Revisiting the Accounting Fraud Components: A Bottom-Up Approach Using the Twitter Platform

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Abstract
Despite the relevant economic and reputational impact of fraud, research in this field remains fragmented. This study aims to create a new framework for accounting fraud, defining its main components from the social media user’s perspective. In terms of research technique, an online data collection using social media platform was used retrieving, through the phyton web crawler procedure, 43,655 tweets containing the phrase “accounting fraud” from July 2006 to December 2019. Individual words were identified and treated within the selected tweets, excluding stop words and, finally, using a sparsity index. The proposed methodology, which overcomes traditional survey inherent bias efficiently, contributes to bridging the divide between academia and society. We find that Twitter users shape the Accounting Fraud Hexagon, composed by (i) The Object and the Tool (of misrepresentation), being the Financials, (ii) The (Guilty) Fraudster, (iii) The Defrauded, (iv) Materiality, (v) The Consequences, and (vi) the Watchdog. Our research has several implications. Our research identifies additional “angles” of vision to the traditional fraud triangle-diamond-pentagon theories compared with the existing top-down conceptual frameworks. Also, since it uses a bottom-up instead of a top-down approach, the study allows a more comprehensive definition of accounting fraud, thus contributing to the debate for a common language in this field. We expect to encourage more research using social media as a tool to test the literature built on in vitro theories empirically.

Keywords
accounting fraud components, accounting fraud hexagon, social media, Twitter

Introduction
Fraud is pervasive in business and, in broader terms, in society. The term “Accounting Fraud” is referred to activities that use accounting books and reports to hide fraudulent behavior or give a false impression of an entity’s financial and economic reality. Thus, it is not an unexpected fact that Accounting Fraud is a relevant topic in business literature since it imposes a substantial economic cost on organizations and society, making it an important topic to study. In the last Report to the Nations, the Association of Certified Fraud Examiners (ACFE) estimates that the cost of fraud globally is worth approximately 5% of revenue or US$4 trillion annually (ACFE, 2018).

Accounting Fraud is not a recent phenomenon. Sutherland (1945), who introduced the term white-collar crime, states that these kinds of perpetrators are usually professionals and, for this reason, related legal charges are not so heavy. Finally, since this crime is invisible to most people, the “characteristic reaction of the average citizen in the modern city toward burglary is apathy unless he or his immediate friends are victims or unless the case is very spectacular” (Sutherland, 1945, p. 139).

A few years later, in the 1950s, the criminologist Donald R. Cressey, extended the study conducted by Sutherland, individuating the incentives to the fraud occurrence, known as the Fraud Triangle Theory (FTT): (i) Pressure, which mainly refers more to the financial pressures, originated by lifestyle, debt, urgent family needs; (ii) Opportunity, which enables fraud to occur, and it is often caused by weak internal controls, lack of supervision, and authority abuse; and (iii) Rationalization, where perpetrator self-justification for his action.

Albrecht et al. (1984) adjusted the FTT into the Fraud Scale Theory (FST), replacing the rationalization factor with

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personal integrity. Albrecht et al. (2004) described the relation between the three elements: when the situational pressure and the opportunity to commit fraud are both high and the personal integrity low, the chance of fraud to occur is high, and conversely, the possibility of fraud occurring is low. More recently, Wolfe and Hermanson (2004) added a fourth element called Capability, factoring the Fraud Diamond Theory (FDT), related to the perpetrator’s privileged position or knowledge. Opportunity, pressure, and rationalization make the perpetrator closer to the fraud, but he/she must have the capability to commit fraudulent actions (Dorminey et al., 2010).

FDT also expands the pressure element. According to Dorminey et al. (2012a), the Fraud Triangle’s pressure element does not necessarily refer to financial pressure. Ramamoorti et al. (2009) revealed that wealthy executives also commit fraud. In this context, FTT cannot observe the pressure element comprehensively. According to Dorminey et al. (2010), situational pressure can be explained by four factors known as MICE (money, ideology, coercion, and entitlement). Money is related to financial pressure, while ideology—similar to the rationalization concept—contributes to the perpetrator justifying his/her action by a greater goodness (such as a donation to people in need). Coercion refers to the pressure done by a third party to commit fraud. Finally, Entitlement is based on the fraudster’s ego, which bets on his/her impunity or perceives the fraud as needed to obtain or maintain wealth and success and, thus, identity and social status.

An updated theory that covers the fraud triggering factors is Fraud Pentagon Theory (FPT). Marks in 2011 (apud Dorminey et al., 2012b) presents an extended version of Cressey’s FTT by adding two more elements of fraud: Competence and Arrogance. The former is similar to Capability, as previously explained in FDT, and it relates to the employee’s capacity to elude controls, developing a criminal strategy for his/her benefits. The latter is the superiority mental state for having certain rights and the feeling that the company’s policies and procedures do not apply to oneself. Abayomi and Abayomi (2016), adding Ethics; Vouinas (2019), with Stimulus (=Pressure) and Ego (=Arrogance) and Tugas (2012), with Regulatory, also propose their pentagon.

The present study’s motivation is that fraud has dominated the business world in the last decades, having fraud-related scandals a relevant economic and reputational impact on the firms’ valuation and profitability.

The originality of the present study is due to two main contributions to gaps in the current literature. First, as showcased in this Introduction, most of the literature is top-down, that is, the researchers and specialists put forward accounting fraud theories. In this paper, we adopt a bottom-up approach, relying on the perception of accounting fraud by Twitter users to derive the six components of our accounting fraud model. This unconventional approach is important because previous research did not provide any empirical support for their theories. Hence, our paper is the first to create an Accounting Fraud Theory using empirical and reproducible data to the best of our knowledge. Therefore, this innovative way of theorizing accounting fraud is novel and addresses a gap in the literature since previous literature describes a social problem starting from a conceptual framework. On the opposite, the present paper goes from the social (media) perspective to design a conceptual framework: the social media users define their accounting fraud shape. The methodology used in the present study is—in itself—a contribution to the accounting literature. Apart from the possibility to efficiently gather an extensive number of observations (not responses!), it overcomes traditional survey intrinsic bias (acquiescence, demand characteristics, question order, social desirability, among others), without needing any add-on statistics tool to mitigate them, providing the genuine point-of-view of random and spontaneous “without-their-knowledge” respondents (Fiesler & Proferes, 2018).

Second, previous literature mainly returns personal aspects of the fraudster (his/her Pressure or Incentive, Rationalization, Integrity, Capability or Competence, Arrogance). At the same time, the present paper shows that impersonal components are relevant as well. This is confirmed by authors who believe that fraud is a multifaceted phenomenon, and, consequently, perceive the need to go beyond the conventional FTT, as Lokanan (2015, p. 20): “the ACFE’s endorsement of fraud as an individualized problem rather than a socio-political issue raises […] concerns that are related to the fraud triangle concepts” or Schuchter and Levi (2015, p. 185): “FT does still offer an incomplete but useful abstraction of complex interactions, it nevertheless neglects the impact of social systems on individual decisions to commit fraud.”

Additionally, the paper also contributes to a more comprehensive definition of accounting fraud with an additional component. Hence, this study’s main objective is to create a new framework for accounting fraud using social media data, using a bottom-up approach. Therefore, we pose the following research question: “What are the Accounting Fraud’s main components?”.

The paper is organized as follows. After reviewing the nuances of accounting fraud definition in accounting literature in Section 1, Section 2 presents the methodology used to answer our research question. Section 3 and 4, respectively, are dedicated to the findings and results’ discussion, while in Section 5, conclusions are presented.

**Literature Review: Nuances of AF Definitions**

The first definition of accounting fraud is of the author who introduces the construct into literature. Sutherland (1949, p. 9) defined white-collar crime as “a crime committed by a respectable person of high social status in the course of his
Based on the offense's characteristics, Clinard and Quinney (1973) differentiated occupational from corporate crime. The former is committed against a company for the perpetrator's benefit, including embezzlement or unjustified cost increases (fraud on expenses). The perpetrator executes the latter for the corporation's benefit, including bribery or violations' control. This kind of crime benefits the company, for example, to obtain a contract or reduce costs, but can also indirectly benefit the perpetrator, such as promotions or salary increases.

Cooper et al. (2013) state that “all white-collar crimes are, by definition, violations of the law committed in the course of a legitimate occupation or financial pursuit by persons who hold respected positions in their communities.” Most white-collar criminals’ main objective is the economic gain or job success that can lead to financial gain.

Statement on Auditing Standards (SAS) no. 99, “Consideration of Fraud in a Financial Statement Audit,” edited by the American Institute of Certified Public Accountants (AICPA), defines fraud as an “intentional act that results in a material misstatement in financial statements” (American Institute of Certified Public Accountants [AICPA], 2002, p. 1721). In paragraphs from 0.05 to 0.12, fraud’s characteristics are described and, when paragraph 0.07 explains the conditions generally present when fraud occurs—management incentive or pressure, the opportunity for a fraud to be perpetrated and the involved capacity to rationalize committing a fraudulent act—the AICPA adoption of the FTT as a reference model can be recognized. In the following Table 1, some nuances of AF definition are presented.

To better understand the nature and extent of the financial reporting fraud, relevant accounting and auditing literature were opening its horizons progressively, producing literature review papers/special issues as much as possible interdisciplinary, including criminology, ethics, finance, organizational behavior, psychology, and sociology.

The first comprehensive work in this sense was Hogan et al. (2008). This paper synthesizes and discusses the implications of academic research on fraudulent financial reporting. The work was sponsored by the Auditing Section of the American Accounting Association (AAA) to support the PCAOB (Public Company Accounting Oversight Board) project related to financial statement fraud. Authors discuss firms' characteristics committing financial statement fraud, research related to the fraud triangle, and auditors' procedures and abilities to detect fraud, especially related to "high risk" areas. This pioneering work was, clearly, limited to accounting academic literature.

For this reason, Trompeter et al. (2013, also sponsored by the Auditing Section of the AAA, continued the work of Hogan et al. (2008 by summarizing relevant fraud interdisciplinary literature from criminology, ethics, finance, organizational behavior, psychology, and sociology), to conceptualize an anti-fraud auditing model. Based on the fraud triangle approach (management’s incentive, attitude, and opportunity to commit fraud), the model would assess the client’s antibodies’ existence and effectiveness (corporate governance mechanisms and internal controls), mapping its overall fraud risk. Trompeter et al. (2014) completed, 2 years later, the fraud research synthesis project with the purpose to better understand the nature and extent of fraud acts from the perspective of non-accounting research and “to share with accounting researchers and practitioners’ ideas, theories, variables, constructs, and research designs used in other fields that might inform anti-fraud research and actions in accounting” (Trompeter et al., 2014, p. 769). The paper reviewed approximately 30 journals in criminology, ethics, psychology, and sociology.

A great deal of Trompeter et al. (2013, 2014) was to introduce into a discussion not only different areas but also new techniques. Authors cite, among others, (Cohen et al., 2010), who used content analysis of press articles and Hobson et al. (2012), who analyzed CEOs’ speech during earnings conference calls to detect financial misreporting.

In line with (and contemporary too) Trompeter et al. (2013, 2014), there is a group of papers belonging to a special issue called “Interdisciplinary perspectives on fraud and wrongdoing.” In its editorial, called “Fraud in Accounting, Organizations and Society: Extending the Boundaries of Research,” Cooper et al. (2013) propose an interdisciplinary review that goes beyond the two dominant areas of accounting and audit research on fraud, emphasizing three themes: the importance of contextualizing fraud, the social construction of fraud and associated categories of wrongdoing, and the recognition that fraud takes place in multiple domains.

As it can be noticed, the accounting boundaries of the research on AF are progressively becoming “social.” However, it still lacks a common “language” for researchers who “need practical, objective, and replicable ways to identify fraud in their data” (Amiram et al., 2018, p. 734). Cooper et al. (2013, p. 444) observe:

“The accounting literature typically [. . .] assumes that fraud is an objective phenomenon; that we all agree what a fraud is, that there is limited moral or ethical ambiguity about the nature and effects of fraud, and that such agreements are somewhat invariant across time and space [. . .] The accounting research on fraud seems to accept legal definitions of fraud and assumes that such laws are universal and uncontested.”

In this sense, the recent work of Amiram et al. (2018, p. 733) “reviews the literature on financial reporting fraud and misconduct from an integrated perspective of law,
Table 1. (Some) Definitions of Accounting Fraud.

| Author             | Definition                                                                                                                                 |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Sutherland (1940, 1949) | White-collar crime is committed by a respectable person of high social status in the course of his occupation. It can be divided into two categories: untrustworthy representation of assets and manipulation of power |
| Clinard and Quinney (1973) | Authors divide the crime into occupational and corporate, the former being against the organization and the latter in favour of the organization |
| Coleman (1987)    | All white-collar crimes are, by definition, violations of law committed during a legitimate occupation or pursuit by people who hold respected positions (reputation) in their communities |
| AICPA (2002)      | Accounting fraud includes intentional financial misrepresentations (e.g., falsification of accounts) and misappropriations of assets (e.g., theft of inventory) |
| Zahra et al. (2005) | Fraud refers to the deliberate actions taken by management at any level to deceive, con, swindle, or cheat investors or other key stakeholders |
| Bhasin (2013)     | Mistakes are not fraud. In fraud, groups of unscrupulous individuals manipulate or influence the activities of a target business intending to make money or obtain goods through illegal or unfair means. Fraud cheats the target organization of its legitimate income and results in a loss of goods, money, and even goodwill and reputation |
| ACFE (2018)       | Occupational fraud is the fraud committed against the organization by its officers, directors, or employees. It occurs when an employee abuses his position within the organization for personal gain. More formally, it may be defined as the use of one’s occupation for personal enrichment through the deliberate misuse or misapplication of the organization’s resources or assets |
| Amiram et al. (2018) | Financial reporting misconduct is a misrepresentation in the form of a misstatement, misreporting, or omission; [. . . it] must be material; [. . . it] was committed negligently, recklessly, or with knowledge of its falsity; [. . . it] is causally related to a loss suffered by the plaintiff |

accounting, and finance [. . .] to provide common ground by defining financial reporting fraud and other forms of financial reporting misconduct.” Authors identify the following universal elements of the umbrella term financial reporting misconduct “there must be a misrepresentation in the form of a misstatement, misreporting, or omission; [. . . it] must be material; [. . . it] was committed negligently, recklessly, or with knowledge of its falsity; [. . . it] is causally related to a loss; suffered by the plaintiff.” To the best of the authors’ understanding, the cited interdisciplinary study offers the most comprehensive accounting fraud definition and, therefore, is used as a guideline analysis and results’ interpretation of the present study.

In conclusion, the path followed by scholars was: (i) to understand the need to define financial misconduct as a (white-collar) crime; (ii) to design general theoretical frameworks (seen in the Introduction) or behavioral theories to analyze individual elements to analyze the phenomenon better and give rules to the market and guidelines to accountants/auditors; (iii) to study the accounting fraud from an interdisciplinary perspective to get a broader understanding; and (iv) to try giving the most comprehensive definition of accounting fraud starting from a cross-disciplinary literature review.

This paper’s goal is a sort of zero-based budget of the AF definition and to expand the range of perspectives used to understand fraud. We aim to examine nuances potentially under-researched in literature, thus, participating in the debate under the previous point (iv), extending it to the social media view.

For this purpose, Twitter users’ comments are analyzed to determine a more comprehensive definition of Accounting Fraud, thus bridging the societal perception with the relevant studies on the subject.

Research Design and Method

The field of collecting survey responses is changing rapidly. Chang and Krosnick (2009) found that Internet data collection from a probability sample yields more accurate results than random-digit-dial telephone interviewing. But the experiments that were done still refer to a formalized and (more or less) structured set of questions with its difficulty of preparation (Malhotra, 2006) and, more critical, intrinsic bias (acquiescence, demand characteristics, question order, social desirability, among others). Intuitively, the methodology used in the present study, apart from the possibility to efficiently gather a large number of observations (not responses!), overcomes each of the mentioned biases, without needing any add-on statistics tool to mitigate them, providing the genuine point-of-view of random and spontaneous (since without their knowledge) respondents.

Therefore, we use a quantitative deductive method (Almeida et al., 2021) to answer our research question differently from previous, exclusively qualitative literature. For our analysis, we used the R Statistical Software. Users’ opinions were collected via Twitter. This social community was chosen due to its high popularity: in 2019, it accounts for more than 330 million monthly active users who post about 340 million tweets a day. This approach is advantageous since it enables...
us to gather people’s perceptions about accounting fraud without directly asking them through a survey. Additionally, it allows for a larger and more diverse sample size.

The analysis was performed throughout the entire period of Twitter life, from July 2006 to December, 2019 (hereafter also “the period”), to avoid specific factors or events bias results, but the first tweets containing the search terms (this is “accounting fraud”) only appear in 2008 as represented in Table 2.

Following Tommasetti et al. (2021), the process of data collection has been achieved using a python web crawler named GetOldTweets, which operates in nearly real-time as a background activity.

This process produced a total of 43,655 tweets collected, including account, date, numbers of likes, and retweets. Within the selected tweets, 34,010 individual words—repeated 627,230 times—were automatically identified, as per Figure 1.

As shown in Figure 1, further screening of the selected words was made to validate the data and ensure their accuracy. For this reason, the crawler has automatically ignored the so-called stop-words (Makrehchi & Kamel, 2017), this is definite and indefinite articles (“a,” “the”), personal pronouns (“i,” “us”), preposition (“in,” “with,” “in,” “to”) and other terms that would not help findings’ ultimate interpretation (“rt” which represent “retweet,” “is,” “via,” “with,” “avoids,” “new,” “exclusive,” “biggest,” “will,” “says”). Finally, the two words, together or individually, composing our research target (“accounting,” “fraud,” “accounting fraud” or “accountingfraud”) were excluded.

Furthermore, to make the data more useful, for the remaining set of words, a sparsity index (Makrehchi & Kamel, 2017) of 98% was applied, eliminating any word that appears in less than 2% of the total tweets: this implied that words than appeared less than 873 times (this is 2% of 43,655 selected tweets) are not considered. This process resulted in a final number of 34 words, repeated a total of 60,035 times.

To avoid interpretive distortions and to allow a better understanding of the most important concept regarding accounting fraud for Twitter users, according to Ciasullo et al. (2018), the most frequent words were grouped into constructs based on their meaning’s affinity. They are presented in Section 4 and discussed in Section 5.

Results

Following preliminary analysis of the selected tweets per year and the numbers of soft (likes) and hard (retweets) engagement during the period is proposed.

As it can be noticed, in terms of annual total tweets, the period 2011–2019 can be considered stable with an annual average of 4,516, with a peak in 2012, when the Autonomy-HP

Table 2. Descriptive Statistics of the Sample.

| Year | Tweets [1] | Likes [2] | RT [3] | [4] = [2]/[1] | [5] = [3]/[1] |
|------|------------|-----------|--------|---------------|---------------|
| 2008 | 57         | 0         | 0      | 0.000         | 0.000         |
| 2009 | 930        | 22        | 16     | 0.024         | 0.017         |
| 2010 | 2,024      | 45        | 184    | 0.022         | 0.091         |
| 2011 | 3,155      | 88        | 608    | 0.028         | 0.193         |
| 2012 | 5,445      | 297       | 1,368  | 0.055         | 0.251         |
| 2013 | 4,116      | 538       | 1,554  | 0.378         | 0.378         |
| 2014 | 3,169      | 801       | 1,297  | 0.253         | 0.409         |
| 2015 | 5,255      | 2,061     | 3,029  | 0.392         | 0.576         |
| 2016 | 4,485      | 3,709     | 3,514  | 0.784         | 0.784         |
| 2017 | 4,334      | 27,933    | 26,116 | 6.445         | 6.026         |
| 2018 | 4,865      | 17,662    | 7,528  | 3.630         | 1.547         |
| 2019 | 5,820      | 34,879    | 12,356 | 2.123         | 2.123         |
| Total| 43,655     | 88,035    | 57,570 | 2.017         | 1.319         |

Note. [4] Popularity index = average number of likes; [5] Virality index = average number of retweets per tweet. As per the normality adherence test, all the above variables are normally distributed.
and Olympus scandals emerged, in 2015, year in which the Satyam Chairman was, together with other ten persons, condemned for the accounting fraud discovered 6 years before.

In 2019, the number of tweets regarding accounting fraud was the highest in the social media database history, due to discussions related to the (i) effect of the Obama administration decision to eliminate private lenders from the student loan market; (ii) Tesla CEO Elon Musk case, questioned for fraud from the Federal Agency (iii) Departments of Defense accounting supposedly “phony.”

“Virality” and “popularity” can be measured to offer a better view of reactivity, dialogs, and users’ engagement. Virality measures how many times a wall post is shared with someone (this is “retweeted”), while popularity represents the number of “likes” to a single tweet. Bonsón and Ratkai (2013, p. 795) state that “these metrics can contribute to theory validations and interpretations,” indicating levels of users’ engagement relating to the discussed topic.

These two indicators were constantly increasing along the period, due to a growing general interaction between Twitter users and, for 2017 in particular, to the political discussions associated with the first year of Trump’s government, as can be observed by the following Table 3, which reports the most popular/viral tweets:

Table 3. Tweets with ReTweet (RT) or Likes > 1,000.

| Username      | Date     | Likes | RT  | Tweet                                                                 |
|---------------|----------|-------|-----|----------------------------------------------------------------------|
| SethHanlon    | 05/23/17 | 8,543 | 7,087 | I’m not sure people truly appreciate the Madoff-level accounting fraud involved in Trump’s budget |
| CoruscaKhaya  | 12/06/17 | 1,930 | 4,745 | Meet Markus Jooste, purveyor of accounting fraud, billionaire, liar & now- the dismissed former CEO of #Steinhoff or - as some in my WhatsApp groups have said - the Brian Molefe of monopoly capital. For today, his face needs to trend as much as #BrianMolefe |
| SethHanlon    | 05/23/17 | 2,483 | 1,543 | In sum, this is the Bernie Madoff Budget. A massive accounting fraud, designed to fleece vulnerable people |
| SollyHlaka    | 12/11/17 | 1,187 | 1,535 | We really need proper articles from you guys. Something like: Steinhoff loses pensioners money through accounting fraud |
| BruceBartlett | 05/23/17 | 1,211 | 1,046 | Donald Trump’s budget is based on a hilarious accounting fraud |
| Funder        | 02/06/17 | 893   | 1,020 | German State Attorney prosecuted Trump’s Germany based company for accounting fraud in 2005 |
| Soledadobrien | 07/30/17 | 1,778 | 809  | A sex scandal led to Bakker’s resignation. Revelations of accounting fraud brought about his imprisonment and divorce |

The proposed methodology, thus, leads to an Accounting Fraud Hexagon, represented in the Figure 2.

This outcome shows that impersonal components, such as the Tool (the Financial Reporting), the Defrauded (Organization), the Materiality, the Consequences, and the Watchdog (Institutions and Audit) play an essential role as well while, as illustrated in the following Table 5, FTT and its variations presented in this paper’s introduction focus on the personal aspects of the Fraudster (his/her Pressure or Incentive, Rationalization, Integrity, Capability or Competence, and Arrogance).

Findings’ Discussion: The Six Components

The above-illustrated results align with the recent and relevant paper of Amiram et al. (2018, p. 733). The authors identify five universal elements for an umbrella definition of financial reporting misconduct. As shown in the following Table 6, their definition overlaps with the Twitter users’ construct, unless Component#6 (the Watchdog).

The Fraud Hexagon offers us a glimpse of the fraud workflow, starting from the Financials as the necessary condition for an Accounting (instead of a common) Fraud, and the associated questions: Who perpetrated it? (the Fraudster), To the detriment of who? (the Defrauded), Which was its magnitude? (Materiality), Causing which kind of Consequences to the involved parties? Who was (supposed to be) regulating and supervising? (the Watchdog). Following each of the detected components of the hexagon are discussed in the mentioned sequence.

Component #1: Financials

“Financial” (Mis)”Reporting” represents at the same time the object of the misrepresentation and the tool to perpetrate,
Amiram et al. (2018, p. 735) observe that “insights from the earnings management literature have been used to develop models to predict misconduct: As such, prior literature reveals that factors such as discretionary accruals and proxies for earnings management are significant predictors of financial reporting misconduct behaviour”.

But there is a clear theoretical distinction between financial reporting misconduct (thought creative accounting) and earnings management. The two terms are often considered synonymous, while the nuances that characterize these practices are different. Ronen and Yaari (2008) classify EM as white (WEM), gray (GEM), and black (BEM). WEM contributes to reports’ transparency, taking advantage of the flexibility among the accounting treatment choices to represent the company’s expectations on future cash flows. GEM represents manipulation of reports within the generally accepted standards’ boundaries, either opportunistic or efficiency-enhancing. Finally, BEM involves outright misrepresentation and fraud. In this line, Gupta and Kumar (2020) state that creative accounting, though legal and acceptable worldwide, gives way to loopholes provided by the acts and rules governing the preparation of financial statements, eventually leading to financial crimes and hampering the economy a whole.

Based on this definition, earnings management and creative accounting-fraud are the two extremities of the (accounting) approach, with the first very close to the cited WEM (or GEM at the most) and the second to the BEM (or GEM at least). While this research is devoted to the BEM side of the spectrum, there is a significant gray area in the middle.
Component #2: The (Guilty) Fraudster

As presented in Table 5, the AF Theoretical Model evolution has proposed, along the last seven decades, different dimensions (Pressure or Incentive, Rationalization, Integrity, Capability or Competence, Arrogance) built around the Fraudster. It is mainly due to the auditing professionals’ need: to map the business top risks. Consequently, accounting (fraud) literature is focused on this element.

Davidson et al. (2015) conducted a detailed analysis on “how executives’ behaviour outside the workplace, as measured by their ownership of luxury goods [. . .], and prior legal infractions is related to financial reporting risk” and “find that CEOs and CFOs with a legal record are more likely to perpetrate fraud” (Davidson et al., 2015, p. 5). Studies also examined which executives are instrumental in the decision to commit financial reporting misconduct. Dechow et al. (1996) find that CEOs also serving as Board Chairperson are more likely to manipulate results, demonstrating that a powerful, entrenched CEO is a misconduct driver. Feng et al. (2011) confirm that higher CEO stocks’ incentives and power lead to results’ distortions, forcing CFOs to succumb to their pressure.

The significance of this component is corroborated by the result of the present research, which attributes to “Guilty,” “Former,” “Execs,” “Executives,” “CEO,” “CFO” a crucial role.

Component #3: The Defrauded

The organization represents the third element of accounting fraud. “Case”(s), such as “Olympus,” “Satyam,” “Autonomy” or “Pentagon(s),” confirm that the “Business,” this is the “Company” in its quality of Defrauded, is seen from the social media users as the most relevant construct in this research findings.

“Satyam” was a corporate scandal affecting the India-based computer services company in 2009. Less than a year after been awarded by Ernst & Young as “Entrepreneur of the Year,” the owner (and chairperson) confessed that the company’s accounts had been falsified, for years, by around US$2 billion. The company, awarded in the same year by the World Council for Corporate Governance with the “Global Peacock Award” for global excellence in corporate accountability, became the centerpiece of “Massive” accounting fraud.

“Autonomy” specialized in analyzing large scale unstructured big data, becoming the UK’s largest and most successful software business by 2010. Acquired by Hewlett-Packard in 2011 for US$11.7 billion with a premium of around 80% over market price, within a year, HP had written off US$8.8 billion of Autonomy’s value. HP claims this resulted from accounting improprieties, misrepresentations, and disclosure failures by the previous management (particularly the CFO).

The “Olympus” case was precipitated in 2011 when the international optical equipment manufacturer’s CEO was suddenly ousted since perpetrated one of the biggest and longest-running loss-hiding arrangements in Japanese corporate history. It wiped 75% to 80% off the company’s market valuation, led to the resignation of much of the board, investigations across Japan, the UK, and the US and the arrest of 11 between directors, senior managers, auditors, and bankers.

The “Pentagon’s” case refers to the vexed question regarding audit (and audit failure) of the US Department of Defence expenses.

Intuitively, major financial reporting frauds need to be studied for “lessons learned” and “strategies-to-follow” to reduce the incidents of such frauds in the future. Despite that, in accounting literature, such cases rarely go further than an evocative citation in the Introduction, as can be observed by the fact that the construct does not participate in most of the AF definitions (Table 1) and any of the AF Theoretical Models (Table 5), unless incidentally in the “Opportunity” perspective. In this sense, as far as the perspective of the “Company”’s (“Business”) “Exposed” to endogenous and exogenous risk factors, Schnatterly et al. (2018) discuss the literature about the Internal (CEO power, 

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**Table 5. Fraud Theory Evolution: Comparison with the Present Study.**

| Author | Cressey | Albrecht et al. | WH | Marks | Present paper |
|--------|---------|----------------|----|-------|---------------|
| Year   | 1950    | 1984           | 2004| 2011  | 2019          |
| Theory | FTT     | FST            | FDT | FPT   | FHT           |
| Method | Conceptual | Conceptual | Experience | Conceptual | Empirical |
| [1]    | Pressure | Pressure ≈ Incentive | Experience | Pressure | Financials |
| [2]    | Opportunity | Opportunity | Opportunity | Opportunity | Fraudster |
| [3]    | Rationalization | Integrity | Rationalization | Rationalization | Defrauded |
| [4]    |          |               | Capability ≈ Competence | Arrogance | Materiality |
| [5]    |          |               |               | Watchdog | Consequences |
| [6]    |          |               |               |         |               |

Note. Dorminey et al. (2010) split “Pressure” into MICE (Money Ideology Coercion Ego).

WH = Wolfe and Hermanson; FTT = fraud triangle; FST = scale; FDT = diamond; FPT = pentagon; FHT = hexagon theory.
organizational complexity, formal organizational controls, firms’ culture/norms, Board structure) and External forces (industry culture/norms, industry complexity, macroeconomic factors) that provide Opportunity for AF.

**Component #4: Materiality**

The measurement, beyond type, of misreporting is also noteworthy. According to Amiram et al. (2018), financial fraud, misrepresentation, misreporting, and other irregularities must be material to determine an accounting fraud. The detected words which compose this second element of the hexagon (“Massive,” “Million,” “M,” “Billion”) confirm. But how calculate the materiality trigger level? The majority of empirical investigations measures wrongdoing as a binary variable (e.g., Shi et al., 2016) and utilizes extensive databases, such as the Government Accountability Office reports (e.g., Ndofor et al., 2015), to gather information about the occurrence of wrongdoing or SEC’s Accounting and Auditing Enforcement Releases.

As Schnatterly et al. (2018) show, few scholars explore the magnitude of wrongdoing, regressing it against different dependent variables, such as whistle-blowing (Dalton & Radtke, 2013). In this sense, Sallaberry et al. (2020) identify financial parameters of damages and benefits from acts of corruption in the most significant fraud that occurred in Brazil, which was replicated in modus operandi in several works and countries in Latin America.

**Component #5: The Consequences**

Its consequences represent the fifth element of accounting fraud. Amiram et al. (2018), a guideline for the present paper in terms of AF definitions, state that “in private suits, the misrepresentation is causally related to a loss.” In the above-cited paper’s section dedicated to the legal literature review, the reader can find an extensive discussion about the state of the law literature on financial misconduct. After that, authors provide an assessment of the efficacy of SEC (see the previous component) and private enforcement (which seems strictly related to the words “Years,” “Charges,” “Charged,” “Settle(s),” “Pay,” “Court” associated to the present component). As observed by Dupont & Karpoff, 2020, p. 221), “society’s laws and regulations, imposes restrictions and ex-post penalties for sloppy, opportunistic, or cheating behaviour and can, therefore, align counterparties’ ex-ante incentives”. In this research line, Wang, Ashton, et al. (2019) examine the impact of different punishments for Chinese accounting fraud, concluding that both monetary and non-monetary “name and shame” punishments have a negative impact on the shareholder wealth of fraudulent firms.

**Component #6: The Watchdog**

A large accounting research body examines institutional features that may facilitate financial reporting misconduct within the cited external forces. (Dupont & Karpoff, 2020, p. 217) propose a construct, the Trust (again!) Triangle, that “highlights three primary mechanisms that provide ex-post accountability for opportunistic behaviour and motivate ex-ante trust in economic relationships [. . .] (i) a society’s legal and regulatory framework, (ii) market-based discipline and reputational capital, and (iii) culture, including individual ethics and social norms”.

Such third-party enforcement includes regulatory requirements and enforcement actions, government monitoring and penalties for misconduct, criminal law enforcement, and private lawsuits, which play a primary role in creating the investors’ trust in company managers. In this sense, Twitter users confirm that “Security” (and Exchange Commission) or “SEC,” the most repeated word in the selected tweets regarding accounting fraud, and its “Investigation” and “Audit” are perceived as the primary financial system watchdog.

On the other hand, in a study of fraud cases in large US companies between 1996 and 2004, (Dyck et al., 2010, p. 2213) state that “fraud detection does not rely on standard corporate governance actors (investors, SEC, and auditors), but rather takes a village, including several non-traditional players” such as media. Miller (2006) investigates the role of the media as a firm monitor since they reveal information on accounting fraud to the public, at the same time
playing a watchdog role through its investigative reporting. Strengthened by the internet, nowadays (social) media are considered as the Fifth Estate (Sormanen & Dutton, 2015), and they serve as soft control of traditional media (Lahey, 2016). Chen et al. (2021) also examine the effect of media coverage on firm earnings management, documenting the media’s role in detecting and deterring accounting fraud (or extreme earnings management). Authors suggest that the media serves as an external monitor that curbs managers’ opportunistic accounting behaviors.

Finally, social media might also serve as a feasible tool for crime surveillance (Wang, Yu, et al., 2019), since increasingly monitored by police to build evidence for criminal indictments (Patton et al., 2017). This finding is in line with the selected word “News,” associated with this component.

**Conclusion**

Accounting fraud was, of course, born with accounting since fraud already existed. It appeared in academic literature around the 40s. During the last almost 80 years, many sophisticated theories were proposed in accounting papers to reach a holistic understanding of this complex phenomenon. FTT, and its variations (FST → FDT → FPT), has been the basis for the large majority of discussions about white-collar crime in the accounting curriculum for years, becoming a helpful tool for auditors to observe the perpetrators’ incentives in committing fraud. In particular, the American Institute of Certified Public Accountants (AICPA, 2002) adopted FTT as a model to detect and prevent corporate accounting fraud. This adoption was evident in the Statement on Auditing Standards (SAS) no. 99, *Consideration of Fraud in a Financial Statement Audit*, which is currently the cornerstone of the AICPA’s anti-fraud program.

This model was built to describe a social issue (AF) starting from conceptual frameworks. The present paper does the opposite: it starts from the social (media) perspective to describe a conceptual framework. Hence, instead of adopting a top-down approach, a bottom-up methodology is adopted, thus, addressing a relevant literature gap.

The outcomes are different, as expected. The FTT, and its variations, focus mainly on personal aspects of the Fraudster (his/her Pressure or Incentive, Rationalization, Integrity, Capability or Competence, and Arrogance). At the same time, this paper shows that impersonal components, such as the Defrauded object (Company), the Watchdog (Institutions and Audit), the Tool (the Financial Reporting) and the Consequences, play an essential role as well. These findings contribute to a more comprehensive definition of the AF phenomenon.

Starting from the above mentioned conceptual frameworks, the path followed by accounting scholars was: (i) to understand the need to define financial misconduct as a (white-collar) crime; (ii) to design behavioral theories to analyze individual elements to investigate the phenomenon better and give rules to the market and guidelines to accountants/auditors; (iii) to study the accounting fraud from an interdisciplinary perspective to get a broader understanding; and (iv) to try giving the most comprehensive definition of accounting fraud starting from a cross-disciplinary literature review.

In this sense, a recent and significant paper is of Amiram et al. (2018, p. 733), who identify the universal elements for an umbrella definition of AF which overlaps with the “proposal” offered by Twitter’s users: there must be a misrepresentation in the form of a misstatement, misreporting, or omission (Component#1—Financials); [. . . it] was committed negligently, recklessly, or with knowledge of its falsity (Component#2—The Guilty Fraudster); [. . . it] is suffered by the plaintiff (Component#3—Defrauded; [. . . it] must be material (Component#4—Materiality) [. . . it] is causally related to a loss (Component#5—Consequences). To the previously mentioned components of the Amiram et al.’s (2018) definition, the present study adds the element represented by the Watchdog (Component #6), which—thought audit, investigations, rules—is supposed to regulate and overview the entire matter.

The contribution of the present study is twofold. First, the study identifies additional “angles” of vision (to the traditional fraud triangle-diamond-pentagon theories) with the purpose to reflect the social (media) perspective about the phenomenon. Second, it allows a more comprehensive definition of accounting fraud, thus contributing to the debate for a common language in this research line.

The methodology used in the present study, apart from the possibility to efficiently gather an extensive number of observations (not responses!), overcomes traditional survey intrinsic bias (acquiescence, demand characteristics, question order, social desirability, among others), without needing any add-on statistics tool to mitigate them, providing the genuine point-of-view of random and spontaneous “without-their-knowledge” respondents. The proposed methodology, together with the Twitter database’s unique opportunity, bridges the divide between academia and society. Authors expect to encourage more research using social media as a tool to test the literature built on in vitro theories empirically.

Our study is not without limitations. Although the sample used in the present research is extensive, being composed by the entire data flow population published on Twitter from all over the world from when this platform was launched (July 2006) up to December 31st, 2019, the automated collection of people’s comments and their limited number of character count (passed in 2017 from 140 to 280) prevent a more in-depth analysis of users’ thoughts and opinions.

More in general, the study uses data coming from social media users. Hence components of accounting fraud could be further detected and analyzed by considering different data sources.

**Author note**

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