### Up the Ante: Mediating Firm Reputation through Online Social Media Communities

**Abstract.** Prior research on firm reputation has acknowledged the importance of word of mouth (WoM) in influencing the choices made by businesses, as well as by individuals. In recent developments, Internet-based WoM systems aggregate vast amounts of information relevant to firm strategy and operations. For example, online social media communities aggregate information generated by both the firm (i.e. firm generated content FGC) andusers (i.e. user generated content UGC). We theorize that FGC and UGC generate reputation benefits for a company in the form of two intermediate information mechanisms: information diversity and valence. Information diversity contributes to the ability of individual market agents to evaluate firm actions with greater access to information, whereas valence reflects the positive feelings that an online community generates for the firm (e.g. members trumpets the firm’s positive attributes). We first undertake a qualitative content analysis to investigate the extent to which FGC and UGC generate information diversity and valence. We then test the hypothesis that both information diversity and valence increase a firm’s financial performance. Our findings show that electronic WoM enhances a firm’s reputation and thereby its performance through both these effects (i.e. embedded information and valence).

**Keywords:** Reputation; Social Media Communities; Firm Generated Content; Users Generated Content; Performance

Social media has been a striking phenomenon in recent years, enabling personal publishing and a fusion of individual ‘voices’ in an online environment (Culnan, et al., 2010; Howard, 2010). As a communication medium it provides firms with the ability to ‘speak’ to their market, and affords the market agents with the ability to interact with the firm, bringing it to life. The technology advances presented by the social networking and firm sites conciliate the access to massive audiences with the possibility of identifying and establishing regular, direct and customized interactions. The resulting interactions, participation and sharing have led to a number of changes in the way market agents view and use technology as well as provide new innovative methods of selling products and services(Dellarocas, 2003; Chen and Xie, 2008). The nature of this new interactive market is such that corporations, advertisers and the media no longer dictate and control communication (Duan et al., 2008). People use social media to discuss products and services *publicly* online, effectively generating a reputation for the firm (Culnan, et al., 2010; Spaulding, 2010). Moreover, consumers in the digital age are also faced with a new challenge when it comes to making purchase decisions - they potentially have a large amount of product and services information. They have access to an increasing number of comparison and review websites, allowing them to search for the product with the best review and price. It is apparent that the progression to a digital age is changing the relationships between individual market agents and firms (Spaulding, 2010). Social media users want the firm to care and know who they are, which is focusing the social media conversation to act as a ‘service’ provided by the firm creating a new method of market competition. These dynamics of information sharinghave important implications for phenomena such as reputation risk and social responsibility because they put them in flux(Rhee and Valdez, 2013; Luca, 2011)*.* As the term ‘reputation risk’is generally used to describe potential threats or actual damage to the standing of an organization (Scott and Walsham, 2005; Gaultier-Gaillard and Louisot, 2006), user generated content (UGC) on social media can pose a strong reputation risk to companies.

Prior management research finds that word of mouth (WoM) behavior is linked to corporate reputation (Rindova et al., 2005; Boyd, et al., 2010). Whereas opinions about a firm can disseminate through the purchasing behavior of customers, a direct expression of an opinion also signifies when it can be mentioned more frequently (Luca, 2011). Positive WoM can result from customers perceiving a company to have good reputation. Rindova et al. (2005) argue that companies with a good reputation can create a goodwill reservoir for themselves, leading buyers to act as advocates for the company. The challenge now is how to fit in to this new media environment where individual agents, whether consumers or independent commentators, are in control (Schubert and Ginsburg, 2000;Baird and Parasnis, 2011). This means innovating and developing new competition and media strategies that recognize this interaction. For example, participation and sharing over social media have led to new methods of fostering strong relationships with users and other market agents (Luca, 2011). An online social media (SM) community is one such mechanism whereby a firm’s reputation is enhanced due to its members’ recommendations. It is like other Internet reputation systems such as Amazon, Yahoo! Auction and eBay (Standifird, 2001). By enabling the firm and users to communicate and share diverse and critical information with each other, an online SM community encourages communication and information exchange*.*

In this paper, we evaluate how companies interact with social media users by examining online communities, which are usually set up by companies to give ‘voice’ to their market and address any customer concerns and engage with interested users and potential customers. As social media is effective due to its two-way communication (Safko, 2010), any change in the conditions under which this communication is carried out can present a significant source of pressure on reputation given its qualities as a boundary object(Baird and Parasnis, 2011; Roth et al., 2013; van Iddekinge, et al., 2013). To address the question of how companies can manage this two-way communication, the research will explore the outcomes of such communication in the form of two intermediate mechanisms: information diversity and valence. Information diversity and valence aggregate two-way communication and reflect the level of electronic word of mouth (eWoM). Our assumption is that information diversity and valence increase the likelihood that individual market agents will evaluate the firm more favorably as they have access to more relevant and diverse information about the activities of the firm (Chaiken, 1980; Fernandez, 1991). As a result, the firm’s financial performance is also likely to improve. We therefore theorize that we can understand reputation benefits provided by an online SM community by focusing on those information mechanisms that synthesize relevant aspects of a company’s behaviors and actions toward external stakeholders. We employ latent Dirichlet allocation (LDA) technique (Blei et al. 2003), a widely used method in information retrieval and machine learning to measure information diversity and valence in social media referral community posts. Research in the area of information extraction has frequently employed methods that identify context-related or context-free concepts (e.g., Wen and Lin 2010).

Prior research on the role of social media infirm reputation was hampered by the fact that social media data were only available with regard to user generated content. Even in the marketing literature studies that examine both the user generated content (UGC) and firm generated content (FGC) in the context of online social media communities are rare. The literature thus lacks a quantification of the value of recurring engagement by social media users. We fill this gap in the literature by focusing on an online SM community and quantifying the recurring engagement by the firm and users, thus making a rigorous assessment of a firm’s reputation management strategies on social media. We thus also present an advance on the extant management research that considers only a narrow description of WoM strategies. Our findings show that eWoM generates reputation benefits in the form of information diversity and valence in online SM communities. Through embedded information and valence, engagement in social media communities also translates into positive firm performance. We also find that a firm’s financial performance, as measured by firm profitability, is more associated with information diversity than with valence. As we find, an online SM community offers a company opportunity to listen to and engage with its users, and potentially to encourage them to become long term advocates for its actions and policies (Chen and Xie, 2008), thus increasing its reputation and market standing.

The rest of the paper is organized as follows. We begin our research by reviewing previous literature on firm reputation and social media. We identify recurring findings and key themes to form the basis of our conceptual framework and the hypotheses. Then, we describe the methodology used, highlighting the choice of the study’s control variables and discussing how the data were used. We then present our results and discuss their implications. We finally discuss the study’s limitations and draw attention to future areas of research related to this study.

**LITERATURE SURVEY**

The Internet has provided a new way for users to engage with and recognize companies with good reputation (Duan et al., 2008). The emergence of social media platforms have also changed the pressures that come to bear on an organization (Blanchard, 2008; Zhang, 2010). These platforms provide an opportunity to users to voice their praise /criticism for products and producers, shifting the market communication paradigm from one-way to two-way communication. Their views can have a substantial effect on other stakeholders’ decision-making (Zhang, 2010; Blanchard, 2008; Chen and Xie, 2008). This increased influence that social media users now have reiterates the fact that companies must focus on long-term user engagement (Roth et al., 2013; van Iddekinge, et al., 2013), and it is, therefore, inadvisable to ‘indulge in PR that does not match experience’ as people can rapidly deconstruct empty, glossy public relations (Scott and Walsham, 2005). Consequently, there is now greater vulnerability on the firms’ part as they have to share and respondto large content volumes generated by people and markets (Rhee and Valdez, 2013; Gaultier-Gaillard and Louisot, 2006). In this section, we first survey the literature that discusses the general issues involved in firm reputation and social media engagement before discussing our conceptual framework and the study’s specific hypotheses.

**Reputation in a Business Environment**

Traditionally, a company measured its success by the number of tangible assets it posted on its balance sheet (Roberts and Dowling, 2002). Currently, assets such as trust, creativity, speed, and reputation along with the ability to adapt to change, determines success (Rindova et al., 2005; Lange, et al., 2011). Reputation is an intangible asset for any business and can indicate good employees, positive client relationships, a strong brand name or its community work (Highhouse, et al., 2009; Boyd, et al., 2010). In its broadest sense, it thus reflects what is generally thought or said. It may also encompass negotiations over responsibilities, boundaries, and fact construction, which requires a critical analysis of “the emergence of an expanded set of organizational actors” such as social media (Rindova et al., 2005). Although reputation is an intangible concept, research universally shows that a good reputation significantly increases corporate worth and provides a sustained competitive advantage (Highhouse, et al., 2009; Rindova et al., 2005). In a market society, it is likely that names – and the reputations that are associated with them – have economic value (Fombrun and Shanley, 1990). A business’s reputation is what brings it repeat orders and new customers, as existing clients refer it to others (Rao et al., 2001; Roberts and Dowling, 2002).

A dominant paradigm in the management literature is the institutional perspective on reputation. It argues that, under mild conditions of uncertainty, the opinions and choices of other individuals greatly influence an individual’s choices and behavior (Rao, et al., 2000; Rao et al., 2001). The ‘social influence’ logic leads to our understanding of how some individuals or organizations can gain disproportionate amounts of public attention (Cattaneo and Chapman, 2010). Even when customers or stakeholders cannot form specific judgments about a firm’s ability to produce quality, its prominence in its area of operation can be a sufficient condition for them to choose that firm. Reputation thus reflects the collective recognition of an organization’s demonstrated ability to deliver valued outcomes (Bergh et al., 2010; Boyd, et al., 2010). After all, Rhee and Valdez (2013) defines a business’s reputation as the collective opinion of stakeholders toward an organization based on its past experiences. If one has the support and backing from its key stakeholders, Romani, et al. (2013) believe, a business can achieve more of its objectives far easily. In this narrative, the emphasis is placed on the exchange of information among a diverse set of stakeholders about an individual or organization’s ‘true’ attributes, which means that reputation synthesizes different aspects of a company’s behaviors and its history. Reputation can thus be understood as an aggregate construct measuring how stakeholders evaluate whether and how the company meets their expectations (Shamsie, 2003; Romani, et al. 2013). Furthermore, effective relationships will not simply happen because we want them to, they need to be managed appropriately to ensure they are a factor of success and not a cause for failure (Gaultier-Gaillard and Louisot, 2006). This highlights the need and importance for businesses to manage the construction of their reputation through relational mechanisms such as engagement and information sharing. This view is further supported by Fombrun (1996) who argues: a strong reputation may originate in a unique product, but is either reinforced or negated by an array of managerial practices that make a company a good workplace for its employees, a good provider of products and services for its customers, a good investment for its shareholders, and a good citizen for its community.

**Social Media and Firm-based Online Communities**

Previously, companies held power when they used traditional advertising mediums to communicate to market agents who were seen to passively receive the messages (Sylvain and Nantel, 2004; Porter and Donthu, 2008). Now, the power has been shifted to these market agents who use the Internet to communicate with each other, potentially generating enormous risks for a company’s reputation. While it can be advantageous in spreading positive news about a product or service’s existence or quality, it can just as easily have its reputation destroyed by negative comments or recommending a competitor. With the viral influence of social media, this can lead to a massive number of people sharing information within a short span of time (Safko, 2010), highlighting the importance of maintaining good userrelationships online to limit the risks of negative press for corporations. Many companies have thus taken to social media networks to connect with consumers, by using them to create valuable relationships before, during and most importantly after purchase. Careful adoption of social media reputation management techniques can help to reinforce and increase product and brand awareness amongst users, as consumers spend ever-increasing amount of time on social networks(Porter and Donthu, 2008).This emergence of user interaction online has been termed electronic word of mouth (eWoM) (Chen and Xie, 2008; Ridings and Gefen, 2004). Firms communicate to consumers via firm generated content (FGC) to influence their eWOM activity and can use the internet to gauge the effectiveness of this communication. Users can create their own content (user generated content (UGC)) by reviewing a product on discussion forums, blogs, websites or online communities (Chen and Xie, 2008**;** Clemons, et al., 2006). A *virtual community* is a specialized, non-geographically bound community based on a structured set of social relationships among its users (Spaulding, 2010; Ryan and Jones, 2012; van Iddekinge, et al., 2013; Roth et al., 2013).

Social interactions in cyberspace enable users to group and gather relevant information in order to increase their firm and community knowledge (Cattaneo and Chapman, 2010). A key part of this process is how users gather their ‘group knowledge’ that influences the agenda for change and development. The group knowledge is linked to the notions of empowerment and collaboration, as online community platforms empower likeminded users to get together and voice their concerns about a firm’s decisions and policies (Kurikko and Tuominen, 2012). Empowerment is the process that provides an individual the opportunity and environment to adopt, develop, practice and maximize his/her skills in order to control certain problems or issues (Rappaport, 1987; Cattaneo and Chapman, 2010). In the context of online communities, earlier conceptualizations of user empowerment have focused primarily on the perceptions of personal control in the product/service development and the promised delivery process (Cattaneo and Chapman, 2010). These conceptualizations, however, do not extend to how group knowledge evolves in online settings and how firm generated content and user generated content contributes to this process. For example, there is no discussion of howorganizations should endeavor to maintain regular interactions with users in online communities. Similarly, how knowledge and information sharing may affect firm actions and behaviors have not been fully understood. An online community is motivated by the idea that, although acquiring new customers is vital for a company to expand its market base, it is also important to build up long term relationships in order to prevent current customers and other stakeholders from becoming dissatisfied and leaving.An online SM community is thus different from other online reputation systems such as that of eBay in some important respects (Standifird, 2001; Jeppesen and Fredericksen, 2006). At eBay, a buyer may never purchase an item from the seller again. However, they can share their opinions about the seller via the Feedback Forum, thereby constructing a meaningful history of the seller. This will benefit future buyers who may base their buying decisions on such a sufficiently extensive public history. In this way, the sellers’ reputations will affect their future sales. Not surprisingly, then, they will seek to accumulate as many positive comments and points as possible and avoid negative feedback (Tam and Ho, 2005). However, in a reputation system like online SM community, the seller can always add comments and responds to posts, which means that there are no isolated interactions. The two-way communication is the backbone of an online social media community and therefore it is important to examine the outcomes of such communication patterns (e.g. information diversity, valence).

**RESEARCH FRAMEWORK**

The past few years have witnessed a dramatic change in the manner of utilization of ‘social media’ by both individuals and companies(Hsiao and Chiou, 2012). For example, modern Internet users develop not just a better understanding of interactive relationships with individuals at a personal level, they also tend to acquire very detailed information about their favorite organizations or companies and their respective products that are on sale or even in production (Koh and Kim, 2003). As an online SM community is characterized by content-generation of both the firm and users, we need to examine the nature of these communication modes in order to fully understand the benefits of such online reputation systems. We can classify the firm and user contents into two types of information mechanisms: information diversity and valence. Our hypotheses thus examine the extent to which FGC (firm generated content) and UGC (user generated content) produce these intermediate information benefits (i.e. information diversity and valence). We further investigate whether these social media information mechanisms affect a firm’s financial performance. Our study’s conceptual framework thus builds on the specific information channels of an online social media community.

**Firm Generated Content**

Traditional reputation management occurred in the form of a business pushing market agents with a message about its product or service, with these agents making minimal impact on the business with their opinions. In a dramatic turnaround, through technology related events, there are now vast opportunities for markets to communicate with the business as well as other users in ‘peer-to-peer communication’ (Antweiler and Frank, 2004; Jahn and Kunz, 2012).Baird and Parasnis (2011) recognize that instead of managing market agents, the role of the business is to facilitate collaborative experiences and dialogue that different stakeholders value. This means companies must carefully consider how to create a social media experience that is unique to their company, offer stakeholders value and exploit the power of the social community(Godes and Mayzlin, 2009). When interacting with users over the Internet, Ryan and Jones (2012) suggest effective social media-based communication must consider subtle user engagement and “leaving the sledgehammer approach to product promotion at home.” This involves listening to firm stakeholders and providing help and information rather than forcefully advertising at them. In other words, providing key relevant information about the company and its products to social mediausers is of paramount importance(Parks and Floyd, 1996).

To achieve these goals, a firm will need to provide engaging content through its online community(Dellarocas, 2006). Engaging content can educate, inform, entertain and inspire, resulting in user advocates (Bouty, 2000; Dellarocas, 2003). This may then involve providing a rich set of information based on a novel set of perspectives. For example, users may be looking for new product information or want to know more about a company’s relationship with its suppliers concerning ethical trading standards or other topical matters. A firm can use its online posts to deal with such queries and produce rich information about its policies and practices(Tam and Ho, 2005)*.* More a company can provide extensive information about its strategy, policies and practices, meaning social media users will fully understand its aims, goals and methods; potentially enhancing its reputation and building a positive image among community members. Reputation may buffer firms during hard times, if the communities with which a firm is associated think they have access to information and are not being treated as “cultural dupe[s]” (Scott and Walsham, 2005). This is because users may put motives alongside mistakes. It is therefore likely that FGC will provide extensive and diverse information to the community as only through this will users engage with the firm**.** Our first hypothesis states this assumption in the following terms:

*Hypothesis 1:* In an online SM community, FGC leads toward an increase in information diversity.

Furthermore, as firms pursue users’ participation at online communities, they constantly face the need for generating absorbing content. In doing so, they are challenged to further build their online community services, reinforcing their meanings and creating new ones(Crandall, et al., 2008; Welbourne, et al., 2009). As a consequence, we expect that users enjoy more opportunities to feel identified and emotionally bonded to firm name and its products. One may then argue that FGC can easily influence valence in a social media community by giving users positive information about its strategy and operations. The firm may emphasize those aspects of its business that creates a positive image for itself, and counter any elements which could harm its reputation. The literature on persuasive advertising (von der Fehr and Stevik 1998; Tam and Ho, 2005) argues that firms can design messages that highlight the positivity of products to enhance market evaluations. In this way, one can instil a sense of positive feeling in users about the company and its products (Schubert and Ginsburg, 2000). Similarly, to create a favorable product image, firms may embed their positive statements in the messages that they direct toward the community members. However, Hsiao and Chiou (2012) state how UGC means users can see honest representations of products by consumers who have already used them. Antweiler and Frank (2004) find users prefer to read eWOM reviews over company advertising as they trust the viewpoint of the user who is not linked to the company; they have no reason to lie in the review so can be trusted to give an honest opinion. A firm may also facedifficulties in establishing regular interaction with users, encouraging voluntary participation and supporting the mutual exchange of benefits (Sylvain and Nantel, 2004). Finally, Lee et al. (2008) find valence is not the sole influencer of consumer decision-making; negative reviews that are of a higher quality have a greater impact over lower-quality negative reviews.As a result, people may weigh negative online reviews more than positive reviews (Ren, Harper and Drenner, 2012).

Further research shows that negative information affects market decisions more than positive information because negativity stays in people’s minds more than positivity does (Goolsby, 2010). As the environment is generally more positive markets notice when negative details arise, and these have a bigger effect on decision-making. Therefore, negative reviews online are more likely to be read as they stand out to users. These factors may make the distance between reputation claims and their realization particularly noticeable. It can therefore be argued that FGC may not be very effective in influencing valence in an online community. As people have developed a general tendency to disbelieve or be sceptical toward marketing messages (Goolsby, 2010; McKinney and Yoon, 2002), FGC may exhibit a weaker persuasive effect than that of UGC. Furthermore, the rise of e-commerce is generally associated with a low-trust environment (McKinney and Yoon, 2002), indicating that individuals must first establish new kinds of trust relationships with companies, delivery mechanisms, payment systems and product care. In light of this, our next set of hypotheses are presented below:

*Hypothesis 2A (Competing):* In an online SM community, FGC positively influences valence.

*Hypothesis 2B (competing):* In an online SM community, FGC has no measureable impact on valence.

**User Generated Content**

Social media has become crucial for many businesses because in terms of individual purchasing decisions, people value recommendations from friends and family as their most trusted source (Aral and Walker, 2011; Arazy, et al., 2010). The theory of social influence suggests that the individual decision-making process is affected by the views/opinions of those around them (Hsiao and Chiou, 2012; Cropanzano and Mitchell, 2005; Tiwana and Bush, 2000). Prior studies on social media also suggest that individuals and communities use social media to obtain different perspectives on purchases (Duan and Whinston, 2008). In an age of easily accessible communication, buyers want to ensure near perfect satisfaction from purchases. They use social media as a means of getting maximum information, be it from their friends on a social networking site, an online forum or review sites. Moreover, it has been shown that individuals like to inform others about purchases and will review a producer if they have a connection to it, whether good or bad (Crandall, et al., 2008; Welbourne, et al., 2009). Indeed, according to Duan and Whinston (2008), social media can give users more comprehensive information than any other source. Their research surveys the writers of travel reviews and discovers that a main motivator for writing reviewsis the need to provide information for potential buyers. Dellarocas’ (2006) study is similar to Antweiler and Frank’s (2004) and looks at the implications the digitization of WoM has on business firms. He explains that since the introduction of the Internet and specifically Web 2.0, the dispersal and impact of WoM has been transformed to a larger scale. For instance, a buyer that a few years ago would have gathered information from advertisements is now primarily looking to online feedback mechanisms. This suggests that UGC can be a source of a wide variety of information, dealing with different aspects of a firm’s operations.

The potential of user generated content is facilitated by the exponential growth in cyberspace interactions through online communities and other social networking tools. These platforms have empowered users to collaborate, share information, create and develop user generated contents, thereby voicing their opinions towards the firm and its products and services (Chen and Xie, 2008**;** Clemons, et al., 2006). These collaborated contributions from various members enable the groups to easily update and access to more relevant information of this matter which is difficult to achieve if acting individually.The diverse knowledge that is created not only benefit individual members but also strengthen their positions to provide inputs to the firm’s decision-making. We thus state our next hypothesis below:

*Hypothesis 3:* In an online SM community, UGC leads toward an increase in information diversity.

When people come into contact with a company (by either buying the company’s product or reading its literature), they may express their opinions and sentiments about that company or its products or services (van Iddekinge et al., 2013). If they are members of an online community, they are likely to share and relate their product experience with other members. They may exhibit favorable attitudes and sentiments if their experience of the product or attachment to the company’s policies has been satisfying. The converse may also be true if they have found something troubling about that company or its products and services. If their experience was not positive, or they dislike any aspect of the company’s policies, they may exhibit negative attitudes and sentiments. These general evaluations of a company or its products and services can be referred to as valence embedded in UGC (Sylvain and Nantel, 2004). One may argue that positive valence of UGC should drive consumer purchases (Spaulding, 2010). The combined knowledge in these situations empowers all participants to generate their own solutions, to make argument, adjustments and, thus, to further contribute to the development of the threads. Kurikko and Tuominen (2012) argue that the collective knowledge of the group will be related to the positive feelings associated with a sense of empowerment. Individual users can easily group with like-minded others in order to create social pressure on the firm, and request the firm to join the conversation online. As indicated above, buyers of Amazon, Tide.com, eToys are grouped and communicated with each other in users-managed online communities to pressure the organizations to change the decisions that they perceived as unethical or unfair (Das and Chen, 2007). This leads us to formulate our next hypothesis below:

*Hypothesis 4:* In an online social media community, UGC leads toward an increase in valence.

### Performance Effects of eWoM

The advantage of an online SM community comes from the theory of recognition heuristics (Goldstein and Gigerenzer 1999, 2002; Howard, 2010). The theory of recognition heuristics (Goldstein and Gigerenzer 1999, 2002) suggests that people place higher values on objects they recognize than on objects they don’t, regardless of their actual values. Thus, when users join a firm’s online community or ‘like’ or ‘share’ certain comments on social media, it creates a ‘recognition value’ for the firm. Reputation functions by reducing stakeholder uncertainty about the value of future exchanges. It is thus likely that a favorable reputation will induce buyers to engage in repeated purchases (Rao et al., 2001). This relationship can be tested by further examining the link between user behavior and company reputation: for example, whether reputation induces buyers to purchase from the company with an online community that he or she is a member of (e.g.Roberts and Dowling, 2002). A company’s reputation that serves as a quality promise for customers may drive this association. Extending and improving relationships is one of the key principles of social media networks (Porter and Donthu, 2008). These networks allow firms to increase the value of a user’s experience. The ability to maximize user value can create competitive advantage for firms and is viewed as a key construct of social media business management (Koh and Kim, 2003). For example, social media users have a very visible voice, which can be as influential for increasing sales as it can be damaging (Baird and Parasnis, 2011).

Furthermore, positive word of mouth can contribute to an increase in product demand and company profitability (Schubert and Ginsburg, 2000). Dellarocas (2003) mentions different motives for WOM, and ‘helping the company’ is one of them. As noted by Jeppesen and Fredricksen (2006) in the context of buyer satisfaction, the question that really matters is whether a buyer will recommend the ﬁrm or not. Positive WoM can lead more customers to choose a particular firm in the future. Buyers also utilize social media to discuss their likes and dislikes in real-time so businesses can gauge market trends and shifts as they happen, resulting in them having less out-dated stock or unfulfilled back orders (Aral and Walker, 2011). Due to their non-transactional nature, social networks are particularly suited for collecting information and obtaining feedback from customers (Arazy, et al., 2010). Many practitioners now believe that the emergence of social media has turned users into firm advocates (Baird and Parasnis, 2011). Firms that can successfully utilize online opportunities can make users promote a product themselves. For example the online techniques used by the US blending company Blendtec improved sales by 800% when their YouTube videos, Will it Blend?, went viral (Aral and Walker, 2011). As unorthodox as these online techniques may be, the influence that users can have as firm advocates are immeasurable. The social media brand community’s influence has thus been termed the ‘ripple effect’ of eWOM (Blanchard, 2008); creating a ‘buzz’ about a company or product as more community members discuss it, and therefore affecting decision-making (Porter and Donthu, 2008). Hence, we posit that the impact of valence, similar to that of information diversity, positively influences market agents’ behavior. We can thus hypothesize:

*Hypothesis 5A.* Information diversity generated by an online SM community results in improvements in the firm’s financial performance.

*Hypothesis 5B.* Valence generated by an online SM community results in improvements in the firm’s financial performance.

Our conceptual model is underpinned by the assumption that a firm’s reputation is inﬂuenced by firm generated content and user generated content in an online SM community. We theorize that information diversity and valence, as generated within an online social media community, are two intermediate information mechanisms that provide reputation benefits to the firm as they synthesize information about a company’s behaviors, intentions and actions(Chaiken, 1980). Information diversity contributes to the ability of an individual member of an online SM community in terms of improving his access to information he needs in evaluating firm actions, whereas valence is important because it reflects the positive feelings that an online community generates for the firm (e.g. trumpeting the firm’s accomplishments in key product design areas). As presented in Figure 1, the model includes two antecedents and two consequences of a firm’s reputation on social media. The model suggests that FGC and CGC produce reputation benefits in the form of information diversity, and valence and that a firm’s reputation influences its payoffs.As Fernandez (1991) has argued, information mechanisms are often bundled together in theoretical arguments. Following firm reputation related literature (Rindova et al., 2005), we assume firm behavior-related antecedents and consequences of reputation, where “the more favorable general estimation the public has of an entity (individual, organization etc.), the more positive the impact of the public’s attitude, actions and behavior on that entity.” Building on these assertions, we conceptualize that social media contents (i.e. FGC and UGC) positively affect a firm’s performance.

[Insert Figure 1 about here]

**Content Analysis**

We analyze the textual or qualitative UGC and FGC data for quantitative analysis using text mining techniques(Das and Chen, 2007). The text mining tool first decomposes the textual content in a piece into words and phrases based on its large library. It then performs extraction of concepts with each extracted concept assigned a corresponding type indicating the sentiment nature (positive, negative, or indifferent). We directly derive our measures of UGC and FGC factors as the number of concepts can indicate the diversity of information and the type of a concept can reflect the embedded sentiment. We undertake a quantitative analysis of the content of the Facebook posts and their responses, and therefore the data were not created directly for the purpose of this research. Consequently, it avoids response biases caused by the researcher being present at both interviews and observations. The posts to be reviewed were limited to a specific time frame to allow a valid comparison between firm generated content and user generated content. UGC is created when a user of a social media platform creates content through comments, posts, and reposts. UGC varies on the different types of social media platform: collaborative projects, blogs, content communities, social networking sites, virtual games worlds and virtual social worlds, the most popular of these being collaborative projects, blogs, content communities and social networking sites (Kaplan and Haenlein, 2010). We measure information diversity by examining the diversity of information content, using the content of all posts and comments posted on the brand community page. The method we employ is latent Dirichlet allocation (LDA) - an advanced statistical technique that classifies content into distinct topics. LDA is a generative probabilistic model that extracts topics from a textual content based on its large library. It is assumed that each topic is a vector of words that are statistically related to each other (Wen and Lin, 2010). LDA models each document *d* in a document corpus as a finite mixture over an underlying set of topics, where each topic *t* is characterized as a distribution over words. A posterior Dirichlet parameter *g*(*d* ; *t*) can be associated with the document *d* and the topic *t* to indicate the strength of *t* in d (Blei et al., 2003).

We classify 150 topics using the entire corpus of electronic communicationsfrom September 2012 to August 2014. The average cosine dissimilarity of the topic space in in a user’s Facebook pages provides the basis for calculating information diversity for each person in every month. In our specification, we measures *i’s* information diversity by summing the cosine distance between the topic vectors coming from *j* ( to the mean topic vector representing all *i’s* messages (. Consequently, a rich and diverse set of topics will have a higher information diversity (ID) score than a homogeneous set of topics in the cosine similarity measure. The measure is specified below:

IDti =

We derive the valence of a review from an analysis of the text in UGC and FGC using computational procedures. Importantly, the statistical algorithms used for the binary text classification of the reviews are proven to be robust (Joachims, 1999). Drawing on a sentiment classification algorithm, i.e., Naïve Classifier (Das and Chen 2007), we measure valence as the net positivity (i.e., number of positive concepts minus number of negative concepts) in a given time period. We check each word in a text against the lexicon and give a value (-1, 0, +1) based on sentiment type (negative, indifferent, positive). We take the net word count of all lexicon-matched words; the text is deemed positive (negative) if the value is greater (less) than zero; else, it is indifferent.

We measure performance in terms of firm financial performance (PFIN) as well as the number of UGC and FGC shared by the members of the online SM community (CSHARE). Safko (2010) suggests the importance of regular updates in order to indicate that the business is active and responsive - such as new product information, relevant news stories or upcoming company events. The benefits of regular updates are two-fold; not only increasing the reputation of the firm but also helping to improve search engine optimization results (Kurikko and Tuominen, 2012). Luca (2011) discusses the advantage of firms sharing interesting, industry-specific information to raise the profile and reputation of the company which can lead to more customers through word-of-mouth. Our goal is to examine if diverse information and valence can increase performance after controlling for seasonality, networks and individual characteristics. The model was test is as follows:

*Performancei,t = β1IDi,t-1 + β2VAL,t-1 + β3UGCVOLi,t-1 + β4FGCVOL i,t-1*

*+ β5OWNVALi,t-1 + β6OWNVOLi,t-1 + β7UCENTi,t-1 + β8FBFi + β9FCCFi + β10FBVi*

*+ β11AGEi + β12MALEi + β13INCi + β14PEXPit + θt + αi + εit*.

**Control Variables**

Our control variables reflect important UGC and FGC factors that are likely to affect their performance. We measure the volumes of UGC (UGCVOLit), and FGC (FGCVOLit) that user *i* observed in the online community at period *t*. To control for a user’s own posting valence and own posting volume, we include the average valence (OWNVALit) and total volume of content (OWNVOLit) generated by consumer *i* in the online community at period *t*. Measuring a user’s own posting valence and own posting volume account for potential selection bias at the content generation level. To control for peer effects, influence and general activity in theonline community, as well as a user’s Facebook social network at large, we include the following variables. We compute a user’s (“fan”) degree centrality (UCENT*it*) on the fan page to quantify his or her influence in the online community.This is based on the communication ties user *i* maintained with other users on the user page in period *t*, reflecting the network structure of users in the online community. To control for the effects of a user’s Facebook social network at large, we include the number of Facebook friends (FBF*i*), the number of user *i*’s Facebook friends who were also users on the user page (FCCF*i*) and the count of Facebook page views (FBV*i*) , i.e., total number of Facebook page views since consumer *i*’s registration of an account on Facebook). These measures vary across individual users but are time invariant. We also include a set of monthly time dummies (θt). We also control for individual user’s demographicsto obtain robust estimates of the effect of focal UGC and MGC measures. The specific demographic variables included are a user’s age (AGE*i*), gender (MALE*i*), i.e., a dummy indicator for male gender (1: male, 0: female) and monthly income (INC*i*), i.e., the level of consumer *i*’s monthly income (1: lowest, 5: highest). We also account for a user’s past expenditure (PEXP*it*) i.e., user *i*’s average expenditure per transaction prior to period *t*.

*Study Data.* Currently, almost 50% of the worldwide online population is covered by Facebook (Burke, et al., 2011; StatisticBrain, 2014), the most representative platform in social networking sites, with half of its users accessing it for 20 minutes every day, generating a total amount of 4.5 billion likes and 4.7 billion shares (StatisticBrain, 2014). Aiming at reaching and interacting with these massive audiences, firms are increasingly present at Facebook, with the top 20 worldwide CPG´ advertisers accounting for more than 300 million users worldwide in their brand like pages (StatisticBrain, 2014). In this research, we use a large firm’s online community dataset that contains both Facebook content information as well as user transaction information. The firm set up its online community page on Facebook in September 2012 to engage and interact with its customers and other users. The community page serves as a platform for the firm to create and pursue an image of itself that it believes best reflects its strengths and long-term interests. Using specific Java codes based on the Facebook application programming interface, we retrieved all user interaction contents from the focal firm’s fan page community on Facebook. In addition to Facebook page information, we obtained company performance data, including labor productivity and revenue growth. We also gathered data about user demographics and usage logs from the information provided by Facebook to the firm. Our data span 96 weeks from September 2012 till August 2014, including information from about 7,850 fans in total with 2.23 FGC posts on average per week (std. dev. = 2.56, max = 7) and 2.59 FGC comments on average per week (std. dev. = 3.67, max = 14) and on average 1.48 UGC postings per week (std. dev. = 2.38, max = 13) and on average 4.57 UGC comments per week (std. dev. = 5.34, max = 38). On a weekly basis, UGC plus MGC participations averaged 16 incidences (std. dev. = 14.53, max = 61). Table 1 provides the descriptive statistics of the model covariates. Table 2 includes a correlation matrix for key research variables. As can be seen, the variables in the model generally have large dispersions in the variable values (i.e., mean > std. dev.). For example, there is a high level of variability in the UGC and FGC information diversity and valence. Another thing to note is that the means and standard deviations of UGC information diversity and valence are higher than those of equivalent FGC variables.

[Insert Table 1 and 2 about here]

**EMPIRICAL RESULTS**

Our first goal is to establish whether the use of social media in an online community context generates information diversity and valence: the two types of intermediate information mechanisms theorized to provide reputation benefits. Social media-based user communities can provide these benefits by enhancing the capacity of individual members to share and communicate diverse and critical information with each other. We calculate information diversity as the topic dissimilarity score in a person’s Facebook post, whereas valence is calculated by measuring the net positivity present in FGC and UGC.

[Insert Table 3 about here]

Table 3 shows the relationships of FGC and UGC with two different information mechanisms (i.e. information diversity and valence) associated with an online SM community. To carry out these investigations, we first estimate a fixed effects (FE) model and then run a random effects (RE) regression. We first provide results of a fixed-effect model in Column 1. As we find, UGC is positively correlated with information diversity (*β* = 3.73, *p* < 0.01). Similarly, the relationship between FGC and information diversity is also positive (*β* = 0.24, *p* < 0.01). We therefore find support for Hypothesis 1 and 3. We repeat the process using the RE model, and find no significant change in the results (see Column 2). In Column 3, we examine the effects of UGC and FGC on valence. FE estimations show that UGC has a positive effect on valence (*β* = 0.26, *p* < 0.05), whereas the relationship between FGC and valence is negative (*β* = -0.18, *p* < 0.01). The findings are very similar when we estimate an RE model (see Column 4). Overall, these results show that having an online community generates important reputational effects for the firm, supporting Hypotheses 2B and 4. As users become members of an online SM community, they are likely to acquire information that they have not previously been exposed to. Hence, their level of information diversity increases, as reflected in their increased knowledge of the company’s goals and practices. These results are also important as they go beyond recognizing the importance of information diversity in an online SM community and bring into play the role of ‘valence’ as an important component of such a community. Although the relationship between FGC and valence is negative, this is mainly due to the very nature of FGC contents that focus more on communicating product design features and their functionality or similar other firm information.

*Social media reputational effects and their relations to firm performance.* We have matched data sample that allows us to implement an identification strategy that exploits differences across users’ fan page joining decision and across timing differences in fan page joining dates. We can thus use a difference-in-differences (DID) model estimation approach, which enables us to estimate the economic impact (i.e., treatment effect) of joining the online SM community. We estimate the model to compare buyer expenditures between fans and nonfans, as well as before and after becoming a fan of the firm’s Facebook user community. To implement this strategy, we combine the 398 reward program members of the firm with the 398 other buyers who were fans of the firm’s Facebook fan page. (We have data sample of 398 of unique customers with memberships of the firm’s reward program and who are also fans on the Facebook fan page.) We thus created an estimation data sample of 796 buyers. A binary variable, SM-Com, is created to indicate whether each of the 796 consumers was a fan in the online SM community (1: fan, 0: nonfan). An additional binary variable, After, is created to indicate the timing of becoming a fan (1: after, 0: before) for the 398 fans, and interact it with VIRTUAL (i.e., VIRTUAL \_ After). VIRTUAL and After might be endogenous, and therefore we first use several exogenous variables (AGE, INC, MALE) in a probit model to model the outcome of an unobserved latent variable determining the selection decisions. We estimate a treatment effects (TE) model, where we focus on the coefficient for VIRTUAL\_ After. Our result is presented in Table 4, Column (1). The DID parameter estimate is 21.73 (1.65), which is significantly positive. This implies a significant positive impact of about $21.73 in purchase expenditure after joining the online SM community. The exposure to UGC and FGC thus has a significant impact on buyers’ purchase behavior. This strengthens our belief to further explore the impact of different UGC and FGC factors in depth.

We further examine the extent to which reputational benefits of an online social media affect a firm’s financial outcomes, after controlling for individual and SM community characteristics. We quantify these benefits in terms of the two particular types of information mechanisms that characterize an online SM community: information diversity and valence. Both information diversity and valence were centered to have a mean of 0 and a standard deviation of 1. This was intended to make a comparable comparison between the two information mechanisms. The results show that both the intermediate information mechanisms are positively associated with firm performance. We find a significant positive relationship between information diversity and revenue growth. Per our results, a one standard deviation increase in information diversity is correlated with generating an additional $584.15 of revenue (see Column 2). Moreover, as Column 3 shows, valence is statistically significantly correlated with revenue growth (*β* = 128.29, *p* < 0.01). We further find that information diversity and valence are positively correlated with generating revenue when treating both information diversity and social communication as independent variables in the same model (Column 4). The F – tests confirm this: using the estimates in Models 2 - 4 show that the effect of information diversity is greater than the effect of social communication at the *p* < 0.05 level. Finally, column 5 presents the RE model results, which are very similar to the other reported results. We thus find support for Hypothesis 5A and 5B.

These results show that the use of social media can have a significant impact on productivity, with the mediating factor being information diversity and valence. Not only can social media induce a change in firm reputation, but this change has a magnifying impact on performance outcomes. When used appropriately, social media can provide a potent means for firms to enhance their reputation and improve financial performance.

[Insert Table 4 about here]

**DISCUSSION**

It is well within the interest of any firm to protect and promote its market reputation when making use of the ‘social media’ space with the intention to advertise or promote its brands, products and/or services (Howard, 2010; Culnan, et al., 2010). Social media’s capacity to provide on the spot discussions or information on a virtually real-time basis benefits companies enormously through the promotion of their products and services and the dissemination of their content. However, this may equally result in abuses of the business’ intangible assets by a third-party. The potential damage to a company’s reputation from a negative social media comment can be all the more real because of the role of negative information in an individual’s decision making. Social media has the potential to transform how firms interact with their markets and deliver accurate product information.

Focusing on firm generated content and user generated content, this study builds on the argument that the online SM communities are important relationship channels for firms, as they provide positive relational and performance consequences. Specifically, we argue that social media generates reputation benefits through the means of FGC and UGC as reputation aggregates information about how users evaluate whether and how the company meets their expectations. The greater the extent to which these content types produce information diversity and valence the greater the firm enjoys enhanced reputation in an online social media community. We further hypothesize that information diversity and valence result in higher levels of firm performance. We empirically test these relationships in the context of a firm’s online community and how it generates reputation benefits through the intermediate information mechanisms of information diversity and valence. As we have defined earlier, information diversity measures the heterogeneity of the communication content, whereas valence indicates the extent of FGC and UGC positivity. The assumption is that both these information mechanisms help users to evaluate firm activities more favourably. We show that an online community is a correlate of social media-induced company reputation. We find that FGC was more related to information diversity than valence, whereas valence was more prominent in UGC. The more importance users attach to firm related information, the greater the influence on users of FGC. Similarly, the more importance users attach to other users’ opinions, the greater the influence on users of UGC. Our results also show that engagement in social media brand communities affects a firm’s financial performance. Importantly, social media provides information benefits by increasing the capacity of individuals to share and communicate diverse and critical information. As we find, these benefits enhance a firm’s reputation and affect performance.

From our empirical results it is possible to conclude that online communities are more effective when they manage to influence firm behavior. This allows us to postulate that in the context of SM communities, reputation benefits are largely dependent on the capacity of the firm to evoke and maximize behaviors relating to FGC, including providing unbiased and complete information, fostering transparency, developing a clear set of norms and best practices for coping with negative interactions and fostering positive ones. Furthermore, the study validates the positive consequences of UGC, positioning online SM communities at the center of managerial objectives. This represents a new challenge for the firms which, in order to improve the effectiveness of an online SM community, needs to go beyond the original scope of their products, providing entertainment, information and socialization (Tiwana and Bush, 2000). In this process, new firm competences are required, shedding light toward the relevance of implementing adequate content generation and distribution agendas and models.

**CONCLUSION**

The Internet has developed eWoM (electronic word of mouth) to the extent that it has transformed the way businesses are managed, as reflected in customer acquisition and retention, reputation building, product development and quality assurance (Chen and Xie, 2008). As technology provides wider opportunities for communication, any difference between expectation and lived experience can come to almost immediate attention.Moreover, the emergence of social media offers companies opportunities to listen to and engage with their stakeholders, and potentially to encourage them to become long term advocates for their products Zhang (2010). Increasingly it is being acknowledged that social media users play a role in defining, creating and extending a firm’s image (Tam and Ho, 2005). Traditional paid-for, one-way communication (i.e. advertising) is becoming redundant in the business world; two-way communicationchannels are much more effective and personal (Sylvain and Nantel, 2004). Companies can make use of the two-way communication nature of social media to collaborate and build relationships with customers. For example, Cisco uses its myPlanNet forum to understand what developers want in the future (Aral and Walker, 2011).

This paper first explored firm generated content and user generated content, which is how users write their opinions online, good or bad, to help others with their decision-making (Spaulding, 2010). Next, the study focused on key factors of content generation, including diverse information and content valence. The research examined these questions using data from a firm’s online social media community. Our results show that social media can generate important reputation benefits in the form of aggregating information in the areas of information diversity and valence. Both these information mechanisms convey the positive and very extensive word of mouth about a firm’s products and services. Moreover, we find that these content topics positively affect a firm’s financial performance. In conclusion, our findings suggest that organizations need to recognize the increased demands placed on strategic reputational boundary objects because of the emergence of a new social contract between organizations and their stakeholders. Placing reputation risk issues in the context of an increasingly communication and information-driven society reinforces the idea that reputation risk issues must be managed, as they are subject to ongoing reflexive assessment and two-way communication. Users on social media are now the most influential consumers of firm related content, creating a demand for high interactivity between the firm and market agents. In this study, we have shown that these demands can be fully met by focusing on the intermediate information mechanisms that are likely to generate reputation benefits for companies.

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Figure 1. Antecedents and consequences of firm reputation

|  |  |  |
| --- | --- | --- |
| **Antecedents** | **Firm Reputation** | **Consequences** |
|  |  |  |

Table 1. Descriptive statistics.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Mean** | **Median** | **Std. dev** | **Min** | **Max** | **Skewness** |
| ID | 8.96 | 7.58 | 4.63 | 0.00 | 26.00 | 2.37 |
| VAL | 0.79 | 0.74 | 0.16 | -3.00 | 5.80 | 3.72 |
| PFIN | 3.16 | 0.00 | 19.45 | 0.00 | 476.71 | 6.38 |
| CSHARE | 0.41 | 0.40 | 0.87 | -7.00 | 4.00 | 0.96 |
| UGCVOL (UGC, volume) | 46.58 | 7.00 | 34.73 | 0.00 | 1.06 | 3.73 |
| FGCVOL (FGC, volume) | 13.34 | 4.00 | 11.83 | 0.00 | 134.00 | 2.69 |
| OWNVAL (Own posting valence) | 0.01 | 0.00 | 0.01 | -0.40 | 1.00 | 57.74 |
| OWNVOL (Own posting volume) | 0.04 | 0.00 | 0.06 | 0.00 | 5.00 | 23.93 |
| UCENT (Degree centrality) | 0.01 | 0.00 | 0.08 | 0.00 | 1.00 | 92.64 |
| FBF (number of Facebook friends) | 337.85 | 265.00 | 316.74 | 0.00 | 3,869.00 | 7.44 |
| FCCF (number of Facebook friends on FFS) | 3.98 | 4.00 | 5.89 | 0.00 | 53.00 | 5.19 |
| FBV (number of Facebook page views) | 164.26 | 88.00 | 167.58 | 0.00 | 2,465.00 | 4.46 |
| AGE (age) | 34.77 | 33.52 | 7.67 | 17.81 | 56.69 | 0.17 |
| MALE (gender) | 0.14 | 0.00 | 0.34 | 0.00 | 1.00 | 2.80 |
| INC (income level) | 3.26 | 2.00 | 0.87 | 1.00 | 5.00 | 0.75 |
| PEXP | 34.72 | 28.86 | 31.74 | 0.00 | 246.51 | 2.40 |

Notes. Observations = 19,832.

Table 2. Pearson correlations (a select group of variables reported) (1 = ID)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| 2.VAL | 0.48 |  |  |  |  |  |  |  |  |  |
| 3.UGCVOL | 0.17 | 0.65 |  |  |  |  |  |  |  |  |
| 4.FGCVOL | 0.36 | 0.32 | 0.29 |  |  |  |  |  |  |  |
| 5.OWNVAL | 0.42 | 0.52 | 0.38 | 0.23 |  |  |  |  |  |  |
| 6.OWNVOL | 0.24 | 0.53 | 0.26 | 0.20 | 0.48 |  |  |  |  |  |
| 7.AGE | 0.28 | 0.58 | 0.24 | 0.31 | 0.35 | 0.24 |  |  |  |  |
| 8.MALE | 0.48 | 0.63 | 0.49 | 0.54 | 0.57 | 0.48 | 0.37 |  |  |  |
| 9.INC | 0.32 | 0.45 | 0.28 | 0.43 | 0.75 | 0.52 | 0.39 | 0.47 |  |  |
| 10.PFIN | 0.16 | 0.61 | 0.57 | 0.22 | 0.62 | 0.54 | 0.31 | 0.52 | 0.53 |  |
| 11.CSHARE | 0.13 | 0.55 | 0.28 | 0.34 | 0.38 | 0.41 | 0.35 | 0.64 | 0.49 | 0.21 |

Table 3. Relationship among social media, information diversity, and social communication

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **(1)** | **(2)** | **(3)** | **(4)** |
|  | **Information diversity** | **Information diversity** | **Valence** | **Valence** |
| **Model** | **FE** | **RE** | **FE** | **RE** |
| UGCVOL | 3.73\*\*\*  (0.39) | 4.39\*\*  (3.52) | 0.26\*\*  (0.25) | 0.24\*\*  (0.17) |
| FGCVOL | 0.24\*\*\*  (0.17) | 0.14\*\*\*  (0.17) | -0.18\*\*\*  (0.02) | -0.03\*\*  (0.09) |
| OWNVAL | 0.19  (0.16) | 1.67  (0.48) | 0.32  (0.28) | 1.52  (0.35) |
| OWNVOL | 0.02\*  (1.82) | 1.53\*  (0.23) | 1.81\*  (0.96) | 1.36\*  (0.37) |
| UCENT | 0.04  (0.06) | 1.37\*\*  (0.71) | 1.64\*\*  (0.35) | 1.59\*\*  (0.42) |
| FBF | 0.25\*  (0.14) | 0.74\*\*  (0.13) | 0.61\*\*  (0.51) | 1.32\*\*  (0.84) |
| FCCF | 0.06  (0.14) | 0.81  (0.14) | 0.56  (0.32) | 0.62  (0.19) |
| FBV | 0.02  (0.06) | 0.13  (0.15) | 0.04  (0.03) | 0.17  (0.05) |
| AGE | 0.03  (0.02) | 0.09  (0.01) | 0.07\*  (0.08) | 0.38\*  (0.09) |
| MALE | 0.04  (0.01) | 0.03  (0.05) | 0.03  (0.01) | 0.06  (0.08) |
| INC | 0.14\*  (0.07) | 0.28\*  (0.19) | 0.19\*  (0.05) | 0.19\*\*  (0.14) |
| PEXP | 0.05  (0.01) | 0.04  (0.06) | 0.02  (0.07) | 0.02  (0.03) |
| Observations | 19,832 | 19,832 | 19,832 | 19,832 |
| R-squared | 0.35 | - | 0.37 | - |

Notes: Month dummies and individual fixed effect are included. Standard errors in parentheses. \**p* <0 .1, \*\**p* < 0.05, \*\*\**p* < 0.01.

Table 4. Social media and performance

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model** | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
|  | **DID** | **Monthly Revenue** | **Monthly Revenue** | **Monthly Revenue** | **Monthly Revenue** |
| **Model** |  | **FE** | **FE** | **FE** | **RE** |
| Information diversity (standardized) |  | 584.15\*\*\*  (2.64) |  | 532.47\*\*\*  (2.83) | 527.96\*\*\*  (2.37) |
| Valence (standardized) |  |  | 128.29\*\*\*  (1.17) | 186.48\*\*\*  (1.18) | 147.38\*\*\*  (1.16) |
| Information diversity x Valence |  |  |  | 0.08  (0.15) | 0.03  (0.18) |
| VIRTUAL \* After (DID treatment effect) | 21.73\*\*\*  (1.63) |  |  |  |  |
| UGCVOL |  |  |  | 0.18\*\*  (0.15) | 0.09\*\*  (0.05) |
| FGCVOL |  |  |  | 0.23\*\*  (0.15) | 0.35\*\*  (0.18) |
| OWNVAL |  |  |  | 0.23  (0.15) | 0.17  (0.09) |
| OWNVOL |  |  |  | 0.17  (0.12) | 0.18  (0.13) |
| UCENT |  |  |  | 0.26\*\*  (0.18) | 0.15\*\*  (0.11) |
| FBF |  |  |  | 0.34\*\*  (0.27) | 0.16\*\*  (0.21) |
| FCCF |  |  |  | -0.01  (0.01) | -0.05  (0.09) |
| FBV |  |  |  | 0.12\*\*  (0.05) | 0.21\*\*  (0.19) |
| AGE |  |  |  | 0.02  (0.04) | 0.08  (0.04) |
| MALE |  |  |  | 0.25  (0.18) | 0.10  (0.06) |
| INC |  |  |  | 0.34\*\*\*  (0.27) | 0.11\*\*\*  (0.18) |
| PEXP |  |  |  | 0.12  (0.03) | 0.08  (0.05) |
| Observations |  | 19,832 | 19,832 | 19,832 | 19,832 |

Notes: Month dummies and individual fixed effect are included. Standard errors in parentheses. \**p* <0 .1, \*\**p* < 0.05, \*\*\**p* < 0.01.