EFFECT OF BRAND SOCIAL MEDIA ADOPTION

ON BRAND PERFORMANCE

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By

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

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ON BRAND PERFORMANCE

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DEDICATION

To my loving partner, Kelly Nguyen, this dissertation and the completion of my degree stand as an enduring symbol of the profound impact you have had on my life, shaping me into a better and more resilient man. Our journey, though separated by miles, has been graced with an unwavering connection that has transcended physical distance. Your warmth and support have made every corner of the world feel like home as if you were always right there with me.

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LIST OF ABBREVIATIONS

IV   Instrumental Variables

FE   Fixed Effects

B2B   Business to Business

B2C   Business to Customer

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ABSTRACT

The continuous emergence and decline of social media platforms present challenges for businesses in planning, investing, and justifying their investments in these platforms. Observations have noted that social media often underperforms compared to firm expectations. While existing academic marketing research typically assumes social media adoption and focuses on the deployment of tactical decisions (e.g., when to post, what to post, achieving virality, or managing brand firestorms), the causal impact of social media adoption on firm performance as a strategic decision has not been addressed. Drawing on theories such as the resource-based view (RBV), and organizational learning, this study aims to address three questions related to a firm's strategic decisions: (1) What is the causal impact of social media adoption on short- and long-term firm performance (i.e., financial performance, including abnormal stock returns, sales growth, ROE, Tobin's Q, total Q, and non-financial performance, such as firm innovativeness)? (2) What are the mechanisms that drive short- and long-term performance? (3) What factors influence the effectiveness of a company's social media adoption?

Utilizing event studies in both short-term and long-term windows, this research examines stock market performance at the time of social media adoption by firms. Additionally, the causal impacts of social media adoption on firm performance are

investigated through an instrumental variable fixed effect, where the number of social media adoptions is considered treatment intensity, and the instruments include peer effects on social media adoption and platform popularity. Drawing on a unique dataset specifically curated for these research questions, this study discovered a positive long-term impact of social media adoption on firm performance. However, this effect materializes only after a firm has adopted multiple platforms, more specifically, after the third adoption. This result can be attributed to the learning effect and risk diversification that firms must endure to experience the reversion of the adoption effect (from negative to positive), in line with the organizational learning theory and RBV. Furthermore, the findings reveal that in the short run, regardless of the number of platforms adopted, firms consistently yield positive returns. The differential results between the long-term and short-term effects help explain the social media paradox, wherein firms expect positive results from social media adoption but often face underperformance. Lastly, an intriguing finding emerged that B2C firms do not experience the initial negative adoption effect of social media (compared to B2B firms), but the final adoption effect magnitude (i.e., the fourth adoption) is smaller than that of B2B firms. This study offers valuable insights into the strategic decision-making process of firms regarding social media adoption and its effects on firm performance.

INTRODUCTION

As of 2019, there were approximately 3.48 billion social media users worldwide, with an annual growth rate of 10 percent. Of these users, nearly 3.26 billion accessed social media via smartphones (Feehan 2020). By October 2021, the number of global social media users had risen to 4.6 billion, with 13 new users creating their first accounts every second (Das et al. 2022). According to Feehan (2020), users spend an average of 2.25 hours daily on social platforms, accounting for one-seventh of their waking lives. Although the average user maintained accounts on nine platforms, they did not actively engage with all of them, with only 83 percent actively participating.

Social media offers a variety of benefits to businesses. For instance, responding to customer service queries on social media can increase sales by 20 to 40 percent, while firms that fail to reply to customers on social media experience a 15 percent higher customer attrition rate than those that respond (Das et al. 2022). Additionally, social media usage has been found to increase communication campaign efficiency by up to 80 percent and reduce product development costs by 50 percent (Mattern et al. 2012). However, despite being considered a new gold rush by marketers, social media often fails to live up to its early hype due to low sales conversion (Elder 2014). Only a select few brands understand how social media interacts with consumers to enhance product and brand recognition, sales and profitability, and customer loyalty. Furthermore, only a small number of firms can quantify the impact of social media ("CMO Survey" 2016). Yet, the proportion of firms using social media as their primary digital medium to reach clients was projected to increase from 39 percent to 47 percent between 2012 and 2016.

Many CEOs and top executives remain uncomfortable when their organizations move beyond "experiments" with social media strategy due to a lack of clear understanding of its value (Divol, Edelman, and Sarrazin 2012). Researchers have consistently identified a discrepancy between the perceived potential of social media and its actual utilization by firms, with two of the most common reasons being that managers have other priorities and are unable to analyze and evaluate the benefits of social media (Jussila, Kärkkäinen, and Aramo-Immonen 2014). Some even believe that social media contributes little or virtually nothing to their business performance ("CMO Survey" 2021). Interestingly, social media expenditures surged during the Covid-19 pandemic, with projected spending expected to continue increasing at an accelerated rate over the next five years.

The influx of platforms also presents challenges for firms in deciding whether to invest resources in building their presence on such platforms. For example, Snapchat has shown a steady decline, with reductions in daily active users and the firm's advertising audience (Feehan 2020), raising questions about the value of initial investments in the platform. Academic researchers have also recognized this rise-and-fall trend for an extended period (Appel et al. 2020, p. 81; Kaplan and Haenlein 2010). Figure 1 illustrates the trends of social media startups and their eventual demise. As not all brands have a presence on every social media platform, there is room for improvement (Swayne 2015). Surprisingly, review papers seldom call for studies on the strategic implementation of social media (Li, Larimo, and Leonidou 2021).

Furthermore, consumer interests in these platforms are fickle, shifting from Facebook to Instagram, Snapchat, and now TikTok. Researchers understand that brands

exist in an echoverse where managing different platforms (e.g., posting schedules, handling firestorms) can affect firm performance differently (e.g., sales, word-of-mouth, consumer sentiment) (Hewett et al. 2016). The one-size-fits-all approach (i.e., cross-posting among platforms) is not the answer, and it is strongly discouraged by both academicians (Pelletier et al. 2020) and practitioners (Beveridge 2021). Thus, the questions of interest for both academia and industry are: (1) What is the effect of adopting a platform on short- and long-term firm performance (e.g., stock return, Tobin's Q, sales growth, firm innovativeness)? (2) What are the mechanisms driving the effects of short- and long-term performance? (3) What are the determinants of the differential effects of social platform adoption for different firms?

By answering these research questions, the study will contribute to the marketing literature in several ways. First, it will provide empirical evidence on the causal impact of social media adoption as a strategic decision on firm performance. This will not only advance the understanding of the role of social media in shaping firm performance but also offer valuable guidance for firms considering social media adoption. Second, the study will identify and analyze the factors influencing the effectiveness of social media adoption, offering a more nuanced perspective on the conditions under which firms may benefit from adopting various social media platforms. Third, by examining the short-term and long-term effects of social media adoption, this research will provide insights into the temporal dynamics of social media adoption and their implications for firm performance. This will help managers make informed decisions when allocating resources and prioritizing their social media efforts. Lastly, the study will investigate the differential effects of social media platform adoption across various types of firms, such as B2C and

B2B firms. This will allow for a more comprehensive understanding of the heterogeneous impacts of social media adoption, enabling firms to develop tailored social media strategies that cater to their specific needs and industry contexts.

This paper's intended contributions are twofold. Firstly, the study aims to inform firms on how to make informed entry decisions on social media and identify the appropriate entry strategy for different types of firms. Moreover, it seeks to bridge the gap between the increasing social media marketing expenditures and their perceived inefficacy. Secondly, the paper allows firms to justify their strategic adoption decisions.

The paper is structured as follows: (1) a review of literature on the typology of different social media platforms, accompanied by hypotheses explaining why various firms experience differing levels of changes to their brand performance upon entry, (2) research design and model specification to test these hypotheses, (3) results and robustness checks, and (4) discussion, limitations of the paper, and future research directions.

LITERATURE REVIEW

The existing body of marketing literature has extensively explored various aspects of social media deployment, focusing on tactical decisions such as when to post, whether to post, what content to post, how to achieve virality and methods for managing social media firestorms (Table 1). However, the present study seeks to shift the focus towards the strategic decision of social media adoption and its subsequent impact on firm performance.

Tactical decisions, which are often made with short-term objectives in mind, differ significantly from strategic decisions, which require a long-term perspective

(Swaminathan et al. 2022; Vadakkepatt, Shankar, and Varadarajan 2021). The long-term nature of strategic decisions underscores their importance and complexity, particularly in the context of social media adoption. As social media platforms continue to evolve and emerge, firms face increasing challenges in determining which platforms to adopt, how to allocate resources effectively, and how to gauge the potential return on investment.

Review of Social Media

Social media platforms are typically classified into two primary categories: earned social media (ESM) and owned social media (OSM). ESM refers to brand-related information generated, consumed, and disseminated by entities other than the brand (e.g., consumers) over online social networks, while OSM refers to a brand's communication developed and disseminated through its own online social network assets (Colicev et al. 2018). This research concentrates on the impact of owned social media adoption and its signaling effect on firm performance (Herhausen et al. 2020).

Social media can be conceptualized from various perspectives. Communication scholars view social media as a medium for storing and delivering information, while sociologists regard it as a structure composed of social actors (Peters et al. 2013). Formally, social media are defined as "communication systems that allow their social actors to communicate along dyadic ties" (Peters et al. 2013, p. 282). Drawing from Appel et al. (2020), this research defines social media as an ecosystem of apps and websites that enable diverse and complex exchanges among interconnected actors, such as individuals and firms, over online social networks.

Social media platforms exhibit different functions (e.g., presence, sharing, identity, relationship, conservation, group, reputation) and content formats (e.g., videos,

pictures, 280-character text). Research has demonstrated that content format significantly influences various types of engagement behavior. For example, video-formatted postings prompt people to actively engage on a company's fan page by providing opinions and comments, whereas photo-formatted material encourages passive user involvement through likes. Instagram users who follow a company's fan page are more likely to "like" the page than comment on it (active engagement), whereas commenting on Facebook is more prevalent (Shahbaznezhad, Dolan, and Rashidirad 2021, pp. 19–20).

Typology

A fundamental differentiation among social media platforms concerns users' motivation to engage. Engagement is described as "customer's cognitive, emotional, and behavioral activities" (Hollebeek 2011, p. 555). Engagement across social media platforms is grounded in two characteristics: (1) the nature of connection (profile-based vs. content-based), and (2) the level of customization of messages, which refers to the extent to which a service is tailored to satisfy an individual's specific preferences (customized message vs. broadcast message) (Voorveld et al. 2018). According to Zhu and Chen (2015), profile-based social media emphasizes individual members, with users connecting based on interest in the person behind the profile (e.g., Facebook, WhatsApp). In contrast, content-based social media revolves around content, with discussions and comments focused on posts and users connecting due to a shared interest in the content (e.g., YouTube or Pinterest). Platforms allowing customized messages target specific persons or groups (e.g., private messages or Facebook comments), whereas broadcast-message platforms aim for a broader audience (e.g., Twitter posts).

Based on these two attributes, social media platforms can be categorized into four types: (1) relationship platforms (profile-based with customized messages, such as Facebook and LinkedIn), (2) self-media platforms (profile-based with user-managed communication channels, such as Twitter), (3) creative outlets (content-based platforms for sharing interests and creativity, such as YouTube and Instagram), and (4) collaboration platforms (content-based platforms for seeking advice, asking questions, or sharing news, such as Quora or Reddit).

This research focuses on consumer-oriented social media platforms, which predominantly include relationship, self-media, and creative outlet platforms such as Facebook, Twitter, YouTube, Instagram, and TikTok. Despite the subtle differences among these platforms, several studies argue that it is appropriate to consider them collectively due to their shared characteristics and user engagement patterns (Kaplan and Haenlein 2010; Mangold and Faulds 2009a). For instance, all these platforms facilitate user-generated content, promote two-way communication between businesses and customers, and rely on social networking features to propagate information (Chu and Kim 2015; Kim and Ko 2012).

By examining consumer-oriented platforms, this study aims to understand how firms can effectively leverage these channels for increased engagement, enhanced brand perception, and improved overall performance. In contrast, professional platforms like LinkedIn, Glassdoor, and Indeed primarily focus on professional networking, job search, and employer branding, serving different purposes in the digital landscape (Davison, Maraist, and Bing 2011; Skeels and Grudin 2009).

There is also evidence of format convergence among social media platforms, with Facebook featuring Reels, Instagram offering Stories, and YouTube providing YouTube Shorts, among others (Hindy 2022). This convergence suggests that consumer-oriented platforms are continually adopting features and functionalities from one another to cater to their users' evolving preferences and needs (Lin and Lu 2011). Furthermore, recent studies have demonstrated that user behavior across these platforms is increasingly overlapping, with users consuming and sharing similar types of content, participating in comparable online activities, and displaying analogous engagement patterns (Rapp et al. 2013). Thus, by examining these platforms collectively, this research acknowledges their converging features and overlapping user behaviors while recognizing the unique opportunities and challenges each platform presents.

Firm Outcomes

While some survey-based research has seen no impact of social media adoption on firm performance (Ahmad, Abu Bakar, and Ahmad 2019), others have discovered a positive relationship between social media use and firm performance (Tajvidi and Karami 2021). Despite research on the organizational level anticipating the favorable benefits of social media adoption on firm performance, no study has yet quantified this positive effect (Herhausen et al. 2020). This study uses a unique real-world dataset that matches firm performance data with their social media data to quantitatively examine the causal effect of social media platform adoption on firm performance (i.e., stock market performance). In the next paragraphs, components of a firm performance will be discussed, along with reasons why social media adoption could impact these facets.

From the market-based asset framework (Srivastava, Shervani, and Fahey 1998), market-based assets include intellectual and relational market-based assets. Intellectual market-based assets are insights a firm possesses about the environment, whereas relational market-based assets are relationships between a firm and its stakeholders (e.g., customers, retailers, strategic partners). These intangible assets can be thought of as stock (e.g., current brand equity) and flow - i.e., "the extent to which a stock of a particular asset augmenting or decaying" (Srivastava, Shervani, and Fahey 1998, p. 5). Under relational market-based assets, firms have customer and partner relationships built based on the value delivered to customers through superior service/product quality and higher levels of trust and confidence. Customer relationships can contribute to the satisfaction and brand equity of a brand's installed user base.

With social media adoption, firms can increase their market-based assets via intellectual and relational routes. Social media can serve as monitoring channels for various consumer outcomes, such as engagement and sentiment (Rust et al. 2021). On the other hand, social media also allows firms to cultivate relationships with customers (via Facebook and Twitter) and their partners (via LinkedIn and Indeed). Social media helps increase information accessibility and reduce costs in terms of customer service (Parveen, Jaafar, and Ainin 2015). Having additional channels to provide customer service can improve service quality for firms (Gunarathne, Rui, and Seidmann 2018). Moreover, social media can also reduce information asymmetry between firms and customers, similar to the press release (Solomon 2012). Leveraging both customer and partner relationships, firms can increase their market-based assets.

Long-term Financial Performance

Drawing upon the Resource-Based View (RBV), this study investigates the relationship between social media adoption and long-term financial performance, particularly stock market performance. The RBV posits that a firm's unique resources and capabilities provide it with a competitive advantage (Barney 1991; Wernerfelt 1984). In the context of social media adoption, firms can build valuable resources in the form of social media expertise, customer insights, and online presence, which may contribute to improved long-term financial performance (Bharadwaj et al. 2013).

Previous research on the impact of social media adoption on firm performance has yielded conflicting results. Some studies report negative consequences, arguing that social media adoption may lead to increased costs, resource constraints, and potential information leakage (Kaplan and Haenlein 2010). Conversely, other research suggests a positive effect, with social media adoption enhancing communication with customers, improving brand visibility, and fostering customer engagement (Rui, Liu, and Whinston 2013; Trainor et al. 2014; Wang, Yu, and Wei 2012).

This study proposes an alternative perspective, grounded in the RBV, suggesting that the number of adopted platforms, rather than the nature of the individual platforms, is a key determinant of the causal impact of social media adoption on stock market performance. The central hypothesis is that the causal impact of social media adoption on stock market performance will initially be negative but will become positive as the firm adopts more platforms. In the early stages of social media adoption, firms may encounter challenges related to increased costs and resource allocation for managing multiple channels, as well as potential negative investor sentiment due to the uncertainty and

skepticism associated with the adoption of new technologies (Kaplan and Haenlein 2010; Lamberton and Stephen 2016).

As firms continue to adopt more social media platforms, the relationship between social media adoption and stock market performance is expected to shift from negative to positive. This transition can be attributed to the development of valuable resources and capabilities, as posited by the RBV (Barney 1991; Wernerfelt 1984). Specifically, in the context of social media adoption, firms can build valuable resources in the form of social media expertise, customer insights, and online presence, which may contribute to improved long-term financial performance (Bharadwaj et al. 2013).

The learning curve associated with social media adoption may lead to improvements in communication strategies and more efficient use of resources, enabling firms to better capitalize on the benefits of each platform (Kumar, Petersen, and Leone 2013). As firms gain experience and become more adept at using social media platforms, they can develop more effective communication strategies, such as personalized content, real-time engagement, and tailored responses to customer inquiries. This can lead to increased customer satisfaction and loyalty, which in turn can positively impact a firm's financial performance (Kietzmann et al. 2011).

In addition, the adoption of multiple platforms may enhance the firm's visibility and reach among investors, thereby strengthening its market presence and contributing to positive consumer sentiment (Godes and Mayzlin 2009). By utilizing a diverse range of social media platforms, firms can increase their online presence, reach a wider audience, and build stronger relationships with customers. This can help to create a positive image of the firm, increase brand awareness, and ultimately boost financial performance.

Furthermore, as firms adopt more social media platforms, they can leverage the synergies between different platforms to create a more comprehensive and integrated social media strategy. For example, firms can use data analytics to identify cross-platform trends, which can inform content creation and audience targeting. This can help firms to deliver a more cohesive and effective social media message, which can positively impact financial performance. Moreover, as firms adopt more social media platforms, they can create a more diversified revenue stream, reducing their reliance on traditional forms of advertising and marketing. This can help to insulate firms from fluctuations in the broader economy and improve their overall financial resilience. Overall, the shift from negative to positive in the relationship between social media adoption and stock market performance can be attributed to the development of valuable resources and capabilities, as firms gain experience and become more adept at using social media platforms. By adopting multiple platforms, firms can increase their online presence, reach a wider audience, and build stronger relationships with customers. This can help to create a positive image of the firm, increase brand awareness, and ultimately boost financial performance.

This study also aims to examine the inflection point at which the effect of social media adoption on stock market performance changes from negative to positive. Identifying this inflection point is an empirical question with important implications for marketing strategy and financial performance. By exploring the intensity of social media adoption, this study seeks to provide insights into the optimal number of platforms for firms to adopt to maximize stock market performance.

By examining the relationship between the treatment intensity of social media adoption (i.e., the number of platforms adopted) and stock market performance, this study aims to resolve the tensions in the literature and contribute to a more nuanced understanding of the complex interplay between social media adoption and financial outcomes. The insights derived from this research, grounded in the RBV, have important implications for marketing strategy and financial performance, helping firms optimize their social media adoption strategies to maximize stock market performance.

H1: The initial adoption of social media platforms will hurt a firm's stock market performance.

H2: As the firm adopts more social media platforms, the relationship between social media adoption and stock market performance will shift from negative to positive.

This study also explores the mechanisms that influence the effect of social media platform adoption on firm performance, specifically examining how this effect can transition from negative to positive. The proposed mechanisms for this shift are the learning effect and the reduction of risk.

Idiosyncratic Risks

The switching effect observed in the relationship between social media adoption and firm performance, characterized by negative outcomes in initial adoption stages followed by positive outcomes in subsequent adoptions, can be explained through the lens of the RBV theory by examining a firm's idiosyncratic risk reduction (Barney 1991). Idiosyncratic risk refers to the unique risks associated with a specific firm or industry that can be mitigated through diversification (Goyal et al. 2003).

One possible explanation for the switching effect is that firms adopting multiple social media platforms, leveraging their unique resources and capabilities as per RBV, are better able to diversify their marketing strategies, leading to a reduction in idiosyncratic risk. This diversification enables firms to manage the inherent risks associated with digital marketing channels more effectively (Aral, Dellarocas, and Godes 2013). As firms adopt additional platforms, they can capitalize on the benefits offered by social media, such as improved customer engagement, increased brand awareness, and enhanced communication with stakeholders (Kumar et al. 2016).

The reduction in idiosyncratic risk can be attributed to several factors. First, as firms adopt more social media platforms, they are better equipped to manage the dynamic nature of digital marketing channels. The adoption of multiple platforms allows firms to reach different segments of their target audience and engage with them through various communication channels, enhancing the overall impact of their marketing efforts (Kaplan and Haenlein 2010). This diversified approach to marketing reduces the firm's reliance on a single platform, minimizing the potential risks associated with changes in user preferences, platform algorithms, or competitive dynamics. Consequently, by spreading marketing efforts across multiple social media platforms, firms can reduce their vulnerability to platform-specific risks and mitigate the impact of unforeseen events on their overall marketing performance.

Second, a diversified social media strategy enables firms to learn from the distinct strengths and weaknesses of each platform, providing them with valuable insights into effective marketing tactics (Hollebeek and Macky 2019). As firms gain experience across different platforms, they can develop more refined and targeted marketing campaigns,

further reducing idiosyncratic risk by minimizing the potential for suboptimal marketing decisions.

Third, the reduction in idiosyncratic risk can also be attributed to the improved ability of firms to monitor and manage their online reputation. With a presence on multiple social media platforms, firms can more effectively track customer sentiment and address potential issues before they escalate and negatively impact the company's brand image (Einwiller, Carroll, and Korn 2010). This proactive approach to reputation management can minimize the firm's exposure to reputational risks, further contributing to the reduction of idiosyncratic risk.

Considering these factors, the formal hypothesis can be proposed as follows:

H3: The adoption of additional social media platforms by firms is negatively related to their idiosyncratic risk, such that an increase in the number of platforms adopted by a firm will lead to a reduction in its idiosyncratic risk.

Learning Curve (Technology Type)

The switching effect observed in the relationship between social media adoption and firm performance, characterized by initial negative outcomes followed by positive outcomes for subsequent adoptions, can be elucidated by examining a firm's technology type through the lens of organizational learning theory (Argote 2013). In this context, technology type is classified into low-technology firms, high-technology firms, and stable-technology firms. The assumption underlying this classification is that high-tech firms experience less learning struggle compared to low-tech firms and stable technology firms.

The rationale for using technology type as a proxy for the learning effect in explaining the switching effect in social media adoption lies in the differences in learning capabilities and adaptability among firms with various technology types. Firms with advanced, high-tech capabilities are likely to have a more agile and innovative organizational culture, fostering rapid learning and adaptation to new technologies (Pavlou and El Sawy 2006). This culture can enable high-tech firms to swiftly identify and capitalize on the opportunities offered by social media platforms, mitigating the initial negative impact on firm performance.

Low-technology firms may struggle to adopt social media platforms due to their limited technological infrastructure and expertise (Jussila, Kärkkäinen, and Aramo-Immonen 2014). This lack of expertise can make it challenging for low-tech firms to understand the intricacies of social media platforms and leverage them effectively. Organizational learning theory suggests that low-tech firms may struggle more with social media adoption because they have less technological capability and a less innovative culture (Argote 2013). For example, low-tech firms may have older computer systems or lack social media expertise, making it difficult for them to implement effective social media strategies. As a result, they may experience a steeper learning curve and initial negative outcomes in firm performance.

Stable-technology firms may face challenges when adopting social media platforms due to their typically conservative approach to adopting new technologies, which can lead to organizational inertia and hinder their ability to adopt innovative social media strategies (Bharati, Zhang, and Chaudhury 2014; Tripsas and Gavetti 2000). Organizational learning theory suggests that these firms may struggle with social media

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adoption because they have a less flexible culture, prioritize other investments over social media (Argote 2013), and exhibit a slower rate of learning due to organizational inertia. For example, stable-technology firms may be hesitant to invest in social media due to concerns about data privacy or the potential negative effects of social media on brand reputation. As a result, they may experience a prolonged period of negative outcomes before they can fully leverage the benefits of social media adoption. Furthermore, these firms may also face challenges in allocating the necessary resources to social media adoption, as their traditional business models and strategies may prioritize other investments (Markides 2006).

High-technology firms, on the other hand, may be better equipped to adopt social media platforms due to their advanced technological capabilities and culture of innovation. These firms are more likely to have a more agile and innovative organizational culture, fostering rapid learning and adaptation to new technologies (Pavlou and El Sawy 2006). Organizational learning theory suggests that high-tech firms may excel at social media adoption because they have a more flexible culture and may possess the necessary technological infrastructure and knowledge to quickly implement social media strategies (Argote 2013). For example, high-tech firms may use social media to improve customer engagement and obtain valuable customer insights that can inform future product development.

Given these differences in learning and adaptation capabilities among firms with low, high, and stable technology types, as supported by organizational learning theory (Argote 2013), it is reasonable to propose the following hypothesis:

H4: The switching effect of social media adoption on firm performance, where negative outcomes are observed for the first few platforms and positive outcomes for subsequent adoptions, will be less pronounced for high-technology firms compared to low-technology firms and stable-technology firms.

Short-term Financial Performance

While firms may primarily focus on the long-term causal impact of social media adoption on their overall performance, it is equally crucial to investigate the immediate short-term effects on firm performance. Analyzing these short-term effects provides valuable insights for a few reasons, as it enables the integration of theories such as information asymmetry and market efficiency (Fama 1970), as well as behavioral finance and investor sentiment (Baker and Wurgler 2007). By examining both the short- and long-term effects of social media on various aspects of firm performance, encompassing financial and non-financial outcomes, researchers can elucidate how firms can optimize their social media strategies to achieve their intended objectives.

First, examining market reactions to social media adoption announcements allows firms and investors to identify the factors driving these responses. Market sentiment towards social media adoption may reflect expectations about a firm's capacity to enhance customer engagement, increase brand awareness, and harness social media for marketing purposes (Labrecque et al. 2013). By investigating short-term effects, researchers can better understand the role of investor expectations, driven by information asymmetry, in shaping market reactions to social media adoption events.

Second, analyzing short-term stock market reactions to social media adoption can provide crucial information on potential overreactions or underreactions by investors.

Investor behavior, as explained by behavioral finance theory, may sometimes deviate from rationality, leading to overreaction to news or events (De Bondt and Thaler 1985). In the context of social media adoption, investors might initially overestimate the benefits of a firm's social media presence, resulting in inflated stock prices. However, as more information becomes available and investors adjust their expectations, stock prices may correct, leading to short-term abnormal returns. Investigating these short-term effects can assist researchers in identifying instances of overreaction or underreaction, thus enabling the development of strategies to exploit such market inefficiencies.

Third, exploring short-term abnormal returns in response to social media adoption can offer insights into the role of information asymmetry and its effects on investor behavior. Firms that adopt social media platforms may possess private information about their marketing strategies, competitive advantages, or other factors influencing their decision to engage in social media. Investors, conversely, may have incomplete or asymmetric information about a firm's social media strategy, leading to mispricing in the market.

It is posited that a fundamental difference exists between the short- and long-term effects of social media adoption, mediated by investor expectations. In the short run, investors may overestimate the impact of social media adoption on abnormal stock returns due to overconfidence, as explained by investor sentiment theory (Baker and Wurgler 2007). Consequently, each platform's adoption could result in short-term abnormal stock returns. However, in the long run, investors may adjust their expectations and change their perspective as they observe firms managing their social media interactions. In the long run, factors such as the number of platforms adopted and

learning effects become significant. Firms with more experience and a broader range of platforms adopted can ultimately transform social media adoption into positive outcomes. However, for the initial adoptions, following the brief short-term abnormal stock returns, investors may readjust their expectations and assign negative abnormal stock returns to a firm.

H5: Social media adoption has a positive impact on short-term abnormal stock returns.

Investigating this hypothesis can also help explain the social media paradox, a phenomenon where some firms experience underperformance despite adopting social media platforms (Kaplan and Haenlein 2010). The social media paradox refers to the observation that, although social media adoption offers potential benefits to firms, such as increased customer engagement and brand awareness, some firms may not experience improved performance or may even face underperformance. This paradox may arise due to factors such as the misalignment of social media strategies with a firm's overall marketing objectives, ineffective execution of social media campaigns, or investors' overreaction to social media adoption announcements, which can lead to subsequent stock price decreases. Therefore, investigating the underlying causes of the social media paradox is crucial for identifying the factors that can influence the effectiveness of social media adoption in driving firm performance. By examining both the short- and long-term effects of social media on various aspects of firm performance, including financial and non-financial outcomes, researchers can shed light on how firms can optimize their social media strategies to achieve their desired goals. Additionally, these insights can inform investors' decisions regarding their allocation of resources to firms that adopt social

media platforms, potentially reducing the risk of underperformance and enhancing returns on investment.

Firm Innovativeness

Financial performance outcomes, such as abnormal stock returns, sales growth, and Tobin's q, are subject to a switching effect, with initial negative consequences followed by positive effects as more social media platforms are adopted. This is likely due to the initial costs and learning curves associated with adopting new social media platforms, which can create short-term challenges for firms (Chen, Liu, and Zhang 2012). However, non-financial outcomes, such as firm innovativeness, are less subject to this switching effect, as the impact of social media adoption on innovativeness remains more consistent across different levels of platform adoption.

Firm innovativeness refers to a firm's ability to generate and implement novel ideas, products, and processes (Garcia and Calantone 2002). In the context of social media adoption, the positive impact on innovativeness can be attributed to the collaboration, communication, and knowledge exchange facilitated by social media platforms. These platforms provide firms with access to diverse knowledge sources, promote knowledge exchange, and enable the development of innovative products or services eligible for patents (Hargadon and Sutton 1997; Wasko and Faraj 2005). Additionally, social media platforms enable firms to engage directly with customers, monitor feedback and comments, and gain valuable insights into customer needs and preferences, thereby informing the development of innovative products or services (Dellarocas 2003; Gruen, Osmonbekov, and Czaplewski 2006).

Dynamic capabilities theory offers an explanation for the positive impact of social media adoption on firm innovativeness. This theory posits that firms must continually adapt their resources and processes to respond to rapidly changing environments (Teece, Pisano, and Shuen 1997). Social media platforms can facilitate communication and collaboration, increase exposure to new ideas and trends, and provide access to diverse knowledge sources (Mangold and Faulds 2009b). Additionally, social media platforms facilitate the crowdsourcing of ideas and feedback from a vast audience, helping firms identify novel areas of innovation (Boudreau and Lakhani 2013). The effective utilization of these platforms for knowledge acquisition and dissemination is crucial for leveraging their potential to increase firm innovativeness (Kaplan and Haenlein 2010).

The positive impact of social media adoption on firm innovativeness is not contingent on the number of platforms adopted but rather on the effective utilization of the platforms for knowledge acquisition and dissemination (Kaplan and Haenlein 2010). As a result, social media adoption can increase firm innovativeness in the context of the rapidly evolving social media landscape. By fostering adaptive and flexible behaviors, promoting collaboration and communication, and providing access to diverse knowledge sources, social media adoption can help firms stay ahead of the curve and drive innovation.

H6: A firm's social media adoption increases its innovativeness.

METHODS

Research Design

This paper begins by outlining assumptions regarding the strategic entry decisions of firms prior to designing research methodology. Specifically, it assumes that within a

narrow timeframe of two weeks, the timing of a firm's decision to enter a social media platform is essentially random, regardless of the day of the week. This assumption is made to ensure the validity of the event studies model. To enhance the robustness of this study, a Heckman selection model is included, which models the process of firms selecting a platform to adopt.

However, it is important to note that a firm's decision to enter a social media platform is no longer random over a longer timeframe. For instance, within a three-year window for TikTok as a platform, a firm can strategically enter the platform in its early stages or wait for it to mature before entering. This assumption suggests that firms are likely to make endogenous decisions in the long run.

Instrumental Variable Fixed Effects for Treatment Intensity

To study the causal effect of social media adoption on firm performance, it is essential to account for endogeneity and selection bias. This study uses an instrumental variable approach to address the selection bias of firms into social media platforms. However, modeling the adoption sequence of each firm to all social media platforms (e.g., Facebook, Twitter, YouTube, Instagram) is impractical, as it would result in 24 sequences. To address this issue while still achieving the main purpose of the study, social media is modeled as treatment intensity, where the adoption of each additional platform increases the intensity of the treatment.

Additionally, this study assumes monotonicity, which means that once a firm adopts a social media platform, it will not unadopt it. This is a valid research design, as it enables researchers to study the causal impact of additional social media platform adoption while acknowledging the heterogeneity between platforms. A similar approach

was taken in the original paper by Angrist and Imbens (1995), where the impact of an additional grade on income was studied while acknowledging the difference between middle school and high school (i.e., when students move from 8th to 9th grade). Similarly, acknowledging that social media platforms differ (e.g., Facebook may differ from Twitter), this study aims to model the causal impact of an additional platform on firm performance.

Using the two-stage least squares (2SLS) estimation, a causal model with variable treatment intensity can be applied without requiring linearity of the relationships between response variables, treatment intensities, and instruments (Angrist and Imbens 1995). The model of interest is

$$Y_{ijt} = \gamma_0 + X_{ijt}\gamma_1 + \rho S_{ijt} + \epsilon_{ijt}$$

where Y represents the outcomes of interest (i.e., idiosyncratic risks and abnormal stock returns), X is a matrix of firm time-varying characteristics, S represents the treatment intensity (i.e., the number of social media platforms that a firm adopts, $S \in \{0, 1, ... ,4\}$), i denotes the firm identifier (i.e., gvkey), t denotes the time period (month), and j denotes the number of platforms that a firm currently has in month t.

To give ρ a causal interpretation, it should have a probability limit equal to a weighted average of the expected difference for the same firm i when it adopts an additional platform and when it did not adopt an additional platform (i.e., $E(Y_{ijt} - Y_{i(j-1)t}$). Unless S (treatment level) is randomly assigned, ρ will not be consistently estimated. However, in the context of social media, it is unlikely that S is randomly assigned because firms can strategically adopt social media for multiple reasons, such as

expanding their customer reach, building brand awareness, increasing engagement, improving customer service, and fostering customer loyalty.

Hence, an instrument Z (or a matrix of instruments Z) is needed that is independent of all potential outcomes (Y) and potential treatment intensities (S). Specifically, the independence assumption is needed where the random variables S and Y are jointly independent of Z (Angrist & Imbens, 1995, p. 434). In the social media context, a suitable instrument can be the number of second-degree peers that have adopted social media platforms. More specifically, this study uses the 2-digit SIC to define the second-degree peers, while excluding all firms that are directly within the 4-digit SIC group (i.e., first-degree peers). The number of second-degree peer adoptions should not have any effect on a firm's performance (i.e., abnormal stock returns) except through its effect on the firm's social media adoption (i.e., peer firms' social media adoption influences others in the industry to follow suit). Consequently, a firm's number of second-degree adoptions will not impact its performance unless the firm chooses to adopt social media. This **exogeneity assumption** provides a crucial foundation for theoretical and empirical research in marketing, as it isolates the effects of social media platform adoption on firm performance from other confounding factors.

Moreover, the adoption rate within the 2nd-degree peer group is a crucial factor that influences a firm's decision to adopt social media (**relevance assumption**). When a 2nd-degree peer group exhibits a high adoption rate, it suggests that similar firms, albeit not in the same 4-digit SIC industry, are experiencing benefits from adopting social media platforms. This can encourage a firm to adopt social media to connect with its target audience and achieve its marketing objectives, such as increased brand awareness

and customer engagement. Furthermore, the adoption rate within the 2nd-degree peer group also serves as an indicator of the stability and reliability of social media platforms. A high adoption rate implies that the platforms are less likely to experience sudden drops in user engagement or revenue, which could negatively impact a firm's marketing campaigns. Therefore, we assume that the adoption rate within the 2nd-degree peer group is a relevant factor in a firm's adoption decision. The exogeneity and relevance assumptions allow us to identify the average treatment effect of social media adoption on firm performance.

However, without imposing additional restrictions, ρ will be the weighted difference between different values of Z, and technically this difference can be induced by three groups: switchers-in (those who adopt an additional social media platform), switchers-out (those who abandon a social media platform), and unchanged (those who do not change their number of social media platforms). It is reasonable to assume that if a firm's treatment status is unchanged (i.e., the firm does not adopt any platform), its outcome should stay constant. Hence, ρ can identify the average of switchers-in and switchers-out.

To identify the causal effect of adopters, an additional nonparametric constraint is required without imposing restrictions on treatment effect heterogeneity. This constraint, known as the **monotonicity assumption**, allows the identification of the average causal effect of treatment for individuals whose treatment status is influenced by the instrument, i.e., the local average treatment effect. Specifically, the monotonicity assumption assumes that the instrument (e.g., 2nd degree adoptions, or popularity of a platform) does not increase the likelihood of a firm abandoning that platform. Although this assumption

cannot be verified, it is reasonable in the context of social media adoption. The average causal response (ACR) can be defined as ρ, which is a weighted average of causal responses to a unit change in treatment among those whose treatment status is impacted by the instrument. In other words, ρ represents the average causal response to adopting an additional platform for those whose adoption status is affected by the popularity of the platform.

To operationalize this 2SLS model, the following regressions are used to estimate the model:

Stage 1: $S_{ijt} = \gamma_0 + X_{ijt}\,\gamma_1 + \sigma_j Z_{jt} + \upsilon_{ijt}$

Stage 2: $Y_{ijt} = \beta_0 + X_{ijt} + \delta_j\,\hat{S}_{ijt} + \epsilon_{ijt}$

where Y represents the outcomes of interest (e.g.., idiosyncratic risks and abnormal stock returns), X is a matrix of firm time-varying characteristics, S represents the treatment intensity (i.e., the number of social media platforms that a firm adopts, $S \in \{0, 1, ..., 4\}$), i denotes the firm identifier (gvkey), t denotes the time period (month), and j denotes the number of platforms that a firm currently has in month t, Z is the number of second-degree peers (within the 2-digit SIC) excluding first-degree peers (those within the 4-digit SIC).

Event Studies

Event definition. This study defines an event as when a firm joins a social media platform (i.e., the act of creating a business account on a social media platform to represent the company in the social network). This study considers both the short and long-horizon perspectives. The short-horizon studies examine how fast information gets

incorporated into prices, whereas the long-horizon studies assess whether there is inefficiency (i.e., mispricing) in the stock market.

Heckman Selection Procedures

A two-stage Heckman (1979) procedure was used to account for potential selection bias where firms that adopt social media are systematically different from those that do not. In the first stage, a probit selection model was utilized to assess the likelihood that a company would adopt social media. The resulting parameters were used to generate the Mills lambda, which was then included as an additional regressor in the second-stage hypothesis testing regression to account for the possibility of selection bias. In this selection equation, this study incorporated variables likely to influence the firm's adoption decision, such as the firm's marketing and technological strategies, which are likely to influence the adoption decision's relative benefit. Year dummies allowed for any temporal variation in the market environment that could affect the decision to adopt social media. Formally, this paper used the following equation:

$$Adoption^*_{ijt} = \beta_0 + \beta_1 Financial\ Leverage + \beta_2 Firm\ Size + \beta_3 2nd\ peer\ effect$$
$$+ \eta + \epsilon_{it}$$

$$Adoption_{ijt} = 1\ if\ Adoption^*_{it} > 0; 0\ otherwise$$

where $Adoption^*_{it}$ is the latent variable representing the selection process for firm i in time t; $Adoption_{it}$ is the observed binary variable, equal to 1 if firm i adopts platform j and 0 otherwise; η is the year fixed effects. Using these coefficients, we calculated the predicted probability of adopting a social media platform for each firm ($P(Adoption_{ijt} = 1)$) and derive the inverse Mills ratio (IMR) for each observation. The second stage of the Heckman method consisted of a least-squares regression on the

cumulative abnormal returns, using the Mills lambda and the hypothesized and control independent variables shown in table 4.

With the Mills ratio (λ), we can also estimate the private information unknown to investors. Testing the significance of lambda can tell us whether private information can explain outcomes (e.g., the magnitude of the CARs to the announcement) (Fang, Lee, and Yang 2015; Wiles, Morgan, and Rego 2012).

Short-horizon Event Studies

Under the assumption of efficient market theory, the event studies method is used to study the effect of adopting a social media platform on stock performance. Under this framework, additional assumptions are made: (1) shareholders are the most important group among stakeholders, the event (i.e., adopting a platform) sharply affects share price, (3) expected return is calculated appropriately, and (4) no information leakage before the adoption event[1].

The estimation window of 90 trading days that ends 9 days before the event date and the event window of three weeks after is used (Wiles, Morgan, and Rego 2012, p. 47). Following guidance from marketing (Wiles et al. 2010) and finance (Kothari and Warner 2007) for assessing information uncertainties regarding the event window, this paper expands the event window to at least the following day (i.e., [0,1]). Moreover, the paper also assessed the extended event by three weeks afterward since the market may need time to price certain assets and strategic decisions by firm management (e.g., overreacted or underreacted) (Daniel et al. 1998).

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[1] Information leakge is assessed in the robustness check.

The abnormal returns are calculated following this equation:

$$AR_{it} = R_{it} - E(R_{it}|X_t)$$

where AR_{it} denotes the abnormal return for social media entry i at a firm at time t, R_{it} denotes the realized (actual return) and $E(R_{it}|X_t)$ denotes the normal expected return given firm characteristics for a firm with the social media entry i at time t. The expected returns are calculated following (Fama and French 1993) three factors (i.e., excess return on the market portfolio, small-minus-big capitalization factor, high-minus-low book-to-market equity factor) modified with the momentum factor (Carhart 1997):

$$E(R_{it}|X_{it}) = R_{ft} + \alpha_i + \beta_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + u_i UMD_t$$

where R_{mt} is the rate of return of the equally-weighted market portfolio (e.g., S&P 500), R_{ft} is the risk-free rate (e.g., three-month U.S. Treasury bill), SMB_t are the average returns of portfolios of small-capitalization stocks over large-capitalization stocks, HML_t are the average returns of portfolios of high book-to-market equity stocks over log book-to-market stocks, UMD_t are the average returns of portfolios of high-prior-returns stocks over low-prior-returns stocks. To get coefficients as intercept estimates, the paper use the ordinary least squares method to estimate the above equation with the residual term ϵ_{it}, where it is assumed to be homoskedastic and has zero expected value. Cross-sectional dependence in the returns may bias the standard deviation estimates downward, inflating the corresponding test statistics when events occur on the same dates (MacKinlay 1997). Hence, the (Jaffe 1974) and (Mandelker 1974) portfolio methods are used to adjust for this bias[2].

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[2] For details of the procedure, see (Wiles et al. 2010) Web Appendix

The cumulative average abnormal returns for event i at firm j in the event window are

$$CAR_i = \sum_{t=t_1}^{t_2} AR_{it}$$

where t_1, t_2 are the beginning and end of the event window. The association between our hypotheses and short-horizon abnormal returns is evaluated based on the following model:

$$CAR_{ij} = \gamma_0 + \gamma X_{ij} + \mu_j + \lambda IMR_{ij} + \upsilon_{ij}$$

where γ_0 is the intercept, X_{ij} is a matrix of the characteristics that lead to heterogeneity in the event effect (see Table 2 for the list of variables), IMR_{ij} is the Inverse Mill ratio calculated from the Heckman selection step, μ_j is the platform fixed effect, $\upsilon_{ij} \sim N(0, \sigma^2)$ is the random error term of the i-th event (e.g., Indeed vs. TikTok entry dates) of the j-th firm.

Long-horizon Event Studies

The long-term impact of social media adoption on abnormal returns was assessed using the buy-and-hold returns and the calendar-time portfolio methods (Sorescu, Chandy, and Prabhu 2007).

Matched Sample, Buy-and-hold Returns (BHARs)

This method uses a matched portfolio of firms that did not experience the event as counterfactual. The matched portfolio can be constructed based on industry, size, and book-to-market ratio (Savor and Lu 2009; Wiles et al. 2010). With the assumption that we have a well-matched sample, these counterfactual firms' returns as the expected return of those firms that did not adopt social media. Hence, the long-term impact of the

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adoption event on stock performance can be determined by keeping this matched sample

for a certain amount of time after the event (e.g., a year).

Following Wiles et al. (2010), the procedure is as follows. First, for each firm

with social media entry, all firms in the same two-digit Standard Industrial Classification

(SIC) code with market values of 50% to 150% of the focal firm are selected. From this

list, the ten companies with the most comparable book-to-market ratios are chosen to

serve as the matched portfolios (the matched portfolio can have less than ten firms). To

calculate the buy-and-hold abnormal returns for firm i, the following equation is used:

$$BHAR_{i(t,T)} = \Pi_{t=1 \to T}(1 + R_{it}) - \Pi_{t=1 \to T}(1 + R_{mt})$$

where R_{mt} is the return of the matched portfolio, averaging all individual firm

BHARs.

Long-term Cumulative Abnormal Returns (LCARs)

The evaluation of firms' long-term performance is conducted through the use of

Long-Term Cumulative Abnormal Returns (LCARs). This method has gained

considerable recognition in the finance literature and has been successfully employed in a

variety of marketing research studies (Barber and Lyon 1997; Sorescu, Chandy, and

Prabhu 2007). The calculation of LCARs is carried out during the time frame subsequent

to social media adoption. More specifically, the post-event horizon $(1, T)$ encompasses

the monthly returns, commencing with the month immediately following the adoption of

social media, and T = 12 for one-year returns and 24 for two-year returns. The formula to

determine LCARs is as follows:

$$LCAR_{pT} = \sum_{t=1}^{t=T} R_{it} - R_{pt}$$

Where R_{it} represents the rate of return for a given firm i in month t, while R_{pt} corresponds to the rate of return on the control portfolio, which is constructed following the approach detailed in the Buy-and-Hold Abnormal Returns (BHARs) section.

Data and Sampling Frame

To obtain data for public companies, the Compustat dataset via Wharton Research Data Services was utilized. This dataset provided various company-related information, including company names, URLs, descriptions, gvkey (i.e., unique firm identifiers on WRDS), and cusip (i.e., stock identifiers in the US and Canada). The Google search engine API was employed to conduct keyword searches for a company's social media handle. For example, to find Adobe's Facebook page, the researchers executed a search for "Adobe Facebook" and collected the top five links that matched "facebook.com." To ensure that the social media handles were accurate, they were verified against the company name and description text provided by Google. A similarity score of 0.9, based on the Jaccard index, was used to filter positive matches. Two research assistants manually reviewed matches between 0.5 and 0.9 to identify false negatives. This process was repeated for all relevant social media platforms, including Facebook, Twitter, TikTok, Instagram, and YouTube, to ensure that the sample represented all US public firms.

To validate this approach, firms with available websites were used to double-check the social media handles. Firstly, the researchers verified the existence of the firms' websites and compared their content with the organization's legal name and S&P Business Description to confirm consistency. Secondly, social media information was extracted by matching available links to the corresponding platforms, such as

facebook.com, instagram.com, twitter.com, youtube.com, indeed.com, and tiktok.com. Finally, a comparison was made between the social media handles obtained from the company's main website and those obtained through the Google API approach, which yielded consistent results.

The present study focuses on the period post-2004, commencing with the year when organizations first gained access to social media platforms, notably Facebook. Excluding the pre-2004 era eliminates instances where all companies would have a zero adoption probability, a distinct situation from cases where social media adoption was possible but deliberately avoided. Consequently, the control group represents instances when businesses had the opportunity to adopt social media but chose not to, safeguarding research findings from being influenced by periods when social media adoption was infeasible.

Moreover, the sample has been confined to include only firms that do not qualify as penny stocks (i.e., those with a share price exceeding $1). The rationale behind this decision is that penny stocks often exhibit higher volatility and lower liquidity than their more established counterparts. These firms can distort the analysis when attempting to estimate the causal impact of social media adoption on firm performance, as such stocks are more susceptible to market manipulation and speculative trading behavior, which may obscure the true effects of social media engagement on a firm's financial performance.

Furthermore, the study has chosen to exclude financial and utility firms from the analysis, as suggested by the finance literature (Serfling 2016). This decision is based on the understanding that these industries are subject to greater regulatory oversight and possess distinct operational objectives compared to typical for-profit businesses.

Financial and utility firms often function as key components of a nation's economic infrastructure, necessitating a unique set of regulatory requirements to ensure stability and consumer protection. As such, their performance may be influenced by a different set of factors, including regulatory changes and macroeconomic indicators, that are less relevant to businesses in other industries. By excluding financial and utility firms from the sample, the study aims to produce a more homogeneous sample that better reflects the relationship between social media adoption and firm performance in industries where the impact of social media engagement is more likely to be discernible.

To mitigate the potential effects of cluster adoption (e.g., an organization adopting multiple social media platforms within a week), a comprehensive examination of the number of companies that adopted multiple clusters within a one-week period was conducted. The results revealed that only 1% of organizations displayed this behavior, prompting their exclusion from the dataset to preserve clarity and reliability for further analysis. The investigation also considered various levels of clustering, such as 7, 14, 30, and 60 days, and determined that the conclusions were consistent despite these variations. Furthermore, instances of businesses creating a social media handle without posting (representing less than 5% of total observations) were excluded. The emphasis was placed on active social media adoption, resulting in a thorough exploration of the subject matter.

For event studies, since other key events can contaminate the effect of adopting social media, this research uses S&P Captial IQ Key Development and Factiva database to exclude more than 2000 key developments, including earning announcements, M&A, spin-offers, stock splits, management changes, joint ventures, stock buyback, unexpected

dividend, IPO, debt defaults, dividend cancellations, regulatory agency inquiry within two-trading day window of the social media adoption date (Wiles et al. 2010). The final sample consists of 9361 unique firms with 4528 adoption events.

Measures

Table 2 shows the construct and variable operationalization.

Social Media Adoption

To avoid placing any undue resource burden on Facebook, Instagram, and YouTube from webscraping, and given the lack of programmatic access to these platforms through APIs, an alternative approach was necessary to collect data on firm adoption of social media platforms. Hence, the first date when Google crawled the Facebook, Instagram, and YouTube links was employed as a proxy for when a firm adopts the social media platform. Twitter API was used to obtain the precise account creation date for Twitter accounts. To validate the validity of this approach, a subset of firms' Facebook pages was examined by visiting facebook.com, navigating to the "Page Transparency" section, and checking the "History" for the exact creation date. This process verified the accuracy of the date proxy. Similarly, the "About" section of a subset of firms' channels was inspected for YouTube to obtain the first join date. For Instagram, the dates of the first posts were checked for a small subset of firms' accounts. By cross-referencing the data obtained through these methods, the proxy yielded highly accurate results.

Second Degree Peer Effects

To quantify the second-degree peer effect of social media platform adoption for a given firm, we calculate the total number of firms that adopt the same platform within the

same two-digit SIC code, excluding those that belong to the same four-digit SIC code as the focal firm

Platform Popularity

To determine the popularity of various social media platforms, this study used data from Business of Apps (https://www.businessofapps.com/), Comscore (https://www.comscore.com/), and Statista (https://www.statista.com/). The platforms analyzed included YouTube, Facebook, Instagram, TikTok and Twitter, with monthly active user data used as a measure of platform popularity.

Firm Performance

Following Tirunillai and Tellis (2012), I operationalize stock market performance using abnormal returns and idiosyncratic risk. The concept of abnormal returns refers to the deviation of a firm's equity value from what is predicted by the extended Fama-French model, which is widely used in the finance literature to estimate expected returns (Carhart 1997; Fama and French 1993). Idiosyncratic risk, on the other hand, pertains to the vulnerability of a firm's equity value and accounts for a significant portion of a firm's total risk, specifically 80% (Luo, Zhang, and Duan 2013). The idiosyncratic risk can be measured as the standard deviation of the residuals in the extended Fama-French model (Goyal et al. 2003, p. 980). The following equation demonstrates this:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + u_i UMD_t + \epsilon_{it}$$

Where R_{it} represents the returns for firm i in month t, R_{mt} represents the average market return, R_{ft} represents the risk-free rate (Treasure bill), SMB_t represents size effects, HML_t represents value effects, UMD_t represents Carhart's momentum effects, α_i represents the intercept, and ϵ_{it} represents the model residual.

Stock price data were obtained from the Center for Research in Security Prices (CRSP) database. Data for Fama-French factors and momentum effects are available at https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. A rolling window of 90 trading months prior to the target day was used to run the aforementioned model to obtain firms' factors and intercept. Abnormal returns were then calculated as the difference between the observed returns and the expected returns. The idiosyncratic risk was determined as the standard deviation of the daily model residuals. The mean value of monthly firm returns ranges from -20% to 60%, with a mean of 0.39%, and the mean value of monthly stock risk ranges from 0 to 0.2, with a mean of 0.026.

RESULTS

Instrumental Variable Fixed Effects

Table 3 presents the results of hypothesis testing using an instrumental variable fixed effects model. This research investigates the validity of the relevance assumption for the instruments, namely platform popularity, first-degree peer effect, and second-degree peer effect. The outcomes reveal that the F-statistics for each endogenous adoption step when treated as dependent variables, exceed the threshold of 10 (Staiger and Stock 1994). Furthermore, the associated p-values are below the .05 significance level. These results lend empirical support to the relevance assumption of the selected instruments in the context of this study.

IV Correction

Based on Table W. 1, the number of platforms adopted was found to have a significant impact on firm performance. However, we also find evidence of omitted variable bias in our initial model without instrumental variables, as it fails to account for

potentially important factors that affect both the number of platforms adopted and firm performance.

One potential source of omitted variable bias is the social media engagement strategy of the firm. Firms that adopt only one or two platforms may have a more targeted approach to social media marketing that allows them to achieve higher performance outcomes with fewer platforms. For example, a niche beauty retailer may use only Instagram and YouTube to showcase its unique products and reach a core audience of beauty enthusiasts. Conversely, a mass-market retailer such as Walmart may have a wider audience and use multiple platforms such as Facebook, Twitter, and YouTube to promote its brand to a larger customer base. By introducing instrumental variables to control for endogeneity, we find that the true effect of the number of platforms adopted is negative for firms that adopt only one or two platforms.

Another potential source of omitted variable bias is social media content quality. The effectiveness of social media marketing depends on the quality of content that firms post on their social media platforms. Firms that adopt multiple platforms but post low-quality or irrelevant content may have lower performance outcomes than firms that adopt fewer platforms but post higher-quality content. For example, a luxury fashion retailer may use only Instagram to showcase its high-end products and attract a discerning audience of fashion enthusiasts. Conversely, a fast fashion retailer such as H&M may use multiple platforms such as Facebook, Instagram, and Twitter to reach a wider audience and promote its latest collections. By introducing instrumental variables to control for endogeneity, we find that the true effect of the number of platforms adopted is negative for firms that adopt only one or two platforms.

A third potential source of omitted variable bias is brand image and reputation. Firms that have a strong brand image and reputation may be able to effectively leverage multiple social media platforms to enhance their performance outcomes, while firms with a weaker brand image or reputation may not see the same benefits. For example, a luxury car manufacturer such as Mercedes-Benz may use multiple platforms such as Facebook, Instagram, and Twitter to showcase its high-end vehicles and appeal to its affluent customer base. Conversely, a budget car manufacturer such as Kia may focus only on one platform to build its reputation and attract new customers. By introducing instrumental variables to control for endogeneity, we find that the true effect of the number of platforms adopted is positive for firms that adopt four platforms.

A fourth potential source of omitted variable bias is the social media marketing budget. Firms with larger marketing budgets may be able to effectively manage multiple social media platforms and engage with customers more effectively than firms with smaller marketing budgets. For example, a multinational consumer electronics firm such as Samsung may use multiple platforms such as Facebook, Instagram, Twitter, and YouTube to showcase its products and reach a global audience. Conversely, a local electronics store may only use one platform to target its local customer base due to limited resources. By introducing instrumental variables to control for endogeneity, we find that the true effect of the number of platforms adopted is negative for firms that adopt only one or two platforms.

Number of Platforms Adopted

Based on Table 3, a notable negative effect of social media adoption on firm performance is observed. Specifically, firms that adopt social media platforms experience

a 12-percentage point decrease in performance compared to those that do not adopt any social media platform. This negative trend persists until the adoption of the third platform. Interestingly, a reversal of this trend is observed upon the adoption of the fourth social media platform. In this case, firms that adopt four social media platforms demonstrate a positive impact on performance compared to those that have not adopted any social media (i.e., 14 percentage points).

One possible explanation for this phenomenon is the existence of a **learning curve** associated with the integration of social media platforms into a firm's marketing strategy. Initially, firms may struggle to optimize the use of social media, resulting in a decrease in performance. However, as firms gain experience and streamline their social media management, they become more adept at leveraging the advantages of these platforms, leading to improved performance. This inflection point appears to occur at the adoption of the fourth platform.

Another potential contributing factor could be the **resources** required for effective social media management. The initial investment in time and personnel may detract from a firm's overall performance as resources are allocated to social media adoption. Over time, and as more platforms are adopted, firms might develop more efficient methods of managing these platforms, enabling them to reap the benefits of an expanded online presence without sacrificing performance.

Possible Mechanisms

Learning Effects

In order to explore the learning effect in relation to technology, this study investigates whether technology levels can partially explain the observed learning curve

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(Table 4). Three types of firms are examined: high technology, low technology, and stable technology firms. The findings reveal distinct patterns for each type of firm with respect to the impact of social media platform adoption on performance.

For high-technology firms, the negative effect of the first platform adoption is similar in magnitude to the overall sample. Interestingly, the second platform adoption exhibits an even greater negative impact on performance. However, by the third platform adoption, the effect becomes positive, without requiring the adoption of a fourth platform. This suggests that high-technology firms may experience a steeper learning curve and are able to overcome the initial performance decline more rapidly than other firms.

In contrast, low-technology firms demonstrate a consistently negative effect for the first three platform adoptions, with magnitudes similar to the full sample estimates. Notably, the adoption of the fourth platform yields a null effect on performance, indicating that low-technology firms may not experience the same performance improvements observed in the overall sample or among high-technology firms.

For stable technology firms, the adoption of the first platform has a positive effect on performance, while the second platform adoption shows a null effect. The third platform adoption results in a negative impact, and the adoption of the fourth platform leads to a substantial positive effect, with a 22-percentage point increase in performance. This pattern suggests that stable technology firms may experience a more variable learning curve, with performance fluctuations across different stages of platform adoption.

To further examine the mechanisms underlying the observed learning effects, it is crucial to consider factors that might contribute to the different learning curves

experienced by high, low, and stable technology firms. One possible explanation is the varying degrees of technological expertise and resources available to these firms. High technology firms, for example, may have greater access to skilled personnel, advanced tools, and knowledge that allow them to more effectively integrate social media platforms into their marketing strategies.

On the other hand, low-technology firms might face resource constraints that impede their ability to optimize social media usage, resulting in a slower learning curve and limited performance improvements. Stable technology firms, with a more consistent level of technological resources, may demonstrate a more variable learning curve due to the interplay of factors such as resource allocation, platform-specific challenges, and varying degrees of platform compatibility.

Idiosyncratic Risks

Another potential explanatory mechanism for the observed trends in firm performance could be related to idiosyncratic risk. Idiosyncratic risk refers to the risk inherent in individual assets or firms, which is unique to that specific entity and not correlated to the overall market. The adoption of social media platforms may influence a firm's idiosyncratic risk, subsequently impacting its performance.

Table 4 shows that the idiosyncratic risk factor decreases consistently from the first to the fourth social media platform adoption. Thus, as firms adopt more social media platforms, they become better equipped to manage the unique risks associated with each platform, thus mitigating the negative impact on performance.

The reduction in idiosyncratic risk could be attributed to a few factors. First, as firms gain experience with multiple social media platforms, they develop a more

comprehensive understanding of the nuances and potential pitfalls associated with each platform. This expertise enables them to mitigate risks more effectively, leading to improved performance. Second, the diversification of platforms may help to spread the risk across multiple channels, reducing the potential impact of any single platform on the firm's overall performance.

Event Studies

Short-term

Table 9 presents the average abnormal returns for windows surrounding the social media adoption event. All statistical tests are two-tailed. Previous research on firm announcements has focused on the announcement date window (0,0) (Wiles, Morgan, and Rego 2012), which is justified in efficient capital markets where stock prices quickly adjust to reflect the wealth effects of such activity and longer windows may introduce more noise into the results (Kothari and Warner 2007). The (0, 1) window was primarily focused on in the analyses due to the greater number of abnormal returns observed on the event day and no evidence of leakage (Table W. 2).

Sensitivity analyses indicate that the hypothesis testing results were robust to alternative expected return models and statistical tests. The pattern of results reported in Table 9 remained consistent when using the CAPM or FF6 models.

The findings suggest that social media adoptions were associated with a significant positive stock price movement for the firm, with an average abnormal return of 0.6% during the (0, 0) window (p < .001). On the event date, 2,464 of the 4,528 abnormal returns were positive. Furthermore, the Wilcoxon signed rank (Z) test, a powerful non-parametric test that incorporates the sign and magnitude of the abnormal

returns, was also significant (p < .001), indicating that outliers did not unduly influence the results (Mcwilliams and Siegel 1997). The social media adoption was associated with an average gain of $1.82 million in shareholder value on the event date. A detailed breakdown of the specific value increments for each platform adoption can be found in Table 9.

To test the hypotheses, a regression of the abnormal returns on the independent variables and controls was conducted. The regression equation specified in the event studies section produced the results in Table 10. The regression for the (0, 1) abnormal returns on social media adoption offered significant explanatory power, with an adjusted R-squared value of .2.

This article aims to investigate the role of social media adoption timing on a firm's performance in comparison to its competitors, as well as its popularity or creation time. The study findings suggest that it is not necessarily the first or second mover advantage that drives firm performance from social media, but rather the order of adoption relative to competitors. Specifically, firms that are relatively late to adopt social media platforms tend to experience the most significant advantages.

The study results may be explained by the fact that earlier adopters face greater challenges in establishing a significant network of followers and creating an active user community. On the other hand, firms that adopt later can learn from the experiences of earlier adopters and build upon their successes and failures. Additionally, as the number of adopters increases, the size of the user base also increases, providing later adopters with a larger pool of potential customers to target.

These insights have important implications for firms seeking to leverage social media as a marketing tool. It suggests that timing is critical in social media adoption, and that firms should pay close attention to the actions of their competitors to determine the most appropriate time to adopt a social media platform. In this sense, predictive machine learning models that can anticipate when competitors are likely to adopt a social media platform could provide significant value to firms seeking to optimize their social media strategies and maximize their performance.

In conclusion, the findings of this study suggest that the timing of social media adoption relative to competitors is crucial in driving firm performance from social media. Therefore, it is crucial for firms to carefully consider this factor when formulating social media strategies, as it can significantly impact their success. Further research in this area could explore other factors that may influence the relationship between social media adoption and firm performance.

The findings reveal no indication of endogenous adoption in the short-term, as the lambda coefficient is not statistically significant ($p > .05$). This suggests that, within the analyzed period, the adoption process does not demonstrate endogeneity.

Long-term

As demonstrated in Table 13, the long-term impact of social media adoption on abnormal stock returns varies across platforms and may range from null to negative. This finding contrasts with the observed short-term stock returns, where abnormal returns were consistently identified following social media adoption across all platforms, including Facebook, Instagram, TikTok, Twitter, and YouTube, albeit with differing magnitudes. The rationale for this discrepancy can be attributed to several factors:

Investor expectations: In the short term, investors may react positively to a firm's adoption of a new social media platform, anticipating increased brand visibility and customer engagement. However, these expectations may not necessarily translate into long-term tangible benefits or sustained growth, leading to a null or negative effect on stock returns in the long run.

Market adaptation: As firms initially adopt social media platforms, they may experience a temporary competitive advantage, resulting in positive short-term stock returns. Over time, as competitors adopt similar strategies and the market adapts, this advantage may diminish, explaining the null or negative long-term effects observed.

Learning curve: Firms may require time to effectively leverage social media platforms for maximum impact. Thus, while initial adoption may generate short-term positive stock returns, it may take several adoption events before the full potential is realized, leading to null or negative long-term effects.

In alignment with the instrumental variable (IV) approach, it was discovered that after accounting for firm-specific effects and platform effects, a positive abnormal stock return was observed following the fourth adoption event (Table 14). This finding suggests that firms may need multiple adoption events to fully harness the potential of social media platforms and generate long-term positive stock returns. Prior adoption events, which may still be in the learning curve phase, were found to have a negative impact on abnormal stock returns. This pattern remained consistent within a two-year time window, further corroborating the robustness of these findings.

Robustness Checks

Alternative benchmark models were also used to assess the robustness of the event studies' results. These models include the (Fama and French 1993)hree-factor (FF3) model and the (Fama and French 2015) five-factor (FF5) model. Moreover, assessing the effect of the market index on the study results, I do not find any difference between the value-weighted vs. equal-weighted index.

To confirm the consistency and validity of the results, which indicate an initial negative impact of social media platform adoption, followed by a positive effect on firm performance as measured by abnormal stock returns, alternative dependent variables were employed. These variables included sales growth, Tobin's Q, and Total Q (Peters and Taylor 2017). Tobin's Q is a widely-used financial metric that represents the market value of a firm's assets divided by their replacement cost. A higher Tobin's Q signifies that the market values the firm's assets more than the cost of replacing them, indicating strong firm performance. Total Q, on the other hand, is a variation of Tobin's Q that considers the firm's total market value, including both tangible and intangible assets. When analyzing sales growth, it was observed that there was a decline following the 1st and 3rd adoption instances, with no significant change after the 2nd adoption (Table 7). Intriguingly, during the 4th adoption, the trend reversed, and a considerable positive effect of social media on sales growth was observed. Similar patterns were found when examining Tobin's Q; a negative impact was evident for the first two adoptions, while the trend flipped during the 4th adoption. This pattern was also consistent when using the Total Q measure.These findings, in conjunction with the initial results, support the assertion that social media adoption may initially have a negative impact on a firm's

performance, but as the adoption process matures, positive effects begin to emerge over time.

In the main analysis, utility and financial services firms were excluded due to their inherent differences, as suggested by the finance literature. Nevertheless, two supplementary analyses were conducted, one for each industry (utility and finance), with the results presented in Table 8.

The findings pertaining to financial services firms corroborate those of the primary analysis, indicating that the positive effects of social media adoption on firm performance materialize only after the fourth adoption. This result implies that financial services firms exhibit analogous patterns of social media adoption to other industries. However, it is essential to account for the unique characteristics of financial services when interpreting these outcomes, such as the sector's stringent regulation and the importance of trust and credibility.

Conversely, the analysis focused on utility firms did not uncover any significant influence of social media adoption on firm performance, whether positive or negative. This lack of impact may be ascribed to several factors inherent to the utility sector. Primarily, the monopolistic or oligopolistic nature of the industry could curtail the necessity for aggressive marketing tactics, as consumers frequently have restricted alternatives. Moreover, utility services are generally viewed as essential, rather than discretionary, diminishing the sway of social media on consumer decision-making. Lastly, the intricate regulatory environment and infrastructure demands may result in an increased focus on operational efficiency, overshadowing the potential advantages of social media adoption.

Previously controlled variables such as marketing expenses, R&D expenses, financial leverage, liquidity, and firm size were not included in the analysis because they have been accounted for in the Fama-French model (Fama and French 1993). The Fama-French model proposes that stock returns are determined by three factors: the market risk premium, the size of the firm, and the value of the firm, which capture the effects of these firm-level factors on stock returns. Thus, the outcome variable of abnormal stock returns has accounted for these factors that could potentially affect returns. Including these previously controlled variables in the analysis would introduce potential problems of multicollinearity, as they are highly correlated with the three factors in the Fama-French model. This could compromise the accuracy of the regression analysis results and introduce bias into the estimates. Hence, their inclusion is deemed unnecessary, as they have already been accounted for in the Fama-French model.

Alternative IV

Throughout this paper's analysis, the number of second-degree peer firm adoptions is used as the primary instrumental variable correction. In this robustness check section, evidence is provided that the results are robust to alternative instruments. More specifically, platform popularity and the number of first-degree peer firm adoptions (i.e., those belonging to the same 4-digit SIC) are also considered. The validity of using first-degree peer firms is in line with the second-degree peer firms.

For platform popularity, it is argued that the popularity of a social media platform, such as Facebook, should not have any effect on a firm's performance (i.e., abnormal stock returns) except through its effect on the firm's social media adoption. Consequently, a social media platform's popularity will not impact a firm's performance unless the firm

chooses to adopt it. This exogeneity assumption provides a crucial foundation for theoretical and empirical research in marketing, as it allows for the isolation of the effects of social media platform adoption on firm performance from other confounding factors.

Furthermore, the popularity of a social media platform is an essential factor that influences a firm's decision to adopt that platform (relevance assumption). When a social media platform is popular, it implies that it has a large user base and a wider reach, making it easier for firms to connect with their target audience. Therefore, firms are more likely to adopt a popular social media platform, as it offers them a better chance of achieving their marketing objectives, such as increased brand awareness and customer engagement. The popularity of a social media platform also indicates its stability and reliability, which are critical factors that firms consider when deciding on which platform to adopt. A popular social media platform with a stable user base is less likely to experience sudden drops in user engagement or revenue, which could negatively impact a firm's marketing campaigns. Thus, it is assumed that the popularity of a social media platform is a relevant factor in a firm's adoption decision. The exogeneity and relevance assumptions enable the identification of the average treatment effect of social media adoption on firm performance.

To achieve a balance between exogeneity and relevance assumptions, the second-degree adoption instrument has been selected. Platform popularity serves as an instrument that possesses a strong exogeneity assumption, while still retaining a valid relevance assumption (supported by the F-test). Nonetheless, it lacks the strength in terms of relevance found in the alternative instruments, such as first and second-degree peer firm adoptions.

Contrastingly, first-degree firm adoption demonstrates a notably strong relevance assumption, largely due to the direct influence of the peer group. However, its exogeneity assumption may not be as strong as those of platform popularity and second-degree peer firm adoption. As illustrated in Table W. 1, consistent results across the three instruments imply that the effects of adopting the first three social media platforms could be negative, while the fourth platform adoption reverses this trend, producing a positive outcome. Additionally, other findings exhibit consistency throughout the three instrumental variables (Table 6). The strength of the exogeneity assumption diminishes from platform popularity to second-degree peer firm adoption and, finally, to first-degree peer firm adoption. Inversely, the relevance assumption strengthens in the opposite direction.

First and Second Mover Advantage

Alternative operationalizations of the order of adoption variable are employed to validate the findings. First, the analysis utilizes a dummy variable for the first-mover advantage, assigning a value of 1 if the firm is the first to adopt a social media platform in its industry and 0 otherwise. A similar approach is taken for the second mover, with a value of 1 assigned if the firm is the second to adopt a platform in its 4-digit SIC industry group and 0 otherwise. As indicated by the results in Table 12, neither first nor second movers experience a significant advantage in their industry.

Additionally, this study examines three categories of adopters: early, optimal, and late. Based on Figure 2, early adopters are firms ranked within the first 80 in their 4-digit SIC industry group to adopt a social media platform, while late adopters rank beyond 150. Optimal adopters are firms that rank between 80 and 150. Using early adopters as the baseline in Table 12, the analysis reveals no significant difference between early and

late adopters. However, an advantage emerges for firms adopting platforms neither too early nor too late within their industry. Specifically, a 0.6 percentage point advantage ($p < 0.05$) is observed for those adopting within the mid-range.

Additional Analyses (Ad-hoc)

Business Type

Contrary to the prevailing belief that B2B firms may not benefit from social media adoption due to factors such as a smaller target audience and perceived limited engagement potential, evidence suggests that these firms experience minimal initial negative impact upon adopting their first platform (Table 5). Moreover, they witness a more substantial positive impact when adopting their fourth social media platform. Several underlying reasons could potentially explain this phenomenon. For instance, B2B firms might have a more focused approach toward content curation, leading to higher engagement with their niche audience. Additionally, their ability to leverage professional networks could amplify their reach and influence on social media platforms.

Conversely, B2C firms consistently exhibit positive outcomes from social media adoption across all adoptions, from the first to the last. This observation is noteworthy because B2C firms typically have larger and more diverse audiences, which could lead to higher engagement rates and increased brand visibility. Furthermore, B2C firms often use social media platforms for promotional activities and customer support, enhancing customer satisfaction and loyalty. However, it is intriguing to find that the final social media platform's positive impact is lower for B2C firms compared to their B2B counterparts. This discrepancy could be attributed to factors such as diminishing returns

on investment as the number of platforms increases or the dilution of audience attention across multiple channels.

As for firms engaged in both B2B and B2C operations, the available data is limited due to a smaller sample size and adoption restricted to the third platform. Nevertheless, the findings indicate that each additional social media adoption yields positive results for these firms. This outcome may result from their ability to leverage the best practices from both B2B and B2C marketing strategies, leading to a well-rounded and effective social media presence.

DISCUSSION

This study contributes to the marketing literature by enhancing the understanding of the relationship between social media adoption and firm performance. The findings advance several key theoretical perspectives, offering a more comprehensive and nuanced understanding of the factors that underlie the effectiveness of social media adoption.

Theoretical Implications

The phenomenon observed in this research, which demonstrates a discrepancy between the short-term and long-term performance of social media adoption, offers valuable insights to the marketing literature. Long-term event studies and instrumental variable techniques suggest that firms do not realize the true causal impact of social media on their performance until the fourth platform adoption. In the short run, however, firms consistently benefit from investor overconfidence in social media adoption events.

This dynamic implies that firms with a myopic focus may gain from pursuing short-term objectives, and if they demonstrate persistence in their social media adoption strategies, they can realize long-term gains. In contrast, firms with a mid-term perspective

that adopt only two or three platforms and subsequently abandon their social media initiatives may not experience the benefits until their fourth platform adoption. This phenomenon, where short-sighted endeavors yield long-term advantages, can be described as the "myopic advantage paradox." This concept captures instances where firms concentrating on short-term gains ultimately secure long-term benefits due to their persistence in adopting multiple social media platforms.

Another relevant concept is the social media shortcomings (paradox), which refers to the discrepancy between high expectations for social media benefits and the actual results achieved by firms (Lamberton and Stephen 2016). This research helps to explain why such a discrepancy is observed. Firstly, high expectations can lead investors to become overconfident in a firm's social media adoption and its potential benefits. However, the actual results from the first few adoptions can be negative because firms face various challenges, such as the steep learning curve associated with new platforms, the need for effective content creation, and adapting to the ever-changing digital landscape. Nonetheless, if firms persist and continue to adopt and learn from their experiences, they can start to see significant results in the long run.

The "myopic advantage paradox" is a captivating and significant finding that challenges conventional wisdom in strategic management and marketing literature. Generally, firms that concentrate on short-term gains are criticized for neglecting long-term sustainability and growth. However, this research demonstrates that, in the context of social media adoption, persistence in short-term strategies can eventually lead to long-term advantages.

Second, the findings emphasize the role of time and experience in determining the impact of social media adoption on firm performance. This suggests that the learning curve associated with social media adoption is crucial in shaping a firm's outcomes. This observation aligns with the concept of absorptive capacity, wherein organizations need time and resources to assimilate new knowledge and technologies (Cohen and Levinthal 1990). The study expands upon the existing literature on absorptive capacity by demonstrating its relevance to social media adoption and the firm's ability to derive value from these platforms.

Third, the findings highlight the role of resource allocation and strategy in driving the benefits of social media adoption. This observation underscores the importance of the resource-based view (RBV) in explaining the variation in firm performance resulting from social media adoption (Barney 1991). The RBV posits that firms with valuable, rare, inimitable, and non-substitutable resources are more likely to achieve a competitive advantage. The study contributes to the literature on RBV by illustrating its applicability to social media adoption and the strategic decisions firms make when allocating resources to these platforms.

Lastly, the influence of industry context is an essential consideration, as different industries may experience varying effects due to their unique characteristics and target audiences. For instance, high-tech industries may suffer less during the initial adoption stages and revert to positive impact faster compared to low-tech industries. This can be attributed to their inherent ability to adopt and adapt to new technologies more quickly. Conversely, B2C industries may consistently experience positive impacts of social media adoption on firm performance. However, the fourth adoption might not be as strong as

that by B2B firms due to factors such as market saturation, diminishing returns on investment, and increased competition on social media platforms.

In conclusion, the "myopic advantage paradox" provides valuable insights into the complex relationship between short-term actions and long-term outcomes in the context of social media adoption. This research expands the marketing literature by challenging conventional thinking regarding short-term gains and long-term sustainability. The study underscores the importance of persistence, resource allocation, and strategic decision-making when adopting social media platforms. Furthermore, it highlights the need to consider industry context when evaluating the impact of social media adoption on firm performance.

Empirical/Methodological Implications

The research provides empirical support for the role of industry context in shaping the relationship between social media adoption and firm performance. By examining the differential effects of social media adoption across various industries, the study helps identify sector-specific factors that may influence the effectiveness of social media adoption. This further expands the marketing literature by elucidating the importance of industry context when considering the implications of social media adoption.

In terms of methodological contributions, the study's use of longitudinal data is a significant advancement. This approach allows for a more comprehensive understanding of how social media adoption impacts firm performance over time. By capturing the temporal dynamics of social media adoption, the study not only highlights the importance

of adopting longitudinal research designs but also offers valuable insights into the dynamic nature of social media adoption and its effects on firm performance.

The current research leverages a new statistical methodology to investigate the causal implications of social media adoption on a range of firm performance indicators, including stock performance and innovativeness. More specifically, this investigation is the first to apply the instrumental variable approach in tandem with fixed effects for examining the treatment intensity average causal impact in the context of marketing. This particular method accommodates the heterogeneity present between each incremental step, such as the transition from utilizing one social media platform to two while acknowledging the potential differences between platforms, or the progression from 8th to 9th grade while recognizing the heterogeneity across schools.

The use of this innovative methodology has broad applicability across various marketing scenarios. In the context of celebrity endorsements, the method can be employed to explore the impact of incremental variations in endorsement deals, such as modifying the number of promotional activities or the number of endorsement contracts, for a specific brand or product category. By acknowledging the heterogeneity in the appeal of different celebrities and the varying effectiveness of promotional activities within the same brand or product category, researchers can gain a more nuanced understanding of the efficacy of celebrity endorsement strategies. This technique can also be applied to assess the outcomes of incremental changes in the number of strategic alliances and partnerships on market share while accounting for the heterogeneity in the types of partnerships (e.g., co-branding, distribution agreements, or joint ventures) and

the industries involved. By considering these sources of variation, marketers can better understand the benefits and potential drawbacks of collaboration in the marketing sphere.

The study also contributes to the exploration of factors that moderate the relationship between social media adoption and firm performance. By examining the role of firm size, industry context, and market competition in shaping the outcomes of social media adoption, the research provides valuable insights into the conditions under which social media adoption contributes to firm performance. These methodological choices further enrich the marketing literature by expanding the understanding of the intricacies involved in the relationship between social media adoption and firm performance.

Managerial Implications

The study presents several valuable implications for managers and firms considering adopting social media in their marketing strategies. By understanding the potential challenges and opportunities associated with social media adoption, managers can make informed decisions that ultimately contribute to improved sales growth and overall firm performance.

Patience and Perseverance: One of the main practical implications of the study is the emphasis on the importance of patience and perseverance during the initial stages of social media adoption. The research findings reveal that the benefits of social media adoption may take time to materialize, with initial costs and challenges potentially offset by substantial long-term gains. To address this, firms should set realistic expectations and allocate sufficient resources to support the adoption process, including investing in the development of robust social media strategies, employee training, and continuous

refinement of their approach to adapt to the ever-evolving digital landscape (Kane et al. 2014).

Industry-Specific Considerations: The study also highlights the need for firms to consider the unique characteristics and demands of their industry when adopting social media platforms and developing strategies. An industry-specific approach can help firms better understand the potential challenges and opportunities associated with social media adoption, enabling them to make more informed decisions regarding their digital marketing efforts. By analyzing the industry context and identifying the most relevant social media platforms and strategies for their specific sector, managers can optimize their social media efforts to achieve the desired outcomes.

LIMITATIONS

While this study provides valuable insights into the relationship between social media adoption and firm performance, several limitations should be acknowledged. These limitations highlight the need for continued exploration of the dynamics between social media and firm performance.

One limitation of this study is the potential influence of the quality of social media content on the effectiveness of social media adoption. Although the study accounts for various factors related to firm performance, it does not delve into the role played by the quality of social media content generated by firms. The quality of content may significantly impact the success of a firm's social media efforts.

Another limitation is the possible impact of competitive dynamics on the relationship between social media adoption and firm performance. While the study examines industry context, it does not consider the role of direct competition between

firms in the same industry or market segment. Firms may experience varying effects

depending on their position within the competitive landscape and how their competitors

are leveraging social media.

Additionally, the study does not explore the potential role of regional and cultural

differences in shaping the relationship between social media adoption and firm

performance. The effectiveness of social media adoption may vary depending on the

region in which a firm operates and the cultural preferences of its target audience. Firms

may need to adapt their social media strategies to cater to these regional and cultural

differences.

Moreover, the study does not investigate the role of the firm's technological

infrastructure and digital readiness in the adoption and effectiveness of social media. The

technological capabilities of a firm and its ability to integrate social media into existing

systems and processes could significantly impact the success of social media adoption.

Furthermore, the study does not account for the role of managerial decision-

making and leadership in guiding the social media adoption process. The commitment

and vision of a firm's leadership team could be instrumental in shaping the outcomes of

social media adoption, including the allocation of resources, employee training, and the

prioritization of social media initiatives.

Lastly, the study does not consider the potential impact of changes in social media

algorithms and platform policies on the effectiveness of social media adoption. Social

media platforms are constantly updating their algorithms and policies, which can

significantly impact the visibility and reach of a firm's social media content. Firms may

need to adapt their strategies to accommodate these changes and maintain the effectiveness of their social media efforts.

FUTURE RESEARCH

Considering the limitations of this study, several potential avenues for future research can be pursued to further expand our understanding of the relationship between social media adoption and firm performance. These research directions aim to develop a more comprehensive understanding of the dynamics between social media and firm performance.

First, future research could investigate the role of corporate social media policies and governance structures in shaping the outcomes of social media adoption. The effectiveness of social media adoption may depend on how firms create, implement, and enforce policies to guide the use of social media by employees and stakeholders. Such research could explore the impact of various governance models, internal communication strategies, and compliance mechanisms on the success of social media adoption.

Second, an interesting avenue for future research would be to explore the role of social media influencers and brand partnerships in enhancing firm performance. As firms increasingly engage with influencers and partner with other brands in their social media efforts, understanding the dynamics of these collaborations and their impact on firm performance becomes critical. Researchers could investigate the factors that contribute to successful partnerships and assess the effectiveness of different types of influencer engagements.

Third, the exploration of the relationship between social media adoption and firm performance in the context of international markets and cross-cultural differences is

another promising area for future research. By examining how cultural differences may affect social media adoption strategies and their impact on firm performance, researchers can gain valuable insights into the challenges and opportunities of implementing social media strategies in diverse markets. This research could also help firms better tailor their social media efforts to various cultural contexts and optimize their international marketing strategies.

Fourth, the impact of emerging social media platforms and technologies on firm performance is a promising area for future research. As new platforms and technologies, such as virtual reality and augmented reality, continue to evolve, firms may need to adapt their social media strategies to capitalize on these innovations. Future research could explore the challenges and opportunities associated with adopting new social media platforms and technologies, and how firms can successfully integrate these innovations into their digital marketing efforts.

Fifth, the potential moderating effects of firm culture and organizational structure on the relationship between social media adoption and firm performance could be explored. Firms with different organizational structures and cultures may experience varying effects from their social media efforts, as these factors can influence the way they adopt and utilize social media platforms. Researchers could investigate how various organizational structures and cultural attributes impact the success of social media adoption, providing insights for firms to better tailor their social media strategies.

Sixth, future academic research could delve into the role of social media analytics and the use of big data in driving the success of social media adoption. For instance, researchers might investigate network analysis in social media platforms, focusing on

understanding how the structure and dynamics of online social networks impact the spread of information, brand awareness, and consumer engagement. By identifying key influencers and communities within these networks, academics could contribute to the development of more effective social media marketing strategies. Additionally, the potential of real-time social media analytics for enhancing decision-making processes within organizations could be explored, examining how the integration of real-time data into marketing decisions can lead to better outcomes, such as improved customer satisfaction, increased sales, and more effective promotional campaigns. Furthermore, academia could probe into the ethical considerations of using big data for marketing purposes, focusing on the balance between leveraging data-driven insights for business success and respecting user privacy, helping firms navigate the complex landscape of social media analytics while adhering to ethical standards and maintaining consumer trust.

By pursuing these future research directions, scholars can contribute to a more comprehensive understanding of the complex relationship between social media adoption and firm performance. These investigations will not only address the limitations of the current study but also provide valuable insights for practitioners seeking to optimize their social media strategies and achieve a competitive advantage in the digital landscape.

Additionally, future research could explore the potential ethical considerations and implications of social media adoption by firms. As social media becomes an increasingly integral part of business operations, it is crucial for firms to navigate the ethical concerns related to privacy, data security, and user consent. Researchers could investigate the ethical challenges faced by firms in their social media efforts and identify

best practices for addressing these concerns while maintaining trust with stakeholders and enhancing firm performance.

Finally, the investigation of the interplay between social media adoption and other digital marketing channels, such as search engine optimization (SEO), email marketing, and content marketing, could provide valuable insights into the overall marketing landscape. Researchers could explore how firms can develop integrated digital marketing strategies that leverage the strengths of different channels to maximize the impact of their marketing efforts on firm performance.

CONCLUSION

In conclusion, this study has presented a thorough investigation of the relationship between social media adoption and firm performance across diverse industries. By utilizing rigorous causal inference methods, including event studies and instrumental variable techniques, the research has aimed to elucidate the intricate dynamics of social media adoption and its influence on firm performance over time.

The findings of this research indicate that the initial impact of social media adoption on firm performance may be negative, attributable to factors such as implementation costs, employee training, and organizational resistance to change. However, as firms accumulate experience and fine-tune their social media strategies, positive outcomes begin to materialize, leading to enhanced sales growth and overall firm performance. The results also stress the significance of industry context and platform selection in determining the relationship between social media adoption and firm performance.

This study offers empirical, methodological, and managerial implications, intending to contribute to the marketing literature and provide valuable insights for practitioners seeking to optimize their social media strategies. The research underlines the importance of patience, perseverance, and continuous refinement of social media efforts, enabling firms to develop more effective strategies, allocate resources judiciously, and ultimately achieve a competitive edge in the digital arena.

As the digital landscape continues to evolve, with social media platforms playing an increasingly important role in customer engagement and brand visibility, it is vital for firms to adapt and refine their strategies to remain competitive. Building on the findings of this study and continuing to investigate the multifaceted aspects of social media adoption, future research can contribute to the development of more effective social media strategies and enhance our understanding of how social media adoption shapes firm performance.

In summary, this study aspires to serve as a catalyst for further research in the area of social media adoption and its impact on firm performance. By identifying the limitations and proposing future research directions, the academic and practitioner communities can collaborate to create a more robust understanding of the factors that contribute to successful social media strategies, fostering a competitive and innovative business environment. The insights provided in this research contribute to the marketing literature and offer valuable guidance for firms navigating the ever-evolving digital marketing landscape.

DECLARATION OF CONFLICT OF INTEREST

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FIGURES
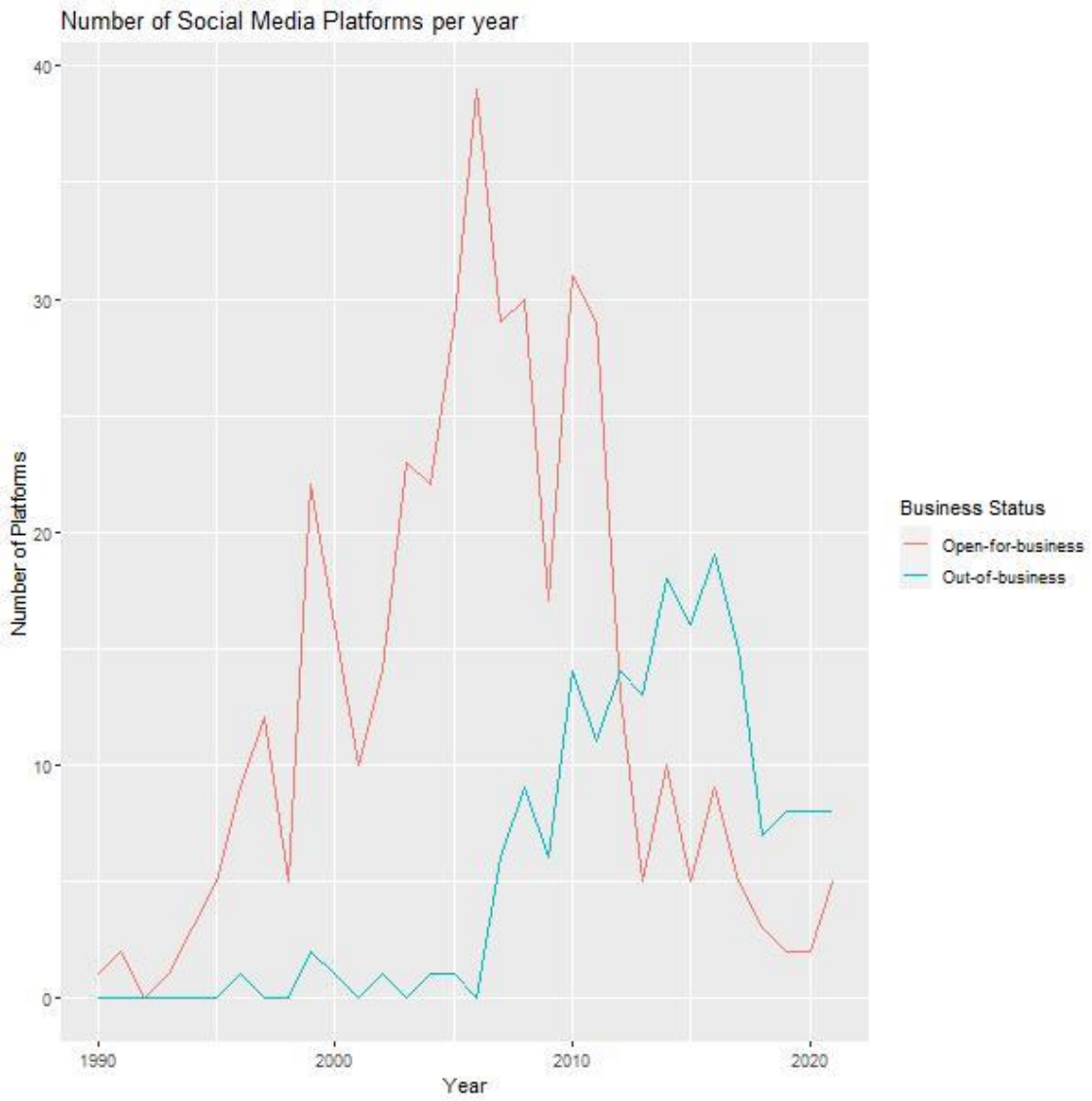
Figure 1 Social Media Platform Rise and Fall

Note: This figure is created from data collected from the defunct and active social media

list on Wikipedia

Effect of Social Adoption Order on Abnormal Stock Returns
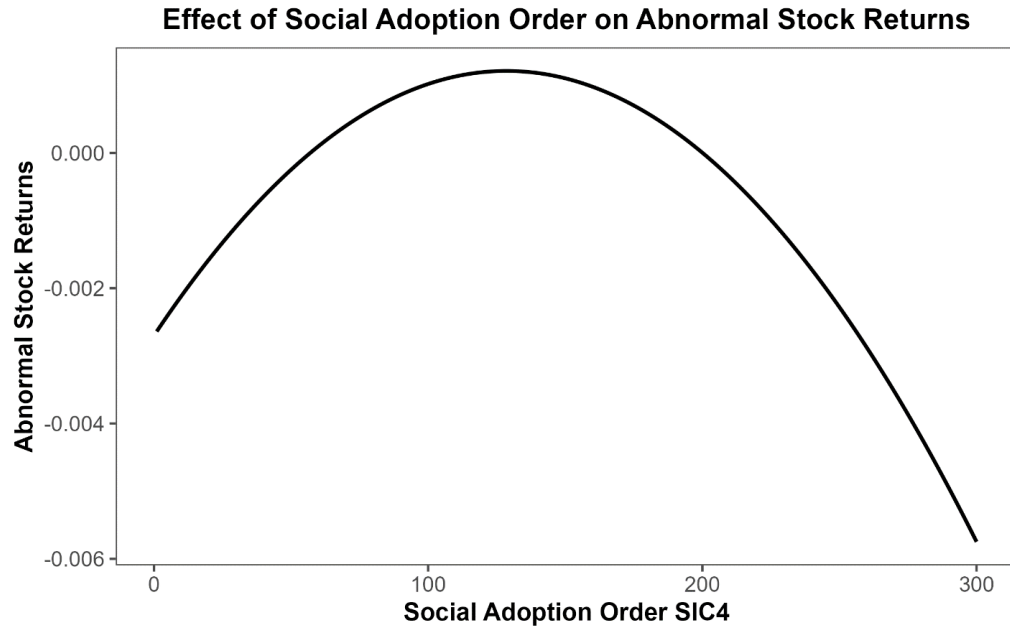
Figure 2 Effect of Social Media Adoption Order on Abnormal Stock Returns

TABLES

Articles	Conditional on social media adoption, what are the strategies that firms can do to increase their performance?
(Tirunillai and Tellis 2012)	The effect of online chatter on stock performance
(De Vries, Gensler, and Leeflang 2012)	How to operate brand fan pages?
(Goh, Heng, and Lin 2013)	How to operate a brand community?
(Swani et al. 2017; Swani, Brown, and Milne 2014; Swani, Milne, and Brown 2013)	What to post?
(Sabate et al. 2014)	The role of content type in generating consumer engagement on social media
(Ma, Sun, and Kekre 2015)How to handle compliments and complaints on social media	
(Kumar et al. 2016)	Social media engagement strategy and its impact on firm performance
(Tirunillai and Tellis 2017)	The effect of offline TV on online chatter
(Kanuri, Chen, and Sridhar 2018)	When to post?
(Tellis et al. 2019)	How to get viral on social media?

Articles	Conditional on social media adoption, what are the strategies that firms can do to increase their performance?
(Herhausen et al. 2019)	How to detect, prevent, and mitigate online firestorms?
This study	What is the causal effect of social media adoption on firm performance?
	What affects the effectiveness of social media adoption?

Table 1 Literature Review

Construct	Variable	Source	Operationalization
Hypothesized Variables			
Platform Entry	Date of entry	Complied	Tiktok, Facebook, Instagram, YouTube: the date of the first Google crawled post Twitter: exact date of entry
Firm Innovativeness	Log(publications per year)	DUKE Innovation & Scientific Enterprise Research Network (https://zenodo.org/record/3976774#.ZBuTNHbMKUn)	
Brand Performance	Abnormal return on stock performance Risk of stock performance	Fama-French Website CSRP	See text

Construct	Variable	Source	Operationalization
Sales Growth	(Revenue$_t$ - Revenue$_{t-1}$) / Revenue$_{t-1}$	COMPUSTAT	
Tobin's Q	(Market value + Liabilities)/(Tangible Assets)	COMPUSTAT	(Tobin 1969)
Total Q	(Market value + Liabilities) / (Tangible + Intangible Assets)	COMPUSTAT	(Peters and Taylor 2017)
Return on Equity (ROE)	(Net Income) / (Shareholders' Equity)	COMPUSTAT	
Instruments			
Platform Popularity	Monthly Active Users	Business of Apps (https://www.businessofapps.com/), Comscore (https://www.comscore.com/), and Statista	See text

Construct	Variable	Source	Operationalization
		(https://www.statista.com/).	
2nd-degree peer effects	Number of 2nd-degree peers have adopted social media	Compiled	
1st-degree peer effect	Number of 1st-degree peers have adopted social media	Compiled	
Control Variables			
Business Type	B2B vs. B2C (Based on SIC)	COMPUSTAT	(Srinivasan, Lilien, and Sridhar 2011)
Product Type	Good vs. Service (Based on the first 2 digits of SIC)	COMPUSTAT	(Srinivasan, Lilien, and Sridhar 2011)
Technology Type	High vs. Stable vs. Low (Based on SIC 3 digits)	COMPUSTAT	(Mizik and Jacobson 2003)

Construct	Variable	Source	Operationalization
Firm Size	Log(total assets)	COMPUSTAT	
Firm marketing emphasis	Advertising spending$_{t-1}$ / Sales$_{t-1}$	COMPUSTAT	(Bahadir, Bharadwaj, and Srivastava 2008)
Firm technology emphasis	R&D spending$_{t-1}$ / Sales$_{t-1}$	COMPUSTAT	(Bahadir, Bharadwaj, and Srivastava 2008)
Financial Leverage	Long-term Debt / Total Assets	COMPUSTAT	(Luo, Zhang, and Duan 2013)
Liquidity (Current Ratio)	Current Asset / Current Liabilities	COMPUSTAT	(Luo, Zhang, and Duan 2013)
Firm Complexity	Count of accounting items disclosed in eXtensible Business Reporting Language (XBRL) filings	https://www.xbrlresearch.com/firm-complexity/	(Hoitash and Hoitash 2022)
Industry Dummy	Based on the 2-digit SIC	COMPUSTAT	Dummy variable for the firm's industry (2-digit SIC codes)

Construct	Variable	Source	Operationalization
Real Uncertainty	Average of the foreast error variances	https://www.sydney ludvigson.com/mac ro-and-financial- uncertainty-indexes	(Jurado, Ludvigson, and Ng 2015)
Macro Uncertainty	Average of the foreast error variances	https://www.sydney ludvigson.com/mac ro-and-financial- uncertainty-indexes	(Jurado, Ludvigson, and Ng 2015)
Investor Sentiment	First principal component of 6 sentiment indexes	https://pages.stern.n yu.edu/~jwurgler/	(Baker and Wurgler 2006)

Table 2 Construct and Variable Operationalization

	Abnormal Returns	Innovativeness
1st Adoption	-0.12*** (0.02)	1.6** (0.58)
2nd Adoption	-0.01 (0.01)	0.10 (0.30)
3rd Adoption	-0.08** (0.03)	1.4** (0.51)
4th Adoption	0.14** (0.04)	
Real Uncertainty	0.006* (0.003)	0.24 (0.41)
Sentiment	-0.002*** (0.0004)	-0.01 (0.04)
Macro Uncertainty	-0.01*** (0.003)	-0.22 (0.28)
Ads		-0.03*** (0.009)
R&D		0.04. (0.02)
Financial Leverage		0.10. (0.06)
Liquidity		-0.11** (0.04)
Firm Size		1.5e-5*** (2.7e-6)
Fixed-Effects:	------------------	-------------------
Year	Yes	Yes
Firm	Yes	Yes
_____	_____	_____
Observations	289,476	11,080
Log-Likelihood	605,485.0	-10,210.2
AIC	-1,203,326.1	21,080.5
BIC	-1,162,905.3	23,493.7

Table 3 Effect of Social Media Adoption on Firm Performance

Sample (Technology)		High	Low	Stable
Dependent Var.:	Risk FF4	FF4	FF4	FF4
1st Adoption	-0.03* (0.01)	-0.12*** (0.02)	-0.07*** (0.009)	0.23* (0.09)
2nd Adoption	-0.06*** (0.008)	-0.20*** (0.03)	-0.04* (0.02)	-0.05. (0.02)
3rd Adoption	0.005 (0.02)	0.04** (0.01)	-0.08*** (0.01)	-0.09** (0.03)
4th Adoption	-0.19*** (0.04)	-0.05 (0.04)	-0.03 (0.04)	0.22*** (0.04)
Fixed-Effects:	----------------	--------------	----------------	--------------
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Observations	285,382	127,169	72,734	89,573

Table 4 Mechanisms of Social Media Adoption Effect on Firm Performance

Sample (b2c)	Full sample	B2B	B2C	Both
Dependent Var.:	FF4	FF4	FF4	FF4
1st Adoption	-0.12*** (0.02)	-0.09*** (0.02)	0.05* (0.02)	0.04*** (0.004)
2nd Adoption	-0.01 (0.01)	0.07* (0.03)	0.17*** (0.04)	0.02*** (0.004)
3rd Adoption	-0.08** (0.03)	-0.08* (0.04)	-0.005 (0.02)	0.06*** (0.004)
4th Adoption	0.14** (0.04)	0.30*** (0.09)	0.12** (0.04)	
Fixed-Effects:	---------------	---------------	--------------	---------------
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
_____	_____	_____	_____	_____
Observations	289,476	240,783	44,241	4,452
Log-Likelihood	605,485.0	462,077.6	95,412.3	13,216.0
AIC	-1,203,326.1	-917,781.2	-189,670.7	-26,222.0
BIC	-1,162,905.3	-884,663.0	-184,652.3	-25,549.9
RMSE	0.02988	0.03551	0.02800	0.01243

Table 5 A Comparison of B2C and B2B Firms

	Popularity IV	2nd Degree IV	1st Degree IV
Dependent Var.:	FF4	FF4	FF4
1st Adoption	-0.13* (0.06)	-0.12*** (0.02)	-0.04*** (0.01)
2nd Adoption	-0.02 (0.04)	-0.01 (0.01)	0.04*** (0.006)
3rd Adoption	-0.02 (0.05)	-0.08** (0.03)	0.01** (0.004)
4th Adoption	0.32** (0.10)	0.14** (0.04)	0.24*** (0.03)
Fixed-Effects:	-------------	---------------	---------------
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Observations	289,476	289,476	289,476
Log-Likelihood	564,649.9	605,485.0	674,667.9
AIC	-1,121,655.8	-1,203,326.1	-1,341,691.8
BIC	-1,081,235.0	-1,162,905.3	-1,301,270.9
RMSE	0.03441	0.02988	0.02353

Table 6 Comparison of different Instrumental Variables

Dependent Var.:	Sales Growth	Tobin's Q	Total Q	ROE
1st Adoption	-0.89* (0.35)	-1.4 (1.3)	-43.2*** (7.7)	-1.5 (1.1)
2nd Adoption	-0.60** (0.19)	-1.8** (0.69)	-19.7* (8.4)	-0.32 (0.40)
3rd Adoption	1.2** (0.39)	7.8*** (1.6)	29.6*** (5.1)	0.75* (0.38)
4th Adoption	1.2 (0.96)	16.0*** (3.8)	41.4*** (8.3)	6.0*** (1.8)
Real Uncertainty	-0.11 (0.12)	1.9*** (0.45)	5.7* (2.6)	0.22 (0.16)
Sentiment	0.10*** (0.02)	0.03 (0.06)	-0.20 (0.26)	0.005 (0.02)
Macro Uncertainty	0.17 (0.10)	-2.8*** (0.38)	-4.2* (1.9)	-0.42** (0.14)
Ads	0.0008 (0.008)	0.03 (0.03)	0.22** (0.07)	0.03 (0.02)
R&D	-0.01 (0.02)	0.004 (0.06)	-0.48*** (0.11)	-0.09** (0.03)
Financial Leverage	-0.26*** (0.03)	-0.53*** (0.12)	0.14. (0.07)	-0.25*** (0.07)
Liquidity	-0.06*** (0.009)	-0.04 (0.03)	4.6e-5 (0.0005)	-0.04** (0.01)
Firm Size	-1.7e-6* (7.8e-7)	-7.5e-6** (2.7e-6)	-8.4e-5*** (1.8e-5)	-1.4e-6 (1.5e-6)
Fixed-Effects:	-----------------	------------------	-------------------	----------------
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
_____	_____	_____	_____	_____

Dependent Var.:	Sales Growth	Tobin's Q	Total Q	ROE
Observations	44,391	43,752	74,348	41,783
Log-Likelihood	-29,665.0	-85,301.4	-273,570.2	-36,887.6
AIC	60,938.1	172,190.8	550,262.3	75,333.1
BIC	67,933.5	179,087.8	564,649.3	82,063.9
RMSE	0.47205	1.7002	9.5893	0.58502

Table 7 Effect of Social Media Adoption on Alternative Outcome Variables

	Utility	Financial
Dependent Var.:	FF4	FF4
1st Adoption	-0.06 (0.05)	-0.05 (0.03)
2nd Adoption	0.004 (0.05)	-0.06* (0.03)
3rd Adoption	-0.02 (0.10)	-0.02 (0.04)
4th Adoption	0.06 (0.10)	0.16* (0.07)
Fixed-Effects:	------------	-------------
Firm	Yes	Yes
Year	Yes	Yes
_____	_____	_____
Observations	13,820	329,087
Log-Likelihood	35,715.7	765,835.6
AIC	-71,159.5	-1,523,605.3
BIC	-70,134.9	-1,480,435.7
RMSE	0.01826	0.02361

Table 8 Effect of Social Media Adoption on Firm Performance for Utility and Financial Industries

Sample	n	FF4	Number Positive FF4	Wilcoxon Signed Rank Test FF4	Market Value (in millions)
Full sample	4,528	0.0006*** (0.0001)	2464***	5739936***	1.82
Facebook	463	0.0006** (0.0002)	250*	61153*	1.82
Instagram	679	0.0004* (0.0002)	363*	126064*	1.21
TikTok	209	0.002* (0.0007)	126**	13771***	6.07
Twitter	1,194	0.0009*** (0.0003)	680***	417099***	2.73
YouTube	1,983	0.0004** (0.0001)	1045**	1060295***	1.21

Table 9 Abnormal Returns and Test Statistics for the Event Day

Dependent Var.:	FF4 (0,0)	FF4 (0,1)	FF4 (0,1)
Firm Complexity	-3.9e-6* (1.8e-6)	-7e-6* (3.5e-6)	-6.9e-6. (3.5e-6)
Liquidity	0.001 (0.001)	0.003 (0.002)	0.003 (0.002)
Scaled R&D	-0.0004 (0.005)	-0.002 (0.01)	-0.001 (0.01)
Scaled Ads	-0.004 (0.006)	-0.008 (0.01)	-0.008 (0.01)
IMR	-0.0005 (0.001)	-0.001 (0.002)	-0.001 (0.002)
Time Since Creation	-3.9e-6. (2.1e-6)	-8e-6. (4.2e-6)	-7.9e-6. (4.2e-6)
Industry Adoption Order	3.3e-5* (1.5e-5)	6.5e-5* (2.9e-5)	7e-5* (3.3e-5)
Industry Adoption Order Squared	-1.3e-7* (5.3e-8)	-2.7e-7* (1.1e-7)	-2.4e-7. (1.3e-7)
Time Since Creation x Industry Adoption Order			-3.2e-9 (9.1e-9)
Fixed-Effects:	-----------------	-----------------	-----------------
Year	Yes	Yes	Yes
Social Media Platform	Yes	Yes	Yes
Technology Firm	Yes	Yes	Yes
B2C	Yes	Yes	Yes
Platform Order	Yes	Yes	Yes
Observations	310	310	310
R2	0.19173	0.19951	0.19978
Within R2	0.04899	0.04990	0.05022

Table 10 Event Studies Analysis

Dependent Var.:	Facebook Adoption	Twitter Adoption	TikTok Adoption	YouTube Adoption	Instagram Adoption
Financial Leverage	-0.01***	0.004**	0.08***	-0.008***	0.01***
	(0.002)	(0.001)	(0.01)	(0.001)	(0.002)
Firm Size	0.02***	0.04***	0.08***	0.10***	0.12***
	(0.001)	(0.0008)	(0.006)	(0.0009)	(0.002)
2nd-degree Pressure	0.0001***	-9.6e-7***	-0.002.	-7e-6***	-3e-5**
	(4.5e-6)	(2.2e-7)	(0.001)	(2.3e-7)	(9.4e-6)
Fixed-Effects:	--------------	--------------	-----------	-------------	-------------
Year	Yes	Yes	Yes	Yes	Yes
Observations	640,573	694,763	166,053	809,575	450,528
Squared Cor.	0.01659	0.06687	0.00616	0.07244	0.07570
Pseudo R2	0.06363	0.10717	0.09654	0.13604	0.16515
BIC	188,501.0	481,898.0	7,455.0	387,105.0	157,214.8

Table 11 Heckman Selection Models

Dependent Var.:	Abnormal Returns	Abnormal Returns	Abnormal Returns
First Mover	-0.001 (0.001)	-0.002 (0.002)	
Second Mover		-0.002 (0.001)	
Late Adopter			-0.004. (0.002)
Optimal Adopter			0.006* (0.002)

Table 12 First and Second Mover Advantage

Note: In this study, firms within their 4-digit SIC industry groups are classified as first movers (1 if first to adopt a platform, 0 otherwise), second movers (1 if second to adopt, 0 otherwise), early adopters (within the first 80 firms to adopt), optimal adopters (ranks 80-150), and late adopters (ranks beyond 150). This classification is based on findings from Figure 2. The same control variables are used for estimation.

Sample	n	LCAR 6 Months	BHAR 6 Months	LCAR 1 Year	BHAR 1 Year
Full sample	1,103	0.005 (0.01)	-0.006 (0.01)	0.006 (0.02)	-0.04* (0.02)
Facebook	135	-0.04 (0.03)	-0.03 (0.02)	-0.13* (0.06)	-0.10. (0.05)
Instagram	213	0.002 (0.02)	-0.01 (0.02)	-0.04 (0.04)	-0.04 (0.04)
Twitter	412	0.01 (0.02)	-0.007 (0.02)	0.02 (0.03)	-0.03 (0.03)
YouTube	343	0.01 (0.02)	0.009 (0.02)	0.06 (0.05)	-0.04 (0.03)

Table 13 Long-term Effect of Social Media Adoption on Firm Performace

Note: The long-term impact of TikTok adoption on abnormal stock returns cannot be observed with a significant sample size.

Dependent Var.:	LCAR (6 Months)	BHAR(6 Months)	LCAR (1 Year)	BHAR (1 Year)
1st Adoption	-0.12* (0.06)	-0.08 (0.06)	-0.06 (0.12)	-0.04 (0.11)
2nd Adoption	-0.03 (0.03)	-0.02 (0.03)	-0.12* (0.06)	-0.05 (0.06)
3rd Adoption	0.05 (0.05)	0.07 (0.07)	-0.04 (0.07)	-0.07 (0.11)
4th Adoption	0.11*** (0.03)	0.14*** (0.03)	0.09* (0.04)	0.17*** (0.04)
_____	_____	_____	_____	_____
Observations	1,102	1,102	1,102	1,102
R2	0.00680	0.00384	0.01087	0.00232

Table 14 Long-term Effects of Social Media Adoption on Firm Performance by Adoptions

Note: The estimated results account for social media platforms and correct for sample selection using a Heckman-type correction identical to the short-term abnormal returns table.

WEB APPENDIX

	Without IV	With IV
Dependent Var.:	FF4	FF4
1st Adoption	0.0003* (0.0002)	-0.13* (0.06)
2nd Adoption	0.001*** (0.0002)	-0.02 (0.04)
3rd Adoption	0.0002 (0.0003)	-0.02 (0.05)
4th Adoption	-0.002*** (0.0006)	0.32** (0.10)
Real Uncertainty	0.004* (0.002)	0.007* (0.003)
Sentiment	-0.002*** (0.0002)	-0.003*** (0.0005)
Macro Uncertainty	-0.008*** (0.001)	-0.01*** (0.003)
Fixed-Effects:	------------------	------------------
Year	Yes	Yes
Firm	Yes	Yes
Observations	289,476	289,476
Log-Likelihood	779,489.4	564,649.9
AIC	-1,551,334.8	-1,121,655.8
BIC	-1,510,914.0	-1,081,235.0
RMSE	0.01638	0.03441

Table W. 1 Model Comparison between with and without instrument correction

Sample	n	CAPM	FF4	FF6
Full sample	4,559	0.0001 (0.0006)	0.0003 (0.0006)	0.0002 (0.0006)
Facebook	453	-0.001 (0.002)	-0.002 (0.002)	-0.002 (0.002)
indeed	130	-0.005 (0.003)	-0.004 (0.003)	-0.004 (0.003)
Instagram	664	0.0007 (0.001)	0.001 (0.001)	0.0009 (0.001)
TikTok	204	0.01 (0.007)	0.01. (0.007)	0.01 (0.007)
Twitter	1,167	-0.0007 (0.001)	-0.0008 (0.001)	0.0001 (0.001)
YouTube	1,941	-0.0001 (0.0006)	2e-5 (0.0006)	-0.0003 (0.0007)

Table W. 2 Short-term Event Studies (Placebo – 1 Day before Events)

Adoption	Facebook	Instagram	Twitter	YouTube
1	653	1340	3277	5909
2	558	438	2851	2672
3	207	538	180	367
4	18	125	47	69

Table W. 3 Adoptions by Platforms

VITA

Mike Nguyen was born on January 13th, 1997, in Hanoi, Vietnam. In his high school years, he moved to Napa, California, in the United States, where he attended Vintage High School. Mike completed his undergraduate degree in International Business and Marketing at Florida International University, located in Miami, in two years, finishing in 2018. He then pursued his MBA at the University of Delaware in Newark, DE, completing the program in 2019.

Mike moved to Columbia, Missouri, to pursue his Ph.D. in Marketing at the University of Missouri. While working on his Ph.D., Mike also earned a Master's degree in Economics and a Ph.D. minor in Statistics. He successfully completed his Ph.D. in four years, in 2023.

After graduation, Mike will join the University of Southern California's Marshall School of Business for a post-doctoral position starting in June 2023.