

SENTIMENT ANALYSIS TREND ON SUSTAINABILITY REPORTING IN INDONESIA:
EVIDENCE FROM CONSTRUCTION INDUSTRY

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Abstract. This study examines the tone of language in sustainability report, focusing on the construction industrial sector of companies listed in Indonesian Stock Exchange year 2010 until 2018. This study analyzed 152 sustainability report using sentiment analysis method wrote in python code. This study shows that around 68%-79% of disclosures in sustainability reports show positive sentiment. These results indicate a high level of corporate accountability in the construction industry related to sustainability. This research contributes to stakeholders in making comprehensive decision related to company's accountability.

Keywords: sustainability report; sentiment analysis; construction sector

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1. Introduction

A country with good infrastructure development reflects the progress and stability of being a prosperous country, with the aim of prospering the community (Nugraha, 2018). As in Indonesia which currently is on a process of improving the infrastructure development during the presidential era of Joko Widodo, within the period of 2014-2019.

Currently, the government is attempting to make companies to be directly involved in efforts to environmental matters by starting to incite the implementation of sustainability report disclosure. Government efforts and commitments then become an important source for each sector to implement sustainable development in their policies and programs, so that they can contribute to reducing emissions and environmental damage (Nasih et al., 2019). As done by companies after the Global Financial Crisis (GFC), which is sought to design new models of corporate social responsibility (CSR) that are more aligned to their core business goals and services (Song et al., 2018). With the aim, the decision to report information is a form of the concept of "accountability" that accounted by the company.

In Indonesia, many companies have been involved in sustainability reports disclosure, which contain information about economic, social and environment (KPMG, 2015). This commitment become serious since the enactment of Law No.40 of 2007 concerning Limited Liability Companies (PT), Article 66 paragraph 2c which

contains the obligations for companies to submit reports of Social and Environmental Responsibility implementation in their Annual Report. In general, this kind of report becomes a benchmark as a qualitative standard and a comparison of companies in a sector to be more valid than a comparison of companies between sectors (Krut & Munis, 1998). With the presentation of qualitative content, actually it is a serious concern for users of information in terms of analysis, comparability and judgment.

The sustainability report with this qualitative standard content brings specific analytical difficulties because its textual database. To support the analysis, this study discusses an analysis that is rarely applied in the sustainability report study, namely the choice of the use of sentiment analysis methods in it. Sentiment analysis or commonly referred as opinion mining techniques, is related to diverse and multidisciplinary artificial intelligence problems, in order to minimize gaps between human and computer (Kaur & Gupta, 2013). Sentiment analysis will find content and even regulate the client's ideas, likes, hatreds and desires by using complex language. Sentiment analysis will function as management, examination of feelings, sentiments, and intelligence of a writer or speaker in a few different specific texts (Kaur & Gupta, 2013).

Previous research in China on financial reports and CSR conducted by (Song et al., 2018) find that an analysis with subjective object descriptions is characterizing the interactions between CSR scores and financial statement sentiment categories. Other researches also used sentiment analysis but applied to social media contents such as facebook, twitter, and other digital forms (Maindola et al., 2018; Pak & Patroubek, 2010; Agrawal et al., 2011).

This study specifically wants to describe sentiment analysis disclosed in the company's sustainability reports, especially in the construction sector. The construction sector was chosen because this sector economically made an important contribution, such as create more job vacancies and contribute to gross domestic income (GDP) (Glass, 2012). In addition, there are only few researches that focus on sustainability reports in the construction sector, so this study aims to open up debate and provide an understanding of in sustainability reports disclosure in the construction sector. This study uses sentiment analysis supported by Python software to analyze 152 company's sustainability reports in the construction sector listed on the Indonesia Stock Exchange from 2010 to 2018.

This study finds that sentiment information on construction companies chose the use of words with positive sentiment and sought to show high accountability. Both form building and non-building construction company are providing positive information, with a percentage of more than or equal to 68%. That means the company shows more attention on the sustainability report disclosure.

This research contributes in the form of forecasting financial performance and supporting corporate stakeholder on decision-making processes (Hajek et al., 2014), which also detects fraud, manages risks, and predicts future performance. This research also can assist stakeholders to analyze and to make decisions related to economic, social and environmental issues.

2. Literature Review

2.1. Overview of Sustainability Report

Companies with focus on social, economic, and environmental issues will gain a competitive advantage and have a credible reputation in the public eyes (Modapothala & Issac, 2009; Vegeera et al., 2018; Dudin et al, 2019; Kormishkina et al, 2019; Pechancová et al., 2019; Fatoki, 2019; Bombiak, 2019;) El Idrissi et al., 2020; Vigliarolo, 2020; Chehabeddine, Tvaronavičienė, 2020). This kind of focus is shown on company's sustainability report, as a concept that becomes important for businesses both at national and global levels (Golob & Bartlett, 2007; Lawrence et al., 2013). Companies that concerns about this issue usually have more resources and tend to invest more in various forms of environmental disclosure, such as social-environmental accounting systems, fair trade certification, better work atmosphere, and attract strong environmental stakeholders (Al-Tuwaijri et al., 2004; Clarkson et al., 2008; De Villiers C & Van Staden, 2011; Hackston & Milne, 1996; Patten, 1992; Arvidsson, 2010).

Setiawan et al. (2012) explains that sustainability reports are seen as a form of corporate social responsibility to stakeholders, although the motivation to submit this report can vary, either because of self-awareness or in response to environmental demands. Kolk (2008) also explains that sustainability reporting is a voluntary activity oriented to giving consideration to social and environmental implications in conducting business to internal and external stakeholders. Thus, in terms of the disclosure of social, economic and environmental issues in the Sustainability Report could be a way to increase transparency (Kaymak & Bektas, 2017), accountability, reputation (Aguilera-Caracuel J & Guerrero-Villegas, 2018) awareness about environmental and social practices (Chang et al., 2017), performance (Michelon et al., 2015) and maintain consumer and public support of the company. Gray et al. (1987) also explained that sustainability reporting is a framework to help companies develop meaningful and credible reporting that meets different needs of every stakeholder groups and increase business value.

In the construction sector only few companies disclose sustainability reports. This is evidenced from 16 global construction and real estate companies that are still not established when compared to other sectors, such as financial services or the utility sector (Lampridi & Ringland, 2008). Brown et al. (2009) also stated that the construction industry in the UK was considered to be less up-to-date on global trends for sustainable development; it still less in defining several indicators that are clearly reported; it does not have a clear process to determine materiality and involvement with stakeholders; and it still lack on awareness about sustainability reporting standards.

2.2. Sentiment Analysis

The complexity attached to the Sustainability report means that many people consider sustainability reports difficult to understand by public. This assumption is widely spreading; meanwhile actually this assumption is not right and takes an important role in decision making, especially for stakeholders of a company (Liu, 2010). Because this section contains more information than numerical sections in annual reports (Chan & Franklin, 2011; Kloptchenko et al., 2004). For this matter, textual information processing is needed to focus on sentiment analysis and factual information retrieval (Liu, 2010).

Sentiment Analysis or mining opinion is a diverse and multidisciplinary artificial intelligence in the study of computational opinion, sentiment and emotion (Chopra & Bhatia, 2016). Sentiment analysis is related to identifying and classifying conveyed opinions or sentiments by conducting sentiment analysis in a particular domain, it is possible to identify the influence of data domain in sentiment categorization (Neethu & Rajasree, 2013). Song et al. (2018) has explored various aspects of the language used in the annual reports of US companies. The results show that sentiment information is an important determinant to forecast financial performance, thus can be used to support stakeholder's decision-making processes (Hajek et al., 2014).

The form of sentiment analysis commonly used in academic, usually caused two problems, namely (Agrawal et al., 2011) classifying documents in the form of positive or negative sentiments, and (Aguilera-Caracuel & Guerrero-Villegas, 2018) classifying sentences or sentence clauses as subjective or objective, and for subjective sentences or clause classifies it as expressing positive, negative or neutral opinions (Indurkha & Damerou, 2010). In this study, building a trust based on it can then be known automatically the utility value for opinion (Liu, 2010) from a company report namely Sustainability Report.

3. Research Methodology

This research is based on the analysis of 152 sustainability reports, both separated and attached in the annual report of construction companies listed on the Indonesia Stock Exchange in 2010-2018. The annual reports were downloaded from the official website of IDX (Indonesia Stock Exchange) and the GRI (Global Reporting Initiative) database. This study uses sentiment analysis techniques using the Python programming language.

The processed reports are in the form of PDF format in English. These conditions are adjusted to Python's ability to only analyses English language texts. To overcome the variety of sustainability report forms that are strongly influenced by the company's disclosure style due to the nature of reporting that is still voluntary, the

author need to perform a text pre-processing procedure including the removal of non-language elements such as still images, changing all letters to lowercase, removing non-alphanumeric symbols, dots, and letters attached to special characters (Goloshchapova et al., 2019). The next stage, the process of sentiment analysis involves grouping points of view in categorical texts such as “positive” or “negative” categories (Liu, 2010).

4. Result and Discussion

Table 1 shows the descriptive statistics of 152 sustainability reports from construction companies. Sentiments are divided into two categories, namely positive sentiment and negative sentiment. The average value of positive sentiment is 162.1382 words, while the average value for negative sentiments is 57.49342 words. It shows that there are around 162 positive words that represent positive opinions or positive sentiments and 57 negative words that represent negative opinions or negative sentiments.

Table 1. Descriptive Statistics

Sentiment	Obs.	Mean	Std. Dev.	Min	Max
Sent_Positive	152	162.1382	358.7285	0	3575
Sent_Negative	152	57.49342	177.7701	0	2022

Table 2 shows the sample distribution breakdowns by year, with the percentage of positive sentiment higher than negative sentiment. Based on 152 sustainability reports observed, the average positive sentiment ranged from 68%-79%, and negative sentiment ranged between 21%-32% from 2010-2018. This shows that construction companies show a positive concern about the efforts of sustainable development. It indicates that construction companies were increasingly improving their carried out information, as appears in the number of positive sentiment that can be said to have stability.

In 2010, we find that construction companies contain 75% positive sentiment, or as many as 1,488 the number of words classified into positive sentiments. While only 25% showed negative sentiment. In 2012, construction companies decreased the use of positive sentiment by 1% but the number of words containing positive sentiments still increased, which amounted to 1,935, while for negative sentiments, also experienced an increase in the number of words, as many as 633.

The following year experienced a significant increase, which amounted to 4% from the previous year, but the number of words containing a significant positive experience has decrease, which only 1,431 words with positive sentiment. This can occur because of an increase in problems or the use of words containing words with negative sentiment. On the next following year, it showed a decrease in the use of words again, with a positive sentiment of 6% but the number of words shown increased. The construction companies that are analyzed certainly show the complexity of information to establish good relationships with stakeholders, without forgetting the reporting objectives, which then the reporting in 2016 became the one with the lowest sentiment, even though it rose sharply to 5,835 words, only 68% of the total words available in the report.

Table 2. Sample Distribution Breakdowns by Year

Year	Sentiment			
	Positive		Negative	
	N	%	N	%
2010	1,488	75%	487	25%
2011	1,786	76%	558	24%
2012	1,935	75%	633	25%
2013	1,431	79%	391	21%
2014	2,936	73%	1,091	27%

2015	2,641	75%	869	25%
2016	5,835	68%	2,689	32%
2017	3,807	77%	1,139	23%
2018	2,786	76%	882	24%

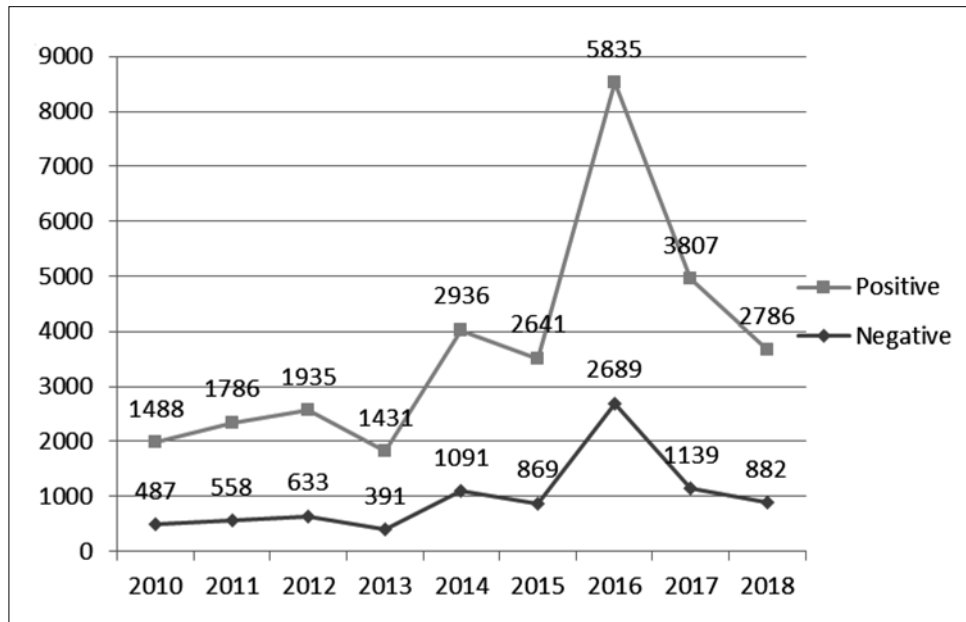


Figure 1. Sample Distribution Breakdowns by Year

Table 3 presents sentiment based on firm distribution which shows two classifications based on sectors, namely building and non-building. There is a difference of 3% between the two sub-sectors. For the non-construction construction sector, it has more positive sentiment of 77%, while the positive sentiment for the building construction sector is only 73%. That means, 23% of the disclosures made by non-building construction companies contain negative sentiments, while building construction companies contain negative sentiments of 26%.

Table 3. Firm Distribution

Sector	Sentiment			
	Positive		Negative	
	N	%	N	%
Building	24479	74%	8671	26%
Non_Building	15558	77%	4739	23%

4. Conclusions

Construction companies in Indonesia demonstrate the accountability of their companies by participating in reporting information relating to environmental issues in their sustainability report. This research that involves 152 sustainability reports of companies in the building and non-building construction sectors listed on the Indonesia Stock Exchange in 2010-2018, was analyzed using sentiment analysis.

The results of the sentiment analysis showed that many companies in the building and non-building construction sectors had used a choice of words that contained positive sentiment compared to negative sentiment. In firm distribution analysis, non-building construction sectors use words with positive sentiments, compared to building one.

From these results, sentiment analysis in construction companies is expected to contribute in helping stakeholders to analyse and assist stakeholders in making decisions related to economic, social and environmental issues while at the same time being an evaluation material for companies to make disclosures in order to increase corporate accountability, as well as paying attention to economic, social and environmental issues.

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