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# Communicating Sustainability: An Operational Model for Evaluating Corporate Websites

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**Abstract:** The interest in corporate sustainability has increased rapidly in recent years and has encouraged organizations to adopt appropriate digital communication strategies, in which the corporate website plays a key role. Despite this growing attention in both the academic and business communities, models for the analysis and evaluation of online sustainability communication have not been developed to date. This paper aims to develop an operational model to identify and assess the requirements of sustainability communication in corporate websites. It has been developed from a literature review on corporate sustainability and digital communication and the analysis of the websites of the organizations included in the “Global CSR RepTrak 2015” by the Reputation Institute. The model identifies the core dimensions of online sustainability communication (orientation, structure, ergonomics, content—OSEC), sub-dimensions, such as stakeholder engagement and governance tools, communication principles, and measurable items (e.g., presence of the materiality matrix, interactive graphs). A pilot study on the websites of the energy and utilities companies included in the Dow Jones Sustainability World Index 2015 confirms the applicability of the OSEC framework. Thus, the model can provide managers and digital communication consultants with an operational tool that is useful for developing an industry ranking and assessing the best practices. The model can also help practitioners to identify corrective actions in the critical areas of digital sustainability communication and avoid greenwashing.

**Keywords:** corporate sustainability; sustainability communication; digital communication; operational model; corporate website; greenwashing

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## 1. Introduction

Over recent decades, the growing interest in corporate sustainability (CS), which is considered “a complex synthesis of institutional factors, social value perspectives, technologies and engineered artifacts, and natural or environmental conditions” [1] (p. 4432), has gradually taken over debates in both academia and business [2,3]. The need for organizations to achieve sustainable development and meet the stakeholders’ expectations is generating dramatic changes in policies and business practices.

Moreover, the increasing attention to stakeholder engagement practices, providing new opportunities to promote public participation, suggests that organizations are adopting new decision-making models and methods for online corporate communication management [4–7].

Indeed, digital environments are progressively playing a crucial role in the sustainability communication of organizations in many different industries [8,9]. Increasingly more often, the websites of large companies present wide sections dedicated to corporate social responsibility (CSR) issues [10] to communicate their commitment to corporate sustainability to stakeholders. In particular, corporate websites have become effective communication channels for disclosing sustainability

information and for improving exchanges with stakeholders [10,11]. These web-based interactions and conversations are able to directly influence stakeholders' interest and their engagement in social and environmental corporate performances [9,12].

Despite the upsurge of interest in the online communication of corporate sustainability, communication practices have only recently received attention in this field [13]. Indeed, models and empirical studies related to the evaluation of sustainability communication in digital contexts remain very limited [10,14–16]. Corporations still have difficulties in identifying, measuring, and improving the critical factors of effective sustainability communication [17].

On these grounds, this paper develops an operational model for evaluating and improving the sustainability communication of the official websites of for-profit and non-profit organizations. The acronym derived from the initials of the core dimensions of online sustainability communication (orientation, structure, ergonomics, content—OSEC) gives the name to the proposed operational model.

The development of a framework for corporate website analyses is relevant both theoretically, because it will favor the comparability of future studies, and practically, because it makes possible the provision of insights to communication managers on how to more effectively communicate their sustainability initiatives in digital environments.

The remainder of the paper is as follows. Section 2 reviews the literature on sustainability communication, focusing on the determinants of effective CSR communication through corporate websites. Then, the research design is explained (Section 3). This allows setting the building blocks for the development of the operational model (Section 4) in which all of the levels are detailed. Section 5 proposes a pilot study on the websites of corporations in the energy and utilities sector included in the Dow Jones Sustainability Index 2015 [18]. The study concludes with managerial implications and suggestions for future research (Section 6).

## 2. Literature Review

The sustainable corporation is gradually emerging as a new business paradigm that is considered essential for the development and competitiveness of organizations [19–21]. The orientation towards sustainability defines the company's identity and highlights the "3P" (Planet, People, and Profit) corporate commitment [22]. In light of this "triple bottom line" model, an organization is deemed to be sustainable if it is able to ensure the right balance between economic performance, the protection of environmental resources, and social progress [23].

A sustainable business approach cannot be implemented without effective communication that aims at sharing CSR values with stakeholders [1]. In this paper, we use the term sustainability communication when referring to all types of corporate and marketing communications about sustainability issues. Sustainability communication thus includes CSR communication that exclusively concerns issues of environmental protection and social responsibility in relation to economic success [24]. This implies that findings from previous CSR communication studies can be usefully "transferred" to sustainability communication.

Sustainability communication has been conceptualized as more than sender-oriented communication to persuade others (among others, see [25]). It also includes processes of dialogue and discourse and the normative aspect of sustainable development [13]. In this perspective, corporate sustainability becomes a narrative construct in which the discourse serves to frame and perform specified sustainable actions [1,26].

The growing interest in sustainability issues and in their performative character has led organizations to adopt appropriate channels both to communicate their commitment and to engage with their stakeholders, especially in an online context [27–29]. Among the online tools that are most commonly used by organizations, a crucial role is played by the corporate website because it enables a more direct and immediate presentation of corporate statements and sustainability initiatives [30–32]. Indeed, corporate websites are progressively replacing traditional corporate communication media (e.g., informative kits, leaflets) in CSR activities, and they are even superior to annual reports because

they present information in a timelier manner [14,33]. From this perspective, online communication becomes a “key relational driver” that connects the company with its stakeholders, helps develop trusted relationships with them, and enhances corporate reputation [34,35].

Thus, the purpose of sustainability communication is to adequately convey the sustainable organization’s commitment, avoiding the gap between what the company “promises” and its effective ability to achieve and report the expected results. On the one hand, the disclosure of information about future sustainability achievements and business performance can increase reputational capital [36]. On the other hand, the (potential) gap between promises and concrete results can be a source of reputational risk [37,38]. Therefore, sustainability-oriented organizations have a high potential in terms of reputational capital but, simultaneously, are more exposed to reputational risk. This risk is strongly increased if the company implements “cosmetic communication”, without concrete actions. In this case, greenwashing [39–41], that is, the practices of corporate identity “cosmetics” (identity-washing) designed to manipulate or hide the most controversial aspects of corporate sustainability, occurs. The risk of greenwashing is also amplified by stakeholders’ empowerment in digital environments [42].

The development of an orientation towards sustainability frequently involves the definition of corporate governance systems, that is, structures and practices through which the organization manages its relationships with its stakeholders, to integrate sustainability issues into corporate management [43]. From this perspective, sustainability-oriented companies must establish an organizational model that is able to achieve the corporation’s purposes [44]. Governance mechanisms, as well as decision-making processes, can be formalized in terms of structures and organizational charts, with clear assignments of responsibility. In the organizational model of sustainable companies, there are different structures and professional roles, acting at both strategic and operational levels [45]. From a strategic perspective, it is possible to identify the presence of departments/functions that manage corporate sustainability strategies, such as the Sustainability Board, the Board Committee, the Director or the Coordinator for sustainability, etc. [7,46]. At the operational level, however, there are sub-organizational units that exclusively address sustainability management [47].

The websites of sustainable organizations frequently present a section concerning sustainability organizational models and governance tools. In particular, the importance of reporting has grown over recent years, resulting in the gradual spread of sustainability reports, realized in accordance with the principles set by international organizations (e.g., Global Reporting Initiative, GRI) [48,49]. The potentiality of the web has led to the proliferation of more interactive reporting approaches to further involve stakeholders [50–52]. Therefore, interactive reporting, transparency, and accountability have become the core elements of sustainability communication in digital contexts to ensure consistency between corporate commitment and the actions that are actually implemented [53].

In addition to sustainability reports, organizations adopt other corporate governance tools to communicate their CSR activities. In this regard, the Code of Ethics and Conduct [54,55], certifications [56,57], and the inclusion in specific sustainability indexes constitute valid indicators to assess the effectiveness of sustainability communication [14,58,59].

The involvement of stakeholders in social, environmental, and economic issues is considered a key aspect in the management of companies’ activities [60]. A sustainable organization inevitably promotes processes of engagement to create “shared value” with its stakeholders [29,61]. The Internet supports bi-directional and multi-directional communication processes with stakeholders [62]. The development of digital tools gradually empowers stakeholders, which become active in the generation of “new content” (user-generated content) [63–65].

Particularly in the digital environment, organizations need to adopt participatory mechanisms based on active dialogue with the public to address increasing stakeholder empowerment [66,67]. The process of stakeholder engagement should be integrated into the overall online communication strategy, exploiting the interactive opportunities offered by the website and its areas dedicated to stakeholder relationships [42]. Therefore, corporate websites should include tools that favor “inclusive”

processes, namely, structured forms of collaboration and methods for personalized engagement. These valorize the feedback of stakeholders, allowing them to influence corporate decision-making [68].

In sustainability communication, it is also worth noting the adoption of appropriate tools to identify the expectations of stakeholders. For example, the analysis of stakeholder priorities (materiality matrix) plays a relevant role because it aims to concurrently identify the core sustainability issues for both stakeholders and the organization [69]. In addition, dialogue with stakeholders is facilitated by the adoption of online tools that support processes of engagement. The main interaction tools for corporate sustainability actions are blogs, forums, online communities, etc. [70]. The presence of these tools facilitates the involvement of stakeholders in company dynamics and the creation of trusted relationships with them.

Sustainability-oriented organizations must consistently communicate their commitment to social issues, the rationale behind their sustainability actions, and the coherence between the initiatives promoted and corporate statements [31,71]. In literature, this consistency has been also labelled as the fit between the organization and the “good causes” it is supporting [72]. Communication concerning the economic, environmental, and social aspects of corporate activities, which is defined in the literature as “sustainability information”, has been widely debated in recent years [30]. The Internet has gradually become a privileged channel for this type of CSR information, and the website has developed in the “center” for the dissemination of content on corporate sustainability issues [73–76].

Porter and Kramer [77] identify three dimensions to evaluate sustainability impact that can be adopted to assess a company’s communication efforts on its website:

- (1) Content related to the core business, which refers to activities that have a strong impact on the area of business and the competitiveness of an organization.
- (2) Content that impacts the value chain, i.e., initiatives that have a significant impact on business processes and activities.
- (3) Social content of generic interest, not significantly related to the core business of an organization but regarding generic philanthropic initiatives.

Sustainability content must adhere to certain principles of corporate communication that are fundamental to the development of reputational capital [78]. These principles refer to the dimensions of visibility, clarity, authenticity, accuracy, consistency, and completeness [34] that have been similarly used in the study of green communication [79].

Finally, various authors argue that effective sustainability communication in digital environments requires websites to provide users with an adequate ease-of-use in navigation [15,80]. The quality of the relationship between the user and the corporate website depends on ergonomics, whose purpose is to create an interface that offers an adequate fruition of content [81,82].

### 3. Research Design

The model was constructed in two phases. In the first phase (as described in Section 2), the analysis of the literature review in the field of corporate sustainability and digital communication was conducted. From this phase, four dimensions (orientation, structure, ergonomics, and content) emerged. These constitute the core elements that impact the effectiveness of sustainability communication activities on corporate websites.

Then, a second phase that concerned the identification of items was performed. The identification of sub-dimensions and specific measurable items for each dimension have been identified from the bottom-up analysis conducted on the first 100 websites of the organizations included in the “Global CSR RepTrak 2015” ranking by the Reputation Institute [83]. The rationale behind this choice is to have an adequate empirical base to operationalize the general dimensions identified in the literature review.

After the two phases, we revise and detail final dimensions, sub-dimensions, and items. In other words, both phases allowed the development of the framework for the assessment of the sustainability communication of corporate websites. The items identified in the model have been treated as

dichotomous (dummy) variables. This choice was justified by the fact that they imply less difficulty in operationalization compared to variables that are detectable with scaling techniques. The allocation mechanism of the scores to the factors of the model has adopted the equipartition criterion, namely, the score of each item equally contributes in determining the final score totalized by the corporate website. This weighting criterion is part of the “tree weight distribution” principle, in which the weights are divided in relation to the number of indicators that are present in the same area [84].

Specific guidelines (e.g., procedures, sequences) have been developed for the evaluation protocol, thus supporting the researchers in the identification of the items of the websites included in the model. The range of values for each website varies from 0 to 100. The final score, which represents a total value resulting from the sum of the scores of each dimension, falls within this range.

#### 4. The Operational Model: Architecture and Metrics

The pyramidal structure of the OSEC model distinguishes three levels placed in a hierarchical manner: the dimensions, the sub-dimensions, and the items. The items are measurable indicators for the evaluation of corporate websites. The sub-dimensions are factors that serve to group together the items in homogeneous categories. Finally, the dimensions are placed at the highest level of the pyramid.

The model is based on the following architecture (see Figure 1):

- (1) 4 dimensions
- (2) 18 sub-dimensions
- (3) 64 items

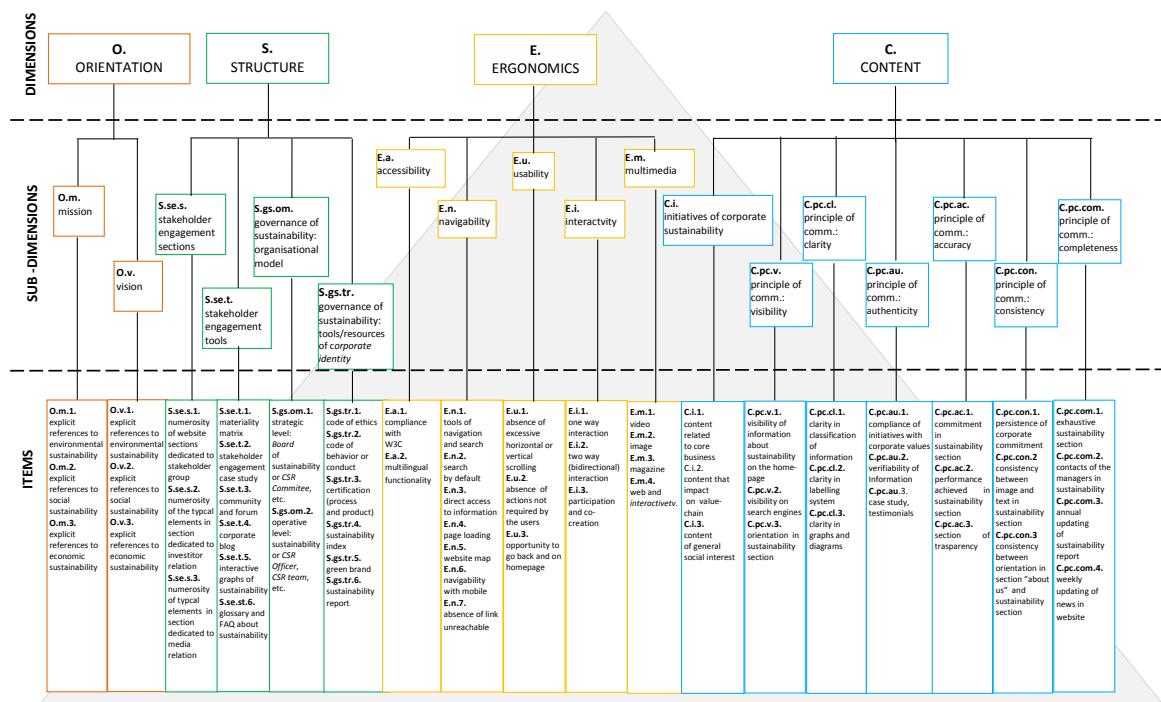


Figure 1. Architecture of the OSEC model.

##### 4.1. Strategic Orientation to Sustainability Expressed on the Corporate Website

The orientation is the strategic approach that defines the core elements of the corporate identity in relation to sustainability. It consists of statements aimed at highlighting the core values and the business philosophy, oriented towards respecting the economic, social, and environmental expectations of stakeholders. In corporate websites, the statements are typically placed in dedicated sections (e.g., “About us”, “Company Profile”).

The orientation consists of two sub-dimensions: “mission”, which is intended as the company’s commitment to sustainability issues in the declaration of institutional purpose and activities; and “vision”, which represents the manner in which the future of the company is prefigured in terms of corporate sustainability commitment. The sub-dimensions of “mission” and “vision” include three items each, referring to the presence of explicit statements on environmental, social, and economic sustainability.

#### 4.2. The Structure and the Website Tools

The second dimension of the OSEC model refers to the set of organizational tools and elements that are able to support the credibility of the information conveyed and the relationships with users on the website. Four sub-dimensions define the structure dimension: “stakeholder engagement sections”, which are dedicated to the stakeholder relationship (employees, consumers, investors, communities, media); “stakeholder engagement tools”, which involves participatory processes aimed at facilitating the involvement of stakeholders in corporate practices; “the governance of sustainability: organizational model”, which detects, at a strategic level, the presence of the Board of sustainability and the operational functions or roles; and “the governance of sustainability: tools/resources of corporate identity”.

#### 4.3. The Ergonomics of the Website

Ergonomics refers to the ability of the website to ensure easiness in the navigation process and an appropriate fruition of content by users [85]. It enables ease-of-use and the uniformity of the information architecture and the functionality of the website. This dimension consists of five sub-dimensions:

- (1) “Accessibility” refers to the inclusive practice of making websites accessible to all typology of users, including those with disabilities, and concerns the compliance of World Wide Web Consortium (W3C) guidelines.
- (2) “Navigability” regards the ease and the quickness with which users find desired information within the website, including the presence of research tools, the organization of content into classification hierarchies, and their fruition by mobile devices.
- (3) “Usability” encompasses the effectiveness, efficiency, and satisfaction due to website design and measures the quality of the user experience in achieving specific goals while visiting a website;
- (4) “Interactivity” concerns the presence in the website of two-way communication processes and tools addressed to engage users in the process of navigation.
- (5) “Multimedia” refers to the simultaneous and integrated use of different media within the website.

#### 4.4. Content on the Website

The fourth dimension of the OSEC model considers the content related to corporate sustainability presented through the website. The sub-dimensions referring to the content concern “sustainability initiatives”, as defined by Porter and Kramer [77], in the following three types of content: content related to the core business, content that impacts the value chain, and content of general social interest. This dimension also includes the evaluation of the “principles of communication”, which should be respected in the formulation of the messages on the website. These principles concerns six different sub-dimensions [34]:

- (1) “Visibility” is the organization’s ability to make visible, traceable, and usable its communication activities for sustainability.
- (2) “Clarity” is the organization’s ability to communicate in a clear and understandable manner, avoiding doubts and misunderstandings.
- (3) “Authenticity” refers to not only truthful but also verifiable and verified communication, through the support of credible sources.

- (4) "Accuracy" is the ability of corporate communication to relate to specific, concrete, and demonstrable aspects, avoiding generic and vague statements.
- (5) "Consistency" is the company's ability to convey content of sustainability in line with its commitments undertaken in the corporate orientation.
- (6) "Completeness" refers to the presence on the website of the key elements of sustainability communication to satisfy all of the information needs of stakeholders.

#### 4.5. The Greenwashing Penalties

The OSEC model provides a penalty to the final score that is attributable to each corporate website suspected of engaging in greenwashing behaviors. The penalty of greenwashing aims to take into account the negative impacts resulting from the practices that run contrary to genuine sustainability communication. The purpose of this mechanism is to identify any signs of greenwashing on the website. To detect such signals, the model considers and incorporates some of the seven "sins" that can be committed by sustainable organizations, defined in the Greenwashing Report by Terra Choice [86]. To allow an adaptation to the operational model, the sins that are not detectable by the analysis of websites were excluded. For the identification of these signals, the model suggests detecting inconsistencies by cross-checking specific dimensions concerning the orientation, the structure, and the content, as shown in Table 1.

**Table 1.** Signals of greenwashing in the OSEC model.

| Description of Sins   | Signals  |
|---|--|
| 1. <i>Sin of No Proof</i><br>Statements about sustainability, without adequate support of credible sources.   | Cross-checking the items related to orientation and the items that detect the principle of authenticity.   |
| 2. <i>Sin of Irrelevance</i><br>Statements that divert attention on topics with a low impact in terms of sustainability.  | Cross-checking the items related to orientation and the items of content related to the core business or value chain impact.   |
| 3. <i>Sin of Vagueness</i><br>Statements about sustainability based on vague or inaccurate information.   | Cross-checking the items related to orientation and the items that detect the principle of accuracy.   |
| 4. <i>Unidirectional Approach to Stakeholder</i><br>Statement about sustainability, without the support of stakeholder engagement tools.                            | Cross-checking the items related to orientation in the sustainability section and the absence of items related to stakeholder engagement tools.                                  |
| 5. <i>Sin of Worshipping False Labels</i><br>The presence of sustainability labels (e.g., green brand) not based on a recognized labeling system or certifications. | Cross-checking the item related to the presence of a green brand and the items related to the verifiability of the information (authenticity) and the labeling system (clarity). |

The mechanism involves a penalty to the final score that varies in relation to the number of items that show signals of greenwashing.

#### 4.6. Value of the OSEC Scores

Although there is no universally agreed-upon method of measuring sustainability communication, the OSEC model proposes a comprehensive way to analyze it, assuming that disclosing information on different facets of sustainability will have positive repercussions on effectiveness of the firm's communication. A proper interpretation of results can help in understanding and in evaluating digital communication on sustainability.

To this end, it seems reasonable to identify different score ranges that can support analysts to adequately interpret the results. Considering that the maximum score ( $s = 100$ ) identifies a company that presents a complete compliance of requirements for an effective sustainability communication, five ranges can be described:

- (1)  $s > 80$ . This score range includes firms that show an excellent compliance to sustainability communication requisites.
- (2)  $70 < s < 79$ . This type of result indicates firms that fulfill communication requirements in a satisfactory way.
- (3)  $60 < s < 69$ . This range presents firms with an acceptable compliance to communication requisites. Improvement actions are however possible on different dimensions.
- (4)  $50 < s < 59$ . Firms in this range show some weaknesses in digital sustainability communication. Several changes are required to avoid reputational risks.
- (5)  $s < 49$ . In the last range, firms present a poor compliance of communication requirements. A complete revision of digital communication strategies and practices is needed.

In case of greenwashing penalties, all the results should be interpreted with caution, as even a high score may be symptomatic of deceitful and not genuine communication. In this case, firms should revise their sustainability policy (and consistency with communication initiatives) and verify if they can do something else in concrete actions. The presence of potential penalties is likely to confirm (or not) the authenticity of communication through corporate websites in relation to actual implemented actions in terms of sustainability. This is particularly critical for firms with high scores in OSEC model ( $s > 70$ ) where the need to verify greenwashing penalties is even more important. The OSEC model is thus somewhat limited by the fact that high scores cannot guarantee that a company is “doing good”, but rather the company’s sustainability communication on corporate website is on a high level on several dimensions. Greenwashing penalties can help in identifying “cosmetic communication” practices but only an in-depth internal audit of firm’s processes can determine “authenticity” of sustainable behaviors or, conversely, unethical conduct.

## 5. Pilot Study

The OSEC model has been tested on the 37 companies belonging to energy and utilities sectors (electric, gas, water) included in the Dow Jones Sustainability World Index 2015 (DJSI). The rationale behind this choice is the fact that several studies highlight that environmentally sensitive industries, such as energy and utilities, are significantly more devoted to environmental information disclosure [87,88]. DJSI has been launched in 1999, being one of the oldest and most prominent sustainability indexes [89,90]. It tracks the performance of the top 10% of the 2500 largest companies in the S&P Global Broad Market Index<sup>SM</sup> that are considered leaders in sustainability in their respective activity sector, automatically excluding companies that generate revenue from armaments and firearms, tobacco, alcohol, and gambling. To be included in it, firms must fulfill strict general criteria in all areas of sustainability (economic, environmental, and social) and specific criteria applicable to certain sector. Criteria are annually revised to ensure their currency and consistency. Data for the Corporate Sustainability Assessment (CSA) are collected from a multitude of sources: responses to the online questionnaire, internal documentation, policies and reports, media and stakeholder analysis, publicly available information, and direct contact with companies. Several studies show that DJSI requirements concerning sustainability aspects are more rigorous than other sustainability indexes [91,92]. Fowler and Hope [93] (p. 251) review the methodology of DJSI affirming that it “meets desirable traits of consistency, verifiability, logicity, and replicability”, although there is some subjectivity in analyst interpretation and, above all, possible bias due to the emphasis given to larger companies. Despite these limitations, companies included in the DJSI are likely to have more sustainable behaviors compared to non-DJSI companies.

Three researchers analyzed all of the websites and structured the responses into a data matrix to code each website. For each item of the model (see Figure 1), the coding scheme requires following a specific protocol of analysis before assigning the corresponding value (0 = in case of absence; 1 = if the requirement is judged as fulfilled). A satisfactory level of initial agreement was reached



(Krippendorff's  $\alpha = 0.85$ ). In the remaining cases, agreement was found after accurately evaluating the specific items involved.

The results of the pilot study are presented in Table 2.

**Table 2.** Ranking of the websites of energy and utilities companies in the DJSI according to the OSEC model.

| Energy and Utilities Companies | Dimensions           |                     |                      |                   | Green-Washing | Total Score |
|--------------------------------|----------------------|---------------------|----------------------|-------------------|---------------|-------------|
|                                | Orientation (0–9.37) | Structure (0–26.56) | Ergonomics (0–29.69) | Content (0–34.37) |               |             |
| Iberdrola                      | 9.37                 | 23.91               | 26.51                | 30.08             |               | 89.87       |
| Eni                            | 9.37                 | 19.93               | 23.26                | 34.37             |               | 86.93       |
| United Utilities Group PLC     | 9.37                 | 20.15               | 23.89                | 32.70             |               | 86.11       |
| Repsol SA                      | 9.37                 | 21.69               | 20.93                | 32.70             |               | 84.69       |
| Terna                          | 4.69                 | 22.14               | 21.56                | 34.37             |               | 82.76       |
| Snam SPA                       | 4.69                 | 22.36               | 22.90                | 32.70             |               | 82.65       |
| Acciona SA                     | 9.37                 | 18.16               | 23.89                | 30.79             |               | 82.21       |
| Red Eletrica Corp              | 6.25                 | 15.05               | 26.51                | 33.66             |               | 81.47       |
| Cia Energetica De Minas        | 9.37                 | 17.49               | 23.68                | 30.32             |               | 80.86       |
| Enagas SA                      | 6.25                 | 19.92               | 21.92                | 32.70             |               | 80.79       |
| Galp Energia SGPS              | 6.25                 | 16.38               | 25.37                | 31.99             |               | 79.99       |
| Total SA                       | 9.37                 | 20.14               | 20.08                | 29.84             |               | 79.43       |
| Technip SA                     | 7.81                 | 17.93               | 22.41                | 29.12             |               | 77.27       |
| CGG SA                         | 6.25                 | 20.36               | 18.45                | 31.99             |               | 77.05       |
| Engie                          | 4.69                 | 17.71               | 22.76                | 30.55             |               | 75.71       |
| Ptt PLC                        | 9.37                 | 18.15               | 14.91                | 32.95             |               | 75.38       |
| EDP Energias De Portugal SA    | 6.25                 | 19.70               | 19.22                | 30.08             |               | 75.25       |
| Trans Canada Corp              | 4.69                 | 17.71               | 22.05                | 30.79             |               | 75.24       |
| Santos LTD                     | 7.81                 | 20.36               | 15.34                | 30.32             |               | 73.83       |
| Woodside Petroleum LTD         | 6.25                 | 18.59               | 20.57                | 28.41             |               | 73.82       |
| Gas Natural SDG                | 7.81                 | 13.72               | 22.19                | 30.09             |               | 73.81       |
| Endesa SA                      | 3.12                 | 14.17               | 24.53                | 31.75             |               | 73.57       |
| Exxaro Resources               | 4.69                 | 21.69               | 23.54                | 23.63             |               | 73.55       |
| Enel                           | 3.12                 | 16.38               | 20.08                | 30.32             |               | 69.90       |
| Baker Hughes Inc.              | 9.37                 | 15.05               | 17.75                | 27.69             |               | 69.86       |
| Ptt Exploration and Production | 6.25                 | 19.70               | 13.57                | 30.08             |               | 69.60       |
| Bg Group PLC                   | 4.69                 | 15.72               | 19.79                | 28.64             |               | 68.84       |
| Cenovus Energy                 | 4.69                 | 16.38               | 15.97                | 30.08             |               | 67.12       |
| Sembra Energy Corp             | 4.69                 | 15.93               | 15.13                | 31.03             |               | 66.78       |
| Ecopetrol                      | 6.25                 | 15.94               | 14.14                | 30.31             |               | 66.64       |
| Enbridge                       | 7.81                 | 17.93               | 12.58                | 28.17             |               | 66.49       |
| Neste                          | 3.12                 | 15.05               | 16.40                | 30.32             |               | 64.89       |
| Halliburton Co.                | 4.69                 | 13.95               | 19.93                | 26.02             |               | 64.59       |
| Suez Environment               | 6.25                 | 19.04               | 18.73                | 18.62             |               | 62.64       |
| Spectra Energy Corp            | 0                    | 14.39               | 15.13                | 30.79             |               | 60.31       |
| SBM Offshore NV                | 9.37                 | 13.72               | 16.61                | 29.37             | −10.94        | 58.13       |
| S-Oil Corp                     | 1.56                 | 10.19               | 18.73                | 23.15             | −10.94        | 42.69       |

In the industry ranking, the website of Iberdrola (Bilbao, Spain) achieves the best score (89.87). Iberdrola is the top performer in several dimensions, such as “orientation”, with a score of 9.37 (the same result is obtained by Eni (Rome, Italy), United Utilities Group PLC (Warrington, UK), Repsol SA (Madrid, Spain), Acciona Sa (Madrid, Spain), Cia Energetica De Minas (Belo Horizonte, Brazil), Total Sa (Courbevoie, France), Ptt PLC (Bangkok, Thailand), Baker Hughes Inc. (Houston, TX, USA), SBM Offshore NV (Amsterdam, The Netherlands)), “structure”, with a score of 23.91, and “ergonomics”, with a score of 26.51 (the same results is achieved by Red Electrica Corp Sa (Madrid, Spain)). Differently, the best score (34.37) in the dimension of “content” is obtained by Eni and Terna (Roma, Italy).

In the evaluation of the “orientation” dimension, Iberdrola’s website presents (under “Company Profile”) a detailed definition of the company’s mission, vision, and values, in which the organization underlines a strong commitment to social, economic, and environmental sustainability.

Regarding “stakeholder engagement” activities, the Iberdrola website includes several areas dedicated to the main stakeholder groups, with in-depth information that is able to ensure

comprehensive and bidirectional communication. Moreover, in the “sustainability section”, the website shows different stakeholder engagement tools, such as the materiality matrix, interactive graphs, or a blog. With reference to the “governance of sustainability”, the “corporate governance” section notes the presence of the “Corporate Sustainability Committee”. The website also includes a variety of corporate governance tools, comprising a code of ethics, sustainability indexes and reports, and certifications.

Considering the “accessibility” item (within the “ergonomics” dimension), the Iberdrola website observes the guidelines established by the W3C (World Wide Web Consortium) and presents multi-language functionality. Regarding the sub-dimension of “navigability”, search tools are clearly evident on the homepage, and direct access to the information (a limited number of clicks) and mobile navigability are observed. Regarding “usability”, the website presents navigation paths and adequate scrolling. The analysis of the sub-dimension of “interactivity” reveals the adoption of tools that facilitate two-way communication, such as the areas of customer care and several interactive tools. Furthermore, the evaluation of the sub-dimension of “multimedia” shows the use of images, videos, magazines, and infographics that enable an intuitive understanding of the information.

Finally, the Iberdrola website highlights all of the types of content considered by the operational model. The core business content relates activities such as the development of new products and services to encourage energy and economic saving among customers. The content that impacts the value chain refers to employee support programs, whereas the content of general social interest contributes, for example, to promoting arts, heritage conservation, and sports.

The website complies with the principles of communication identified in the OSEC model. The Iberdrola website respects the sub-dimension of “visibility”, having a sustainability section that is clearly highlighted in the homepage in which it is possible to identify an explicit orientation towards sustainable development. Regarding the sub-dimension of “clarity”, the website is characterized by an adequate classification of content and an effective labelling system. The sub-dimension of “authenticity” is respected, with the sustainability initiatives being in accordance with corporate values (e.g., social commitment, environment protection). All of the information included in the sustainability section is also supported by case studies, best practices, reliable sources, and recognized methodologies. Concerning “accuracy”, the website presents details on the sustainability performance achieved by the organization. In accordance with the item of “consistency”, corporate commitment is persistent over time because there are long-term initiatives. Finally, the website complies with the principle of “completeness”, in light of the exhaustiveness of the information within the “sustainability” section; indeed, this area includes sustainability development goals, values, a sustainable energy business model, and other core elements (e.g., sustainability reports, indexes, contact).

The pilot study makes it possible to calculate the positional (maximum, minimum, median) and synthetic values (mean, standard deviation, coefficient of variation) that are typical of descriptive statistics (see Table 3) [94]. These values must be interpreted with caution, considering the number of websites examined.

**Table 3.** The positional and the synthetic values in the pilot study of the OSEC model.

| Energy and Utilities Companies | Dimensions              |                        |                         |                      | Green-Washing | Total Score |
|--------------------------------|-------------------------|------------------------|-------------------------|----------------------|---------------|-------------|
|                                | Orientation<br>(0–9.37) | Structure<br>(0–26.56) | Ergonomics<br>(0–29.69) | Content<br>(0–34.37) |               |             |
| Positional values              | Maximum (Iberdrola)     | 9.37                   | 23.91                   | 26.51                | 30.08         | 89.87       |
|                                | Minimum (S-Oil Corp)    | 1.56                   | 10.19                   | 18.73                | 23.15         | –10.94      |
|                                | Median                  | 6.25                   | 17.93                   | 20.08                | 30.32         | 73.83       |
| Synthetic values               | Mean                    | 6.33                   | 17.75                   | 20.00                | 30.01         | 73.53       |
|                                | Std dev                 | 2.47                   | 2.98                    | 3.84                 | 3.12          | 9.34        |
|                                | CV                      | 0.39                   | 0.17                    | 0.19                 | 0.10          | 0.13        |

Table 3 notes that the maximum score is 89.87 (Iberdrola), the minimum score 42.69 (S-Oil Corp (Seoul, South Korea)) and the median score 73.83. Given that this is very close to the mean of the sector considered by the pilot study (73.53), the data distribution is almost symmetric. More generally, the analyzed websites achieve medium scores for three out of four dimensions (orientation, structure, ergonomics) and present higher values on the content dimension (mean 30.01 out of a maximum of 34.37). This finding is most likely a confirmation that the companies included in the DJSI present a wide range of activities related to sustainability that can be communicated effectively through their websites. However, most of them have the possibility of improving on the other three dimensions.

Finally, the coefficient of variation (0.13) indicates that the data are concentrated around the mean; the same occurs for all of the sub-dimensions.

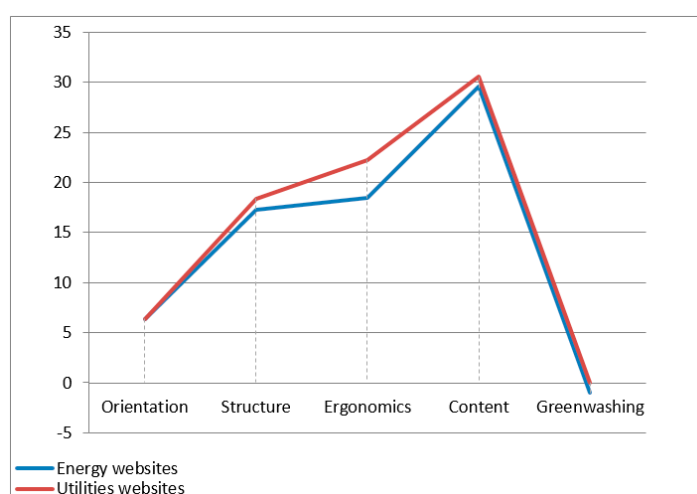
A further analysis shows some differences among the 22 organizations belonging to the energy sector and the 15 utilities companies (see Table 4).

**Table 4.** Comparison between the positional and the synthetic values in the energy and utilities companies.

|                   | Energy     | Dimensions |       |       |       | G.     | SC.   | Utilities      | Dimensions |       |       |       | G. | SC.   |
|-------------------|------------|------------|-------|-------|-------|--------|-------|----------------|------------|-------|-------|-------|----|-------|
|                   |            | O.         | S.    | E.    | C.    |        |       |                | O.         | S.    | E.    | C.    |    |       |
| Positional values | Max. Eni   | 9.37       | 19.93 | 23.26 | 34.37 |        | 86.93 | Max. Iberdrola | 9.37       | 23.91 | 26.51 | 30.08 |    | 89.87 |
|                   | Min. S-Oil | 1.56       | 10.19 | 18.73 | 23.15 | -10.94 | 42.69 | Min. Suez En.  | 6.25       | 19.04 | 18.73 | 18.62 |    | 62.64 |
|                   | Median     | 6.25       | 17.82 | 18.45 | 30.08 |        | 71.70 | Median         | 6.25       | 18.15 | 22.76 | 30.79 |    | 80.79 |
| Synthetic values  | Mean       | 6.32       | 17.31 | 18.40 | 29.58 |        | 70.74 | Mean           | 6.35       | 18.39 | 22.23 | 30.65 |    | 77.62 |
|                   | Std dev    | 2.66       | 2.93  | 3.61  | 2.74  |        | 9.63  | Std dev        | 2.24       | 3.05  | 3.01  | 3.61  |    | 7.42  |
|                   | CV         | 0.42       | 0.17  | 0.20  | 0.09  |        | 0.14  | CV             | 0.35       | 0.16  | 0.13  | 0.12  |    | 0.09  |

The websites of the utilities companies generally obtain higher scores than the websites of the energy companies. As shown in Table 4, the means of the two sectors considered in the model are somewhat different: energy (70.74) and utilities (77.62). The comparison between the means and the medians of the two clusters underlines that there is more symmetry in the distribution in the energy sector, in which these values are closer to each other.

Furthermore, the values of the coefficients of variation indicate that the data are more concentrated around the mean in the utilities sector (0.09). Comparing the means of the dimensions for each business activity, the scores indicate the absence of significant differences in “orientation”, “structure”, and “content”; the only relevant difference is in the dimension of “ergonomics”, which achieves a score of 18.40 in energy and a score of 22.23 in utilities. Figure 2 highlights the gap between the means of the dimensions of the sectors considered.



**Figure 2.** Gap between the mean of the scores in the DJSI energy and utilities companies' websites.

Moreover, the OSEC model shows greenwashing signals in only two websites of the energy sector (SBM Offshore NV; S-Oil Corp). From this analysis, it should be useful for companies in the energy sector to invest in improving the ergonomics of their websites (above all, in terms of the adequacy of the navigation process and fruition of content on the website), avoiding engaging in practices of “cosmetic communication”.

## 6. Implications and Future Research

The field of sustainability communication is rapidly evolving, thus resulting in radical changes in the company-stakeholder relationship. The proposed operational model makes it possible to expand the studies related to the evaluation and improvement of sustainability communication in digital contexts [10,15,16]. The OSEC model is a normative model because it identifies a number of elements that are necessary for adequate sustainability communication. The model provides specific indications on how to measure the requirements of this type of communication on the corporate website. The analysis of the total score achieved by each website makes it possible to assess and improve them. In particular, the scores obtained in the single dimensions indicate the critical areas that need improvement actions by acting on the corresponding items that are shown to be inadequate. Moreover, the potential penalties provided by the model show the presence of the risk of being accused of “cosmetic communication” adopted by organizations within their websites, giving information related to the items involved. From this perspective, the model indicates the organizational practices that should be modified to avoid the risk of greenwashing and its associated reputational drawbacks.

The pilot study conducted on the websites of DJSI companies belonging to the energy and utilities sector confirms the applicability of the model and shows the different types of analysis and assessments that the OSEC model enables to implement diagnosis and corrective measures in the field of online sustainability communication. Equally interesting, as evidenced in the pilot study, is the possibility of intra-sectoral benchmarking, thus allowing the identification of the direct competitors that are the top performers in sustainability communication on their websites. The OSEC model allows managers and digital consultants to have the opportunity to evaluate and improve the online sustainability communication of the organizations in which they operate, through specific corrective actions in areas in which there are critical issues. Furthermore, the industry ranking obtained by the application of the operational model is significant for digital communication managers. These rankings make it possible to identify the best-in-class in terms of effective practices of online sustainability communications.

A number of future research opportunities can also arise from this study. A larger empirical base is necessary to test the model’s applicability and to verify whether the OSEC model can also be adopted to analyze and evaluate sustainability communications on the websites of multi-brand organizations. In this case, for a comprehensive analysis of some items (such as the presence of community, corporate blogs, or certifications), it would be appropriate to analyze product brand websites in addition to corporate websites. Further research is needed to extend the application of the proposed model to other digital communication fields, providing appropriate adjustments. Measuring the requirements of sustainability communication in conversations on social media [95] and understanding the variables on which there are levers with specific actions may be of great interest to both scholars and practitioners of corporate communication and sustainability management.

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