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## SUSTAINABILITY COMMUNICATION ON TWITTER: DISABILITY DISCLOSURES OF LISTED COMPANIES IN POLAND

## ABSTRACT

A rapidly growing corporate use of social media can support corporate social responsibility (CSR) and sustainability advocacy of listed companies enhancing the positive image of people with disabilities and social inclusion. Emphasizing CSR towards people with disability (D), abbreviated CSR+D or CSR-D, is customary. The aim of the study is to examine the use of Twitter to highlight advocacy efforts for people with disabilities by the sixty best sustainability-oriented WSE listed companies in Poland.

We examined keywords and their popularity and context using topic modeling and text mining based on corporate tweets. Tweets' topics were extracted using the DMM model from 154,496 company media uploads. Then, the occurring themes were determined.

The results indicate a very limited promotion of CSR activities on Twitter. Accordingly, also limited use of Twitter in communicating disability with no diffusion of topics was observed, despite an overall increase of corporate social media use. Disability issues were far more often communicated for high-profile events related to disability. Only a few tweets appeared on Down syndrome, with more frequent tweets referring to visual, hearing, or autism disorders. However, tweets about disability receive more users' reactions and gain a wider audience than example those related to seniors or climate. More results on topics and their popularity due to the sector, time and accompanying events were included. The research contribute to understanding of the evolving social media tools and their corporate whereas there is limited or paid access to data.

**KEYWORDS:** *Twitter communication; disability; Corporate Social responsibility; social media; text mining; topic modeling; corporate communication*

## INTRODUCTION

People with disabilities can legitimize themselves as different corporate stakeholders: employees, clients, business partners, or corporate philanthropy beneficiaries. Thus, a wide spectrum of corporate activities can support them (Leoński, 2017), and different matters arise, like the human rights (United Nations Human Rights Office of the High Commissioner, 2011; ISO 26000, 2010) or diversity management (Özbilgin & Tatli, 2011). Socially responsible and inclusive activities – performed a while ago as CSR (Płoska & Próchniak, 2020) and now as sustainable activities – require effective media

communication with all stakeholders (Ajayi & Mmutle, 2021), while business meets its social obligations (Freeman, 1984).

In the paper, we analyze the Twitter accounts of the best-performing companies listed on the Warsaw Stock Exchange (Poland) social responsibility index (WIG-ESG consisting of WIG20 and mWIG40) to assess the corporate communication towards people with disabilities. Based on a review of the literature we are aware that indexed companies should perform ESG better (Deng & Cheng, 2019).

The rationale for analyzing Twitter was its use by companies and accessibility through an application with a programmable interface (API), after obtaining permission to download data. Due to the unstructured nature of the collected data, text mining and topic modeling methods were used to: isolate topics in the context of people with disabilities, compare the use of keywords on disability with other CSR topics (climate, seniors), and check the most often co-occurring words with the word *disability*.

## LITERATURE REVIEW

### CORPORATE SOCIAL RESPONSIBILITY AND DISABILITY

A multidimensional and holistic corporate responsibility approach towards people with disabilities is not common. However, Leoński (2017) addresses this topic extensively mentioning diverse types of disability-related issues in CSR policies. Also, Migliaccio (2019) draws attention to the roles of people with disabilities using the concept of stakeholders. Hernández González (2021) underline actions for the inclusion of disabled employees and customers over philanthropic activity in this regard. Segovia-San-Juan et al. (2017) show that the commitment of Spanish socially responsible companies to people with disabilities focus more on external, image-based activities than on the employee dimension.

Topic oriented approach is more often explored. Authors, like: Ang (2017), Bartram et al. (2021), Gould et al. (2021), Pérez-Conesa et al. (2020) address the responsible commitment focusing on employment and integration of

people with disabilities. Some even focus here on specific industries, especially service industries (Ellinger et al., 2020; Kwan, 2020). Lindsay et al. (2018) analyze the benefits of employing people with disabilities by reviewing 39 articles. Other articles focus on the employers' attitudes towards people with disabilities (Bredgaard & Salado-Rasmussen, 2021; Ebuenyi et al., 2020), while Schur et al. (2017) analyze the work environment and Martin & Honig (2020) deal with self-employment. Some publications analyze employment perception by clients (Kuo & Kalargyrou, 2014).

Also, the client approach is widely analyzed, focusing on the specific needs of consumers (Ellis et al., 2017; Maciaszczyk, 2015) as well as the access and delivery of services and product (Tor-Carroggio, 2021). The image of people with disabilities, who increasingly appear in social and commercial advertising, is also noticed (Houston, 2019). Initiatives for the disabled are often associated with cooperation with NGOs or corporate foundations (Forum Darczyńców et al., 2017).

## **CORPORATE SOCIAL NETWORKING**

The social networking sites (SNS's) used for corporate or brand communication include different forms and tools. The key platforms are Twitter, YouTube, Pinterest, Facebook, and Instagram. Communication is provided by visual and textual forms such as tweets, likes, feedbacks, pins, status updates, posting questions, and presentations/videos. SNSs and online applications meet consumers' expectations and fulfill corporate communication (Bialkova & Te Paske, 2021), as social media become a primary source of news (Lee et al., 2022). SNSs seem to be proper for addressing the stigmatization and isolation problem (Furr et al., 2016). They also allow the highlight invisible issues in the mainstream debate and the public discourse (Bitman, 2021). However, there is a knowledge gap in research on forms or effects of using social media. The studies focus mainly on reporting, rarely on stakeholders. Even, if potential of social media grows (Ali et al., 2015), there are doubts whether social media is proper for communicating CSR practices (Moyaert et al., 2021).

Abitbol and Lee (2017) indicate that responsible activities and message strategies should correspond to stakeholders' expectations, and SNS's communication usually involves the choice of topic (*what*) and a choice of dialogic strategy (*how*). Saxton et al. (2017) emphasize in SNS's communication *how* and She & Michelin (2019) underline: decisions, talks, and actions. Balasubramanian et al. (2020) raise the role of social media in building public awareness. Saxton et al. (2017), Zerbini (2015) and Castelló et al. (2016) warn against moral hazard of greenwashing and misleading practices. She & Michelin (2019) highlight the need for accountability in corporate social media. Also, some theories on using CSR social media CSR arise. Signaling theory emphasizes implicit and explicit messages to engage stakeholders (Saxton et al., 2017). Bergh et al. (2014) note that signals lower uncertainty when information is incomplete or asymmetrically distributed. The signaling approach may be also linked with legitimacy (Saxton et al., 2017). Disclosing facts can create positive emotions or comments (like 'tweets' or 'retweets'), and build corporate attributes and legitimacy consistent with stakeholders' expectations. But also legitimacy may lead to manipulation or greenwashing (Castelló et al. 2016). She and Michelin (2019) suggest that 'talk' and 'decisions' disclosures are more likely to receive positive feedback, 'talk' disclosures get less negative feedback, and 'decisions' – more negative response (She & Michelin, 2019). The limitation of the media is the inability to identify negative effects, the weak influence of the media, and the emotional and influential language (Moyaert et al., 2021).

## METHOD

In the study, we used the Twitter API for Academic Research to obtain all historical (from joining Twitter) tweets and retweets of the studied WIG-ESG companies having Twitter account on July 1, 2021. companies. Finally, 154,496 observations were compiled with background information on companies, such as the date of creating an account on Twitter, the number of tweets, and the number of followers. Then, tweets relating to disability matters were collected and analyzed.

**Table 1.** *Research scheme.*

Step	Tool	Literature sources	Research results
Gathering observations	Twitter API for Academic Research		154,496 observations
Keyword collection and testing – preprocess	tokenization and lemmatization	Shmatov & Catelli (2023)	
Extraction of selected phrases	manually		227 tweets
Topic-modeling method	the Gibbs Sampling Dirichlet Multinomial Mixture algorithm (GSDMM) which is a modified LDA model	Dumais et al. (1988) Lee & Seung (1999) Blei et al. (2003) Blei & Lafferty (2006) Hofmann (1999)	
Indication of specific topics in the dataset	Iterations with alpha, and beta parameters	Yin & Wang (2014)	Obtaining words with given focus
Distribution of words into topics	coherence score	Röder et al. (2015)	clusters and parameters selection
Other CSR topics' selection	Topics selection based on keywords	Knight (2018), Zientara et al. (2018) Filho et al. (2018).	Selection of tweets on topics: Disability, seniors, climate change
Words' occurrence	Occurrence examination		Bigrams and trigrams extraction

**Source:** Own elaboration.

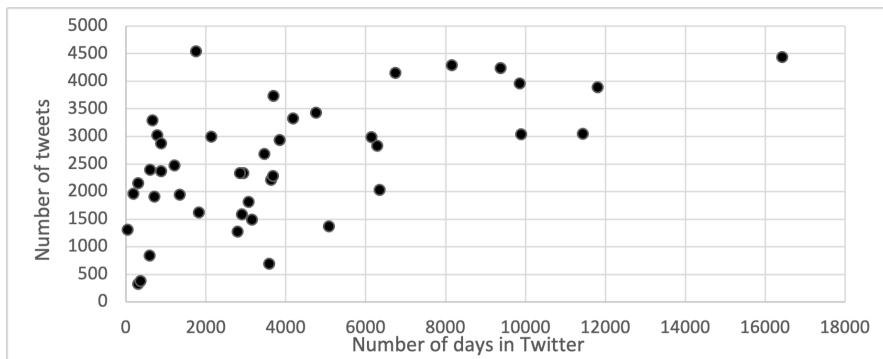
## RESULTS

### BASIC STATISTICS OF ESG INDEX COMPANIES' TWITTER PROFILES

Firstly, basic statistics: the date of account creation, numbers of tweets and followers were studied. Based on studied companies, Twitter (est. in 2006) accounts' diffusion was in 2013, but the longest activities date to 2009 and the shortest – to 2020. Percentage of studied companies with social media accounts in 2021 is as follow: LinkedIn – 95%, You Tube – 88%, Facebook – 83%, Twitter – 77%, Instagram – 63%. There is a moderate positive relationship between the time of being on Twitter and the number of posts on the

timeline (figure 1). Some of the companies publish several posts daily, while others – less than once a day. Two atypical observations, distinguished by the number of Twitter posts, have been removed from Figure 1: one company with over 106 thousand tweets and one with over 58 thousand tweets. There is a similar correlation between the time of being on Twitter and the number of followers. An unusual situation occurs only for one company that has over 1 million followers with only 2.6 thousand Twitter posts.

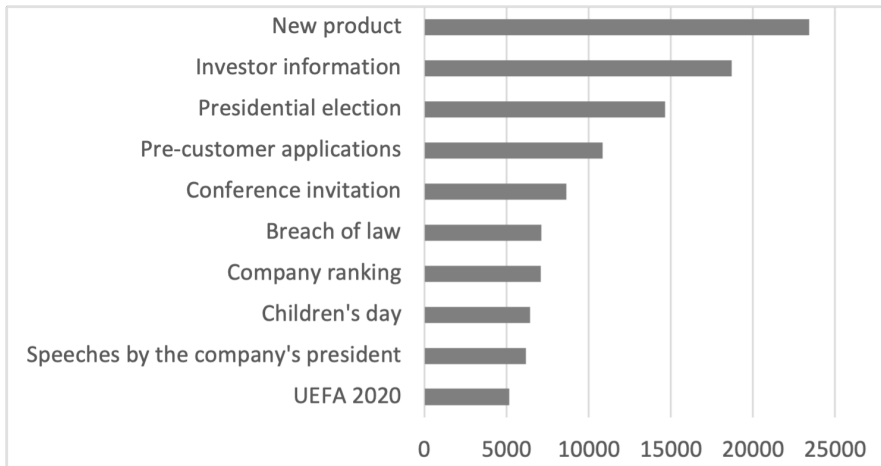
**Figure 1.** *The correlation between the number of posts and the number of days on Twitter.*



**Source:** Own elaboration.

## TOPIC MODELING IN CSR TWEETS

Tweets' topics (set of words) were extracted using the DMM model. Then, the occurring themes were determined by finding the optimal number of themes (5, 10, 15, 20, 25, and 30 topics). The themes were evaluated with their semantic fit using the Coherence Score. Based on the highest value of the dataset indicator, 30 topics were identified, but no words indicating CSR were found. More common topics are 'investor relations', information aimed at their customers, and information about events organized by companies or popular news in Poland. This would imply that companies are not using their social profiles on Twitter to promote their activities in this field (CSR).

**Figure 2.** *Most common topics in tweets of studied companies.*

**Source:** Own elaboration.

However, 28% of the records in database belongs to one media company (e-commerce industry) using social network as news channel, which distorts the obtained results. Thus, the company was excluded from the DMM model. As a result, 2 charity-related topics have been identified: community involvement (6,455 tweets), and sport charity activities (7,371 tweets).

## TOPIC MODELING IN TWEETS RELATED TO PEOPLE WITH DISABILITIES

First, an analysis of disability-related tweets was performed using a topic-modeling method with parameters selected based on the coherence score results that decreases when the number of topics increases (only results obtaining a coherence score close to 0.5 are included in Table 2). After a careful review of the results obtained, a subjective descriptions (titles) were proposed for the two topics: ‘Millennium Action’ – related to the screening of films with audio-description and ‘The World Day of People with Autism’. Their formulation was self-creation based on the relevant words obtained from the implementation of the GSDMM algorithm, which can be found in the Table 2.



The order of the received words in the table is significant (higher ranked words are more relevant to the extracted topic).

**Table 2.** *Keywords for featured topics*

<b>Topic 1 – movies with audio-description</b>	<b>Topic 2 – World Autism Day</b>
<i>deaf</i>	<i>day</i>
<i>Audio description</i>	<i>behalf</i>
<i>subtitling</i>	<i>autism</i>
<i>children</i>	<i>global</i>
<i>movies</i>	<i>bank</i>

**Source:** Own elaboration.

Since the number of relevant tweets is low and the topic modeling algorithm searches only the most popular topics, manual verification of topics was used. This analysis enabled separating the topics: employees (11), customers (16), and related to activity and supporting this social group – these tweets were the most often occurring. Dominating tweets were ‘blindness’ and ‘autism’.

## COMPARISON OF THREE CSR TOPICS IN TWEETS

The study also compared the popularity of the 3 CSR topics using a search for characteristic words, which are recorded in the table below. (See Table 3).

Most tweets were about seniors. People with disabilities received the most ‘likes’, ‘shares’, and ‘replies’ from Twitter users. One company had a lot of posts on all topics due to the business nature. Banking and insurance companies addressed more posts to people with disabilities and seniors than on the climate, differently than energy companies (except one focusing posts on seniors – 60 tweets, and people with disabilities – 27 tweets).

**Table 3.** *A comparison of tweets in three CSR areas.*

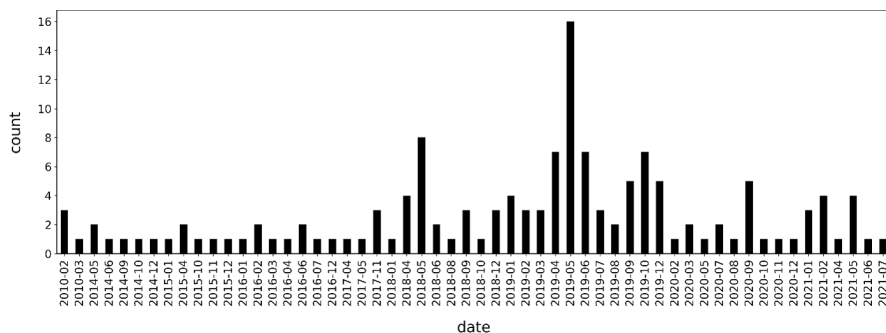
Topic	Disability	Seniors	Climate
Occurred words *	<i>disab*</i> (144), <i>blind</i> (30), <i>deaf</i> (30), <i>autism</i> (22), <i>Down</i> (5)	<i>senior</i> (234), <i>Elderly person</i> (29), <i>pensioner</i> (15)	<i>Climate changes</i> (26), <i>global warming</i> (8), <i>carbon footprint</i> (9), <i>decarbonization</i> (17), <i>greenhouse gases</i> (11), <i>renewable energy</i> (37)
Tweet count	227	259	108
Likes' count	2341	1239	406
The highest number of likes for one of the posts	583	44	24
Share count	728	655	145
The highest number of shares for one of the posts	76	37	9
Reply count	105	83	19
The highest number of replies for one of the posts	17	7	3

\* The table presents occurred words from among those selected for analysis.

**Source:** Own elaboration.

## ‘DISABILITY’ TWEETS OVER TIME

‘Disability’ occurred in 144 tweets (0.093% of all tweets collected), most often in May 2019, probably due to the protest of people with disabilities that was held in Warsaw on the 23<sup>rd</sup> of May.

**Figure 3.** Occurrence of the word *disability* over time.

**Source:** Own elaboration.

The mostly used words were: ‘behalf’ (14), ‘bank’ (11), ‘children’ (10), and ‘barriers’ (9), as the tweets are most often about the banks’ activities for children with disabilities.

## ‘DISABILITY’ CO-OCCURRENCE

Pairs (bigrams) and triples (trigrams) of words provided within the prepared analysis’s framework (table 4) that companies usually indicate ‘paraspport’ and ‘international days’ in the context of people with disabilities. Also, phrases as ‘close to the issues of the protest’ or ‘decision-making state policy’ appeared (probably due to the above-mentioned protest). There were also some phrases concerning employment of people with disabilities and support programs.

Three companies stood out due to the highest number of posts with the word ‘disability’ in their posts. Although, each of them shared different information, from current events related to people with disabilities to posts related to the protest of people with disabilities. The most shared and liked post was on a table tennis disabled player who became an honorary ambassador of the company to foster the cooperation aimed at social activities for the disabled. The same company also takes part in the ‘work integration’ program aiming the employment of people with disabilities. The other company focuses on eliminating social barriers in access to culture for blind and deaf people.

**Table 4.** *Most common word pairs in tweets with word disability.*

Bigrams		Trigrams	
words	number of occurrences	words	number of occurrences
international day	4	pko bank foundation	2
audio description films	4	pko bank polski	2
on behalf of athletes	3	on behalf of sportsmen association	2
occupational therapy	3	association of fencing athletes	2
warsaw wrocław	3	Wołomin fencing association	2
subtitles for the deaf	3	occupational therapy workshop	2
natalia partyka	3	Polish occupational therapy	2
youth clubs	3	occupational of Polish association	2
pko foundation	2	Polish association on behalf of	2
pko bank	2	intellectual disability associations	2

**Source:** Own elaboration

## DISCUSSION

Twitter increasingly becomes a platform to advocate sustainable practices. Chae and Park (2018) notice that companies promote their responsible practices mostly by disclosing commitment, news, and events. Disability matters are noticeable on Twitter (Sarkar et al., 2021). Some studies are based on data collected from Twitter (Anderson, 2022), although, most of the studies refer

to public sector (Santoso, 2019) or the public debate on disabilities (Ineland et al., 2019; Burnap & Williams, 2016). Some research mention people with disabilities in the context of communication difficulties using Twitter (Hemsley et al., 2015). In turn, the other study on Twitter posts reflects discussion in favor of activism and disability culture (Sarkar et al., 2021). But, different studies lead to different country conclusions. The study focused on disability matters present in tweets in Sweden led to the division of users into nine groups, where companies are oriented towards disability products and interests (Ineland et al., 2019). Analyzing the structure of the company posts among the 9 surveyed groups, tweets (posts sent) were dominant, with about half as many retweets, and the fewest received. Companies received the fewest tweets of all groups.

The authors notice a research gap in disability-related social media communication, where existing studies refer to lessons learned, and practices developed before social media tools were developed. Meanwhile, conclusions about communication based on modern tools have not been discussed yet. There are insufficient studies in relation to the communication of actions by companies. Although the general use of social media in communication and corporate responsibility disclosures companies is growing. The levels and uses of social media are still not well developed that confirms also our study.

## **CONCLUSIONS, IMPLICATIONS AND LIMITATIONS**

The studied companies that form WIG-ESG include different industries (banking, heavy industry, ICT, oil and gas, pharmaceutical manufacturing). Studied companies make only limited use of Twitter to highlight their advocacy efforts for people with disabilities.

The study did not show diffusion of topics related to people with disabilities. Disability issues are far more often communicated on Twitter for high-profile events related to disability, e.g., the strike or the World disability days. Only a few tweets appeared on Down syndrome, with more frequent tweets referring to visual, hearing, or autism disorders. Tweets about disability receive more user reactions ('likes', 'shares', 'retweets') and gain a wider audience than on topics related to seniors or climate. E-commerce, banking,

energy, and insurance studied companies published the most posts on the topic of people with disabilities. The IT companies do not show their disclosures in this area on Twitter. Also, companies choose a specific group of people with disabilities and help them (e.g., parasports, people with visual and hearing disabilities).

Corporate responsibility communication is a multidimensional phenomenon and social media is one of the communication channels used. There is a strong emphasis on consistency and a comprehensive approach to communicating responsible activities (Mazurowska & Płoska, 2022). In addition, several legislative and standardization initiatives compel the sustainability reporting and communication (European Parliament, 2014; GRI, 2022), where issues related to activities for persons with disabilities appear. It can therefore be assumed that the need for communication will grow.

This article can support further discussion on corporate Twitter use while best companies communicate so little about their activities for people with disabilities. Further studies can contribute to the other communication channels (websites, non-financial reports, and advertisements) or corporate foundations practices.

The most evident limitation of the study is the use of Twitter only. However, access to APIs for other social media is limited, and also API access to Twitter in a needed rate limit to conduct the study is paid from April 2023. The other limitation might be the preprocess of extracting phrases – perceived as subjective. Also, country comparisons, having regard to country languages and their lemmatization, might be useful. This would allow to compare and think of general trends. Such research could become part of the debate on good practices in disability advocacy and communication. However difficulties with conjunction occurred in Polish language, methods can be used for different communication matters and using national languages.

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