

Article

The Impacts of Social Media on Accounting and Auditing: Evidence from Greek Listed Firms

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Abstract: Companies are increasingly using social media to communicate with stakeholders. During the last decade, social media started to become part and parcel of contemporary lifestyles. Thus, the main purpose of this research was the investigation of the impacts of social media on accounting and auditing by using companies' social media posts. We performed quantitative research on an initial population of 183 companies being traded on the Athens Stock Exchange (ATHEX) for one fiscal year. We gathered data from corporate social media accounts and social media posts for the 2018 fiscal year (Twitter, Facebook and LinkedIn). We analyzed social media posts' strategies, and we used the Kruskal–Wallis model and OLS regression model in order to analyze the relationships between social media accounts and posts and accounting and auditing. The findings from our research show that firms with active social media accounts and active impression management techniques on Twitter, Facebook and LinkedIn tend to achieve higher profits compared to companies that have inactive social media accounts. Additionally, the firm's total liabilities are mainly positively related to its posts on specific social media accounts. In addition, cash, total assets and earnings before taxes affect social media posts to different degrees, depending on the post's content and the category of social media as well. Taking into account the auditing variables, it is suggested that there is no relation among the given auditor's opinion, the going concern assumption and the reviewed posts.



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Keywords: social media; posts; Twitter; Facebook; LinkedIn; cash; total assets; total liabilities; profits; earnings before taxes; audit opinion; going concern assumption; impression management

1. Introduction

The purpose of this study was to investigate and report the relations among social media and accounting and auditing. We chose to analyze the relationships between social media and accounting and auditing because the ubiquitous adoption of Internet technologies in both fixed and mobile forms has driven the widespread growth of social media that operate within global social networks [1]. Moreover, investors can not only monitor a brand's performance, but also predict its future value [2]. Social media can be powerful in changing users' opinions [2]. In other words, we can remember Tesla's share value after the CEO's (Elon Musk) tweets that the company is going to go private and about the unexpected productivity, which led to a soar in Tesla stocks [3]. Musk's Twitter habit has already cost the CEO and Tesla \$40 million in fines and forced Musk to give up his role as chairman in a settlement with the Securities and Exchange Commission over the tweets about taking the company private [4]. A year after Musk's infamous tweet, Tesla failed to deliver the profitability that was promised, despite strong sales growth [3]. If we take into consideration the recent news concerning COVID-19 and the need for the application of a new sustainability reporting system, which would have a pervasive impact on the entire economic and social fabric of the world post-COVID-19 [5], we can understand that we are going to face an unexpectedly rapid change in our basic routines, more than we can imagine.

Thus, it is evident that social media have become a crucial part of our lives. During the COVID-19 pandemic, social media platforms such as Twitter and Facebook have played an

important role in conveying information, both accurate and inaccurate, thereby creating mass confusion [6]. As the response to COVID-19 has reduced face to face contact, communication via social media has increased [6]. Moreover, before the COVID-19 pandemic, plenty of studies had tried to explain social media's impact on our lives [2]. Schniederjans et al. [7] analyzed the relation between a company's performance and its impression management on social media. Luo et al. [2] studied the impact of social media on stock's future value. Akmesse et al. [8] deduced that companies that were being traded on BIST and had active social media accounts achieved higher performances than entities with inactive social media accounts. Drake et al. [9] suggested that the equity research posted online by social media analysts provides investors with information that is similar to but arrives earlier than sell-side equity research.

This study actually tries to fill the corporate knowledge gap about social media, accounting and auditing, in response to the crucial points about them, hopefully leading to the existence of useful data to companies. As social media accounts can attract stakeholders, accounting can show the real time results of this attraction, and auditing can inform the stakeholders about the entity's actions. Thus, there is a theoretical connection among these factors, and we aimed to prove this relation with quantitative research in a population that included Greek companies listed on ATHEX. In our study, we used Greek listed companies because many of them have underdeveloped social media strategies, and their reports came from different audit companies (not only Big4 firms), but they also involved different auditing opinions (not only unmodified opinion). We also included companies that have not having the ability to operate as a going concern. Additionally, listed Greek companies have similar reporting of financial statements, because they are listed on the Greek Stock Exchange. Thus, because of the characteristics we mentioned above, the results will be constructive for future studies. Twitter, Facebook and LinkedIn were chosen as the social media platforms, because they are already developed, and they are capable of providing validated and useful corporate information. More specifically, Twitter and LinkedIn are quite popular in the corporate environment, and Facebook was one of the top social media platforms in Greece in 2018 [10]. We gathered the posts of social media accounts for the 2018 fiscal year in this case. These posts were analyzed by their content based on Yang J. and Liu S.'s research [11]. According to Yang J. and Liu S. [11], firms employ an assertive impression management (IM) strategy to emphasize positive outcomes through multiple self-presentational patterns, and tend to omit negative earnings news by posting a significantly lower volume of negative earnings-related tweets than positive earnings-related tweets. Therefore, we took into consideration the (IM) strategies as expedient in our research in order to characterize social media posts; for instance, we categorized social media posts according to their content as direct positive with financial content, direct positive with non-financial content, neutral and negative. We created the appropriate sample for each given question, and with the support of the Kruskal–Wallis model and OLS regression model, we came up with research results.

Concerning the paper's structure, in Section 2, we review the existing and relevant literature on social media, accounting, finance and auditing. Section 3 introduces the methodology of the research and analyzes the hypothesis. Section 4 examines the statistical and econometrical data, and the results as well. Finally, Section 5 discusses the conclusions of the research, the implications and suggestions for future research.

2. Literature Review and Development of Hypotheses

2.1. Social Media

Social media are defined as online services that provide for decentralized, user level content creation (including editing or tagging), social interaction and open (public) membership [12]. They are accessible to anyone with access to the Internet to publicly broadcast opinions of a firm's operations, predictions of future stock price changes or decisions to trade [13]. Social media also promote public two-way communication among people and between users and companies [13].

Simultaneously, they help the executives to understand the market's needs. Nevertheless, the absence of social media can be a threat for the sustainability of companies. In other words, social media officers cannot predict or control users' reactions or comments, and they are not able to accomplish full control of these platforms as compared to traditional websites [14]. The most common social media are Facebook, YouTube, WhatsApp, Instagram, Reddit, Twitter, LinkedIn, Skype, Snapchat, Viber and Pinterest. In this research, we focus on Twitter, Facebook and LinkedIn.

2.1.1. Twitter Use

Taking into consideration the Twitter use, Twitter is a microblogging service where users send updates (tweets) to a network of associates (followers) from a variety of devices [15]. Tweets are text-based posts up to 140 characters in length [15]. In Jansen et al.'s research, it is assumed that customers' attitudes are influenced by social media services, as these technologies have become trusted sources of information. Several studies have focused on Twitter use. In other words, Suddaby et al. (2015) [16] have shown the differences among Twitter, Facebook and LinkedIn in Big4 social media accounts and taking into consideration the changes of the accounting profession and interview data. Secondly, Chahine and Mandora (2018) [17] suggested that the market reaction is higher for firms with two-way interaction strategies rather than one-way messaging in social media. Additionally, this reaction is higher in smaller firms, firms with losses and those with a family and/or a dominant shareholder. Thirdly, Lee et al. (2013) [18] have supported evidence that companies have more followers and positive interactions (tweets, retweets, mentions) in Twitter accounts when they post content relative to the corporate social responsibility.

2.1.2. Facebook Use

Facebook remains the first option of social media users in 2018 [19]. There are two groups of users on Facebook: those who think that companies have no place on Facebook and those who want companies to be active on Facebook accounts [20]. The latter group emphasizes the importance of meaningful posts without unsolicited sales messages and would prefer to search for the companies themselves rather than being bombarded by company messages [20]. Hasan and Cready (2019) [21] have proved that Facebook activity increases around earnings announcement; the increase contains news related to earnings. According to this study, such activity is selective and lower for companies with high levels of information asymmetry, for firms that meet the criteria of analysts' forecasts and for firms with negative firm news and positive changes of price.

2.1.3. LinkedIn Use

According to Zhang (2015) [22], social media and, more specifically, LinkedIn voluntary disclosures depend on the new media adoption. Research on Eurozone companies has shown that the companies focus mostly on current and potential employees using LinkedIn [23]. Only a few of these companies have used LinkedIn for marketing or other purposes. Furthermore, the lowest score of LinkedIn usage was found in Greece. Nevertheless, during 2018, LinkedIn was the 14th option among social media preferences in Greece [10].

2.2. Impression Management

Impression management is the process by which people control the impression of others, and it plays an important role in interpersonal behavior [24]. This happens because the impressions people make on others have implications of how others perceive, evaluate and treat them [24]. Thus, humans choose the kind of impression to create the appropriate model to others. Nonetheless, organizational impression management refers to any action purposefully designed and carried out to influence an audience's perceptions of an organization [25]. However, impression management has changed during the recent year, because of social media and technological development. The usage of Twitter and Facebook

support the companies to easily and cheaply achieve the appropriate positive information disclosure. Therefore, it accomplished a successful organizational impression management (OIM) where organizations use impression management (IM) tactics to enhance, sustain and defend a positive image with a variety of stakeholders outside and inside the organization [7]. A study on Big4 companies has shown that there are differences in posts among Twitter, Facebook and LinkedIn and in promotional and marketing strategies in these media accounts.

Mohamed et al. (1999) [26] suggest that OIM tactics may be characterized by using a 2×2 matrix, as either direct or indirect and as either assertive or defensive [27]. Direct tactics involve techniques for presenting information about organization's characteristics, accomplishments or abilities [27]. In contrast, indirect tactics attempt to manage information about activities or other entities with which the organization is associated [27]. Assertive strategies are proactive and attempt to enhance the organization's image according to company's goals [27]. However, defensive tactics are reactive and are adopted in response to situations that threaten to damage the organization's image [27]. Yang and Liu (2017) report that companies try to decrease negative information concerning their image. In contrast, they use different methods to manipulate information dissemination and enable positive information to go viral. Firms choose ways to emphasize their success and to distort users' opinions of their performance [11].

2.3. Financial Performance and Accountancy

2.3.1. Financial Performance

In recent years, some researchers have mentioned the connection between social media and financial performance. Akmesese et al. (2016) [8] have concluded that social media have a positive impact on financial performance by using tourist companies being listed in the stock exchange. The financial performance of specific companies has been studied by using financial indicators like market value, market value to net sales ratio and price to earnings ratio of an enterprise. Nevertheless, it has been concluded that there is no meaningful difference between tourism enterprises with social media accounts and those who do not use social media in terms of net sales and market value to book value ratio, which are financial performance indicators. This prompts the first research hypothesis:

Hypothesis 1 (H1). *Do the companies that use at least a social media account with active impression management strategies present higher profits than the companies that have inactive accounts or do not have any account at all?*

Furthermore, Yang and Liu (2017) [11], taking into consideration the FTSE 100 companies that were listed on the London Stock Exchange, assumed that Twitter's posts are related with companies' earnings, when the companies have used assertive impression management techniques. Moreover, companies can use the promotion of a stable and dynamic organizational structure on social media to reach its stakeholders. In other words, ingratiation, intimidation, organizational promotion, and supplication are the instant social media impression management strategies that are significantly related to financial performance [7]. Nonetheless, there was not found any positive relation among credibility, transparency, social responsibility, and financial performance [7]. Additionally, according to Yang J. and Liu S. (2017) [11], firms employ an assertive impression management (IM) strategy to emphasize positive outcomes through multiple self-presentational patterns and tend to omit negative earnings news by posting a significantly lower volume of negative earnings-related tweets than positive earnings-related tweets. So, extending this research, we developed the second hypothesis:

Hypothesis 2 (H2). *Can the company's accounting data influence the population of social media posts?*

2.3.2. Accounting Variables

There is a tendency for social media to affect investors' opinion. According to [2], investors can predict equity's value, if they keep track of social media data and posts in a specific period. However, the frequency of corporate companies' posts in social media or the voluntary disclosure depends on information environment, information asymmetry, firm assets, firm capital structure, firm size and profitability [22,28]. It is the fact that the larger companies tend to post the more voluntary information to decrease information asymmetry and the equity's costs [28–31]. In addition, there is a strong relation between online posts and company's financial leverage, because companies try show the appropriate fiscal data to their stakeholders. In other words, voluntary disclosure can reduce agency costs by facilitating assessment of the firm's ability to meet its liabilities [28]. Agency theory through voluntary disclosure can reduce agency costs in order for the company achieve the increase in capital equity at the best price [28]. Taking into consideration the facts and circumstances of the entity and what we believe would be material to users of the financial statements and the studies that they have mentioned before, we decided to further expand on the existing studies concerning social medial in relation with accounting and especially with auditing, and developed the third hypothesis:

Hypothesis 3 (H3). *Does the auditor's opinion or the ability of the company to continue as an ongoing concern affect social media posts?*

2.4. Research Questions and Hypothesis

This paper, taking into account previous literature and the existing conceptual framework, tries to identify the correlation and impact between social media with accounting factors and auditing as well.

This study tries to fill the corporate knowledge gap among social media, accounting and auditing relating to the above crucial questions that can lead to the existence of useful data to the companies; because social media can attract company's stakeholders, accounting can show the real time results of this attraction and auditing can inform the stakeholders about the entity's actions. So, there is a theoretical connection among these factors, and we intend to prove this relation with quantitative research.

3. Methodology

3.1. Sample

The population of this study consists of 183 companies listed on ATHEX, as it was on 21 July 2019. These companies were chosen because there is the general belief that they are more advanced in voluntary disclosure methods, financial statements, audit reports and social media strategies compared to other companies that are not listed. Furthermore, they follow the same patterns in financial statements reports (stand alone and consolidated) and disclosures because of the International Accounting Standards (IAS) and the general rules of Hellenic Capital Market Commission.

We found the official social media accounts from companies' official sites and an online search with keywords, and we chose Twitter, Facebook and LinkedIn accounts. Twitter's and Facebook's content has been analyzed for a year, but LinkedIn's posts have been analyzed for six months because LinkedIn's general protection rules did not allow us to extend the research period. Nevertheless, bank institutions, related parties of the parent companies (parent companies were listed) and insurance companies were excluded by the sample because of the different rules of financial disclosure. Moreover, we have chosen companies with traditional income statements (not with contribution margin income statements) in order for the sample to be useful in studies of fundamental analysis. Thus, the net population included 175 companies, and the sample for the needs of the study of impression management techniques consisted of 75 companies (75 companies had access in Facebook, Twitter and LinkedIn simultaneously). Concerning the sample of 75 companies, Chi-square statistics did not show statistically significant differences ($p > 0.05$) between

the sample of 75 companies and the total population of 183 firms regarding the sales, the employees' numbers and the total assets [32].

We should mention that in this group of companies, there was an oddity. In other words, the parent investor company was listed in ATHEX, but it has no social media accounts. However, investee, joint ventures, investment companies or subsidiaries had social media accounts on Twitter, Facebook and LinkedIn. We found the related parties of listed parent companies from relative notes of published consolidated financial statement reports. It is noted, according to International Accounting Standard (IAS) 28, that when a company holds 20% or more (directly or through subsidiaries) of another company, it will be presumed the investor has significant influence [33]. The existence of significant influence by an entity is usually evidenced in one or more of the following ways [33]:

- Representation on the board of directors or equivalent governing body of the investee;
- Participation in the policy-making process, including participation in decisions about dividends or other distributions;
- Material transactions between the entity and the investee;
- Interchange of managerial personnel; or
- Provision of essential technical information.

Nonetheless, according to the IFRS 10, when a company (parent company) holds more than 50% of the investee company in voting rights, has controlling interests and they have relevant activities, then the investee is a subsidiary company. In this research, we came into the situation where there is no difference between social media accounts of parent companies and the group of companies. We did not take into consideration these companies, because in this paper we study separate accounting statements, not consolidate ones. To the key definition of IFRS 10, consolidate financial statements are the statements of a group in which assets, liability, equity, income, expenses and cash flows of the parent and subsidiaries are presented as those of a single economic entity [34].

The general posts and the data were collected by three different methods. When the data of social media accounts consisted of a small population, they were analyzed by the traditional method of analysis of every post. If we had a big or huge population, we used the application "ScrapeHero Cloud" on Twitter, and the "Netvizz" application on Facebook. We extracted the population's data and evaluated the posts by their content considering narrative information, visual information, hashtags, and hyperlinks, extending Yang J. and Liu S.'s (2017) research [11] based on techniques presented in Table 1.

3.2. Social Media Posts Examination

The posts of each company divided into two different topics: (a) general posts and (b) financial posts on Twitter, Facebook and LinkedIn. The general posts mostly advertised company's products and services, events, distinctions or event reviews (positive and negative). It was determined that the entities that posted throughout the year on Twitter, Facebook and LinkedIn followed assertive impression management techniques or neutral depending the posts' content, while the companies that had not posted anything on those accounts followed defensive impression management because there was no activity on their social media pages; in other words, it is assumed that these companies minimized information in order to avoid visitors' attention. Thus, according to variables, the general companies' posts were divided into (i) positive, (ii) neutral and (iii) negative. We set as variables narrative information, quantitative information and visual information following the pattern set by Table 1.

Additionally, hashtags, cashtags and hyperlinks were set as variables of assertive impression management of general posts. The same variables were used to investigate fiscal posts on social media accounts. Last but not least, we took into consideration and classified as financial posts, posts with keywords such as "financial statements", "report", "new shop", "subsidiaries", "discount", "sales", "investments", "improving performers", "declining performers", "administrative decisions", "costs", "expenses", and "disclosure".

Table 1. Impression management (IM) techniques and functions.

IM Strategy	Technique	Variable	IM Function
Defensive	Minimizing	Volume	Reducing the volume of tweets can help avoid extra media exposure and avoid public attention.
		Narrative information	Using narrative information to describe earnings details can enhance managerial interpretations of good firm performance.
Assertive	Self-presentational patterns	Quantitative information	Highlighting key financial indicators or performance comparison with numbers, percentages or monetary formats can assist firms in emphasizing good financial results.
		Visual information	Graphs, pictures or videos can be embedded in tweets to help present positive information in a vivid, eye-catching manner.
		Hashtag/Cashtag	Using a hashtag # or cashtag \$ in tweets helps firms highlight the tweets with information that they would like to show and share by making them more easily searchable than other tweets.
	Dissemination	Hyperlink	Incorporating hyperlinks in tweets enables firms to manipulate the dissemination of information. They can direct audiences to a piece of information that they would like to disseminate by linking them to external websites with detailed elaborations.

Reference: Yang and Liu (2017) [11].

3.3. Econometrical and Statistical Models

3.3.1. Social Media Posts and Profitability

As soon as we gathered each company's posts and distinguished them as general posts or fiscal posts, we investigated if the companies with active social media accounts on Twitter, Facebook and LinkedIn are more profitable than entities with defensive impression management techniques which do not have active accounts. In order to study these profits, we calculated the relative change in profits between 2017 and 2018 fiscal years. Therefore, profit variation between two years was specified with the effective use of the Minitab 19 program and with the help of a non-parametrical Kruskal–Wallis model. With the application of a non-parametric Kruskal–Wallis model, we checked if there were any statistically significant differences between the groups of social media accounts and change of profit for 2017–2018; so, we identified correlations between the groups. For each social media account (Twitter, Facebook and Twitter), the companies that had active social media accounts and impression management strategies were represented with the number “1”, the companies that had social media accounts but not impression management techniques (there were no posts on these accounts) were represented with the number “−1”, while the companies with no social media accounts were represented with the number “0”. Last but not least, in order to study the correlation between social media accounts and profits totally, we added the companies with social media accounts but no impression management techniques to companies that did not have social media accounts and active strategies; so, the former entities were represented by the number “0”.

3.3.2. Relation between Posts and Accounting Variables

Considering the models were tested by Zhang (2015) and Mohamed et al. (2016) [22,28], we developed the econometrical model of Ordinary Least Squares (OLS) in order to study the relation among accounting variables and social media posts and determine if the social media posts (dependent variable) depend on the independent variables of intangible assets, total assets, cash, earnings before taxes and total liabilities. In other words, we used as a dependent variable the number of posts of each social media account (Twitter, Facebook,

LinkedIn) and as an independent variable financial statements' lines as intangible assets, total assets, cash, earnings before taxes and total liabilities in 2018. More specifically we used:

Intangible Assets: They measure information asymmetry and the company's goodwill. Additionally, when a company has more intangible assets, it is considered to have more uncertainty in the future [22].

Total Assets: As a proxy of firm assets and value.

Cash: In order to measure a company's liquidity and ability to pay its debts.

Earnings Before Taxes: They represent the measurement of a company's performance.

Total Liabilities: They are used as a measurement of debt structure.

These accounting data can impact on the number of the total company's posts when it follows organized marketing strategies. The net population consisted of 75 companies, because these companies had access to Twitter, Facebook and LinkedIn; in this case, for the needs of the OLS model, it was required that the companies have access to three social media accounts and not at least one account. We used the Gretl program in order to develop the OLS model. In addition, we minimized the multicollinearity of accounting variables, and this study used the "ln" logarithms in independent variables of OLS. Last but not least, the standard errors (ϵ) followed normal distribution. Thus, that is the regression model of each social media account, as is stated below:

$$\text{Number of Posts}_i = b_0 + b_1 \ln(\text{Intangible Assets})_i + b_2 \ln(\text{Total Assets})_i + b_3 \ln(\text{Cash})_i + b_4 \ln(\text{Earnings before Profits})_i + b_5 \ln(\text{Total Liabilities})_i + \epsilon$$

3.3.3. Social Media Posts and Audit Opinion

We tested the relation between the number of social media posts and audit opinion and the number of social media posts with the entity's ability to continue as an ongoing concern. We studied this connection with the program Minitab 19 analyzing the correlations through the statistical Kruskal–Wallis model; we did not identify any significant statistical differences. We took into account the International Standards on Auditing (ISA) in order to inspect the auditor's report in published annual reports.

- **Unmodified Opinion (ISA 700):** The auditor shall express an unmodified opinion when it is concluded that financial statements are prepared, in all material respects, in accordance with the applicable financial reporting framework [35].
- **Qualified Opinion (ISA 705):** The auditor shall express a qualified opinion when, having obtained sufficient appropriate evidence, they conclude that misstatements, individually or in the aggregate, are material, but not pervasive to the financial statements, or when the auditor is unable to obtain sufficient appropriate audit evidence on which to base the opinion, but the auditor concludes that the possible effects on the financial statements of undetected misstatements, if any, could be material but not pervasive [36].
- **Adverse Opinion (ISA 705):** The auditor shall express an adverse opinion when, having obtained sufficient appropriate audit evidence, they conclude that misstatements, individually or in the aggregate, are both material and pervasive to the financial statements [36].
- **Disclaimer of Opinion (ISA 705):** The auditor shall disclaim an opinion when the auditor is unable to obtain sufficient appropriate audit evidence on which to base the opinion and the auditor concludes the possible effects on the financial statements of undetected misstatements, if any, could be both material and pervasive [36].
- **Entity's ability to continue as a going concern (ISA 570):** The management should assess the entity's ability to continue as an ongoing concern. The auditor's responsibilities are to obtain sufficient appropriate audit evidence regarding, and conclude on, the appropriateness of the management's use of the ongoing concern basis [37].

- If the auditor is unable to obtain sufficient and appropriate evidence concerning the entity's ability to continue as an ongoing concern, the auditor shall express a qualified or adverse opinion [37].
- If the auditor is able to obtain sufficient and appropriate evidence concerning the entity's ability to continue as an ongoing concern, but the continuity is uncertain; then, if there is the adequate disclosure of management's assessment, the auditor shall express an unqualified opinion [37].

In a sample of 175 companies, 174 entities' reports presented an unmodified opinion, while one company presented a disclaimer of opinion. We set the unmodified opinion with the number "2" and the disclaimer of opinion with the number "−2" (we set those arithmetical values, as we had already taken "−1", "0", "1"). Additionally, we studied only Twitter's, Facebook's and financial posts disclosures, and we excluded LinkedIn's case in order to analyze the model's correlation effectively.

4. Results

4.1. Impact of Twitter, Facebook and LinkedIn on Relative Change of Profits (Question 1-H1)

Before applying the Kruskal–Wallis model in relative profits' change and Twitter's, Facebook's and LinkedIn's posts, we calculated basic descriptive statistics as average, standard deviation, minimum and maximum, as they are stated by Table 2.

Table 2. Basic descriptive statistics in relative change in profits and social media posts.

	Average	St. Deviation	MIN	MAX
Relative Change in Profits	−1.63	35.69	−379.05	206.56
Number of Twitter Posts	0.1486	0.4861	−1.000	1.000
Number of Facebook Posts	0.3446	0.6140	−1.000	1.000
Number of LinkedIn Posts	−0.1757	0.8388	−1.000	1.000
Posts: Yes or Not (if they were any posts on social media accounts)	0.5068	0.5017	0.000	1.000

The results of the Kruskal–Wallis model are presented by Table 3. It is required that the averages of active social media accounts, inactive social media accounts and the absence of social media accounts are different in Table 3. It is evident that the average of relative change in profits for those companies with active social media accounts is bigger than companies with inactive social media accounts (without any post on accounts) and companies that have no accounts. Furthermore, the average of change in profits is higher for the entities with inactive accounts than the companies who did not have any accounts on the studied social media. LinkedIn is considered a special case of this model, because of the fact that this social media category was studied for half instead of one whole year.

In order to further analyze the relationship between the companies that have social media accounts and their profits, we extend the Kruskal–Wallis model; we did not present the numerical option "1" separately. So, we set the number "1" for companies that had at least one social media account on Twitter, Facebook and LinkedIn. We set the number "0" for companies with inactive social media accounts and for companies with no social media accounts at all. The Table 4 shows that the average of companies with "1" is higher than the "0" entities. Therefore, the change of profits for companies with social media accounts is bigger than the companies that have no social media accounts.

Table 3. Results of Kruskal–Wallis model on social media posts and relative change in profits.

Variable	<i>n</i>	Median	Mean Rank	Z-Value
Twitter Posts				
−1	8	−0.088808	81.0	0.44
0	110	−0.212515	71.2	−1.58
1	30	0.069732	84.7	1.46
Total	148		74.5	
Facebook Posts				
−1	11	−0.159608	73.4	−0.09
0	75	−0.249378	70.2	−1.23
1	62	0.002421	79.9	1.29
Total	148		74.5	
LinkedIn Posts				
−1	67	−0.242924	72.5	−0.51
0	40	−0.218087	69.7	−0.83
1	41	0.106931	82.4	1.39
Total	148		74.5	

Table 4. Results in charge of profits for companies with or without social media accounts.

Variable	<i>n</i>	Median	Mean Rank	Z-Value
0	73	−0.298482	67.5	−1.96
1	75	0.023406	81.3	1.96
Total	148		74.5	

4.2. Results of Accounting Variables in Total Number of Social's Media Posts (Question 2-H2)

In order to analyze the relationship between social media posts and accounting variables, we used the following regression models. The regression model of each social media account is as stated below:

1. $(\text{Total Twitter Posts})_i = b_0 + b_1 \ln(\text{Intangible Assets})_i + b_2 \ln(\text{Total Assets})_i + b_3 \ln(\text{Total Cash})_i + b_4 \ln(\text{Profits before Taxes 2018})_i + b_5 \ln(\text{Total Liabilities})_i + \epsilon$
2. $(\text{Total Fiscal Twitter Posts})_i = b_0 + b_1 \ln(\text{Intangible Assets})_i + b_2 \ln(\text{Total Assets})_i + b_3 \ln(\text{Total Cash})_i + b_4 \ln(\text{Profits before Taxes 2018})_i + b_5 \ln(\text{Total Liabilities})_i + \epsilon$
3. $(\text{Total Facebook Posts})_i = b_0 + b_1 \ln(\text{Intangible Assets})_i + b_2 \ln(\text{Total Assets})_i + b_3 \ln(\text{Total Cash})_i + b_4 \ln(\text{Profits before Taxes 2018})_i + b_5 \ln(\text{Total Liabilities})_i + \epsilon$
4. $(\text{Total Fiscal Facebook Posts})_i = b_0 + b_1 \ln(\text{Intangible Assets})_i + b_2 \ln(\text{Total Assets})_i + b_3 \ln(\text{Total Cash})_i + b_4 \ln(\text{Profits before Taxes 2018})_i + b_5 \ln(\text{Total Liabilities})_i + \epsilon$

Before we studied OLS models, we checked the relationships of the above variables.

Regarding Table 5, we used Pearson's Correlation Model to define the correlation of independent variables. It is evident that most of the variables are highly correlated because the value of correlation is higher than 0.5 and around 1, especially at 0.01. This means that the variables are positively correlated (not perfect positive correlation), and there is a strong linear relationship among the variables. The only negative and around zero correlation is depicted between earning before taxes and total assets at the 0.01 level and earning before taxes and total liabilities at the 0.05 level simultaneously.

Table 6 shows that there is a strong correlation between the total general Twitter posts and independent accounting variables. More specifically, there is strong correlation among total assets, earnings before taxes, total liabilities and the total amount of general Twitter posts. However, according to adjusted square $R = 0.376110$, the accounting factors are not extremely meaningful. Moreover, it is shown by coefficients that there is a positive correlation among the variables with only the exemption the factor of total assets. Last but not least, $F(5, 75) = 3.16523$ represents that there is a low variance among the independent variables comparing the relation between each independent variable and dependent variable of Twitter posts.

Table 5. Variables' correlation.

	Intangible Assets	Cash	Total Assets	Earnings before Taxes	Total Liabilities
<i>n</i> = 149					
Intangible Assets	1	0.644 **	0.490 **	0.471 **	0.458 **
Cash	0.644 **	1	0.513 **	0.616 **	0.466 **
Total Assets	0.490 **	0.513 **	1	−0.178 *	0.966 **
Earnings before Taxes	0.471 **	0.616 **	−0.178 *	1	−0.297 **
Total Liabilities	0.458 **	0.466 **	0.966 **	−0.297 **	1

Note: ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Table 6. OLS—general Twitter posts and accounting variables.

	Coefficient	Std. Error	Z	p-Value	VIF
Constant	34.3998	123.728	0.2780	0.7810	
Intangible Assets	4.54082	2.82593	1.607	0.1081	1.313
Total Assets	−60.8211	16.2692	−3.738	0.0002 ***	1.819
Cash	9.81388	7.56279	1.298	0.1944	2.865
Earnings before Taxes	17.0751	6.31791	2.703	0.0069 ***	2.268
Total Liabilities	37.0403	11.5025	3.220	0.0013 ***	2.809
Mean dependent var	28.86420	S.D. dependent var	118.7328		
Sum squared resid	703622.0	S.E. of regression	96.85879		
R-squared	0.376110	Adjusted R-squared	0.334517		
F(5, 75)	3.165231	p-value (F)	0.012017		
Log-likelihood	−482.2507	Akaike criterion	976.5014		
Schwarz criterion	990.8681	Hannan-Quinn	982.2655		

Note: *** statically significant at the 0.01 level.

Table 7 depicts the powerful connection between the independent variables (cash and total liabilities) and the dependent variable of total general Facebook posts. The coefficient of total liabilities is equal with 36.7184; this means that there is a strong correlation between the total liabilities and total general posts on Facebook posts. Nonetheless, there is a negative correlation between total assets, cash and total Facebook posts (Coefficient = −2.92208, −49.4783 respectively). In this case, adjusted R-squared = 0.189875 is a more credit value than R-squared = 0.240508, as the former coefficient does not depend on the total number of variables. Adjusted R-squared does not have much explanatory power in the regression model of total Facebook posts.

Table 7. OLS—general Facebook posts and accounting variables.

	Coefficient	Std. Error	Z	p-Value	VIF
Constant	109.495	159.124	0.6881	0.4914	
Intangible Assets	5.38955	4.44050	1.214	0.2249	1.313
Cash	−2.92208	6.36277	−0.4592	0.6461	1.819
Total Assets	−49.4783	17.5254	−2.823	0.0048 ***	2.865
Earnings before Taxes	12.9806	9.04794	1.435	0.1514	2.268
Total Liabilities	36.7184	13.2228	2.777	0.0055 ***	2.809
Mean dependent var	59.50617	S.D. dependent var	117.5528		
Sum squared resid	839612.5	S.E. of regression	105.8056		
R-squared	0.240508	Adjusted R-squared	0.189875		
F(5, 75)	2.577430	p-value (F)	0.033111		
Log-likelihood	−489.4070	Akaike criterion	990.8140		
Schwarz criterion	1005.181	Hannan-Quinn	996.5781		

Note: *** statically significant at the 0.01 level.

Financial Twitter posts are affected mainly by cash, total assets and total liabilities. Furthermore, there is a positive correlation among dependent and independent variables, except for total assets like general posts on Twitter and Facebook in the cases above. Taking into account Table 8, R-squared and adjusted R-squared are 0.570998 and 0.542398, respectively; so, they are approximately equal. The results of $R^2 = 0.570998$ and $F = 1.180397$ suggest that there is an average correlation among independent variables and total financial Twitter posts. Nevertheless, the particular OLS model represents lower homoscedasticity in general posts on Facebook than in financial posts on Twitter. This means that the specific Twitter model is not more explanatory than a stable model $E(Y|X) = a$ and the independent variables do not have such explanatory power in the number of financial posts on Twitter.

Table 8. OLS—financial Twitter posts and accounting variables.

	Coefficient	Std. Error	Z	p-Value	VIF
Constant	13.0901	9.21139	1.421	0.1553	
Intangible Assets	0.0402911	0.143753	0.2803	0.7793	1.313
Cash	1.29198	0.631991	2.044	0.0409 **	1.819
Total Assets	−5.03720	2.32010	−2.171	0.0299 **	2.865
Earnings before Taxes	0.107100	0.287369	0.3727	0.7094	2.268
Total Liabilities	3.34802	1.49457	2.240	0.0251 **	2.809
Mean dependent var	1.209877	S.D. dependent var	7.347986		
Sum squared resid	1853.044	S.E. of regression	4.970639		
R-squared	0.570998	Adjusted R-squared	0.542398		
F(5, 75)	1.180397	p-value (F)	0.326853		
Log-likelihood	−241.7045	Akaike criterion	495.4091		
Schwarz criterion	509.7757	Hannan-Quinn	501.1732		

Note: ** statically significant at the 0.05 level.

It is depicted by Table 9 that there is an average correlation between the payment of total liabilities and the dependent variable of the number of financial Facebook posts. Moreover, there is a positive impact on Facebook posts, except for earnings before taxes and total assets; the latter coefficient has been negative in the above OLS models as well. Values of R-squared = 0.076611 and adjusted R-squared = 0.015052 suggest that there is no strong linear correlation between the accounting determinants and the total number of Facebook posts. This is evident from the fact that the particular posts are affected only by total liabilities at the 0.05 level. In addition, $F(5, 75) = 2.242480$ shows that the accounting determinants are of limited explanatory power on the number of fiscal Facebook posts.

Table 9. OLS—financial Facebook posts and accounting variables.

	Coefficient	Std. Error	Z	p-Value	VIF
Constant	−0.914652	7.75333	−0.1180	0.9061	
Intangible Assets	0.216665	0.159584	1.358	0.1746	1.313
Cash	0.163126	0.270249	0.6036	0.5461	1.819
Total Assets	−0.905334	0.615178	−1.472	0.1411	2.865
Earnings before Taxes	−0.965745	1.04451	−0.9246	0.3552	2.268
Total Liabilities	1.65446	0.695840	2.378	0.0174 **	2.809
Mean dependent var	2.111111	S.D. dependent var	7.963981		
Sum squared resid	4685.275	S.E. of regression	7.903817		
R-squared	0.076611	Adjusted R-squared	0.015052		
F(5, 75)	2.242480	p-value (F)	0.058679		
Log-likelihood	−279.2721	Akaike criterion	570.5442		
Schwarz criterion	584.9109	Hannan-Quinn	5.763.083		

Note: ** statically significant at the 0.05 level.

From the results of previous OLS models, it is evident that there is statistical significance between general Twitter posts and accounting coefficients p -value = 0.012017 < 0.05 (Table 6). Additionally, there is significance between general Facebook posts and accounting variables, p -value = 0.033111 < 0.05 (Table 7). Additionally, taking into consideration Tables 6–9, we have also calculated VIF (Variance Inflation Factor) for independent variables. The values are between 1.313 and 2.865 [38–41], this means that they are less than the acceptable threshold of 5 [41] and indicates that collinearity does not pose any issues in our models.

4.3. Audit Effects on Number of Total Posts on Twitter and Facebook (Question 3-H3)

Before we studied the relation between audit opinion and the financial posts on Twitter and Facebook, we calculated the basic descriptive statistics as is stated below in Table 10.

Table 10. Basic descriptive statistics of audit opinion effects on social media posts.

Variable	Average	St. Deviation	MIN	MAX
Twitter Financial Posts	1.128	7.139	0.000	65.000
Facebook Financial Posts	1.933	7.478	0.000	49.000
Audit Opinion	1.9732	0.3277	−2.0000	2.0000
Continuity as a going concern	0.1678	0.3925	−1.0000	1.0000

In this case, we analyzed the remained 149 companies with financial posts on Twitter and Facebook. Concerning the study of the effects of audit opinion and the company's ability to continue as an ongoing concern, we did not deduce that there is any reasonable derivable in this case. The average of disclaimer of opinion and unmodified opinion is zero; so, the statistical working hypothesis H1 (averages are different) was discarded. Thus, it is evident that there is no impact from audit opinion on the number of Twitter or Facebook (or both accounts) financial posts (Table 11).

Table 11. Kruskal–Wallis model results in audit opinion and social media.

Audit Opinion	Total	Average	Mean Rank	Z-Value
−2	1	0.00	68.0	−0.16
2	148	0.00	75.0	0.16
Total	149		75.0	
−2	1	0.00	63.5	−0.27
2	148	0.00	75.1	0.27
Total	149		75.0	

Like audit opinion, there is no effect from company's ability to continue as an ongoing concern to the financial posts on Twitter or Facebook or both social media accounts (Table 12).

Table 12. Kruskal–Wallis model results in continuity as an ongoing concern and social media.

Continuity as a Going Concern	Total	Average	Mean Rank	Z-Value
−1	1	0	68.0	−0.16
0	122	0	74.2	−0.49
1	26	0	79.1	0.54
Total	149		75.0	
−1	1	0	63.5	−0.27
0	122	0	76.2	0.74
1	26	0	69.7	−0.70
Total	149		75.0	

The results of our study extended Yang and Liu's (2017) [11] research concerning the IM techniques in social media. We have analyzed these strategies in three different social media (Twitter, Facebook and LinkedIn), and we also chose to prove the relationship between those strategies in social media and specific financial statement lines, differentiating from Mohamed et al.'s (2016) study [28] with more accounting variables and auditing definitions related to the auditor's opinion and the firm's ongoing concern.

5. Conclusions

We explored the relation among social media, accounting, and auditing. We found that social media use had a positive effect on company gross profits. In other words, the companies that had at least one social media account on Twitter, Facebook or LinkedIn and applied an assertive strategy of impression management were more profitable than the entities that did not have any social media account, or they had inactive social media accounts. Findings of a specific model revealed that the companies with at least a social media account on Twitter, Facebook or LinkedIn presented higher profits than entities without any account.

This paper provides insights into accounting effects on social media posts. From an OLS regression model, we conclude that total assets, earnings before taxes and total liabilities impact on Twitter's general posts and the impression management strategies as well. Due to positive coefficients of variables, we understand that when the company intends to increase profits or plans to pay its liabilities, it boosts general posts on Twitter and it follows an assertive impression management strategy. Due to the negative coefficient of total assets, it is evident that when a company presents a high value of total assets, it is not going to boost general social media posts. In addition, we found that there is a powerful dependency between total liabilities and general posts on Facebook. There is also a strong negative correlation between total assets. Therefore, as with Twitter's case, when the company intends to raise their profits, it will increase general Facebook posts. When the value of total assets is limited, then the entity boosts general Facebook posts. The results are included in Table 8.

We deduce that financial posts on Twitter are closely related with total assets, cash and total liabilities at the 0.05 level. Like the previous cases, when the value of the total company assets is low or starts to be diminished, the company increases financial posts on Twitter; while when the company is going to pay its liabilities or there is a need for cash, the financial posts on Twitter are going to be increased. Moreover, because of $F(5,75) = 1.180397$, the accounting determinants (intangible assets, cash, total assets, earnings before taxes and total liabilities) are of high use in explaining financial posts on Twitter. Nevertheless, there are no sufficient results for Facebook financial posts. In other words, only total liabilities can affect Facebook financial posts at the 0.05 level. The results are included in Table 7.

Studying the four analyzed OLS models, we conclude that both types of posts (general and financial) are dependent on the total liabilities. This is something that we can see in everyday life, if we think that most of the companies boost their postings in their peaks. Secondly, it is evident that the dependency between general posts and accounting determinants is higher than the correlation between financial posts and accounting factors. Thirdly, the regression models depict that when the total assets are being increasing, total liabilities are going to be raised, no matter the correlations on Twitter and Facebook. This is a fact that can be justified by the equation: $\text{Total Assets} = \text{Total Liabilities} + \text{Equity}$. However, we did not find any correlation between auditing and social media posts. In other words, applying the Kruskal–Wallis model, we cannot suggest that Twitter and Facebook posts depend by audit opinion or by the company's ability to continue as a going concern.

Widespread use of social media has equal potential to transform corporate agendas and to create a recipe for organizational value and competitiveness. This, also, accentuates the claim that a firm's strong and well-established presence in social media is a key element to its success [40]. Our study tried to provide further evidence of the effect of social media in accounting and auditing. We relied on the strategies of Yang J. and Liu S.'s

(2017) research [11] in order to categorize our data, and followed the research pattern of Mohamed et al. (2016) [28] in order to analyze the relationship between the accounting and auditing variables and social media posts. However, we extended the models of Mohamed et al.'s (2016) [28] research, and we added into our study more accounting variables, and we inserted for the first time auditing variables (auditor's opinion and going concern) in order to analyze if social media can affect audit definitions. Thus, our study is the first study that extends and analyzes:

1. If a companies' social media accounts have an effect in change of profits.
2. If there is a relationship among accounting data and social media posts.
3. If there is a relationship between auditor's opinion, company's ability of going concern and social media posts.

Taking into consideration the relative background of studies between social media, accounting and auditing, the literature is quite limited; for this reason, our study is focused on the collection of data of corporate social media accounts and the development of statistical and econometrical models to analyze the relationship between social media posts and strategies in relation to specific accounting and auditing variables.

The study can have a valuable impact and practical results on corporate environment and audit teams. For instance, the corporate environment needs to take a closer look on the relationship between social media posts and financial statement lines—FS lines (accounting variables), so marketing teams are able to create a strategy in order to affect specific FS lines. Moreover, auditing teams, when they execute substantive analytical procedures, can create better expectations for marketing expenses in relation with financial statements. Last but not least, accounting and auditing teams will be able to create a better rational cost allocation among cost of sales, administrative expenses, development expenses and distribution expenses.

This study has certain limitations. This paper focused on finding any correlation between social media posts with general and financial content and specific accounting and auditing factors. We analyzed the findings for a whole fiscal year, 2018, and we chose companies with common traits in a mutual economic environment; in other words, we only chose Greek companies listed on ATHEX. It should be mentioned that we were restricted to 2018, because the following fiscal years, 2019–2021, were affected by COVID-19 or the Russia–Ukraine war. Financial Statements Data or Financial Statements Notes “events after the end of the reporting period”; so, we would be able to have a clear conclusion. Additionally, we did not take into account computer programming languages or skills that would support data analysis.

Considering the sample and time period limitations of specific papers, they can be handled in future studies. It would be interesting for future research to expand the research scope to companies with different characteristics that present different audit opinions in financial reports to be justified any relation with social media efficiently; for example, this study can be expanded on insurance companies, bank institutions or companies under liquidation, as we have excluded those categories from our research. Moreover, because in our research, we chose only Greek companies with statutory financial reports, this study can be expanded on the international level with companies' statutory financial statements or group financial statements in local and international levels. A topic for following investigations is the use of fundamental or technical analysis ratios in relation with social media posts by analyzing fundamental companies' ratios and technical charts of stocks in relation with social media posts. Additionally, this study can provide rational results with the effective use of data analysis tools and computer science in new studies.

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