustainability reporting. Our research extends this analysis to the disclosure in social media. Studies on whether the information needs of the recipients of information disclosed by companies on sustainability are also scarce. Given the lack of prior research in these two fields, our study aims at covering this niche.

The article is structured as follows: the first section presents a background and literature review, allowing the formulation of research questions. The second section describes the sample, data collection, and methodology. The third part shows the results and discussion, followed by conclusions.

2. Background and literature review

2.1 Sustainability disclosure and social media

Sustainability disclosure gives way to the organization to convey the organization's short-term and long-term vision and strategies to the stakeholders. Consequently, it has the potential to show how the value is created. By realizing economic, environmental, and social information, the organization may communicate with various potential parties, including suppliers, creditors, activist groups, the government, the media, customers, and the general public (Saxton et al., 2019). Sustainability disclosure, therefore, reduces information asymmetry and helps gain a competitive advantage and reputation that lead to value maximization (Bae et al., 2018). During the last decade, the transformation brought by digital and technological advances has made organizations undergo a thorough overhaul of communication with their stakeholders. Traditionally, corporate annual reports were considered the primary source for communicating the organizational performance to their stakeholders (Hadro et al., 2021). However, in the last decades, social media has disrupted the firms' reporting field by providing a more dynamic and interactive public space (Neu et al., 2020). Social media can be a powerful communication resource for sustainability and may provide potentially efficient means for sharing sustainability-related information and engaging stakeholders in sustainability discussions. The appropriate communication of sustainability activities is necessary for companies to achieve credibility and legitimize their actions. Social media has created new possibilities for organizations to engage in conversations with their stakeholders and receive real-time feedback on organizational announcements (Manetti et al., 2017).

Consequently, companies are increasingly using the internet to disseminate sustainability information as it enables them to engage with a broader range of stakeholders on a timely basis (Lodhia 2018). Social media have given a chance to organizations to disseminate reliable and consistent information, meet the public's expectations, and earn public trust. However, the information released should be adjusted to the information needs of their uses specific to the industries to which the company belongs.

2.2 Stakeholders' information needs

Business stakeholders such as suppliers, customers, and investors are the main drivers for communicating sustainability credentials (Thijssens et al. 2016). Companies face increasing pressure from stakeholders to adopt sustainable behavior and provide an adequate representation of sustainability practices (Raimo et al., 2021). Most existing sustainability disclosure is voluntary, which means that individual issuers choose which information to disclose. The resulting lack of standardization means that disclosures vary substantially, which raises the issue of to which extent this disclosure meets the information needs of its recipients. The increasing importance placed on sustainability worldwide has contributed to focusing attention on the specific shareholders' information needs. It is essential to underline that the stakeholders are not a homogeneous group. Therefore, the information needs of investors and other stakeholders differ in their focus on different aspects

of an organization's activities and on different types of information (de Villiers & Sharma 2020). Different stakeholder groups typically have other objectives in seeking corporate information (Adhariani & de Villiers 2019). Companies are expected to report extensively on all critical aspects of sustainability while ensuring that they do not subordinate the interests of groups that have specific expectations and information needs (Naynar 2016). Identifying potentially material topics by sector or industry is fundamental for high-quality sustainability reporting, both for organizations that report and for users of the reports, and aids other management activities that aim to evaluate companies' sustainability performance (GRI 2013). To meet the information expectations, it is necessary to get acquainted with them. The report prepared by the Global Reporting Initiative (GRI) (2013) can provide companies with the essential help. GRI is a not-for-profit organization that promotes the use of sustainability reporting as a way for organizations to become more sustainable and contribute to a sustainable global economy. The report of GRI (2013) provides an international reference list of relevant sustainability topics, considering the different stakeholders' perspectives of particular sectors. Based on the previous, we formulate the following two research questions:

RQ1: What sustainability topics disclose companies from the energy industry on Twitter?
RQ2: To what extent do corporate disclosure practices in the energy industry meet the information needs of their stakeholders?

2.3 IC and sustainability disclosure

Even though there is no generally accepted definition of intellectual capital (IC), there is a consensus concerning the fact that IC is important as a factor in the achievement of organizational objectives (Striukova, Unerman & Guthrie 2008). In this paper, we refer to the understanding of IC as the "intellectual material, knowledge, experience, intellectual property and information that can be put to use to create value" Dumay (2016). IC can be utilized by management to take a longer-term perspective of organizational strategy and provide information to financial stakeholders (De Villiers and Sharma 2020). Intellectual capital is one of the prominent features in the current era, the era of the knowledge revolution and the revolution of smart technologies. The use of data and technology requires specific knowledge and skills embedded in intellectual capital (Juric, 2020). This is the first motive that makes us assume the relation between a high level of IC and social media disclosure on sustainability. The relationship between the IC and the idea of sustainability and their mutual influence was underlined from the theoretical perspective in the existing literature (e.g. Sułkowski & Fijałkowska 2013). Empirical research usually tries to verify how much of intellectual capital is disclosed through sustainability disclosure (e.g., Bronzetti et al., 2013). Other studies document the determinants of sustainability disclosure. Still, these are limited to company characteristics such as firm size and age, firm nationality, industry type, ownership structure, corporate governance, reporting language, auditor type, profitability, growth, media visibility, and GRI usage (e.g. Manetti and Bellucci, 2016; Dienes et al., 2016).

In this paper, we take a different approach. We follow Bananuka et al. (2021), indicating that in a situation where the firm's total intangible and knowledge-related resources useful for value creation are low, it is likely that sustainability reporting practices will also be low. Firms with low levels of IC continue to exert meager and simple disclosure, usually exclusively obligatory, because of a lack of competencies, recognition of the need, and resources required to prepare more sophisticated sustainability disclosure. To prepare disclosure on sustainability, the company needs knowledgeable, skilled, and motivated employees, appropriate systems and databases as well as relationships between firm workers and other stakeholders capable of smooth information acquisition, elaboration, and sharing. All these are crucial elements of IC. Therefore, IC may be treated as an important moderator of sustainability disclosure. Consequently, de Villiers and Sharma (2020) underline that IC is an essential element in preparing sustainability reports. Also, Massaro et al. (2018) provide evidence of the interconnection between IC and sustainability and suggest it is hard to separate the two.

Considering the above, we expect that the level of IC may determine the sustainability disclosure. This topic is a research niche. The only existing studies indicate some components of IC influence sustainability reporting. The latest survey by Bananuka et al. (2021) based on a questionnaire investigates whether IC elements (human, structural and relational capital) affect sustainability reporting practices of financial services in Uganda. They find that human capital and relational capital elements are the resources that can better explain the variances in sustainability reporting practices. With this research, we add to the previous analysis of Bananuka et al. (2021), which is believed to be the first study examining how IC affects sustainability reporting practices. We extend their research to sustainability disclosure in social media. We also place our study in the international context and other sectors. Our study also applies a different methodology that focuses on analyzing the text disclosed.

With this research, we add to the previous analysis of Bananuka et al. (2021). Considering theoretical premises, we formulate the third research question:

RQ3: How does intellectual capital impact the extent of sustainability disclosure on Twitter?

3. Sample, data collection, and methodology

3.1 Sample and data collection

To analyze the main topics related to sustainability that companies disclose on social media, we focused our research on the top 32 companies from the Fortune 500 ranking in the energy industry for the year 2021. We decided to investigate the world's largest business corporations in this sector based on their revenue in descending order. Hence, we followed Xiong *et al*. (2019), who found that company size affects how companies adopt Twitter in their communication. Generally, smaller companies with limited resources tend to use Twitter less and, if so, mainly for one-way communication. We also decided to exclude Chinese companies from our research since studies suggest Chinese companies barely use English profiles on Twitter for corporate purposes (Bryl 2021). The main features of our sample are presented in the table below.

Table 1: Descriptive statistics of the studied sample

No. of companies	32
National context	US (10), Germany (2), Brazil (2), India (2), UK (2), Italy (2), Spain (2), France (2), Saudi Arabia (1), Norway (1), Finland (1), Switzerland (1), Russia (1), Malaysia (1), Austria (1), Australia (1)
Tweets	
Total	17 876
Mean	558,6
Median	329,5
Min.	22
Max.	2 521

Source: Own elaboration

To collect data on tweets, we used a dedicated R script (Rtweet) that employed the official Twitter API to download tweets from corporate profiles for the entire year 2021. We concentrated only on the official English language profiles of the companies. The Twitter accounts of each company were identified and manually validated to eliminate false corporate profiles. We excluded brands and sub-brands profiles of the studied company. Finally, we gathered 17 876 tweets, an average of almost 559 tweets per company.

3.2 Methodology

To determine the disclosure on sustainability (to answer RQ1 and RQ3), we adopted the keywords/keyphrases approach. Keywords/keyphrases were defined as either a separate word (leakages), an abbreviation (HR), or a phrase (emission to air) multiplied by various verbal expression forms.

With the help of Kripendorff's (2004) rules for content analysis, a single tweet containing only text was defined as the unit of our research. Because a single tweet could potentially encompass more than one item referring to sustainability, we developed a concept of sustainability mention that was depicted as any information related to sustainability within a separate tweet. Consequently, we managed to identify several sustainability mentions in various categories in a single tweet. As a result, we anticipated that the total number of sustainability mentions would outnumber the total number of tweets related to sustainability topics. We erased pictures, videos, and/or external links from tweets to concentrate only on the textual content. To identify the sustainability keywords, we applied the Global Reporting Initiative (GRI) report: "Sustainability Topics for Sectors: What do stakeholders want to know?" which defines the most important topics for stakeholders in the given industries. We follow the research of GRI (2013), in which this institution conducted a questionnaire among 94 organizations related to the different stakeholder groups. This research generated 2812 topics that were related to 52 business activity groups. As a result, the 1612 unique topics have been identified through this process. A special section was dedicated to the energy sector. It lists all the material issues that the users of information concerning this sector expect about sustainability disclosure. The table below shows the most relevant topics for stakeholders in the energy industry companies based on GRI (2013).

Table 2: Sustainability topics most desired in the energy industry according to GRI

Category	Topic
Economic	Carbon abatement and offsetting
	Payments to government
	Strategy to address risks and opportunities from climate change
	Tendering processes
	Indirect economic impacts
	Local employment
	Local supply chain
Environment	Energy efficiency of end products & Energy efficiency of operations
	Water management
	Water withdrawal
	Water pollution
	Biodiversity and ecosystem services (BES) impact management
	Emissions to air
	Leakages
	Oil/gas spills
	Tailings waste
	Fires and explosions
	Remediation, reclamation and decommissioning
Social	Employment practices
	Labor management
	Occupational health and safety management
	Employment practices
	Migrant workers
	Impacts on local communities
	Local community resettlement
	Public policy positions and lobbying
	Corruption
	Risks and conflicts with local communities and indigenous peoples
	Human rights impacts
	Security practices in sensitive and/or conflict-affected areas
	Water use rights
	Fuel quality
	Eco-efficient technological innovation
	Emergency preparedness
	Process safety and asset integrity
Other	Renewable energy technology
	Corporate governance
	Oil and gas reserves
	Biofuel production
	Emergency management system
	Near accidents management
	Political accountability
	Unconventional and hard-to-access oil/gas reserves exploitation

Source: GRI, 2013

Based on the GRI report (2013), we developed a set of 86 keywords related to sustainability divided into four main categories (Environment, Economic, Social, and Others), which are most relevant for energy industry companies. We created an Excel spreadsheet that included a set of tweets for a given company. With the help of Excel formulas, we automated the process of searching tweets for keywords. A random manual double-check was performed to avoid any potential research mistakes.

To overcome the limitation of a small sample and to find the answer for our RQ3, we employed a QCA method, which has been lately more widely used in management and finance studies (Mastrangelo et al., 2019). QCA is a set-theoretic method that uses sets and searches for set relations to form concepts and formulate casual relations between social phenomena applying Boolean algebra rules (Schneider & Wagemann 2012). QCA is based on configuration analyses (also referring to conjunctural causation in set theory) (Schneider & Wagemann 2012), assuming that different conditions can cause the occurrence and absence of an outcome (Greckhamer et al. 2018). We use fs/QCA software to run QCA analysis. Fs/QCA uses the Quine-McCluskey algorithm with the simplification rules of Boolean expressions to determine configurations that are sufficient or necessary conditions for specific levels of an outcome (Fiss 2007; Schneider & Wagemann 2012). Finally, the QCA analysis results for each outcome are presented as models with the degree of consistency and coverage. Consistency is defined as the degree to which empirical evidence is consistent with the set-theoretic relation in question (Rihoux & Ragin 2008). At the same time, coverage can be interpreted as a numeric expression for the empirical importance (sufficiency) and relevance (necessity) of a given condition (or a combination) for producing an outcome (Schneider & Wagemann 2012). The formulas expressing consistency and coverage are as follows (Rihoux & Ragin 2008):

$$Consistency\ (X_i \leq Y_i) = \frac{\sum(\min(X_i, Y_i))}{\sum(X_i)} \quad (1)$$

$$Coverage\ (X_i \leq Y_i) = \frac{\sum(\min(X_i, Y_i))}{\sum(Y_i)} \quad (2)$$

Where min indicates the selection of the lower out of two values, X_i represents membership scores in a combination of conditions, and Y_i represents membership scores in the outcome.
To apply QCA analysis with our data, we used models described by the following equation:

$$y = f(x_1, x_2, x_3, x_4) \quad (3)$$

We run five models with the same four conditions (x_1, …, x_4). As outcomes (y), we defined five dependent variables representing the ratio of sustainability intensity and five sustainability topics in the companies' tweets (Tweets sustainability intensity, Environment, Economic, Social, Other mentions intensity). As a condition, there is an explanatory variable in each model - Intellectual Capital (IC) measured as market value to book value (MV/BV). Based on the literature review, we also added three control variables: company profitability (EBIT/equity), company size (value of assets), and leverage (debt/assets).

4. Results and discussion

To answer RQ 1, we first investigated the intensity of tweets containing the sustainability items and the division into the four sustainability categories. In 2021, a total of 7 669 sustainability tweets were published, which made an average of 239 sustainability tweets per company. Hence, we argue that sustainability is an important theme in corporate disclosure practices on social media since almost half of the published tweets referred to sustainability (mean score of 0.47) (Table 3).

Table 3: Sustainability topics' intensity in tweets

	Tweets			Mentions				
	Total	Sustainability	Sustainability intensity	Environment	Economic	Social	Other	Total
AngloAmerican	458	147	0,32	56	48	91	18	213
Aramco	201	98	0,49	79	20	30	7	136
BHP	410	134	0,33	68	34	79	16	197
BPC Limited	1800	356	0,20	206	21	186	64	477
Centricapls	276	139	0,50	106	47	36	29	218
Chevron	524	145	0,28	83	72	40	31	226
Enbridge	695	317	0,46	162	54	182	63	461
Enel group	703	425	0,60	220	128	106	200	654
Energy Transfer	603	419	0,69	335	64	138	44	581
Engie	1053	553	0,53	292	313	144	167	916
Eni	835	263	0,31	141	103	104	68	416
Eprod	126	52	0,41	43	2	7	1	53
Equinoir	115	72	0,63	57	26	10	25	118
Exelon	509	305	0,60	162	48	223	24	457
ExxonMobil	116	83	0,72	72	34	17	5	128
Flameoftruth	2521	389	0,15	118	46	370	71	605
Fortum	91	61	0,67	47	26	13	16	102
Gazprom	248	40	0,16	16	5	8	18	47
Glencore	526	252	0,48	92	140	159	33	424
Iberdrola	1198	793	0,66	582	118	207	652	1559
Marathon Petroleum	346	151	0,44	31	22	132	19	204
Petrobras	22	12	0,55	11	4	3	1	19
Petronas	101	28	0,28	18	4	15	4	41
Philips	246	141	0,57	84	24	83	21	212
Repsol	224	129	0,58	107	40	28	46	221
RioTinto	185	96	0,52	40	42	40	16	138
Shell	162	94	0,58	80	28	9	34	151
Siemens Energy	313	159	0,51	115	34	49	39	237
Total Energies	1267	409	0,32	269	144	123	183	719
Uniper	1689	1284	0,76	1132	288	264	217	1901
Vale	192	80	0,42	17	18	60	14	109
Valero	121	43	0,36	9	8	43	12	72
Total	**17 876**	**7 669**	**0,47***	**4 850**	**2 005**	**2 999**	**2 158**	**12 012**

*mean value
Source: Own elaboration

We observed that tweets containing topics related to sustainability (tweets sustainability intensity) are relatively numerous. On average, 47% of all tweets of the world's largest energy companies include at least one sustainability topic. Although the tweets' sustainability intensity performed a visible variance, we did not identify a company that does not disclose anything on sustainability via tweets. In addition, the lowest tweets' sustainability intensity amounted to 0,15, which still suggests that sustainability topics are not entirely neglected even in the case of that single company (Flame of Truth). Considering the sustainability categories breakdown, the most often disclosed themes related to the environment (40%), followed by the social topics (27,9%). Details are presented in the table below.

Table 4: Summary of the sustainability disclosure in tweets

	Total	Share (%)	Mean	Median	Min	Max
Environment	4 850	40	151,6	83,5	9	1 132
Economic	2 005	17,4	62,7	37,0	2	313
Social	2 999	27,9	93,7	69,5	3	370
Other	2 158	14,6	67,4	27,0	1	652
Total	12 012	100	375,4	215,5	19	1 901

Source: Own elaboration

Concerning RQ2, first, we identified the sustainability topics of the most significant interest expressed by the stakeholders of the energy industry outlined in the GRI report (Table 2). Secondly, we identified the most frequently disclosed topics based on the set of previously developed keywords, and finally, we compared these two sets of data. The results are presented in the figure below.

The three most often topics disclosed via Twitter were not classified into one main sustainability category. In fact, these topics belonged to the Environment (Energy efficiency of end products & Energy efficiency of operations), the Other (Renewable energy technology), and the Social (Carbon abatement and offsetting) category, respectively. Comparing the broad spectrum of topics expected by the stakeholders, we state that, on average, companies address the needs for sustainability information relatively well; however, there is still a great potential for improvement. We observed that the companies entirely neglected some topics, i.e., none of the studied companies disclosed on Twitter topics related to oil/gas exploitation, political accountability, fuel quality, water use rights, local community resettlement, fires, explosions, leakages, local supply chain and tendering processes. In general, these topics have rather negative content, and therefore disclosing them may put companies in a negative light. Consequently, we conclude that disclosing sustainability on Twitter is not free of greenwashing corporate practices.

To answer RQ3, we use Qualitative Comparative Analysis to find casual relations in our sample. Results of five logical models confirm that Intellectual Capital is relevant for sustainability disclosure on Twitter for energy industry companies. We look at five models for the Sustainability intensity, Environment, Economic, Social, and Other topics intensity outcomes. We obtain equifinality (alternative factors that can produce the same outcome) in our models, thanks to QCA, which indicates that more than one set of variables explains a specific outcome (Fainshmidt et al. 2020). The results of the QCA method are presented in Table 5.

Figure 1: Sustainability posts on Twitter in 2021 (sustainability topics - keywords counts)

Source: Own elaboration

In each model, IC is a relevant driver for the level of sustainable topics disclosure on Twitter. The study results align with the resource-based view theory, which suggests that organizations with resources like IC that are not imitable, substitutable, and rare have a competitive advantage over those without. This result also goes in line with legitimacy theory, stakeholders' theory, and signaling theory. Moreover, it is also consistent with a few existing empirical studies in this field (Bananuka, 2021, Yusoff et al., 2019). Our study, however, goes further. We find that IC does not constantly influence positively dependent variables. For models with Sustainability intensity and Environment dependent variables, solutions without IC are also present. Sustainability intensity and Environment models solutions' paths include similar sets of conditions. IC influenced disclosure of sustainability and environmental topics on Twitter positively if companies are both large and with low leverage. Disclosure related to sustainable topics, in general, is more frequent for companies with a lower level of IC if they are smaller or in the worst financial situation, less profitable, and with higher leverage. Likewise, when the

value of IC is lower, separately as two solutions, small companies and those highly in debt tend to communicate more about environmental issues. There are two solution paths for the Economic disclosure model that include IC as a relevant variable. Companies with higher IC tweet more about Economic topics if they are greater, less profitable, and have lower leverage.

In contrast, the group of companies that disclose less about that topic is characterized by a lower level of IC and profitability but is larger. There is only one solution regarding Social disclosure, where there are more tweets of companies with higher IC but smaller in size and with lower leverage. In the model, in reference to topics classified as Other, our research confirms that the companies that are more active on Twitter are the ones with a lower level of IC but, at the same time larger and less profitable.

Table 5: QCA results

Sustainabilityintensity = f(IC, Profitability, Size, Leverage)			
	raw coverage	unique coverage	consistency
~IC*~Size	0.703617	0.0565928	0.799735
~Size*Leverage	0.62077	0.021587	0.819723
~IC*~Profitability*Leverage	0.576429	0.042007	0.859131
IC*Size*~Leverage	0.348891	0.0484248	0.811398
solution coverage: 0.831972			
solution consistency: 0.726439			
Environment = f(IC, Profitability, Size, Leverage)			
	raw coverage	unique coverage	consistency
~IC*~Size	0.750477	0.0528326	0.78183
~IC*~Profitability	0.711012	0.0171865	0.771409
~Size*Leverage	0.651178	0.0337365	0.788135
IC*Size*~Leverage	0.401655	0.0401018	0.856174
~Profitability*~Leverage	0.582432	0.00190961	0.793582
solution coverage: 0.931891			
solution consistency: 0.71345			
Economic = f(IC, Profitability, Size, Leverage)			
IC*~Profitability*Size*~Leverage	0.380703	0.0882573	0.804107
~IC*~Profitability*Size*Leverage	0.468212	0.175767	0.865837
solution coverage: 0.55647			
solution consistency: 0.835955			
Social = f(IC, Profitability, Size, Leverage)			
IC*~Size*~Leverage	0.604106	0.604106	0.826479
solution coverage: 0.604106			
solution consistency: 0.826479			
Other = f(IC, Profitability, Size, Leverage)			
~IC*~Profitability*Size	0.573964	0.573964	0.827292
solution coverage: 0.573964			
solution consistency: 0.827292			

Where: ~ indicates the absence of a condition, no variable means that a condition is not relevant for the particular solution

Source: own elaboration based on fs/QCA software

5. Conclusion

The universe of social media is vast and growing. Social media platforms have created an impressive field for interactive communication among all actors taking part in sustainability activities. The first central thesis of this article is that the non-financial disclosure should satisfy the information needs of its stakeholders. The second states that intellectual capital determines this disclosure. The analysis results indicate that sustainability is an important topic in social media disclosure practices. All the companies in our sample tweet about sustainability issues. Out of all tweets on any possible topic, almost half of them include sustainability topics. Certain topics

are pmore relevant among tweeters' preparers. These include environmental and social issues. Analyzing in-depth the information needs of the addressees of the information disclosed by the company concerning a particular industry, we notice that these needs are not entirely fulfilled in many areas. This is especially true in those areas where there is stakeholder interest, but disclosure of information might not be beneficial to the company. This allows us to conclude that companies opportunistically select information to present to their users in such a way as to create a positive image of themselves and do not necessarily care about preserving the principle of delivering relevant and material information. This situation disturbs the principle of transparency and accountability. It also raises suspicion of greenwashing practices.

Regarding intellectual capital and its role as a determinant of sustainability disclosure, we can partially conclude similarly to the work of Bananuka et al. (2021). Intellectual capital is relevant for sustainability disclosure on Twitter for energy industry companies, that was confirmed by five logical models of QCA. However, its influence is not always positive; it depends on companies' financial characteristics and sustainability topics. Social media provide opportunities for dynamic engagement online. They also contribute to creating a sustainable world where each voice will be heard and acknowledged. Undoubtedly, online and mobile communication channels are expanding and should not be ignored by companies on any topic, including the one referring to sustainability.

The only concern is that the information disclosed through the use of these modern and attractive communication methods presents information tailored to the needs of its users rather than selectively and opportunistically tailored to the needs of the company that publishes it. The results of this research imply that to improve sustainability disclosure practices, emphasis should be put on understanding the information needs of addresses and better use of social media as they offer a unique platform for communication exchange and dialogue. The IC is also an important moderator of the disclosure; therefore, in order to take advantage of the social media potential and create and use an appropriate communication platform and thus keep stakeholders informed, it is vital to develop corporate IC. This study contributes to and extends the existing literature on sustainability disclosure practices, but it is limited to the world's largest energy industry companies. Future research may involve other sectors with larger samples to validate our results.

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