



“The impact of firms’ and CEOs’ social media usage on corporate performance”

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| AUTHORS | Wafa Ghardallou  |
| ARTICLE INFO | Wafa Ghardallou (2021). The impact of firms’ and CEOs’ social media usage on corporate performance. <i>Investment Management and Financial Innovations</i> , 18(4), 21-35. doi: 10.21511/imfi.18(4).2021.03 |
| DOI | http://dx.doi.org/10.21511/imfi.18(4).2021.03 |
| RELEASED ON | Tuesday, 05 October 2021 |
| RECEIVED ON | Tuesday, 17 August 2021 |
| ACCEPTED ON | Wednesday, 22 September 2021 |
| LICENSE |  This work is licensed under a Creative Commons Attribution 4.0 International License |
| JOURNAL | "Investment Management and Financial Innovations" |
| ISSN PRINT | 1810-4967 |
| ISSN ONLINE | 1812-9358 |
| PUBLISHER | LLC “Consulting Publishing Company “Business Perspectives” |
| FOUNDER | LLC “Consulting Publishing Company “Business Perspectives” |



NUMBER OF REFERENCES

44



NUMBER OF FIGURES

0



NUMBER OF TABLES

7

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BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Received on: 17th of August, 2021
Accepted on: 22nd of September, 2021
Published on: 5th of October, 2021

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Conflict of interest statement:
Author(s) reported no conflict of interest

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THE IMPACT OF FIRMS' AND CEOs' SOCIAL MEDIA USAGE ON CORPORATE PERFORMANCE

Abstract

The impact of social media usage on corporate performance has not been examined in the Saudi context. This paper aims to investigate the influence of social media, namely companies' and CEOs' involvement in Twitter and LinkedIn, on the profitability of Saudi Arabia listed firms. A dynamic panel estimation method is used to empirically assess this relationship. The study employs 120 firms listed on the Saudi Stock Exchange Tadawul from 2014 to 2017. Data are obtained from the companies' annual reports. Statements of financial status as well as income statements are used to collect data on the dependent variable and control variables. The results show that having a LinkedIn official account by both the CEO and the company does not improve the enterprise performance. In contrast, companies that are active on Twitter will contribute to an increase in their short-term performance. CEOs who engage in Twitter via a high number of followers help to boost the performance of their companies in the long and short term. Hence, this paper recommends that Saudi firms should be aware that their performance could be increased by monitoring their presence on social networks and by having a strong intention to use these tools.

Keywords

firm performance, CEOs' social media usage, companies' social media usage, Saudi listed firms

JEL Classification

L25, G30, G32

INTRODUCTION

In today's modern world, social networks usage has completely changed the way persons and companies communicate. Social media becomes the main source that facilitates the transfer of flow of information and knowledge. Internet technology has also changed the manner firms disclose their financial statements through gradually changing the extent of corporate disclosure to social platforms. Throughout the past, firms used to communicate financial information via regular reports and official statements. However, with the increased prevalence of social media, this type of disclosure has changed. Nowadays, companies share financial information and news through official webpages, social platforms and executives' personal accounts. Firms are increasingly encouraged to use social media because it helps to reduce asymmetric information between the company and the investors and influences the investors' emotional response (Chen et al., 2014). Investors use information disclosed via social networks to predict future stock fluctuations (Bollen et al., 2011; Sul et al., 2014) and thus make the right decision (Nofer & Hinz, 2015).

Other benefits that come from enhanced internet activity is the freedom to act in terms of timing process and type of data. This freedom creates new opportunities to negotiate directly with shareholders by allowing them to respond in a timely manner to any news. Besides, companies' future profits get enhanced after using social media (Sang, 2014). Information communicated through social platforms can influence and predict stock market movements (Cole et al., 2015; Zheludev

et al., 2014). For instance, Bollen et al. (2011) demonstrate that companies' announcements on Twitter are good predictors of Dow Jones industrial index.

On the other hand, chief executive officers, as the company's primarily representative leaders, may also profit from social media by increasing their presence on social networks in order to meet a large audience (Sul et al., 2014). Furthermore, investors are more likely to invest when CEOs communicate information about their companies through their personal webpages (Elliott et al., 2018). It is also argued that CEOs' usage of social media enhances the firms' revenues (Mcpherson et al., 2001). Hence, CEOs around the world are increasingly using social networks to influence shareholders and build a positive image of their company. In this regard, chief executives' involvement in social media activities has increased from 36% to 66% between 2010 and 2012 (Weber Shandwick's Survey, 2012). Therefore, many scholars claim that CEOs' engagement in social networks has a positive effect on a company's performance (Cianci & Kaplan, 2010; Benthaus et al., 2016). Other researchers underline the prominent role that firms' engagement in social platforms play in boosting their performance (Rodriguez et al., 2012; Paniagua & Bolufer, 2014; Parveen et al., 2015; Ainin et al., 2015).

Although the relationship between social media usage and firm performance is a current subject, as far as the author knows, no previous research has examined this connection in the context of Saudi Arabia. Therefore, this paper aims to fill this gap by studying the impact of social media usage on Saudi listed firms. It particularly investigates whether company's use of online social media and CEO presence on social networks explain the firm performance.

The choice of the Saudi market is motivated by the fact that Saudi Arabia is an emerging economy that has the largest social media presence in the world (KSA Social Media Statistics, 2020). In the last decade, Saudi Arabia has recorded an unprecedented raise in the number of online social media users. In this regard, Facebook and Twitter dominate with the largest number of social media users in the kingdom (Ministry of Communications and Information Technology, 2021).

As such, studying this phenomenon is a real opportunity that brings new insights regarding the performance of firms in Saudi Arabia. This study attempts to provide researchers with a first look at social technologies' usage and corporate performance, and thus intends to open doors for future studies in emerging countries.

This paper is structured as follows: The first section reviews the literature on social media usage by a company and CEOs and business performance. It highlights the theoretical background and develops the hypotheses of the study. The second section describes the empirical methodology. Results are presented in section 3. The last section concludes the paper.

1. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

This study focuses on the impact of CEOs' and companies' usage of social media and networks on the financial performance of a firm. The literature defines social media as "a group of internet-based applications that build on the ideological and technological foundations of web

2.0, and that allow the creation and exchange of user generated content" (Kaplan & Haenlein, 2011). In addition, according to Mou et al. (2013), social media includes web-based technologies. This paper draws inspiration from the social network theory to explain theoretical links of the relationship between social media usage and enterprise performance.

The social network theory stipulates that social relationships play a prominent role in exchanging information and in transferring social me-

dia influence. Particularly, the importance of media effects has been expanded since 1960s. In this respect, the theory differentiates between individual use of social media and company usage of social networks (Schaupp & Belanger, 2014). The social network theory predicts a positive link between social media use and firm performance. First, it is argued that networking, i.e., the use of twitter, Facebook, LinkedIn, etc. enhances the exchange of information and enlarges communication channels, which reduces information asymmetries and uncertainty between managers (Sang, 2014). Indeed, Sang (2014) argues that social media usage decreases problems of uncertainty, especially with the company's customers, since these latter get accurate information, which, in turn, improves the performance of an organization.

In addition, the usage of social media allows the company to take advantage from various opportunities, including searching and sharing information, seeking for new customers, announcing positive signals to the market (Parveen et al., 2015). Online social platforms contribute to and facilitate knowledge sharing between the company and its stakeholders (Sigala & Chalkiti, 2015). Making the information available, relevant and timeliness is very important in helping investors and customers to make the right decision (Barreda et al., 2015).

Similarly, it is claimed that companies that use social media are more likely to realize higher sales growth as they are connected directly to consumers at low cost and at a timely manner (Mangold & Faulds, 2009; Kaplan & Haenlein, 2011; Lee et al., 2015). Besides, social media utilization enables the organization to benefit from advantages of online environment such as Twitter, MySpace, etc. (Kaplan & Haenlein, 2011).

Likewise, Nguyen et al. (2015) stipulate that social technologies permit to share experiences, to accumulate knowledge and to enhance the learning process, with positive effects on the firm performance. Moreover, internal usage of social media enhances knowledge sharing within the company and reduces information asymmetry, thus resulting in higher performance

(Cao et al., 2018). Kiron et al. (2012) demonstrate that firms can benefit from social network usage by adopting better marketing strategies and innovating in the management process.

Moreover, top managers may profit from social media usage by developing social capital through increasing the number of relationships with investors and financial institutions. Social capital will in turn be used in order to enhance the value of their companies (Fernández-Pérez et al., 2013), and thus their financial performance. Furthermore, according to the social network theory, CEOs' achievements are positively correlated with managers' use of social network (Peng & Luo, 2000). Better chief executives' performance will certainly improve the organization value.

Geletkanycz et al. (2001) advocate that socially connected CEOs are more likely to develop best practices and can easily benefit from transfer of expertise, which in turn will positively affect the growth of a firm. In the same vein, social network usage can help CEOs to open new doors for the company. For instance, Agrawal and Knoeber (2001) demonstrate that politically connected managers via social platforms are in a better position to negotiate new government contracts.

Besides, some authors advocate that CEOs as representatives of a company have a great influence on investors' reaction (Constant et al., 1996). In this regard, Benthaus et al. (2016) studied the influence of CEOs' Twitter posts on NYSE and NASDAQ stock markets. The authors found that Twitter posts have a significant impact on stock prices and that information is carefully reflected in investors' decisions. Furthermore, Sul et al. (2014) stipulate that this influence increases with the user's popularity on social platforms. Indeed, Elliott et al. (2018) demonstrate that CEOs who actively communicate details about the company on social platforms can mitigate the impact of any negative information and can affect investors' decision-making process. In fact, investors are more ready to invest in the firm when the CEO in person discloses information regarding the company rather than by means of their relationships or through the

company's website. Hence, executives' engagement in social media networks should increase the performance of their firm due to their expertise and popularity.

Additionally, Koo and Jung (2011) argue that the usage of social platforms by employees in the company increases their task performance. The social network theory suggests that social networking facilitates the flow of knowledge between employees, leading to an information-rich structure within the organization (Aral et al., 2013; Wu, 2013). Actually, employees who work in an environment in which information is communicated fluently are more likely to be more productive with a positive impact on firm performance.

Although the theoretical literature suggests a positive influence of social network usage on firm performance in terms of innovativeness improvement and operational efficiency, it is essential to report that several scholars stress the potential drawbacks of organizations' usage of social media. Indeed, it is claimed that directors who are connected on social platforms are less monitored and have more freedom. These latter can be more independent and may use this liberty to act in their own self-interest against the shareholders' interests and wealth. Furthermore, top managers can benefit from information asymmetry to serve their objectives. In addition, work could be disrupted and employees may be distracted from work-related communication because of excessive usage and interaction on social media, which will cause a reduction in productivity and decreases firm performance (Leonardi et al., 2013). Besides, the flow of firms' knowledge and information that circulate outside the company via social platforms can lead to the divulgence of confidential information that may hurt company's innovativeness.

In conclusion, based on the review of the literature on social network theory and business performance, this study predicts a positive link between social network usage and firm performance. This is because social media usage decreases problems of uncertainty, especially with the company's customers, since clients got accurate information; which in turn improves the

organization's performance. Besides, companies that use social media are more likely to realize higher sales growth as they are connected directly to consumers at low cost and at a timely manner. Furthermore, social technologies allow you to share experiences, accumulate knowledge and improve the learning process, with positive effects on the firm's performance. Finally, top managers may profit from social media usage by developing social capital through increasing the number of relationships with investors and financial institutions. Social capital will in turn be used to enhance the value of their companies. Therefore, the following hypotheses are predicted:

H1: A company's use of social media positively affects its financial performance.

H2: CEO's usage of social media positively affects a company's financial performance.

2. METHODOLOGY

The focus of this paper is two-fold. First, it aims to investigate the effect of the firm's presence on online social media on its performance. Second, it attempts to examine the specific effect of CEO's usage of social platforms on firm's financial performance. Data is obtained from Tadawul stock exchange and particularly from the companies' annual reports. This study specifically uses statements of financial position as well as income statements to collect data on the dependent variable and control variables. The dependent variable and the explanatory variables are described in the next section. Data on social media usage either by a company or by a CEO are obtained from Tweeter, LinkedIn and other online social media. The study employs 120 listed non-financial firms from 2014 to 2017. Financial firms are excluded because of their specific reporting standards. In addition, firms with many missing values are eliminated from the sample.

2.1. The dependent variable

The dependent variable measures a firm's performance. Three different variables to measure a company's performance were employed: return on

assets (ROA), return on equity (ROE), and Tobin's Q (Tobin). These variables are the ones that are commonly used in the related literature (Binacci et al., 2016). Moreover, it is worth to note that the utilization of these various measures allows evaluating the diverse dimensions of the performance. Indeed, it is argued that return on assets and return on equities measure the accounting performance, whereas Tobin's Q assesses the company's market performance.

Return on assets (ROA) is the ratio of the net income divided by the total assets. It shows the rate of return a company achieves after using its resources. This measure considers both the operational and the historical events of the company. Thus, ROA indicates the firm's efficiency when using its assets.

Return on equities (ROE) is defined as the ratio of net income to total equities. It measures the return on investment of the shareholders and the amount of profits as a percentage of the shareholders' equities. Accordingly, return on equities indicates the income that the firm generates as of the shareholders' investments.

Tobin's Q (Tobin) is defined as the sum of the market value of equity and the book value of total assets minus the book value of equity, divided by the book value of total assets. Tobin's Q reflects the company's market value. When the ratio exceeds the value of 1, company's stocks are undervalued, whereas, when the ratio is between 0 and 1, stocks are overvalued by the market, since the replacement costs of the assets are greater than the market value.

Finally, it is essential to report that using the above variables allows you to measure both the short-run and long-run performance because return on assets and return on equity are short-term performance measures, whereas Tobin's Q measures the long-term performance. Indeed, Caton et al. (2001) stipulate that Tobin's Q measures the ability of a firm to enhance its performance over the long-run period.

2.2. The independent variables

According to what is described above, this study attempts to investigate the effects of social media usage on firm performance. To do this, the

study follows the prior literature and employs an assortment of variables that proxy engagement in online social platforms. In the context of Saudi Arabia, the most common social media being used by business companies are LinkedIn and Twitter. Therefore, data on firms' and CEOs' usage of LinkedIn and Tweeter are collected. Firms' usage of LinkedIn is respectively measured by two variables: The first one is defined as the company's presence on LinkedIn (Comp_Link), which is a binary variable that equals 1 if the company has an active account on LinkedIn, and 0 otherwise. The second variable reflects the degree to which the company is active on LinkedIn (Comp_Conn) and is measured by the number of connections in LinkedIn. Similarly, firms' usage of Twitter is measured by three variables. The first one is a binary variable (Comp_Twitter) that takes the value of 1 if the company has an account on Twitter, and 0 otherwise. The second and the third variables capture the activity of the company on Twitter and are respectively measured by the number of company's followers on Twitter (Comp_Foll) and the number of company's tweets (Comp_Tweets).

CEOs' usage of LinkedIn is also measured by two variables: The first one is defined as the CEO's presence on LinkedIn (CEO_Link), which is a binary variable that equals 1 if the CEO has an active account on LinkedIn, 0 otherwise. The second variable reflects the degree to which the CEO is active on LinkedIn (CEO_Conn) and is measured by the number of connections on LinkedIn.

Likewise, CEOs' usage of Twitter is measured by three variables. The first one is a binary variable (CEO_Twitter) that takes the value of 1 if the CEO has an official account on Twitter and 0 otherwise. The second and the third variables reflect CEO's activity on Twitter and are respectively measured by the number of CEO followers on Twitter (CEO_Foll) and the number of CEO's tweets (CEO_Tweets).

2.3. The control variables

The econometric model includes a list of control variables to take into account the impact of firm-specific effects on the estimated results (Nguyen & Nguyen, 2020; Ghardallou et al., 2020).

The following control variables are used: the size of a company (Ln-Size) measured by the natural logarithm of total assets. The impact of the firm size on its performance is predicted to be positive. Indeed, previous studies consider that big companies are better able to negotiate in order to obtain finance with preferable interest rates. In addition, larger firms hold more resources, which leads to greater efficiency.

The second control variable is the firm leverage (Leverage). Most of the empirical literature measures the leverage of a firm by the ratio of total debts to total assets. The effect of debts on corporate performance is ambiguous. On the one hand, some authors claim that more debts have a positive effect on the financial performance (Jensen, 1986). This is because debt is considered as an instrument that reduces agency conflict problems. Indeed, more debts will encourage managers to serve lenders and reduce their willingness to invest when investment opportunities are rare. On the other hands, another empirical literature pointed out the negative effects of leverage on firm performance. In this regard, debts are considered as a measure of firm risk. Particularly, more debts are likely to increase default risk and lead to lower firm performance. Lastly, the tangibility of assets (Tangible) is included as an additional control variable. The variable (Tangible) is measured as the ratio of fixed assets to total assets. The literature claims that there is a negative relationship between tangible assets and firm performance. This is because tangible assets are a proxy of agency costs and thus financial distress. Indeed, companies may use tangible assets as collaterals to secure their debts. Therefore, the tangibility of assets tends to be positively correlated with the firm's leverage. However, as highly indebted firms are characterized by lower performance, the tangibility of assets will be associated with lower financial performance (Al-Najjar, 2011).

2.4. The econometric model

The impact of social media usage on firm performance will be assessed through panel data analysis. Panel model is commonly used to resolve unobserved heterogeneity issues (Pervan et al., 2019; Cheng et al., 2020). Following pri-

or literature, three different regression models are estimated using the System-GMM estimator. More specifically, the three equations are estimated using the two-step GMM estimator with correction from Windmeijer (2005). Variables that are related to social media usage are assumed to be exogenous. In contrast, the rest of the variables are considered as endogenous and are instrumented by their lags of no more than three periods.

The estimated specifications are the following:

$$\begin{aligned} ROA_{it} = & \alpha + \beta_0 \text{Lag_} ROA + \\ & + \beta_1 \text{Comp_} Link_i + \beta_2 \text{Comp_} Conn_{it} + \\ & + \beta_3 \text{Comp_} Twitter_i + \beta_4 \text{Comp_} Foll_{it} + \\ & + \beta_5 \text{Comp_} Tweets_{it} + \beta_6 \text{CEO_} Link_i + \\ & + \beta_7 \text{CEO_} Conn_{it} + \beta_8 \text{CEO_} Twitter_i + \\ & + \beta_9 \text{CEO_} Foll_{it} + \\ & + \beta_{10} \text{CEO_} Tweets_{it} + \beta_{11} Z_{it} + e_{it}. \end{aligned} \quad (1)$$

$$\begin{aligned} ROE_{it} = & \alpha + \beta_0 \text{Lag_} ROE + \\ & + \beta_1 \text{Comp_} Link_i + \beta_2 \text{Comp_} Conn_{it} + \\ & + \beta_3 \text{Comp_} Twitter_i + \beta_4 \text{Comp_} Foll_{it} + \\ & + \beta_5 \text{Comp_} Tweets_{it} + \beta_6 \text{CEO_} Link_i + \\ & + \beta_7 \text{CEO_} Conn_{it} + \beta_8 \text{CEO_} Twitter_i + \\ & + \beta_9 \text{CEO_} Foll_{it} + \\ & + \beta_{10} \text{CEO_} Tweets_{it} + \beta_{11} Z_{it} + e_{it}. \end{aligned} \quad (2)$$

$$\begin{aligned} Tobin_{it} = & \alpha + \beta_0 \text{Lag_} Tobin + \\ & + \beta_1 \text{Comp_} Link_i + \beta_2 \text{Comp_} Conn_{it} + \\ & + \beta_3 \text{Comp_} Twitter_i + \beta_4 \text{Comp_} Foll_{it} + \\ & + \beta_5 \text{Comp_} Tweets_{it} + \beta_6 \text{CEO_} Link_i + \\ & + \beta_7 \text{CEO_} Conn_{it} + \beta_8 \text{CEO_} Twitter_i + \\ & + \beta_9 \text{CEO_} Foll_{it} + \\ & + \beta_{10} \text{CEO_} Tweets_{it} + \beta_{11} Z_{it} + e_{it}. \end{aligned} \quad (3)$$

where, ROA_{it} , ROE_{it} , and $Tobin_{it}$ are different measures of firm performance, β_0 is a constant term, Z_{it} is the vector of control variables, and e_{it} is the error term. Control variables are described in the above section. Dependent and explanatory variables are further described in detail in Table 1.

Table 1. Variables' definition

| Variable | Definition | Measure |
|---------------------|---|--|
| <i>ROA</i> | Return on assets performance measure | Ratio of net income divided by total assets |
| <i>ROE</i> | Return on equity performance measure | Ratio of net income to total equities |
| <i>Tobin</i> | Tobin's Q performance measure | Sum of the market value of equity and the book value of total assets minus the book value of equity, divided by the book value of total assets |
| <i>Comp_Link</i> | Company usage of LinkedIn | A binary variable that equals 1 if the company has an active account on LinkedIn, and 0 otherwise |
| <i>Comp_Conn</i> | Degree to which the company is active on LinkedIn | Number of connections in LinkedIn |
| <i>Comp_Twitter</i> | Firms' usage of Twitter | A binary variable that takes the value of 1 if the company has an account on Twitter, and 0 otherwise |
| <i>Comp_Foll</i> | Captures the activity of the company on Twitter | Number of the company's followers on Twitter |
| <i>Comp_Tweets</i> | Captures the activity of the company on Twitter | Number of the company's tweets |
| <i>CEO_Link</i> | CEO's presence on LinkedIn | A binary variable that equals 1 if the CEO has an active account on LinkedIn, 0 otherwise |
| <i>CEO_Conn</i> | Degree to which the CEO is active on LinkedIn | Number of connections on LinkedIn |
| <i>CEO_Twitter</i> | CEOs' usage of Twitter | A binary variable that equals 1 if the CEO has an official account on Twitter and 0 otherwise |
| <i>CEO_Foll</i> | Reflects CEO's activity on Twitter | Number of CEO's followers on Twitter |
| <i>CEO_Tweets</i> | Reflects CEO's activity on Twitter | Number of CEO's tweets |

3. RESULTS

3.1. Descriptive statistics

Descriptive statistics show the mean, the standard deviation, the minimum and the maximum values of all the variables included in the model. These statistics are shown in Table 2. Besides, Table 3 shows descriptive evidences regarding the evolution of a firm's performance depending on the usage of social media respectively by the company and the CEO. This aims to examine if there is a statistically significant difference in the performance of firms engaged on social media (group 1)

and those that are not (group 0). Table 3 displays the mean, standard deviation and the p-values. Surprisingly, results in Table 3 demonstrate that there is no significant difference between firms that have an official twitter account and the control group. Besides, it seems that companies that do not use LinkedIn, outperform those that have an official account. On the other hand, firms whose executives have Twitter account perform better than those whose CEOs do not use Twitter account. Finally, results reported in Table 3 demonstrate that the difference between the two groups, depending on whether a CEO has a LinkedIn account or not, is not statistically significant.

Table 2. Descriptive statistics

| Variables | Obs | Mean | Std. Dev. | Min | Max |
|-------------------------|-----|----------|-----------|---------|---------|
| <i>ROA</i> | 458 | .041 | .287 | -5.815 | .377 |
| <i>ROE</i> | 458 | .056 | .516 | -10.090 | .603 |
| <i>TOBIN'S Q</i> | 442 | .603 | 1.868 | 0 | 14.41 |
| <i>CEO LinkedIn</i> | 370 | .340 | .474 | 0 | 1 |
| <i>CEO connections</i> | 363 | 150.848 | 486.987 | 0 | 5047 |
| <i>CEO Twitter</i> | 360 | 1888889 | .391 | 0 | 1 |
| <i>CEO followers</i> | 359 | 2130.206 | 12620.27 | 0 | 207000 |
| <i>CEO tweets</i> | 359 | 777.052 | 4215.668 | 0 | 33500 |
| <i>Comp LinkedIn</i> | 368 | .820 | .384 | 0 | 1 |
| <i>Comp connections</i> | 367 | 19583.58 | 61916.81 | 0 | 408508 |
| <i>Comp Twitter</i> | 361 | .470 | .499 | 0 | 1 |
| <i>Comp followers</i> | 366 | 77430.7 | 428957.6 | 0 | 3900000 |
| <i>Comp tweets</i> | 388 | 5690.183 | 25622.48 | 0 | 167500 |
| <i>Leverage</i> | 449 | .398 | .205 | .013 | .889 |
| <i>LnSize</i> | 458 | 14.732 | 1.572 | 9.856 | 19.915 |
| <i>Tangible</i> | 458 | .479 | .236 | 0 | .990 |

Table 3. Firms' performance based on the social media usage

| Social media | Firm performance measure | Groups | Mean | Standard deviation | P value |
|---------------------|--------------------------|-----------|--------|--------------------|---------|
| Company on LinkedIn | ROA | Group = 0 | .055 | .063 | 0.092 |
| | | Group = 1 | .038 | .351 | |
| Company on LinkedIn | ROE | Group = 0 | .104 | .129 | 0.028 |
| | | Group = 1 | .043 | .629 | |
| Company on LinkedIn | Tobin's Q | Group = 0 | .345 | .453 | 0.013 |
| | | Group = 1 | .065 | .534 | |
| Company on Twitter | ROA | Group = 0 | .031 | .436 | 0.615 |
| | | Group = 1 | .048 | .083 | |
| Company on Twitter | ROE | Group = 0 | .025 | .779 | 0.366 |
| | | Group = 1 | .080 | .164 | |
| Company on Twitter | Tobin's Q | Group = 0 | 2.322 | 1.854 | 0.598 |
| | | Group = 1 | 2.223 | 1.652 | |
| CEO using Twitter | ROA | Group = 0 | .0007 | .0790 | 0.094 |
| | | Group = 1 | .059 | .534 | |
| CEO using Twitter | ROE | Group = 0 | -.0309 | .124 | 0.048 |
| | | Group = 1 | .092 | .959 | |
| CEO using Twitter | Tobin's Q | Group = 0 | .296 | .253 | 0.026 |
| | | Group = 1 | .472 | .434 | |
| CEO using LinkedIn | ROA | Group = 0 | .039 | .356 | 0.879 |
| | | Group = 1 | .033 | .079 | |
| CEO using LinkedIn | ROE | Group = 0 | .0468 | .633 | 0.882 |
| | | Group = 1 | .058 | .199 | |
| CEO using LinkedIn | Tobin's Q | Group = 0 | 2.275 | 1.802 | 0.929 |
| | | Group = 1 | 2.297 | 1.600 | |

Note: Two-sample t-test with equal variances.

3.2. Correlation matrix

The data is further analyzed by exploring the correlation between different explanatory variables and the dependent variable. Table 4 displays the correlation matrix; the results show that all the independent variables are weakly

correlated, which allows their inclusion simultaneously in the same specification. In addition, social media variables are shown to be correlated with the various dependent variables. However, it is important to note that the sense of the relationship varies depending on the social media platform.

Table 4. Correlation matrix

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|-----------|--------|--------|--------|--------|--------|-------|--------|--------|-------|-------|--------|--------|--------|-------|-------|------|
| ROA | 1 | | | | | | | | | | | | | | | |
| ROE | 0.980 | 1 | | | | | | | | | | | | | | |
| Tobin | -0.278 | -0.278 | 1 | | | | | | | | | | | | | |
| CEOLink | -0.122 | -0.134 | -0.060 | 1 | | | | | | | | | | | | |
| CEOCon | -0.062 | -0.063 | -0.045 | 0.550 | 1 | | | | | | | | | | | |
| CEOTwit | 0.004 | 0.006 | 0.018 | 0.291 | 0.174 | 1 | | | | | | | | | | |
| CEOFoll | 0.022 | 0.035 | 0.009 | 0.038 | 0.110 | 0.351 | 1 | | | | | | | | | |
| CEOTwt | 0.004 | 0.018 | 0.074 | 0.116 | 0.092 | 0.412 | 0.301 | 1 | | | | | | | | |
| CpLink | -0.020 | -0.032 | -0.047 | 0.161 | 0.156 | 0.074 | 0.079 | 0.071 | 1 | | | | | | | |
| CpCon | -0.029 | -0.043 | -0.044 | 0.094 | 0.082 | 0.233 | 0.201 | 0.013 | 0.157 | 1 | | | | | | |
| CpTwt | 0.038 | 0.064 | 0.053 | 0.240 | 0.099 | 0.315 | 0.168 | 0.176 | 0.264 | 0.289 | 1 | | | | | |
| CpFoll | 0.027 | 0.035 | 0.044 | 0.230 | 0.153 | 0.253 | 0.408 | -0.014 | 0.077 | 0.508 | 0.185 | 1 | | | | |
| CpTwt | 0.026 | 0.038 | 0.054 | 0.260 | 0.176 | 0.222 | 0.345 | -0.012 | 0.096 | 0.410 | 0.222 | 0.509 | 1 | | | |
| Lev | -0.097 | -0.090 | -0.054 | 0.063 | -0.007 | 0.211 | 0.108 | 0.153 | 0.117 | 0.082 | 0.260 | 0.036 | 0.079 | 1 | | |
| Size | 0.185 | 0.200 | -0.280 | -0.094 | -0.033 | 0.108 | 0.141 | 0.037 | 0.143 | 0.554 | 0.321 | 0.275 | 0.227 | 0.377 | 1 | |
| Tang | 0.074 | 0.078 | -0.032 | -0.078 | -0.019 | 0.024 | -0.054 | -0.216 | 0.018 | 0.034 | -0.025 | -0.006 | -0.002 | 0.181 | 0.306 | 1 |

3.3. Results and discussion

Estimation results are respectively presented in Tables 5-7. Table 5 includes ROA as a dependent variable, whereas Tables 6 and 7 make use of ROE and Tobin as financial performance measures. In all the three tables, eight regressions are tested. Regression (1) includes only (Comp_Link), whereas regression (2) tests the effect of (Comp_Link) and (Comp_conn). In Regression (3), the impact of (Comp_Twitter) is examined, and in regression (4), (Comp_Foll) and (Comp_Tweets) are added. Regressions (5) to (8) include exactly the same variables with reference to the CEO usage of social media. Results show that coefficients associated with the lagged dependent variables are positive and highly significant through all the specifications whatever the measure of financial performance, which is used. This justifies the use of the dynamic specification.

Second, results regarding the company's usage of LinkedIn are surprisingly negative. Indeed, coefficients associated with (Comp_Link) and (Comp_conn) are negative and significant regardless of the measure of firm performance. Findings suggest that Saudi firms, which are actively engaged in using LinkedIn, will negatively influence their performance. Indeed, it looks that higher companies' connections on LinkedIn reduce the financial performance of a firm. These findings imply that Saudi firms that have official LinkedIn accounts seem to adversely affect their profitability. These results corroborate those of Baccarella et al. (2018) who underline the negative side of social media usage, due to the risks associated to fake news, online trolling, and the invasion of privacy.

Turning to the effect of companies' presence on Twitter, results reveal that coefficients of firm's usage of Twitter account are not significant through all the models. Thus, having an official Twitter account does not explain the performance of Saudi public traded firms. In addition, coefficients associated with the number of followers on Twitter are globally not significant, except in the first model, which further demonstrates that company's followers on Twitter do not affect its profitability. However, findings

provide evidence of a positive and significant effect of firm's number of tweets on the financial performance, with non-significant influence on the market value measured by Tobin's Q. Here, it appears that when the company increases its engagement in Twitter by rising tweets, it will boost its short-term profitability, whereas it will not affect its long-run performance.

Tables 5, 6 and 7 show that coefficients associated with CEO usage of LinkedIn and CEO number of connections are not significant through all the regressions. This indicates that Saudi listed firms' performance is not affected by executives' usage of LinkedIn. In other words, whether CEO holds an official LinkedIn account or not does not affect the profitability of the firm. Similarly, CEO's number of connections on LinkedIn does not explain the business performance. Moving to the effect of CEO involvement on Twitter, the findings indicate that having an official Twitter account can significantly increase the firm's performance. Indeed, coefficients associated with the variable (CEO_Twitter) are positive and significant, except for the second model in which ROE is used as a dependent variable. Besides, coefficients associated with the variable (CEO_tweets) and (CEO_Foll) are positive and significant at the 1% level through all the regressions. Therefore, directors that increase their engagement in Twitter by rising the number of tweets and the number of followers can significantly increase the long-run and short-run performance of their company. This result confirms previous findings (Benthaus et al., 2016) that found that CEOs' Twitter posts on U.S. stock markets have a significant impact on stock prices and that information is carefully reflected in investors' decisions. The results of this study are also aligned with the study of Sul et al. (2014) who stipulate that the positive relationship between executives presence on social media and firm performance increases with the user's popularity on social platforms. Moreover, Elliott et al. (2018) demonstrate that CEOs who actively communicate on social platforms can mitigate the impact of negative information about the company and can affect investors' decision making process. Actually, investors are more willing to invest in the firm when the CEO personally communicates any information

Table 5. Estimation results using the ROA performance indicator

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------------------------------------|-----------------------|--------------------------|---------------------|--------------------------|---------------------|-------------------------|----------------------|---------------------------|
| <i>Lag_ROA</i> | 1.165*** (0.289) | 1.157*** (0.289) | 1.109*** (0.240) | 1.089*** (0.242) | 1.024*** (0.213) | 1.063*** (0.239) | 1.209*** (0.298) | 1.161*** (0.291) |
| <i>Comp_Link</i> | -0.060*** (0.0115) | -0.0534*** (0.0128) | | | | | | |
| <i>Comp_conn</i> | | -0.000117* (6.98e-05) | | | | | | |
| <i>Ln_Size</i> | 0.180** (0.0867) | 0.178** (0.0871) | 0.0880* (0.0504) | 0.102* (0.0543) | 0.0858* (0.0509) | 0.0851* (0.0506) | 0.232*** (0.0523) | 0.241*** (0.0501) |
| <i>Tangible</i> | 0.00195 (0.0756) | 0.00279 (0.0758) | 0.0843 (0.0650) | 0.0950 (0.0697) | 0.0728 (0.0599) | 0.0826 (0.0658) | -0.0319 (0.0651) | -0.0625 (0.0847) |
| <i>Leverage</i> | -0.598*** (0.166) | -0.597*** (0.167) | -0.251 (0.182) | -0.323 (0.205) | -0.247 (0.177) | -0.245 (0.178) | -0.582*** (0.142) | -0.584*** (0.139) |
| <i>Comp_Twitter</i> | | | 0.0176 (0.0219) | 0.0238 (0.0263) | | | | |
| <i>Comp_Foll</i> | | | | -1.92e-07* (9.72e-08) | | | | |
| <i>Comp_Tweets</i> | | | | 2.47e-06** (1.14e-06) | | | | |
| <i>CEO_Link</i> | | | | | -0.0704 (0.0489) | -0.0698 (0.0498) | | |
| <i>CEO_Conn</i> | | | | | | -8.73e-06 (1.49e-05) | | |
| <i>CEO_Twitter</i> | | | | | | | 0.0864** (0.0421) | |
| <i>CEO_Foll</i> | | | | | | | | 4.65e-06*** (1.05e-06) |
| <i>CEO_Tweets</i> | | | | | | | | 0.000594*** (0.000127) |
| Constant | -2.417* (1.234) | 0 (0) | -1.315* (0.733) | -1.505* (0.781) | -1.240* (0.714) | -1.238* (0.716) | -3.257*** (0.742) | -3.837*** (0.849) |
| Observations | 263 | 260 | 258 | 238 | 266 | 260 | 260 | 258 |
| Nb. Firms | 99 | 98 | 97 | 89 | 102 | 101 | 100 | 100 |
| Instruments | 8 | 8 | 8 | 10 | 8 | 9 | 8 | 9 |
| Hansen: <i>p</i> -val ^a | 0.306 | 0.122 | 0.052 | 0.060 | 0.093 | 0.063 | 0.375 | 0.382 |
| AR(1): <i>p</i> -val ^b | 0.137 | 0.137 | 0.117 | 0.121 | 0.137 | 0.132 | 0.146 | 0.154 |
| AR(2): <i>p</i> -val ^c | 0.276 | 0.233 | 0.423 | 0.511 | 0.198 | 0.623 | 0.799 | 0.623 |

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. a: Test the null hypothesis of the appropriate set of instruments. Based on these values, the null hypothesis of the validity of instruments at the usual risk thresholds cannot be rejected. b: Test for first-order serial correlation. c: Test for second-order serial correlation. Based on these values, the null hypothesis of the absence of second-order autocorrelation of residuals of the prime difference model cannot be rejected.

about the company. Hence, executives' engagement in social media networks should increase the firm's performance due to their expertise and popularity.

Finally, the results of the different control variables are generally in line with the previous liter-

ature. Firm size has a positive and significant effect on firm performance in the majority of the specifications. Leverage has a negative and significant effect, whereas the variable (tangible) is associated with lower market value of the firm.

Table 6. Estimation results using the ROE performance indicator

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------------------------------------|-----------------------|---------------------------|---------------------|-------------------------|----------------------|-------------------------|----------------------|---------------------------|
| <i>Lag_ROE</i> | 0.969** (0.474) | 0.967** (0.475) | 1.010*** (0.312) | 0.993*** (0.316) | 0.941** (0.438) | 0.947* (0.490) | 0.919** (0.442) | 0.886** (0.433) |
| <i>Comp_Link</i> | -0.124*** (0.0395) | -0.108** (0.0416) | | | | | | |
| <i>Comp_Conn</i> | | -0.000284** (0.000116) | | | | | | |
| <i>Ln_Size</i> | 0.427*** (0.122) | 0.426*** (0.122) | 0.129 (0.0885) | 0.151 (0.0979) | 0.461*** (0.116) | 0.465*** (0.120) | 0.471*** (0.113) | 0.477*** (0.119) |
| <i>Tangible</i> | 0.00381 (0.164) | 0.00439 (0.164) | 0.147 (0.125) | 0.167 (0.134) | -0.00592 (0.106) | -0.00400 (0.110) | -0.0242 (0.107) | -0.0413 (0.135) |
| <i>Leverage</i> | -1.159** (0.551) | -1.159** (0.553) | -0.432 (0.353) | -0.550 (0.406) | -1.172** (0.553) | -1.181* (0.597) | -1.084** (0.544) | -1.134* (0.582) |
| <i>Comp_Twitter</i> | | | 0.0322 (0.0365) | 0.0361 (0.0422) | | | | |
| <i>Comp_Foll</i> | | | | -2.99e-07 (1.84e-07) | | | | |
| <i>Comp_Tweets</i> | | | | 4.12e-06* (2.30e-06) | | | | |
| <i>CEO_Link</i> | | | | | 0.0340 (0.0535) | 0.0455 (0.0867) | | |
| <i>CEO_Conn</i> | | | | | | -8.82e-06 (0.000156) | | |
| <i>CEO_Twitter</i> | | | | | | | 0.149 (0.0989) | |
| <i>CEO_Foll</i> | | | | | | | | 7.88e-06*** (2.16e-06) |
| <i>CEO_Tweets</i> | | | | | | | | 0.00100*** (0.000247) |
| Constant | -5.806*** (1.787) | 0 (0) | -1.917 (1.281) | -2.203 (1.401) | -6.425*** (1.644) | -6.486*** (1.707) | -6.629*** (1.601) | -7.496*** (1.930) |
| Observations | 263 | 260 | 258 | 238 | 266 | 260 | 260 | 258 |
| Nb. Firms | 99 | 98 | 97 | 89 | 102 | 101 | 100 | 100 |
| Instruments | 8 | 8 | 8 | 10 | 8 | 9 | 8 | 9 |
| Hansen: <i>p</i> -val ^a | 0.261 | 0.101 | 0.042 | 0.051 | 0.320 | 0.306 | 0.286 | 0.280 |
| AR(1): <i>p</i> -val ^b | 0.364 | 0.364 | 0.323 | 0.325 | 0.363 | 0.370 | 0.363 | 0.365 |
| AR(2): <i>p</i> -val ^c | 0.456 | 0.433 | 0.294 | 0.389 | 0.465 | 0.235 | 0.583 | 0.426 |

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. a: Test the null hypothesis of the appropriate set of instruments. Based on these values, the null hypothesis of the validity of instruments at the usual risk thresholds cannot be rejected. b: Test for first-order serial correlation. c: Test for second-order serial correlation. Based on these values, the null hypothesis of the absence of second-order autocorrelation of residuals of the prime difference model cannot be rejected.

Table 7. Estimation results using Tobin's Q performance indicator

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------------------------------------|-----------------------|-------------------------|--------------------|------------------------|--------------------|-------------------------|--------------------|--------------------------|
| <i>Lag_Tobin</i> | 0.317** (0.130) | 0.317** (0.131) | 0.316** (0.140) | 0.328** (0.139) | 0.250** (0.123) | 0.233* (0.129) | 0.246* (0.130) | 0.245* (0.132) |
| <i>Comp_Link</i> | -0.265*** (0.0467) | -0.245*** (0.0513) | | | | | | |
| <i>Comp_Conn</i> | | -0.000339 (0.000290) | | | | | | |
| <i>Ln_Size</i> | 0.591 (0.443) | 0.596 (0.446) | -0.142 (0.137) | -0.164 (0.152) | 0.0969 (0.396) | 0.0949 (0.407) | 0.192 (0.414) | 0.263 (0.445) |
| <i>Tangible</i> | -0.934* (0.473) | -0.937* (0.477) | -0.0367 (0.446) | 0.0547 (0.479) | -0.710* (0.398) | -0.739* (0.406) | -0.755* (0.410) | -0.800 (0.515) |
| <i>Leverage</i> | 0.895 (0.933) | 0.894 (0.935) | 0.585 (0.680) | 0.530 (0.770) | 1.550 (1.030) | 1.555 (1.071) | 1.407 (0.995) | 1.267 (1.071) |
| <i>Comp_Twitter</i> | | | -0.187 (0.208) | -0.287 (0.215) | | | | |
| <i>Comp_Foll</i> | | | | 1.73e-07 (3.40e-07) | | | | |
| <i>Comp_Tweets</i> | | | | 5.29e-06 (4.08e-06) | | | | |
| <i>CEO_Link</i> | | | | | -0.114 (0.148) | -0.0317 (0.182) | | |
| <i>CEO_Conn</i> | | | | | | -0.000449 (0.000325) | | |
| <i>CEO_Twitter</i> | | | | | | | 0.341* (0.189) | |
| <i>CEO_Foll</i> | | | | | | | | 1.86e-05** (7.78e-06) |
| <i>CEO_Tweets</i> | | | | | | | | 0.00237** (0.000948) |
| Constant | -7.175 (6.277) | 0 (0) | 3.229 (2.014) | 3.528 (2.184) | -0.285 (5.616) | -0.147 (5.728) | -1.714 (5.892) | -4.708 (6.999) |
| Observations | 254 | 251 | 249 | 229 | 259 | 253 | 253 | 251 |
| Nb. Firms | 96 | 95 | 94 | 86 | 99 | 98 | 97 | 97 |
| Instruments | 8 | 8 | 8 | 10 | 8 | 9 | 8 | 9 |
| Hansen: <i>p</i> -val ^a | 0.085 | 0.026 | 0.071 | 0.095 | 0.022 | 0.028 | 0.019 | 0.022 |
| AR(1): <i>p</i> -val ^b | 0.023 | 0.023 | 0.033 | 0.040 | 0.052 | 0.062 | 0.061 | 0.067 |
| AR(2): <i>p</i> -val ^c | 0.854 | 0.822 | 0.765 | 0.345 | 0.265 | 0.549 | 0.521 | 0.743 |

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. a: Test the null hypothesis of the appropriate set of instruments. Based on these values, the null hypothesis of the validity of instruments at the usual risk thresholds cannot be rejected. b: Test for first-order serial correlation. c: Test for second-order serial correlation. Based on these values, the null hypothesis of the absence of second-order autocorrelation of residuals of the prime difference model cannot be rejected.

CONCLUSION

This paper sheds light on the impact of social media usage by companies and CEOs, specifically LinkedIn and Twitter usage, on firm performance. So far, this question has received little research attention, especially in Saudi Arabia, even though the country is considered as an emerging economy that has the largest social media usage in the world. The sample consists of 120 listed non-financial firms from 2014 to 2017, and the data was obtained from companies' annual reports, as well as from LinkedIn and Twitter platforms for social media variables. The results demonstrate that LinkedIn usage by firms has a negative impact on their performance. These results corroborate previous studies that pointed out the negative side of social media usage, due to the risks associated to fake news, online trolling, and the invasion of privacy. Besides, findings provide evidence that when a company increases its engagement in Twitter by

rising the number of tweets, it will boost its short-term profitability, whereas it will not affect its long-run performance. Furthermore, the results indicate that the performance of Saudi firms is not affected by executives' usage of LinkedIn; however, CEOs with an official Twitter account can significantly increase their firm's profitability. Besides, CEOs' number of tweets is positively related to firm performance. Therefore, directors that increase their engagement in Twitter by rising their number of tweets and the number of followers can significantly increase the long-run and short-run performance of their companies. The results of this study confirm previous conclusions that CEOs' Twitter posts significantly affect stock prices and that information is carefully reflected in investors' decisions.

The study has important implications from the organizational viewpoint. First, it contributes to the enrichment of the literature on enterprise performance determinants in emerging economies. More specifically, it considers the role of social media usage in Saudi companies' profitability, which so far has not been empirically examined. Second, from a management perspective, this study is of practical value to firms and CEOs alike who are seeking to enhance their firms' profitability. Indeed, this paper empirically confirms the fact that company's presence on Twitter enhances its short-term performance. Moreover, Saudi enterprises may boost their long-run performance by encouraging their executives to be active and to be involved in Twitter in order to disclose pertinent information about the firm. In contrast, having an official LinkedIn account does not seem to enhance an enterprise's profitability. Thus, by properly applying CEO and firm media appearance, Saudi companies can boost their performance. However, in the practical application process, appropriate measures should be taken to avoid the negative consequences of excessive use of social platforms.

AUTHOR CONTRIBUTIONS

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ACKNOWLEDGMENTS

This research was funded by the Deanship of Scientific Research at Princess Nourah bint Abdulrahman University through the Fast-track Research Funding Program.

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