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Article

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Exploration of themes based twitter data in fraud-forensic accounting studies

A. A. G. S. Utama¹ and Basuki Basuki^{1*}

Abstract: The rapid development of information technology is also followed by developing databases and information based on social media. Social media Twitter is one area for disclosing accounting information in tweets, retweets, and other posts. This study aims to explore fraud-forensic accounting disclosures from the viewpoint of the four largest public accounting firms in the world (The Big 4) on the Twitter database. The approach used in this research is exploratory qualitative, with the content analysis method using NVivo software R1. The data collected a target of around 1000+ tweets. Researchers logged onto Twitter (as @agungdeagung) and searched for all tweets containing the hashtag #fraud #forensic #accounting #big4. This research produces the theme of business, knowledge, time, and reports, and the themes of accounting, fraud, and forensics, which have already been defined as keywords in disclosure on social media Twitter. This research implies that in carrying out a qualitative approach with the twitter database, elements of the domain, community (user), information posts, and powerful data-based analysis software must be fulfilled.

Subjects: Qualitative Methods; Business, Management and Accounting; Accounting

Keywords: accounting; exploration; fraud; forensics; content analysis; NVivo; themes

1. Introduction

In recent years, the importance of forensic accounting has overgrown. It is a professional field with a landscape shaped by the rise of financial technology (FinTech; Handoko et al., 2019; Louwers & Wm. Dennis Huber, 2015). Forensic accounting specialists do not just work for law enforcement agencies; they can also be found in business entity compliance departments, law firms, banks, and government agencies (Vidas et al., 2014). The majority of forensic accountants are hired for compliance purposes; they ensure the company's finances are kept safe and orderly (Biswas et al., 2013; Mansour et al., 2020; Tapanjeh & Tarawneh, 2020). Apart from forensic accounting, many companies also have in-house accountants to monitor and minimize any deviations or complications during their business processes. Internal accountants assist in preventing fraud and cleverly discover hidden fraudulent activity when reading company reports, but only when forensic accountants discover such evidence (Hassan Ali Abdulrahman et al., 2020). For example, forensic accountants are often asked by insurance companies to investigate suspicious activity suspicions or use them as a precautionary measure. As revealed by the Global Fraud and Identity Report 2020 states that 33% of businesses experienced more losses due to fraud than the previous year.

Apart from modern businesses such as insurance, forensic accountants are also highly skilled in analyzing and preparing financial information for courts (Bayne et al., 2018; Jeong & Jeong, RSC,

2006). Courtship is a field that requires a combination of accounting, auditing, and investigative skills. Accountants in this field will usually be involved in reviewing financial records and information in post-acquisition disputes, economic damage, bankruptcy calculations, and computer forensics. Assessments of business, bankruptcy, and fraud issues also usually require the skills of a forensic accountant. Although not all cases can lead to formal litigation, forensic accountants are required to produce information to a standard that will be appropriate for use in court (Biswas et al., 2013; Guo et al., 2009; Hassan Ali Abdulrahman et al., 2020; Nunn et al., 2011; Shields et al., 2011; Tapanjeh & Tarawneh, 2020).

This year could be a critical year for company audits. For the second time in this century, many scandals forced the Big Four accounting firms to rethink their business models. After the 2001 Enron collapse, stricter US rules about selling other services to audit clients led KPMG, Deloitte, EY, and PwC to sell or give up their consulting arm. However, the business has grown back enormously through sales to non-audit clients. Those auditing the revenue only generate one-fifth of the total revenue of the Big Four. Now a series of major British failures—Carillion, Thomas Cook, and BHS—have reignited concerns about conflicts of interest and a push for new regulations to separate the Big Four. Today, the auditing profession must seize the opportunity, withdraw from consulting completely, and refocus on corporate account users and the public interest. Several regulatory initiatives are pending, including a new international auditing standard requiring increased disclosure of “major audit issues,” which is the most significant issue to arise in any corporate audit and UK proposals for audits to be operationally segregated from other activities. Stricter enforcement already provides a strategy to motivate change. The UK Financial Reporting Board imposed nearly three times as many penalties on accounting firms in 2018–2019, which caused the world’s Big Four public accounting firms to set aside £ 162 million, to pay future lawsuits and fines (Adesina et al., 2020; Handoko et al., 2019; Hassan Ali Abdulrahman et al., 2020; Tapanjeh & Tarawneh, 2020).

So far, audit fees have been restrained despite regulations that force companies to conduct audit tenders more frequently. Investors may even be willing to pay higher bills for higher quality audits. Donald Brydon’s UK auditing review last month called for creating a new corporate auditing profession, separate from accounting. Its ethical principles will go beyond integrity and independence to emphasize action in the public interest and challenge management. Foremost is that the new profession will promote the forensic accounting mindset and explain that auditors must beware of fraud. Auditors should also be encouraged to look outside, beyond company executives, by giving them the task of notifying regulators if they have concerns about the company’s financial viability. They can also become official ports for whistleblowers. The positive aspect is that companies can use external contacts to help improve audit quality by asking investors to ask questions and concerns about the company’s accounts (Grover, 2013; Mansour et al., 2020).

Deloitte, Ernst Young (EY), KPMG, and PriceWaterhouseCooper (PwC) are actively involved in developing a strong talent pool in their respective consulting practices in various countries’ markets. This strategy has led to intense competition in recent times and involved hunting down many partners and their teams from their respective rosters. The demand for personnel is driven by the growing demand for consulting services in the country and the much more mixed consulting firms’ expectations. Where companies have traditionally been asked to offer strategic support, clients now expect end-to-end engagement from strategy to implementation, including security in digital transactions (Meffert et al., 2016; Moore et al., 2014; Park et al., 2018; Servida & Casey, 2019; Van Beek et al., 2015).

Cybersecurity and digital forensics now appear to be among the various specialties in which companies are now building their organizational capabilities and excellence. The world market is also digitizing very quickly and producing sensitive data, especially unstructured data sourced from

social media. Today's corporate data is more vulnerable to digital security issues than ever before, given the growing number of online users and diverse professions. The impact of the rapid data from social media and the digital market has made The Big Four itself a victim of cyberattacks. (Adesina et al., 2020; Amann & James, 2015; Garfinkel, 2010; Gbegi & Adebisi, 2014; Grover, 2013; Jo et al., 2019; Nunn et al., 2011).

Forensic accounting uses accounting skills to investigate fraud, embezzlement, and other irregularities hidden as financial transactions. In many cases, forensic accounting investigations are used in legal proceedings. However, they are also used for compliance efforts and to prevent crime. Whereas traditional accounting transactions are in the valuation of business funds and convey information properly to investors and management, forensic accountants are called upon to investigate the flow of funds through the business to evaluate the path they are taking and determining whether illegal transactions have occurred (Kahvedžić & Kechadi, 2009; Lang et al., 2014). A forensic accountant investigates various fraud activities that can occur across different types of companies, health care, real estate, mass marketing, hedge funds, and securities trading. These professionals can also investigate other crimes such as contract disputes, money laundering, bribery, and embezzlement. While forensic accountants' duty primarily directs them to investigate and analyze, they can be called upon to become expert witnesses in court (Kruger & Yadavalli, 2017; Walnycky et al., 2015). Apart from formally solving cases, the skills possessed by forensic accountants are also used in personal (non-formal) matters. As in a marriage dissolution, a forensic accountant will review both parties' financial situation and their expenses to advance the settlement process and provide attorneys with accurate information for court use. Forensic accountants can also track assets through investment accounts and identify hidden income or assets (Biswas et al., 2013; Mansour et al., 2020; Tapanjeh & Tarawneh, 2020).

Forensic accounting is often also called investigative accounting, which is defined as applying special knowledge and unique skills to identify transactions that are not authentic and gather evidence about the same. The profession of an investigative accountant demands reporting, where fraud accountability is established, and the report is considered as evidence in court or an administrative process (Biswas et al., 2013; Dong, 2011; Gbegi & Adebisi, 2014; Handoko et al., 2019; Louwers & Wm. Dennis Huber, 2015; Nunn et al., 2011; Tapanjeh & Tarawneh, 2020). In other words, forensic accounting includes the use of accounting, auditing, and investigative skills to assist in legal matters. The settlement of such legal cases consists of two main components, namely: a) In litigation cases, the forensic accountant's investigative skills are used in two ways; the accountant can be called upon to provide an expert opinion based on his investigation and requires testimony in the courtroom. b) Forensic accountant investigative skills are needed to collect, analyze, and evaluate financial evidence and the ability to interpret and communicate findings (Guo et al., 2009).

Forensic accounting is used for fraud examinations and fraud examinations covering suspected fraud from inception to disposition, including obtaining evidence, interviewing, writing reports, and testifying. Forensic accountants are held by law firms, companies, banks, government agencies, insurance companies, and other organizations to analyze, interpret, summarize, and present complex financial and business issues concisely and straightforwardly (Biswas et al., 2013; Hassan Ali Abdulrahman et al., 2020; Louwers & Wm. Dennis Huber, 2015; Mansour et al., 2020; Tapanjeh & Tarawneh, 2020). It is universally considered both at home and abroad that forensic accounting takes the court as its purpose and criminal or civil lawsuits as its primary service orientation. Its purpose is limited to providing expert advice, i.e., expert reports or accounting expert evidence, through investigation or identification. Expert advice is submitted to the court and used as expert evidence or court evidence. After cross-examination, expert evidence is adopted as refereed evidence by the judge to determine whether the defendant should bear legal responsibility. Expert advice also provides litigation support. In this sense, forensic accounting is equivalent to lawsuit accounting or

court accounting. Based on forensic accounting's localization, promoting scientific development, creating new professions, and developing economies, it must define forensic accounting's fundamental connotations as a socio-professional activity in which individual legal subjects use law, accounting, auditing, and judgment to deal with and resolve illegal encroachment problems.,damage, value maintenance, and added value (Dong, 2011; Louwers & Wm. Dennis Huber, 2015).

Various organizations maintain forensic accountants. Typically, this includes police, banks, insurance companies, government agencies, and law enforcement. Forensic accounting combines the auditing skills of a Certified Public Accountant with the investigative skills of a detective. Generally, forensic accountants are employed by large public accounting firms and manage their internal divisions. Likewise, their specialization lies in litigation support and fraud-checking. As criminal and commercial threats to organizational integrity rapidly evolve, effective, measured countermeasures and responses are critical. Fraud, corporate crime, commercial disputes, litigation, and increased data security and regulatory requirements can compromise an organization's integrity and reputation, undermine trust, and attract harmful regulatory intervention and media attention.

The adoption of internet-based information technology, both in fixed and cellular forms, has driven the widespread growth of social media operating in global social networks. Social media platforms, including Facebook, Twitter, Pinterest, LinkedIn, Tumblr, and Google, and many of their competitors, have touched the lives of large sections of the global population. This Web 2.0 technology builds on the early stages of an Internet-based communication model of one-way websites and blogs. One example, KPMG Forensics, helps clients reduce the risk of reputation and commercial loss. By applying accounting, investigative, intelligence, technology, and forensic industry skills, KPMG can help prevent and resolve commercial disputes, fraud, breaches, and violations of rules and regulations. KPMG establishes facts, collects and stores evidence, assists in recovery, and lays the groundwork for criminal or civil action. Their ability to conduct covert and open investigations spans national borders. It can span multiple jurisdictions, often using Forensic Technology expertise. KPMG also helps clients to avoid expensive and unnecessary disputes and litigation. When things go wrong, they have experienced independent experts to help them get a successful resolution by providing an independent, authoritative, and objective analysis of the accounting and financial complexities involved in litigation and commercial dispute resolution.

This study aims to interpret the structure of Twitter content qualitatively regarding the fraud-forensic accounting topic. The content structure referred to is the categories or themes that arise from each content and draw overall meaning from these themes. The research question is: "What themes did Big4 reveal on their Twitter account with the topic of fraud-forensic accounting? This research is expected to be useful for academics and practitioners in terms of strategies to interpret opinions through social media qualitatively and increase knowledge and opinion studies for academics and researchers, primarily qualitative content analysis. This article's structure includes an introductory section that explains the background of the problem, research objectives, and research questions, including an explanation of the general definition of fraud-forensic accounting. Then, explain the research method, which contains information about the data, the data processing using qualitative NVivo software, and the analysis techniques used. The discussion section will explain the information on the results and discussion of several stages of analysis. At the end of this article, we will present the conclusions and challenges of social media-based research.

2. Research method

The study used a qualitative exploratory approach to content analysis through the latest NVivo software edition (R1). The use of NVivo makes it easier for researchers to access user data on the Twitter social networking site. NCapture provides several options for capturing

data from each of these sites and offering several tools to help researchers analyze the results. NVivo is a qualitative data analysis software developed by *Qualitative Solution and Research (QSR) International*. QSR itself is the first company to develop qualitative data analysis software. NVivo originated from the emergence of NUD * IST (*Nonnumeric Unstructured Data, Index Searching, and Theorizingsoftware*) in 1981. NUD * IST was initially created by a programmer named Tom Richards to help his wife, Lyn Richards, a sociologist. In this study, the NVivo used was the latest NVivo released in March 2020 (NVivo R1). This NVivo is especially useful for researchers with little or no coding skills but still want to collect data sets on social media information. This research captures (captures) every posting of information on social media feeds or web search engines, especially Twitter, through the NCapture facility at NVivo. While NCapture is free to add as a Google Chrome browser extension, NCapture saves associated data sets as a proprietary .nvcx file type that can only be opened in NVivo. This means that users will need to purchase an NVivo subscription to open and manipulate the data sets they download using NCapture. After obtaining the desired social media information as a data set, the next step is to create a new project and import the NCapture file into NVivo.

After the files are imported from external data, NVivo then processes and produces the output datasheet in CSV and Excel formats). NVivo has tab options on the spreadsheet's side, including a map function that plots data points by geography or location. NVivo also has a word frequency option. This function includes information about the length and frequency of terms. It allows adding or subtracting irrelevant words to be included in the results. The frequency query also includes several visual aids, such as word trees and word clouds. Ultimately, NVivo and Ncapture seem like handy tools for extracting social media data when users are unfamiliar with coding. NVivo is still a useful tool for real-time social media data collection. It provides a great set of tools for researchers unfamiliar with coding and new to data analysis.

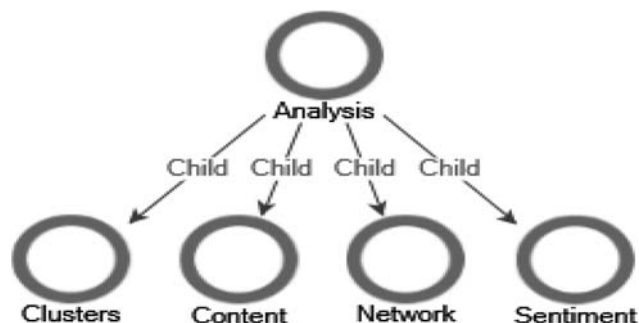
Social media are “websites and applications that enable users to create and share content or participate in social networks.” The two most popular social media sites among British adults aged 16+ are Facebook and Twitter. Communication is the main reason for using both sites. However, they both provide different interaction opportunities and are used for slightly different purposes. While Facebook is used to share opinions and photos with friends, Twitter is used as a news source and keeps up with current events. On Twitter, users can post messages or micro-blogs, called “tweets,” up to 140 characters long. Tweets can include links to other content (images or videos) and websites (such as articles from digital editions of newspapers). About 500 million tweets are sent per day, and Twitter has 316 million active users. A Twitter user account allows them to follow other users, subscribe to their tweets, and be followed. Most tweets are public and can be seen by anyone, with or without a Twitter account, but some users protect their tweets so that approved followers can only see them (Debreceeny, 2015; Komorowski et al., 2018; PUDARUTH et al., 2018; Rumata, 2017b; Tayebi et al., 2019).

As a social environment, Twitter has good etiquette or code of practice. This includes hashtags, words, acronyms, or phrases that start with the “#” symbol and continue without spaces. Hashtags allow users to search for information and follow and contribute to discussions on specific topics. Users can repost other users' tweets, share them with their followers using the retweet function or manually copy and repost, adding RT letters to the start. Twitter users can also engage in conversation by entering their respective username, which starts with the “@” symbol, in the tweet. However, unsolicited and unwanted tweets are considered spam and violate Twitter rules (Chitrakala, 2017; Deller, 2011; Komorowski et al., 2018; Rumata, 2017a).

NCapture is a web browser extension for NVivo 10 which can be used to create chronological data sets or “sets” of tweets, working backward from “capture.” Twitter determines the number of tweets that may be captured and the amount of traffic or data flow on the site at that time. Therefore, we are trying to collect data at set intervals until we have collected a target of around 1000+ tweets. Researchers logged onto Twitter (as @agungdeagung) and searched for all tweets containing the hashtag #fraud #forensic #accounting # big4. The NCapture tool (for Internet Explorer) is used to convert search results into data sets. Initial testing with this tool provided instructions for structuring a near-continuous data set by capturing Thursday and Friday, 19 and 20 November 2020. The final observations included all tweets captured on Friday and then the batch of tweets imported into NVivo.

This study has been discussed with the Research Ethics Committee of Airlangga University, who emphasized that these observations do not require ethical approval. However, researchers recognize that there is still an ongoing debate about the ethical issues raised using this data type for research purposes. The next step is to explore NVivo’s automatic features to generate and count keywords as contained in tweets. However, this was not found to be a useful way of exploring data. In contrast, this research uses well-established qualitative data analysis methods. Following a grounded theory method of data analysis, tweets are read sequentially, line by line, and coded iteratively according to an evolving list of themes. In this way, we can familiarize ourselves with Twitter’s discourse and characterize each tweet’s primary thrust in a more nuanced way than can be gathered by merely reading the search results for #fraud #forensic #accounting # big4 on Twitter or via automated methods. Retweets and spam tweets are manually excluded.

The analysis technique for social media-based research, especially Twitter, is based on several literature reviews: cluster analysis, content analysis, network analysis, and sentiment analysis. This study only used content analysis and little information related to the sentiment analysis.



Clustering is a method of analyzing data that is often included as a data mining method. The purpose of which is to group data with the same characteristics into the same “region” and data with different characteristics to a “region” another. There are several approaches used in developing clustering methods. Two main approaches are clustering with a partition approach and clustering with a hierarchical approach. Clustering with a partition approach or *partition-based clustering* classifies data by sorting the analyzed data into existing clusters. Clustering with a hierarchical approach or hierarchical clustering groups data creates a hierarchy in the form of a sociogram where similar data will be placed in adjacent hierarchies and not in distant hierarchies. Content analysis is a scientific technique to interpret text or content. Krippendorff defines content analysis as a research technique to infer the meaning of the text or through procedures that can be trusted (reliable), can be replicated or applied in different contexts (replicable), and are

Table 1. Word frequency

Word	Length	Count
https	5	20,126
global	6	1951
accounting	10	1597
#betterworkingworld	19	1364
fraud	5	1330
business	8	1213
Deloitte	8	1029
future	6	997
world	5	992
people	6	878
learn	5	828
companies	9	815
leaders	7	760
report	6	747
# covid19	8	650
latest	6	637
explore	7	635
forensic	8	608
digital	7	604
industry	8	591
today	5	586
technology	10	573
watch	5	554
impact today	6	536
businesses	10	514
change	6	508
# wef20	6	498
insights	8	488
#betterquestions	16	483
growth	6	475
leader	6	469
financial	9	468
value	5	429
challenges	10	426
services	8	415
shares	6	410
organizations	13	360
around	6	344
trends	6	341
build	5	330
innovation	10	320
discuss	7	314
first	5	310
opportunities	13	310
discover	8	309

(Continued)

Table 1. (Continued)

Word	Length	Count
company	7	307
years	5	300
transformation	14	299
trust	5	290
survey	6	283

Source: Processed Results, 2020

valid. Krippendorff does not limit the text in the definition to a written product, but also “other meaningful matter,” namely products that have other meanings such as paintings, images, maps, sounds, or symbols (Chitrakala, 2017; Duli, 2018; Komorowski et al., 2018; Rumata, 2017b, 2017a).

Meanwhile, sentiment analysis is a field of study that analyzes a person’s opinion, sentiment, evaluation, judgment, attitudes, and emotions towards a product, organization, individual, problem, event, or topic. The essential task in sentiment analysis is to classify the text’s polarity in the document, sentence, or feature/aspect level and determine whether the opinion expressed in the document, sentence, or feature of the entity/aspect is positive, negative, or neutral. Furthermore, sentiment analysis can express emotional sadness, joy, or anger. Expressions or sentiments refer to the focus of a particular topic; statements on one topic may have different meanings with the same statement on different subjects (Chitrakala, 2017; Dutta Das et al., 2017; Komorowski et al., 2018; Moretti et al., 2015; PUDARUTH et al., 2018; Shukri et al., 2015; Stieglitz & Krüger, 2011).

In this study, the researcher views the content as a stand-alone text and context. To interpret the content, it is necessary to analyze the relationship between texts or, in this case, tweets to one another to find significant meanings and group them into categories, and interpret these categories into a comprehensive meaning of the existing text data. Although this research uses qualitative methods, the research procedure must maintain trustworthiness. To achieve this, validity and reliability through a pre-test is commonplace in quantitative research. In qualitative research, the concepts of credibility, dependability, and transferability must be present in every procedure. To build a level of confidence regarding this inductive technique’s scientific procedure, the researcher must test the coding process’s consistency (coding consistency checks).

3. Discussion

Through social media Twitter, users can write a short text with a maximum length of 140 characters. They can include links to photos, videos, and websites and publish them online on their Twitter account. These messages are called tweets. Users can follow each other, meaning that they receive tweets from other users on their feed who can respond to them, like them, or re-tweet them on their account. Twitter users have a username (using the “@” symbol), identifying users and addressing them in tweets. Users can also use hashtags (using the “#” symbol) before the relevant keyword or phrase in their tweets to categorize the content and make tweets more searchable. Due to the high number of users, functionality, facilitation via users, and the open API, application programming interface (which is much more limited for other social media platforms), Twitter has gained prominence as a tool for conducting research. Different fields of research use different methods making use of Twitter as a critical element of analysis. In the current research, it does not use the API. However, it uses a direct method on the Twitter search engine using predefined hashtags.

Table 2. Word frequency re-observation

Word	Length	Count	Similar Words
https	5	20,127	https, □https
deloitte	8	1378	#deloitte, @deloitte, deloitte, deloitte'risk, deloitte's11th
#betterworkingworld	19	1365	#betterworkingworld, better working world
leaders	7	1430	#leader, #leaders, #leadership, leader, leaders, leaders', leaders', leadership, leadership'
people	6	881	multitude, people, peoples'
global	6	3308	#global, # globalization, #globalization, global, globalisation, globalism, globalization, globally, internal, internally, international, internationally, interns, planetary, world, the world', world,' worlds, worldwide
#covid19	8	673	#covid19, covid19
companies	9	1405	#companies, #company, #society, accompany, accompanying, companies, companies', companies', company, parties, party, societies, society
forensic	8	639	#forensic, #forensics, forensic, 'forensic, forensics
latest	6	637	latest
today	5	586	today
fut ure	6	1101	#future, future, future', futures, succeed, succeeded, succeeding, succeeds

(Continued)

Table 2. (Continued)

Word	Length	Count	Similar Words
accounting	10	3301	#accountability, #accountant, #accountants, #accounting, #control, #controller, #history, #invoice, #invoices, #invoicing, #reporting, @bill, account, accountability, accountable, accountant, accountants, accounted, accounting, accounting', accounts, answer, answered, answering, answers, billing, billings, bills, calculate, calculated, calculating, calculations, calculator, control, controlled, controls, describe, described, describes, describing, explanation, explanations, history, invoice, invoices, report, reportable, reported, reportedly, reporter, reporters, reporting, reports, scores, stories, story
financial	9	506	#financial, #fiscal, financial, financially, financials, financiers, fiscal
#wef20	6	498	#wef20
Word	Length	Count	Similar Words
technology	10	1016	#engineering, #technological, #technologies, #technology, engine, engineer, engineering, engines, technical, technological, technologically, technologies, technology
#betterquestions	16	487	#betterquestion, #betterquestions
fraud	5	1424	#fraud, #frauds, @fraud, faked, fakes, fraud, fraud', fraud,' frauds, fraudulent, imposter, impostors, pretend, pretending

(Continued)

Word	Length	Count	Similar Words
business	8	2020	#business, #jobs, business, business', "business, business," businesses, businesses', concern, concerned, concerned,' concerning, concerns, engage, engaged, engagement, engagements, engaging, jobs,' lined, lines, occupational, occupied, occupy, official, officially, officials
digital	7	1010	#digital, #digitalisation, #digitalization, #digitalize, #digitally, #digitisation, #digitization, #digitize, digit, digital, "digital, digitalisation, digitalization, digitalize, digitalized, digitally, digitisation, digitise, digitization, digitization", digitize, digitized, digitizing, digits, figure, figured, figures, finger

Source: Processed Results, 2020

Figure 1. Word cloud.

Source: Processed Results, 2020



To have a community of practice on Twitter, members of the community must have a domain of common interest to which they are committed. An analysis of account descriptions based on an analysis of word frequency and statistical measures revealed that followers had a wide variety of themes. Some of the themes that arise from the exploration results using word frequency at NVivo can be shown in the following table (Table 1):

Table 3. observation data twitter

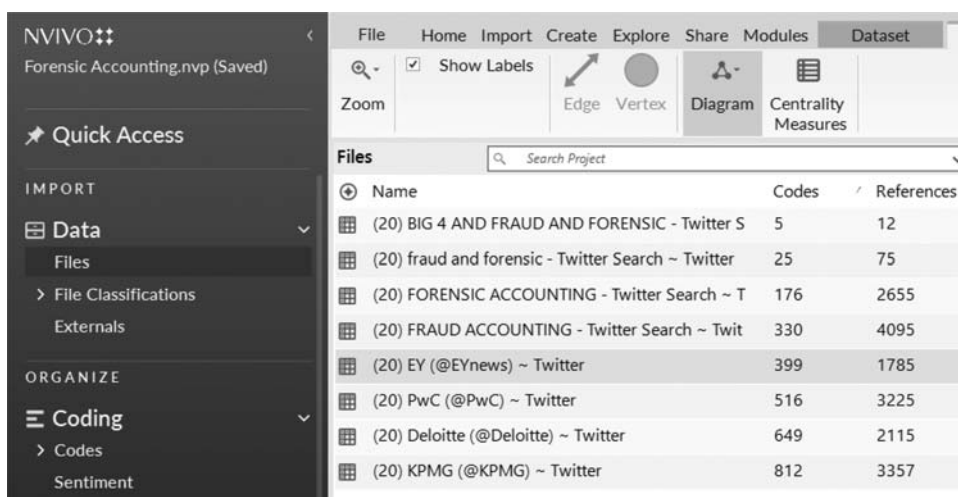
Reference	Reference Type	Title	URL	Access Date
Files\20) BIG 4 AND FRAUD AND FORENSIC—Twitter Search ~ Twitter	Web Page	(20) BIG 4 AND FRAUD AND FORENSIC—Twitter Search/Twitter	https://twitter.com/search?q=BIG%20%20AND%20FRAUD%20AND%20FORENSIC&src=typed_query	18/11/2020 17:47
Files\20) Deloitte (@Deloitte) ~ Twitter	Web Page	(20) Deloitte (@Deloitte)/Twitter	https://twitter.com/Deloitte	18/11/2020 17:44
Files\20) EY (@EYnews) ~ Twitter	Web Page	(20) EY (@EYnews)/Twitter	https://twitter.com/EYnews	18/11/2020 17:46
Files\20) FORENSIC ACCOUNTING—Twitter Search ~ Twitter	Web Page	(20) FORENSIC ACCOUNTING—Twitter Search/Twitter	https://twitter.com/search?q=FORENSIC%20ACCOUNTING&src=typed_query	18/11/2020 17:49
Files\20) FRAUD ACCOUNTING—Twitter Search ~ Twitter	Web Page	(20) FRAUD ACCOUNTING—Twitter Search/Twitter	https://twitter.com/search?q=FRAUD%20ACCOUNTING&src=typed_query	18/11/2020 17:47
Files\20) fraud and forensic—Twitter Search ~ Twitter	Web Page	(20) fraud and forensic—Twitter Search/Twitter	https://twitter.com/search?q=fraud%20and%20forensic&src=typed_query	18/11/2020 17:37
Files\20) KPMG (@KPMG) ~ Twitter	Web Page	(20) KPMG (@KPMG)/Twitter	https://twitter.com/KPMG	18/11/2020 17:42
Reference	Reference Type	Title	URL	Access Date
Files\20) PwC (@PwC) ~ Twitter	Web Page	(20) PwC (@PwC)/Twitter	https://twitter.com/PwC	18/11/2020 17:43

Source: Processed Results, 2020

In summary, the Twitter data source reference obtained through observation can be shown, as shown below (Figure 2).

Figure 2. Input twitter data reference.

Source: Processed Results, 2020



Name	Codes	References
(20) BIG 4 AND FRAUD AND FORENSIC - Twitter S	5	12
(20) fraud and forensic - Twitter Search ~ Twitter	25	75
(20) FORENSIC ACCOUNTING - Twitter Search ~ T	176	2655
(20) FRAUD ACCOUNTING - Twitter Search ~ Twit	330	4095
(20) EY (@EYnews) ~ Twitter	399	1785
(20) PwC (@PwC) ~ Twitter	516	3225
(20) Deloitte (@Deloitte) ~ Twitter	649	2115
(20) KPMG (@KPMG) ~ Twitter	812	3357

Figure 3. Main coding network.

Source: **Processed Results, 2020**

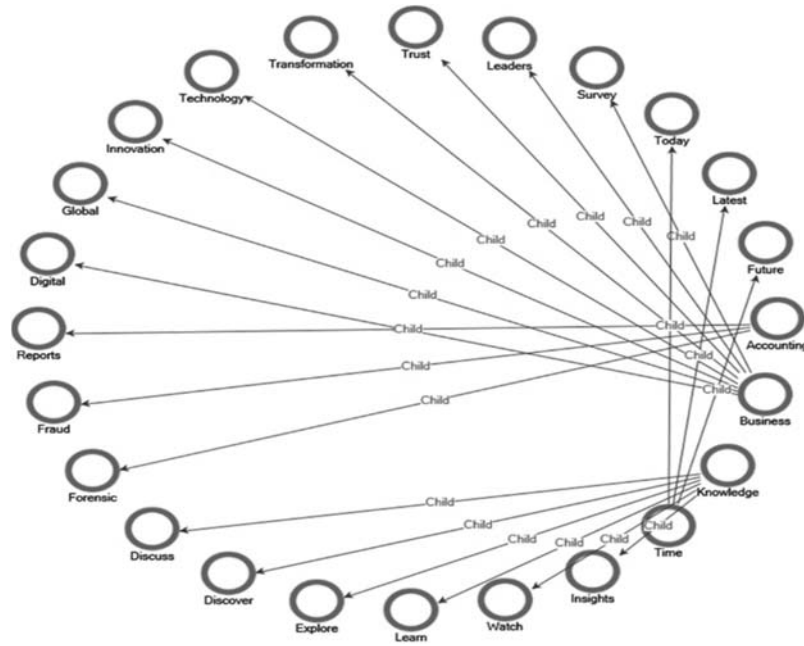
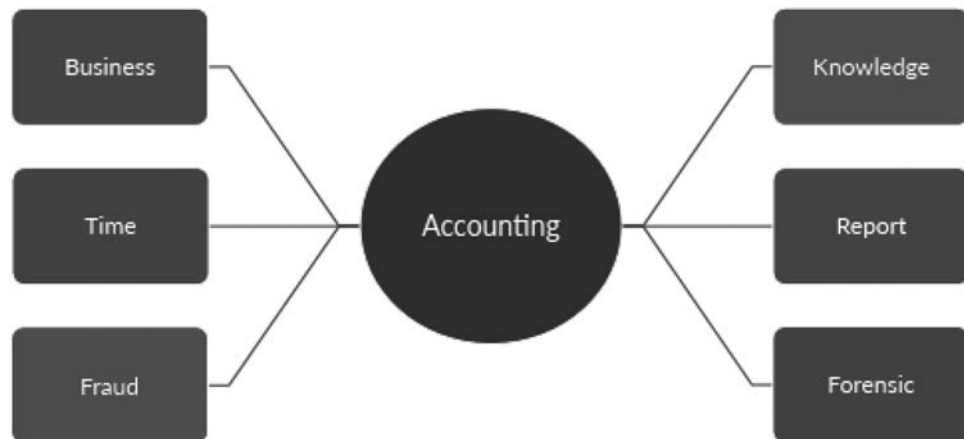


Figure 4. Mind map.

Source: **Processed Results, 2020**



There are 50 words most often expressed p there Twitter, according to the length of 5 characters and the frequency of disclosure frequency. To get to the coding stage, not all words will be taken as coding, but reduced according to research needs. To determine the key theme that later became the primary coding of this research, then re-observation was made on word frequency, but by following the synonyms on the theme. The results of the word frequency on repeated observations are shown in the following table (Table 2):

Apart from being in tabular form, the number of words disclosed on the Twitter account can also be viewed through the Word Cloud. The larger the letters displayed indicates, the more often the word is disclosed on Twitter data sources. Word cloud in this study, the results can be seen in the following figure (Figure 1).

The following table (Table 3) shows the reference to the results from Twitter observations via predefined hashtags. There are nine references and access times used for the next stage, namely determining to code.

Table 4. Auto coding

	A : accounting	B : business	C : forensic	D : fraud	E : global	F : https
Files\20\BIG 4 AND FRAUD AND FORENSIC - TWITTER SEARCH" TWITTER	2	0	2	0	0	0
Files\20\DELOITTE (@Deloitte)"TWITTER	8	107	1	0	118	471
Files\20\EY (@EYnews)"TWITTER	4	193	2	0	184	212
Files\20\FORENSIC ACCOUNTING -Twitter search" Twitter	394	7	419	44	2	19
Files\20 FRAUD ACCOUNTING -Twitter search" Twitter	698	15	72	533	2	45
Files\20\fraud and forensic -Twitter search" Twitter	2	0	13	7	0	3
Files\20\KPMG (@KPMG)"Twitter	33	145	0	4	107	830
Files\20\PwG (@PwG)"Twitter	5	117	2	8	137	806

Source: Processed Results, 2020

Figure 6. Sentiment analysis.

Source: Processed Results, 2020



5. Conclusion

This study uses a qualitative approach using Twitter data, and the analysis used is a content analysis and a little introduction to sentiment analysis on coding. Conditions that must be met when using Twitter data are domain, community, and posting information. The qualitative method currently looks at the disclosure of fraud and forensics from 4 of the world's leading public offices, known as Big4. Based on the results of Twitter data input, it can be informed that the reference source meets the research target of 1000 + . The data group's name has been adjusted to the predefined keywords and special data groups in the Big 4 public accounting firm. Based on the results of observations through these various stages, it can be seen that several themes can be defined as the Main Coding. The research question is what themes Big4 discloses regarding fraud and forensics in accounting on social media Twitter. Qualitative data analysis is a tiring, heavy, and time-consuming job because the data generated are extensive, diverse, and unstructured. However, this problem has been solved with the introduction of qualitative software NVivo. The software helps researchers to store, organize, and explore data easily and minimize the risk of damage to original data. The biggest challenge of this research is the lack of scientific studies or domestic research related to qualitative analysis of Twitter texts on fraud-forensic accounting.

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