Online Anti-Brand Herds: a Form of Environmental Turbulence

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ABSTRACT

The online environment offers a fertile breeding ground for anti-brand herds of disgruntled consumers. Firms are often caught off guard by the unpredictability of such herds and, as a consequence, are forced into a reactive, defensive stance. We conduct a social media analysis that aims to shed light on the formation, growth, and dissolution of online anti-brand herds. First we expand on the concept of environmental turbulence to advance core properties unique to online herd behavior. Next, based on evidence gathered from 40 online anti-brand herd episodes targeting two prominent firms from the Netherlands, we develop an analytical model to investigate drivers of herd formation, growth, and dissolution. Finally, combining environmental turbulence literature with our empirical findings, we derive a novel typology of online anti-brand herd behaviors, and put forward six propositions to guide theory development in this area.

Keywords:

Social Media, Social Network, Consumer activism, Typology, Corporate Communication

INTRODUCTION

Anti-brand sentiments are on the rise. Customers are becoming more vociferous in their complaints when goods or services disappoint and when brands misalign with consumers' personal values. According to a recent study commissioned by the Ombudsman Services [http://www.ombudsman-services.org], 38 million customer complaints (or one customer complaint every 1.2 seconds) were lodged in the United Kingdom in 2013 alone[1]. This trend of growing anti-brand sentiments is fueled by an increasing tendency among consumers to take action against firms: 32% of consumers stated that they are more likely to complain about a defective good or service than they were 12 months ago (Ombudsman Services, 2014). Furthermore, the study revealed that over a quarter (or 27%) of consumers are turning to social media as a channel to escalate their grievances (Ombudsman Services, 2014). Social media is emerging as a dominant avenue for consumers to voice their anti-brand opinions and as a consequence, firms are beginning to feel the adverse effects from negative social commentaries. As uncovered in a survey conducted by the Social Media Marketing University (SMMU) [http://socialmediamarketinguniversity.com], 26.1% of firms have had their reputations tarnished due to negative social commentaries, 15.2% have lost customers and 11.4% have reported lost revenue[2]. For consumers with strong anti-brand feelings, social media is an attractive channel to air their views because it allows them to galvanize like-minded peers to exert collective pressure on firms to undertake corrective measures—what we label as anti-brand herd behavior.

Yet, a majority of firms are often caught off guard by the unpredictability with which anti-brand herds gather, due to instigation by unknown stakeholders, and the virality with which negative sentiments spread. This makes it difficult for firms to react in a timely fashion when

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[1] URL: http://www.ombudsman-services.org/downloads/CAM_Research_Report.pdf.
[2] URL: http://socialmediaimpact.com/brands_social_media_complaints.

confronted with anti-brand herds, with some firms becoming paralyzed with inaction. For instance, in the immediate aftermath of the crash of Asiana Airlines flight on July 6th, 2013, many people, including victims and eye witnesses, turned to social media to air their reactions to the incident, whereas the airline was roundly criticized for its four-hour silence despite an established social media presence[3]. The same conclusions were reached in the SMMU's (2014) survey where it was found that 23.4% of brands not only lack a strategy to manage negative social commentary, but they also have little intention to develop one. Additionally, 24.5% of brands are still in the process of developing a social media strategy whereas 7.6% have strategies in place that are proving to be ineffective in countering negative social commentaries (SMMU, 2014).

The increased complexity, uncertainty and pace of changes in the environments in which firms operate is known as environmental turbulence. While previous research suggests how information technology (IT) and dynamic capabilities can contribute to firms' effectiveness in turbulent environments (Pavlou & El Sawy, 2006; Pavlou & El Sawy, 2010), IT itself can also be a breeding ground for environmental turbulence. A deeper appreciation of online anti-brand herding is hence necessary to buffer against this environmental turbulence for firms operating in the social media era (cf. Aral, Dellarocas, & Godes, 2013; Kane et al., 2014). Consequently, the central research question of this study is: *"What categories of anti-brand herds and related environmental turbulence can be discerned, and how do firm interventions and media reports affect the dynamics of anti-brand herds?"*

To this end, we conducted a social media analysis on the formation, growth, and dissolution of online anti-brand herds. Based on data from two prominent case companies with headquarters situated in the Netherlands, we modeled the evolution and decline of anti-brand

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[3] URL: http://crisisthinking.co.uk/2013/10/09/crisis-management-planning-101-learning-from-asianas-mistakes.

protests on social media. Theoretically, we expanded on the concept of environmental turbulence to: (1) advance dimensions for characterizing online anti-brand herds; (2) develop an analytical model to empirically examine drivers of anti-brand herd formation, growth, and dissolution, as well as; (3) derive a novel typology of online anti-brand herd behaviors.

This paper comprises five sections, including this introduction. In the second section, we offer an overview of prior research into anti-brand herding and environmental turbulence, and elaborate on online environmental turbulence caused by anti-brand herding. Specifically, we built on environmental turbulence literature to advance dimensions for characterizing online herds. In the third section, we describe our empirical study that draws on data gathered from 40 episodes of anti-brand herding. We develop an analytical model to capture the evolution of anti-brand herd behavior over time. In the fourth section, we derive a novel typology that not only delineates between product- and value-inspired anti-brand herds, but also differentiates between first and subsequent episodes of anti-brand herd behaviors. We further illustrate how these four categories of online anti-brand herd behaviors differ in terms of our proposed environmental turbulence dimensions. In the last section, we: (1) present propositions to inform future research; (2) review the insights to be gleaned from this study towards informing the management of online anti-brand herds; (3) summarize the contributions to theory and practice, as well as; (4) highlight potential limitations.

THEORETICAL FOUNDATION

Brands are invaluable firm-specific assets. At its most primordial level, a brand distinguishes a firm's offerings from that of its competitors by acting as a unique identifier for goods and services offered by the former. A trusted brand therefore promises a certain level of quality for goods and services, which in turn benefits consumers by reducing risk and

simplifying purchase decisions (Keller and Lehmann, 2006). Brands also serve indispensable social functions. Prior research indicates that brands can be inscribed with symbolic meanings (McCracken, 1986) in order to convey unique personalities (Aaker, 1997; Aaker et al., 2001) and establish emotional connections with consumers (Belk and Tumbat, 2005; Smith et al., 2007). For this reason, brands act as collective identities for consumers, who share similar brand preferences, to band together to form relational networks—what Hollenbeck and Zinkhan (2006) labelled as brand communities. As noted by Hollenbeck and Zinkhan (2006), brand communities cultivate "a sense of belonging among consumers and the brand becomes the central purpose and meaning for group interaction" (p. 479). Yet, not all brand communities are necessarily positive. Just as fan communities are formed around a common passion for a brand, anti-brand communities exist due to the gathering of consumers who feel a unified detestation for a brand (Hollenbeck and Zinkhan, 2010; Ward & Ostrom, 2006).

Anti-brand communities endanger firms' competitive sustainability and long-term survivability by promoting herd behavior in three ways. First, anti-brand communities tend to foster counterfactual thinking in that members become accustomed to comparing their existing situations with hypothetically better alternatives, thereby perpetuating a cycle of cynicism towards targeted firms (cf. Hollenbeck and Zinkhan, 2010). Second, anti-brand communities encourage discursive storytelling whereby damaging images of firms are constantly reinforced through embellished stories (cf. Thompson et al., 2006). Finally, anti-brand communities often expose other consumers to incidental displays of vocal opposition and/or organized resistance (Hollenbeck and Zinkhan, 2010).

Anti-brand communities are fertile breeding grounds for herd behavior. Herd behavior, as conceived by Rafaat et al. (2009), is "a form of convergent social behavior that can be broadly

defined as the alignment of the thoughts or behaviors of individuals in a group (herd) through local interaction and without centralized coordination" (p. 420). As such, we refer to 'herd behavior' as pertaining to the behavior of the herd itself and not to any party doing the herding, as in the analogy of the shepherd herding his flock. Sun (2013) alleged that two preconditions must be present for herd behavior to occur: decisional uncertainty and observability of others' actions. This is because people are more likely to defer to the judgment of the majority whenever they: (1) are uncertain about the decision to be made due to asymmetric or incomplete private information (Fiol and O'Connor, 2003; Lieberman and Asaba, 2006; Walden and Browne, 2009), and; (2) can observe homogeneity in the actions of many others (Sun, 2013). Consequently, herds are typically accompanied by information cascades where people are inclined to imitate the behavior of their predecessors in the herd the moment they feel that their private information becomes less instructive than what they can acquire from the herd (Anderson and Holt, 1997; Çelen and Kariv, 2004; Duan et al., 2009). Bikhchandani et al. (1992) acknowledged that it is highly probable for an information cascade to be formed from a few select individuals, which in turn acts as a magnet to draw in others.

To make matters worse, the advent of the Internet, and especially that of social media, has significantly enhanced the capabilities of anti-brand communities to propagate herd behavior on a much larger scale, achieving a far greater reach. As discerned by Mangold and Faulds (2009), social media has radically altered market interactions in four ways. One, social media has become the predominant vehicle for consumer-sponsored communications, thereby amplifying the capacity of a single consumer to influence and mobilize others (Mangold and Faulds, 2009). Two, social media is drawing consumers away from traditional media by offering on-demand and immediate access to information at their convenience (Rashtchy et al., 2007; Vollmer and

Precourt, 2008). Three, consumers are becoming increasingly reliant on social media when searching for information and making purchase decisions (Lempert, 2006; Vollmer and Precourt, 2008). Four, social media is construed by consumers to be a more trustworthy source of information about goods and services as compared to corporate-sponsored communications (Foux, 2006). In this sense, the ability of social media to motivate individuals and the virality with which messages can be relayed across communities contribute to phenomenal growth in online anti-brand herds (cf. Ombudsman Services, 2014).

Despite the dangers posed by online anti-brand herds, there has only been a handful of studies to-date that shed light on this growing phenomenon. These studies can be broadly classified according to whether they pertain more to the normative understanding of online anti-brand communities or relate to corrective actions, which can be undertaken by firms to tackle online anti-brand sentiments. Consistent with normative studies, Krishnamurthy and Kucuk (2009) demonstrated a positive relationship between the number of online anti-brand communities and a substantial decrease in brand value. This relationship is especially pronounced for the more valuable brands because such brands have been found to incur the wrath of consumers more readily within online environments than less valuable brands, what Kucuk (2008) recognized as Negative Double Jeopardy (NDJ). Similar findings were documented by Zhang and Luo (2013) who, in conducting an event analysis of 500 multinational corporations in China, observed that online anti-brand communities have the power to pressurize prominent firms into taking actions they would not have otherwise undertaken (e.g., donating money for aid in the aftermath of a disaster).

Conversely, corrective studies have testified to the critical role of firm interventions in mitigating the fallout from anti-brand sentiments online. Van Noort and Willemsen (2012)

discovered that appropriate responses from firms can alleviate the damage to their brand image caused by consumer complaints online. Specifically, Xia (2013) found that openness to online consumer criticism may lead to better brand evaluation than if firms were to adopt a defensive posture. Another characteristic of firm responses to anti-brand herds is linked to the timing of the interventions. Originating from psychology and law disciplines, research into the idea of 'stealing thunder' claims that firms enjoy strategic advantages from being the initiator of bad news whenever there is a high probability that this news may become public knowledge anyway (Willliams, Bourgeois and Croyle, 1993; Arpan and Roskos-Ewoldsen, 2005). Strategic advantages from stealing thunder include the likelihood of: (1) media exhibiting less interest in 'old' news, and; (2) having published reports framed in a positive manner due to preemptive measures (e.g., press releases) taken on the part of the firm (Wigley, 2011).

Despite the complementarities between the normative and corrective research streams, we are unaware of any study that has connected both research streams. This study therefore strives to bridge the knowledge gap between the normative and corrective research streams by extending the notion of environmental turbulence to explain online anti-brand herd behaviors. We seek to: (1) uncover distinct properties of online anti-brand herds; (2) empirically explore the drivers affecting the formation, growth, and dissolution of such herds, as well as; (3) derive a novel typology of online anti-brand herd behavior.

An Environmental Turbulence Perspective of Online Anti-Brand Herd Behavior

Firms operate in turbulent environments of varying degree. Originating from Emery and Trist's (1965) seminal study on the 'causal texture' of organizational environments, turbulence has often been employed by scholars to depict environments that possess high levels of interconnectedness between organizations, and with short inter-periods of dynamic changes

(Dess and Beard, 1984). Firms operating in turbulent environments often face uncertainty and must constantly adapt their behavior to overcome such adversity (Bourgeois, 1988; Calantone et al., 2003; Glazer and Weiss, 1993). Environmental turbulence has been associated with behavioral constraints that inhibit firms' ability to compete and perform in the marketplace (Boyne and Meier, 2009). There is an abundance of empirical evidence that attests to the negative impact of environmental turbulence on firm performance (e.g. Anderson and Tushman, 2001; Li and Atuahene-Gima, 2001; Lin and Germain, 2003; Power and Reid, 2005). While previous research suggests how IT can overcome environmental turbulence (Pavlou & El Sawy, 2006; Pavlou & El Sawy, 2010), firms' external IT environment can also be a source of environmental turbulence. Specifically, anti-brand herds could be construed as a major cause of turbulence within online environments. The sophistication and volatility of online herd behavior has been alluded to in the work of Langley et al. (2014), who identified eight generic patterns of online herd behaviors, ranging from "slowly diffusing, small and disparate groups through to rapidly spreading, massive herds expressing a convergent behavior" (p. 16). Depending on the size of the community, the speed of contagion and the uniformity of communal direction, Langley et al. (2014) noted that it might be difficult for firms to alter the behavior of the online herd whenever there is rapid dissemination of a dominant opinion, which resonates with the majority—what they called 'stampeding'. In such scenarios, firms are forced into a reactive position relative to the environmental turbulence brought about by a stampeding herd. To better comprehend online anti-brand herd behavior from a firm-centric standpoint, we adapt focal attributes of environmental turbulence, which have been advocated by Dess and Beard (1984), to characterize online herds in terms of its complexity, dynamism and munificence. Furthermore,

for each of the three preceding properties, we describe how it would manifest in the context of online anti-brand herd behavior (see Figure 1).

Insert Figure 1 about here.

Complexity: Complexity refers to the heterogeneity of the external circumstances that confront a firm (Boyne and Meier, 2009). For this reason, firms dealing with a wide cohort of consumers, offering a vast range of goods and services and/or operating in broad range of markets and geographical regions are often said to be functioning in complex environments (cf. Boyne and Meier, 2009; Volberda and van Bruggen, 1997). Moreover, this complexity could be made worse if strong interdependencies were to exist among environmental elements (Lawrence, 1981). This is because environmental elements cannot be subdivided into homogeneous groups to reduce complexity if interdependencies exist among them. In scrutinizing the national and international public discourse over the killing of a giraffe by the Copenhagen Zoo in Denmark, Zimmerman et al. (2014) observed that online anti-brand sentiments culminate in a complex environment for firms because these sentiments are usually intertwined with interferences from mainstream or niche media, giving rise to situations which can potentially spiral out of control. As the adverse effect of complexity on firm performance has ample support within extant literature (e.g., Andrews et al., 2005; Fernandez, 2005; Heinrich and Fournier, 2004), we argue for complexity as a core property of online herd behavior due to *contributor heterogeneity* (cf. Boyne and Meier, 2009) and *media diversity* (cf. Zimmerman et al., 2014).

Dynamism: Dynamism, on the other hand, is the degree to which environmental elements change over time, or are in a constant state of flux (Duncan, 1972). For example, dynamic environments are those with ever-changing market conditions such as huge variations in

consumer preferences, massive fluctuations in demand, rapid advances in production technology, or the constant entry and exit of competitors (Volberda and van Bruggen, 1997). According to Boyne and Meier (2009), dynamic environments can be characterized by the frequency of change as well as the amplitude of this change (cf. Buchko, 1994; Dess and Beard, 1984; Wholey and Brittain, 1989). Whereas the frequency of change is dependent on the rate with which external events arise, the amplitude of change is subjected to the intensity of these event occurrences (Boyne and Meier, 2009). Likewise, Volberda and van Bruggen (1997) noted that both frequency and amplitude of change co-exist within dynamic environments: just as it is entirely plausible for firms to experience high frequency environmental changes with low intensity (e.g., day-to-day fluctuations in demand), it is equally likely for low frequency environmental changes to manifest with high intensity (e.g., a production technology becoming obsolete). In the same vein, we argue for dynamism as a core property of online anti-brand herd behavior and further posit that this dynamism originates from the *growth speed* and *persistency* of such herds (cf. Crane and Sornette, 2008).

*Munificence***:** According to Dess and Beard (1984), munificence is the extent to which environmental resources are accessible for sustained growth. Firms, which operate in industrial sectors with bountiful resources, are thus blessed with munificent environments (Boyne and Meier, 2009). Conceivably, social media, by virtue of its capacity for facilitating spontaneous peer-to-peer communication among consumers (Mangold and Faulds, 2009), can be said to be reminiscent of munificent environments for sustaining the continued growth of online herds. Romero et al. (2011), in analyzing common hashtags on Twitter, further noticed that discussions on social media are particularly contagious with repeated exposures continuing to exhibit unusually large marginal effects on diffusion. We therefore argue for munificence as a core

11

property of online herd behavior that is governed by opinion heterogeneity (cf. Mangold and Faulds, 2009) and topic reach (cf. Romero et al., 2011).

METHODOLOGY

To assess the characteristics of online environmental turbulence caused by distinct categories of anti-brand herd behaviors, we approached notable firms to establish when they had been targeted by anti-brand herds and what the topic of discussion was about. We then gathered data retrospectively about these anti-brand herds from databases of online messages that are maintained by Customer Relationship Management (CRM) companies for the purpose of monitoring (social) media activity relating to leading firms and industries. Descriptive analysis of this data yields novel insights into the evolution of online anti-brand herds. We further modeled the formation, growth, and dissolution of these online anti-brand herds in an attempt to shed light on the behavioral properties of such herds.

Data Collection

Data was gathered from online anti-brand herds that target firms based in the Netherlands. We concentrate our investigative efforts in the Netherlands for two reasons. First, we have decided to gather data in a language, which is constrained to a narrow geographical region, in order to reduce cross-cultural contamination when searching for anti-brand messages relating to a particular herd. Second, the Netherlands is the country with the highest level of social media usage within the Europe Union (EU) (Eurostat, 2013). In 2012, 65% of individuals in the Netherlands utilized the Internet for posting social media messages or instant messaging. This

figure is far above the 50% for the second highest European country, Luxembourg, and the 40% average for EU28 countries as a whole.

Two large companies, one from the financial sector and one from the telecom sector, consented to participate in the study. Both firms are not only household names in the Netherlands, but they are among the market leaders in their sectors. We interviewed directors and members of the corporate communications departments about the anti-brand herd occurrences that they had encountered between January 2011 and December 2013. They provided dossiers for each anti-brand herd occurrence, describing the topics discussed within the herd as well as when and how public statements were issued about these topics.

Our two firms outsource the monitoring of online brand activity to CRM companies that specialize in brand monitoring online. Each firm collaborates with a separate CRM company and we were granted access to all data gathered about online anti-brand herds encountered by the firm. Although the data consists primarily of publicly posted messages, these messages, when combined, form a commercially sensitive dataset as it reveals how the two firms were placed under tremendous pressure by mass consumer protests. We have thus agreed to keep the details of the two firms and the topics for these anti-brand herds confidential.

We solicited data via access to the databases of Sales Force Radian6 and Buzzcapture Brand Monitor. These CRM companies maintain databases on online brand sentiments that has been consolidated from a variety of data sources, which include (micro)blogs (e.g., forums, news sites, and Twitter), and social networking sites (e.g., Facebook).

Descriptive Statistics

We disregarded anti-brand herds with less than 100 messages because these topics, although sometimes identified by the firms as being relevant, apparently did not amass sufficient

grassroots attention and were often treated as web care incidents whereby individual complaints can be readily dealt with by a web care team. It is interesting to note that 37% of the anti-brand herds identified by the two firms as relevant, did not reach our 100 messages threshold. This implies that the two firms in question are quite sensitive to online anti-brand sentiments and pay attention to even very small herds. In consultation with the two firms, we further assessed how these firms had reacted to online anti-brand herds in terms of press releases, statements issued on each firm's website, as well as tweets from firm-related accounts. The type and timing of these interventions were incorporated into the data set.

Apart from firms' communications, all other anti-brand messages were categorized into one of three categories: (1) *primary media* comprising national newspapers and television shows; (2) *secondary media* comprising local newspapers and news aggregator sites, as well as; (3) *social media* comprising blogs, forums, Twitter and Facebook where individuals and the occasional groups offer opinions on topics of interest or commentaries about issues raised by primary and secondary media sites. Twitter messages account for 69% of the total number of messages in the social media category.

We are left with a dataset comprising 17 anti-brand topics that constitute an attack on one of the two firms, leading to 40 episodes with a total of 26,009 consumer messages (μ=650; σ=1,005), at an average of 1.29 messages per person (σ=0.15). We define an episode as a herding instance that conforms to a formation, growth, and dissolution pattern. Of the 17 topics, seven had a single episode and the other ten had multiple episodes, with an average of 2.35 episodes per topic. Episodes lasted between 14 hours and 23.7 days, with an average duration of 4.7 days per episode. An example of the formation, growth, and dissolution of anti-brand messages during an episode is depicted in Figure 2.

Insert Figure 2 about here.

Through an inspection of YouTube [https://www.youtube.com], Crane and Sornette (2008) distinguished among four formation, growth, and dissolution patterns for online herds as depicted in Figure 3. They employ 'views per day' as a measure and propose cutoffs at peak fractions of 20% and 80% of the total number. Adhering to the same logic, we evaluate the patterns exhibited by the episodes in our dataset, using messages per day, and notice that the peak fraction is always above 20%. This indicates that there are no endogenous growth patterns and all episodes are bursts of activity initiated by events external to the herd. In 75% of the episodes, the peak fraction lies between 20% and 80% of all messages (i.e., exogenous critical), suggesting that there is a prolonged period of turmoil after the initial surge of postings. Only 25% of the episodes died out quickly (i.e., exogenous sub-critical).

Insert Figure 3 about here.

In a recent study, Langley et al. (2014) described eight herding patterns prevalent on Twitter. They observed a dynamic transition between herding patterns, leading to a stampede (Langley et al., 2014). Anti-brand episodes in the present study however, show a different development as they increase rapidly in size and postings so much so that stampede is the default pattern as soon as the herd takes shape. This leads us to conclude that the dynamic transition path described by Langley et al. (2014) applies to endogenous critical herds and is less relevant for explaining online anti-brand herd behaviors in our dataset.

Firms may adopt the principle of 'stealing thunder'. By being the first to break the bad news, firms can not only frame negative topics in a favorable fashion, but they are also able to

disempower protesters (Arpan and Roskos-Ewoldsen, 2005; Wigley, 2011; Williams, et al., 1993). We note that in 25% of the episodes in our dataset, the firm in question applied the stealing thunder strategy. In other words, for the remaining 75% of the episodes, the two firms were either taken by surprise or they had other reasons to not seize the opportunity to steer the conversation.

In 27 of the 40 episodes, the firm made an intervention, in the form of a formal press release or an interview in the mainstream media. In only one of the episodes, the firm made multiple (four) such interventions. The time when the firm intervened after the onset of a herd was, on average, 13 hours (min = 0; max = 83). This implies that firms generally do not devote much time towards preparing a response. Rather, they felt the need to reply within the first day.

Model Development

In order to gain a better understanding of the formation, growth, and dissolution of online anti-brand herds, we develop an analytical model that is adapted from the Generalized Bass Model (GBM) (Bass, Krishnan and Jain, 1994). The GBM is a highly influential analytical model that incorporates parameters for the influence of marketing interventions, such as changes in price or promotion, on product diffusion. As the adopted behavior of consumers in this study is to contribute to an online herd, rather than to purchase a product, we include interventions from media sources and from the targeted firm itself.

$$H'(t) = \left(x(t)p + x(t)q\frac{H(t)}{m}\right)\left(m - H(t)\right) \quad (1)$$

$H'(t)$ is the growth of the herd at time t. The parameters p and q are related to the *dynamism* of the growth of the herd, whereby p represents the influence of the protest on individuals' likelihood to join the herd, and q represents the internal influence within the population of protestors (Gruen, Osmonbekov and Czaplewski, 2006). In this sense, the sum of p

+ *q* captures the growth rate of the herd and the ratio *q/p* reflects the strength of the word-of-mouth effect (Van den Bulte and Stremersch, 2004). The parameter *x(t)* is the intervention function and it is related to the *complexity* of influences acting on the herd, whereby *x(t)* is a vector of effects from both *primary media* (e.g., national newspapers and television programs), and *secondary media* (e.g., regional newspapers and news aggregators) as well as from *the targeted firm* itself. Finally, the parameter *m* represents the size of the potential market, and it is associated with the *munificence* of the environment, whereby we assume, for the purpose of simplicity, that each individual participates a maximum of one time in a protest.

The intervention function will be multiplied with *p* and *q* in the differential equation above, and hence its value at a particular point in time influences the growth of the herd at that time. Following Guseo (2007), we assume that an intervention's effect is immediately felt, with an exponential decay over time. Therefore, we compose *x(t)* as follows, assuming *n* different interventions occurring at times $a_1, …, a_n$:

$$x(t) = 1 + c_1 e^{b_1(t-a_1)} I_{t \geq a_1} + c_2 e^{b_2(t-a_2)} I_{t \geq a_2} + \cdots + c_n e^{b_n(t-a_n)} I_{t \geq a_n} \quad (2)$$

$I_{t \geq a_i}$ is the indicator function, which will be equal to 1 when $t \geq a_i$ and 0 if $t < a_i$. This means that the intervention can only have impact from time a_i onwards (since it occurs at time a_i). The exponent b_i is negative, and describes the persistency of the intervention effects, whilst c_i describes the depth and sign of the intervention effects: some interventions can slow down the herd growth ($c_i<0$), others will fuel it ($c_i>0$). If b_i is close to zero, the intervention effects have a strong persistency, while if b_i is large, the intervention effects only last shortly. We estimate the parameters in our model using nonlinear least squares, as implemented in the R package, nlsLM, by fitting the size function of the herd, *H(t)*, to the actual herd size as a function of time *t*, but after removing the daily and weekly pattern. To assess the effect of various influences (e.g., firm

and media) on the growth of the herd, it is imperative to take the normal daily and weekly patterns of online consumer activity into account. If an intervention is made just at the time when everyone is starting their day and becoming active online, then a growth in the herd may be independent of the intervention. Thus, when assessing the effect of an intervention and estimating the parameters stated above, we first remove this standard daily and weekly pattern from the data. Calculated on the basis of six months of online data mentioning a focal firm, we use multiplicative seasonal decomposition on the number of posts per hour. The results of this seasonal decomposition appear in Appendix 1.

We fit the parameters of each episode separately, and within such an episode we enforce the intervention parameters b_i and c_i to be the same for each occurrence of an intervention of the same type—i.e., primary media, secondary media, the firm's small interventions (e.g. Tweets), and the firm's large interventions (e.g. press releases)—in order to avoid over-fitting. Furthermore, we constrain the intervention parameters c_i to be between -10 and 10, in order to reduce skewing of the estimates.

Model Results

We start with an illustration of our model output for one episode. Afterwards, we report statistics and draw conclusions from the model results for all 40 episodes.

We consider the episode as plotted in

Figure 2. In this episode, a total of 5,642 consumer posts were registered. Furthermore, there were 104 primary media posts, 255 secondary media posts, 6 small firm interventions (e.g., tweets) and one large firm intervention. Fitting the model and estimating the parameters leads to the following: $p = 0.0057$, $q = 0.56$ and $m = 4499$. The reason that the fitted m is lower than the actual number of consumer posts stems from the fact that the model estimates *deviation* from the

standard daily and weekly pattern (see Appendix 1). In Table 1 the specific intervention parameters for this episode are given:

Insert Table 1 about here.

Notice that q is almost 100 times larger than p in this episode, indicating a high word-of-mouth effect and relatively high internal influence within the population of protestors. The intervention parameters indicate that on average, primary and secondary media fueled the growth of the herd, though the effect is small. Postings in primary media have a shorter persistency compared to those in secondary media. Whereas small firm interventions (i.e., tweets) were found to be effective in slowing the growth of the herd for this particular episode, the reverse is true for the single large firm intervention in that it accelerated the growth of the herd with quite long persistency. In Figure 4 below, we depict the original hourly data (the same as in

Figure 2), together with the model fit, adjusted by adding the daily and weekly patterns that had been subtracted during the fitting procedure.

Insert Figure 4 about here.

In Table 2 below, we display the mean and median of the estimated parameters p, q, m and the derived parameters $p+q$ and q/p, as well as a summary of the intervention parameters, for the 40 episodes included in this study. The reason for showing the median is that the empirical distribution of the parameters is not symmetric, signifying that the mean itself might be misleading. It can be seen that for half of the episodes, q is more than 7 times larger than p, and the very high q/p ratio indicates that online anti-brand herds exhibit a very strong word-of-mouth effect as anticipated.

Insert Table 2 about here.

Primary media postings occurred in 38 of the 40 episodes. Secondary media postings occurred in 37 of those 38 episodes, and in one episode where there was no primary media involvement. On average, there are 40 primary media postings per episode and 242 secondary media postings. There are 21 episodes where primary media interventions appear to slow herd growth, and 17 episodes where they seem to fuel herd growth. On the other hands, secondary media postings more often tend to fuel herd growth (i.e., 24 episodes), while in 14 episodes they slow herd growth. In general, primary media interventions have a stronger immediate effect (whether positive or negative) than secondary media interventions even though the effect of secondary media interventions exhibits longer persistency. Of the 40 episodes, 27 contain large interventions by the firm (e.g., press releases), and 28 contain small interventions by the firm (e.g., a tweet). 20 episodes have both small and large firm interventions. There are 10 episodes where the firms' large interventions slow herd growth, and 17 episodes where the large interventions fuel herd growth. We see comparable numbers for the firms' small interventions: in 8 episodes the firms' small interventions slow herd growth, while in 17 episodes the small interventions increase herd growth. Overall, firms' large interventions have the strongest immediate effect on the herd (whether positive or negative), followed by firms' small interventions, primary media interventions, and, lastly, secondary media interventions. The persistency of the effect of firms' small interventions is comparable to the persistency of the effect of secondary media interventions, while the effect of firms' large interventions exhibits shorter persistency.

A TYPOLOGY OF ONLINE ANTI-BRAND HERDS

In this section, we advance a novel typology of online anti-brand herd behaviors in accordance with the principles of environmental turbulence (Volberda and van Bruggen, 1997; Dess and Beard, 1984). To the best of our knowledge, no such typology exists within extant literature. Consequently, our typology could aid scholars in generating new insights into the dynamics of online anti-brand herd behaviors. Studies may focus on a single category of online anti-brand herd behavior or compare effects among different categories. Our typology could also facilitate managers in appreciating characteristics associated with different categories of online anti-brand herd behaviors such that how firm interventions can be targeted and purposeful.

There are many different approaches for developing typologies in information systems literature, including case studies (Kietzmann, et al., 2013), experiments (McKnight, Choudhury and Kacmar, 2002), interviews (Cram and Brohman, 2013), and content analysis (Feller, Finnegan and Nilsson, 2011). Hence, there is no single optimal method for systematically developing a typology. For the purpose of this study, we have adopted an inductive approach, which is appropriate for structuring emerging phenomena (Maxwell, 2005). As such, we base our typology on characteristics of online anti-brand herds that emerge from our observations and data analysis. Particularly, two key differentiating factors arose from a close scrutiny of our cases. First, there is a major difference between *novel* topics, in which new issues are brought to light which the firm has not had to deal with before, and *repeat* topics, whereby subsequent herding episodes occur based on the same topic as in previous episodes. Clearly, wholly novel topics pose a different kind of challenge to firms, as they would have to cope with a situation they have not encountered before. For consumers and the media, novel topics constitute newsworthy stories whilst repeat episodes return to issues which the public is already aware of. Second, an important differentiator between herds is the breadth of the relevance of the topic; is

it about issues which are only pertinent to the firm's customers, or is it about issues which are relevant to a much wider audience? This is related to a proposition for future research by Park and Lee (2009), who predicted discrepancies in word-of-mouth effects for topics pertaining to morality versus those related to a firm's capability—what we term as values-inspired versus product-inspired topics. On the one hand, topics on morality or values may appeal to the broader community than discussions centered on a single firm's product (Skowronski and Carlston, 1987), as most firms' customers represent only a subset of the entire population. On the other hand, those directly affected by problems with a specific product may be more inclined to join an anti-brand herd than those people who are indirectly interested in a values-based discussion. In Table 3, we summarize a range of characteristics combining these two key differences between herds, and measures related to the three dimensions of environmental turbulence: *complexity*, *dynamism* and *munificence* (Dess and Beard, 1984). We observe a number of significant differences among the environmental turbulence dimensions for the four types of online anti-brand herds, on the basis of ANOVA analyses comparing product- vs. values-inspired herds, first vs. subsequent episodes and across all four online anti-brand herd categories using Tukey post-hoc tests. We group the observed parameters into the three dimensions of environmental turbulence proposed by Dess and Beard (1984).

Insert Table 3 about here.

Complexity: There is a significant difference between first vs. subsequent episodes and also a difference between product- and values-inspired herds. With respect to contributor heterogeneity, we observed a significantly larger number of unique contributors in herd episodes when the topic is new, i.e. first episodes, as compared to subsequent episodes when the topic has

been the focus of a previous herd episode ($F_{(1, 38)}$ = 7.213, $p < .05$). This may be due to subsequent episodes appealing to a core group of engaged protestors with entrenched interest in the topic, thereby leading to simplified interactions. First episodes, on the other hand, due to their novelty, are likely to appeal to a larger set of protestors, thus leading to more sophisticated interactions. With respect to media diversity, we observed significantly higher activity in secondary media (e.g., local newspapers and news aggregator sites) for values-inspired herds as compared to product-inspired herds ($F_{(1, 38)}$ = 4.568, $p < .05$). There are many news aggregator sites with a values-based focus, such as sites gathering news on environmental issues, and these will increase interdependencies among protestors and media in the firm's environment.

Dynamism: Key differences exist primarily between product-inspired and values-inspired herds with the former exhibiting more dynamic herd behavior. With respect to word-of-mouth, we measure a significantly stronger word-of-mouth effect for product-inspired herds, based on our model estimates of the ratio of p and q ($F_{(1, 38)}$ = 3.123, $p < .1$). We speculate that this is due to the immediacy felt by a firm's customers when defects are detected for the products being sold by the firm. Consumers may well feel strongly about values-inspired topics but they may consider these to be long-term issues that do not illicit an immediate response. With respect to herd persistency, we also observed more dynamism for product-inspired herds, in terms of higher persistency of participation after the initial peak ($F_{(1, 38)}$ = 4.429, $p < .05$). This resembles the exogenous critical online pattern described above (Crane and Sornette, 2008). Again, due to the personal involvement of a firm's customers with its products, protestors are likely to linger on even after the initial news has broken.

Munificence: We again observe a difference between first and subsequent episodes as well as a difference between product- and values-inspired herds. With respect to topic reach, our

model generates an estimation of the size of the potential audience for a herd topic, *m*. This is based on the Bass model estimation of the size of the potential market for a product. There is a significantly larger audience for first-time episodes as compared to subsequent episodes on the same topic ($F_{(1, 38)} = 7.858$, $p < .01$). This may be due to the general attention-grabbing nature of novel topics that spark the interest of most protestors. Conversely, when the same people see the same topics re-emerge, many of the original protestors would have already move on to other matters and do not deem such topics as being newsworthy any longer. With respect to opinion heterogeneity, we calculate the number of unique hashtags included in messages within the herd, relative to the size of the herd. We observe a significantly higher proportion of hashtags in product-related herds, indicating that these herds offer a wider range of subtopics which potential protestors can relate to ($F_{(1, 38)} = 3.089$, $p < .1$). We suspect that this may be due to a certain degree of group-think in values-related communities, where a single dominant view or a small number of subtopics emerge which are then repeated by many herd members.

When we relate the effects of firm interventions on the herds to the four categories of online anti-brand herd behaviors presented in Table 3, we observe that the parameter *c* from our analytical model relating to the firm's large interventions (e.g., press releases or interview), which estimates the effect of the intervention on the growth of the herd, is significantly higher for product-inspired vs values-inspired herds ($F_{(1, 38)} = 8.274$, $p < .01$). This implies that when firms intervene in product-related topics, the herd is more likely to grow. Post-hoc analysis shows that this effect is particularly strong for product-related, subsequent episodes. We believe that this is due to the personal involvement of a firm's customers in discussions related to product defects. These customers react more often in response to a firm's communication activities. This observation represents an interesting avenue for future research.

DISCUSSION

In this paper, we adopt a dual approach to investigate online anti-brand herd behavior. First, employing environmental turbulence as our theoretical lens, we present a normative method for distinguishing among distinct categories of online anti-brand herds. This provides us with a basis for making sense of what is happening when brands come under attack in an online setting. As such, our study assists firms in predicting the outcomes of herd development in relation to the environmental turbulence of their situation, from stakeholders, social interactive behaviors and topic content. Second, we take modest but concrete steps towards assessing the influence of interventions from both media sources, and corrective measures from firms to prevent herds from growing and damaging their brands. This yields insights into plausible ways that a herd can be steered by its target firm and helps in prescribing viable approaches a firm could take in any given circumstances.

We are now able to formulate propositions for each of the four categories of online anti-brand herd behaviors shown in Table 3. We go on to discuss the scientific contribution and the managerial relevance of this study together with potential limitations of the present study.

Propositions

We formulate six propositions, of which the first four are related to normative herd turbulence properties, relating each of the four categories of online anti-brand herd behavior to expected outcomes with respect to the three environmental turbulence dimensions of *complexity*, *dynamism* and *munificence*. The last two propositions are related to the corrective interventions which firms can make. The propositions guide future research on this subject. We refer to novel vs. known topics and to product-inspired vs. values-inspired topics as the focus of the herds, which have been defined earlier in this paper.

Proposition 1: Online anti-brand herds which focus on a novel topic which is product-inspired, exhibit high complexity, high dynamism and high munificence.

Proposition 2: Online anti-brand herds which focus on a known topic which is product-inspired, exhibit low complexity, high dynamism and low munificence.

Proposition 3: Online anti-brand herds which focus on a novel topic which is values-inspired, exhibit high complexity, low dynamism and high munificence.

Proposition 4: Online anti-brand herds which focus on a known topic which is values-inspired, exhibit high complexity, low dynamism and low munificence.

Proposition 5: Online firm interventions have a stronger effect on the dynamism of product-inspired herds than of values-inspired herds.

Proposition 6: Online firm interventions have a stronger effect on the dynamism of online anti-brand herds which focus on a known topic than of those which focus on a novel topic.

In empirical tests of these six propositions, dependent variables are the herds' turbulence properties, in terms of complexity, dynamism and munificence. The measures which we describe above, and which are summarized in Figure 1, offer researchers with a useful starting point for operationalizing these constructs, although a number of other measurements are possible.

The independent variables in empirical tests of the first four propositions are simply the attributes of the topic of focus of the online anti-brand herd: whether it is product-inspired vs. values-inspired and whether it is a first episode or subsequent episode of a topic. As such, we believe that testing these propositions is feasible with publicly available data. For the last two propositions relating to firm interventions, the independent variables are the firm's own

interventions and the reporting carried out by primary and secondary media. This is related to studies of communication science and, in particular, crisis management.

Implications to Theory

Our study contributes to extant literature in three ways. First, we offer valuable insights into the properties of online herds, especially those herds with an anti-brand orientation. Three of the properties are in line with the recent paper by Langley, et al. (2014), namely the size of the herd, the speed with which it grows and the diversity of the members' opinions. Other relevant herd properties include the active involvement of both primary and secondary media and the post-peak viral effect indicating a critical pattern (c.f. Crane and Sornette, 2008). By linking these herd properties to the theoretical notion of environmental turbulence, we contribute to literature on firm environment by contextualizing the three dimensions of complexity, dynamism and munificence to match illuminative properties (i.e., contributor heterogeneity, media diversity, growth speed, herd persistency, opinion heterogeneity and topic reach) associated with online environmental turbulence. Second, we developed measures of these dimensions by applying an adapted version of the Generalized Bass Model (Bass, Krishnan and Jain, 1994), and we present statistics on the properties of 40 episodes of online anti-brand herds. In a way, we offer empirical evidence of the drivers of herd formation, growth, and dissolution. Third, we advance a novel typology of online anti-brand herd behaviors by distinguishing among herds with different topic characteristics. On the one hand, the topic with which a herd is concerned can be a novel subject which has not led to the development of a herd before, or it can be a known topic which the firm has dealt with before. On the other hand, the topic can be product-inspired, and predominantly relevant for the customers of the firm in question, or it can be values-inspired, and relevant to a far wider section of the population. We thus arrive at a new

conceptual division among various categories of online anti-brand herds that allow us to formulate propositions, to guide theory development.

In our empirical study, we show that firm interventions influence the growth and dissolution of anti-brand herds. We also show that a firm's large intervention, such as a TV interview or a press release, has a larger effect than a small online intervention but that this effect of large interventions less persistent is than that of small interventions. One key difference between these two courses of action is that large interventions are aimed at a broad audience, whereas small interventions are more personal, addressing questions or concerns of an individual, such as when a firm tweets a reply to a single customer. On Twitter, very many messages are directed to individuals, even though many other people may be able to read them.

Added to this, we find empirical evidence that firm interventions have a larger effect on the dynamism of the herd than media communications do. Interestingly, firm interventions particularly have an effect on herds focused on product-inspired topics, but these interventions reinforce rather than diminish herd growth. Although this may suggest that firm interventions are counterproductive, as the targeted firm presumably intended for their action to slow the growth of the herd, others have argued that even anti-brand herds may have positive effects for the firm being targeted (Holt, 2002): "*The Internet provides an open forum for discussion about branding activities and it also serves as a free marketing research tool.*" (Hollenbeck and Zinkhan, 2006 p.484). Consequently, it may be the case that firms need not try to avoid large anti-brand herds at all costs, but rather that they are well advised to participate in these discussions as a means to better understand consumer sentiments, and to forge better relationships with them. Indeed, the Chinese phrase for 'crisis' is composed of two characters, one for 'danger', and one for

'opportunity', capturing quite nicely the idea that firms should be open to business possibilities afforded by engaging online anti-brand herds in open dialog.

Implications for Practice

Our analysis of instances of anti-brand herd behavior is of an inherently applied nature. The properties of anti-brand herds which we have measured, and the model we present for estimating herd behavioral characteristics, together offer new insights for both brand managers and (social media) communication managers. This study is the first of its kind to advance a novel typology comprising four categories of online anti-brand herd behaviors and we further illustrate how these different anti-brand herd behaviors vary in terms of their complexity, dynamism and munificence. This in turn offers a structured understanding of online anti-brand herds and can help managers to be more aware of the situation in which they find themselves. Finally, we also offer insight into the effects of crisis communication interventions applied during episodes of anti-brand herd behavior. Though our empirical findings do not translate into a simple guidebook of when or how to intervene in anti-brand herding situations, this study aids in unravelling the intricacies among consumers, media and firm interactions in online environments.

Limitations

One limitation of this study is the reliance on herds attacking two firms based in the Netherlands. Future research can expand the empirical dataset to further refine our understanding of environmental turbulence that originates from online anti-brand herds. A second limitation is that we only analyze *whether* the targeted firm intervenes in the present study and we do not assess the effects of *which* intervention is carried out. Prominent in the literature on intervention strategies in response to negative information is the work of Oliver (1991), describing strategic behaviors that organizations may enact in response to pressures toward conformity with the

institutional environment. Five types of strategic responses are proposed by Oliver (1991), which vary in active agency by the organization from passivity to increasing active resistance: acquiescence, compromise, avoidance, defiance, and manipulation. Oliver (1991) conceived these reaction strategies as dependent variables and demonstrated how situational characteristics lead organizations to favor one tactic or another. Another approach which may be highly relevant for comprehending firms' response to anti-brand herding, is the Situational Crisis Communication Theory (SCCT) (Coombs, 2007). The SCCT aims to provide guidance to firms on how to react in order to reduce reputational damage and manage stakeholder perceptions. In this approach, various types of action are proposed as a means to repair damage done to the firm's reputation, to reduce consumers' negative affect and to prevent negative behavioral intentions. Founded on the idea that a firm in a crisis needs to exhibit responsible and accountable actions, the categories of crisis communication espoused in this theory include denial of the crisis, diminishing the perceived damage and rebuilding reputation. Besides these primary reactions, secondary response strategies are also proposed, aimed at bolstering the firm's reputation. These secondary response strategies involve reminding stakeholders of good past performance and claiming victimization. Both of these approaches offer a basis for further research into the effects of firm-specific response strategies when confronted by online anti-brand herds. Last, this study included 'stealing thunder' as a proactive firm strategy to counter anti-brand herds. Future research could also take the timing of reactive and proactive response strategies of targeted firms into account. As illustrated by the Asiana Airlines example in the introduction, the customers' expectations and evaluations of the timing of firm interventions might change over time.

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APPENDIX 1

Seasonal decomposition of online messages relating to one of the firms involved in the study during a period of six months.
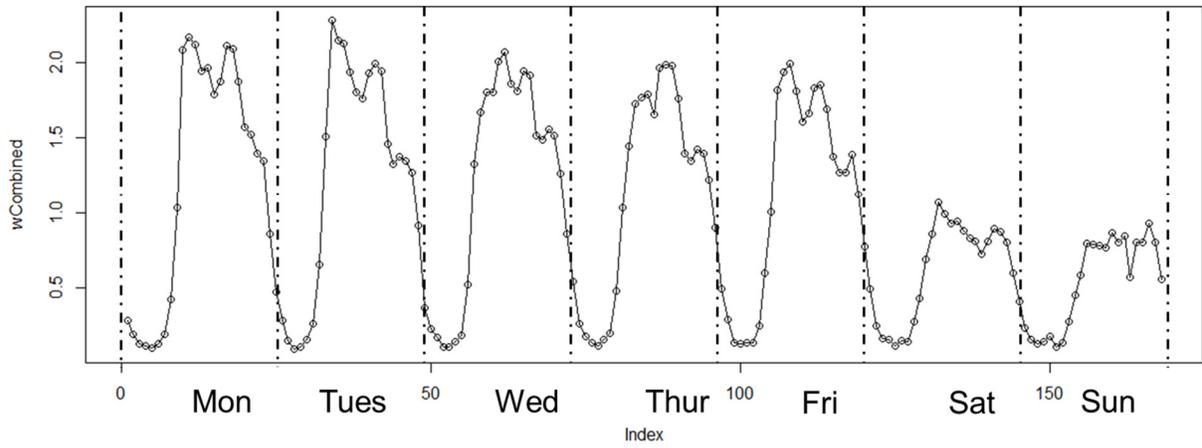
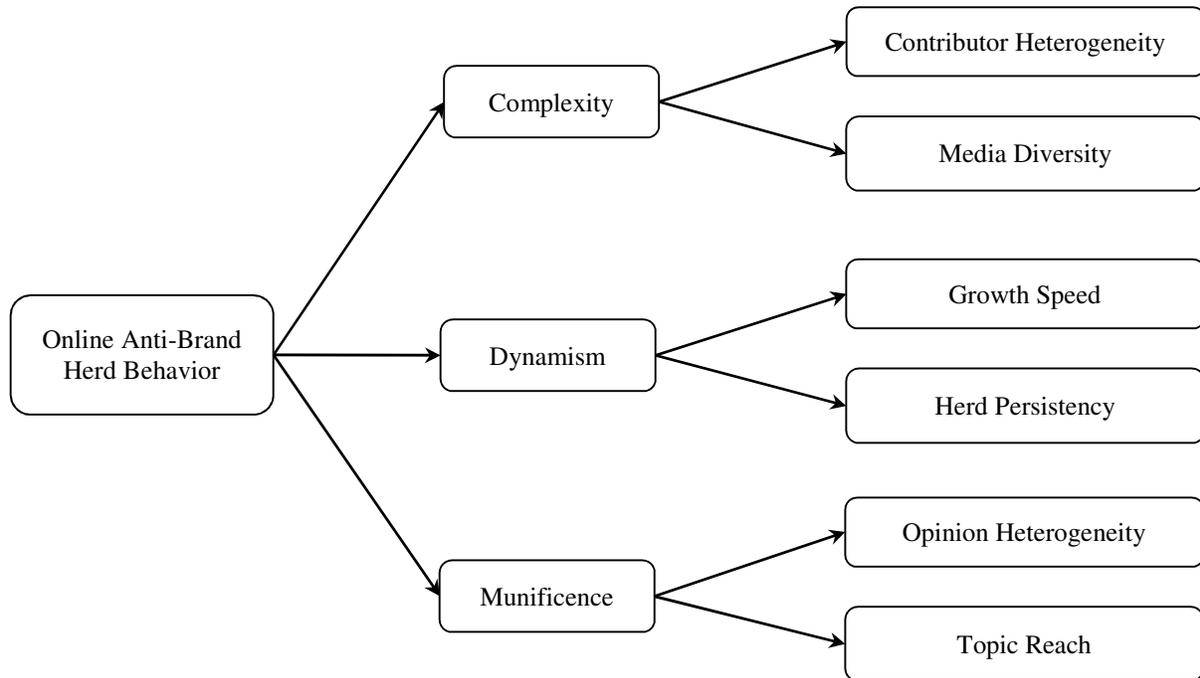**FIGURE 1**

Dimensionality of Online Anti-Brand Herd Behavior

FIGURE 2

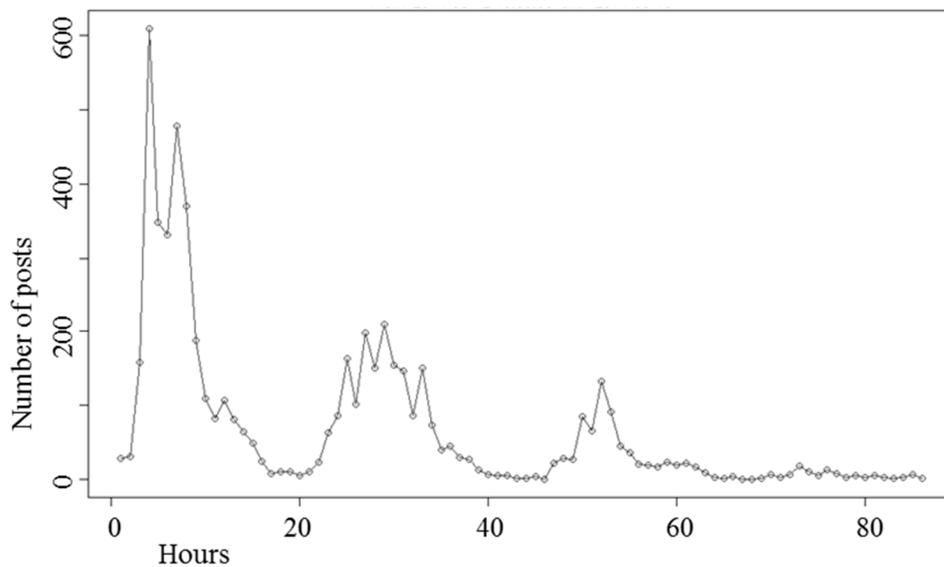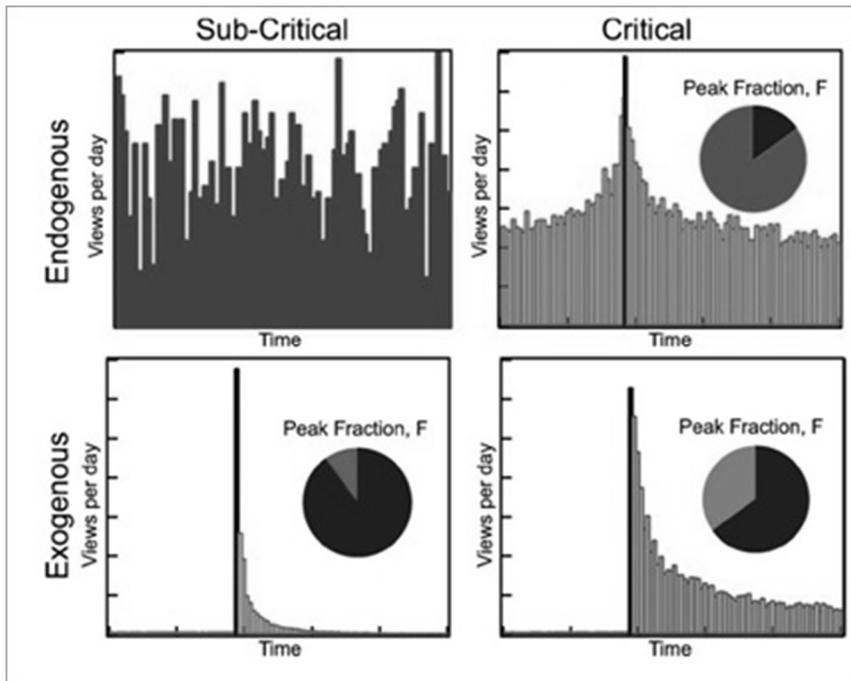**Hourly number of anti-brand messages for one episode**

FIGURE 3

Four types of social media herding patterns based on the peak fraction (from Crane and Sornette (2008))

FIGURE 4

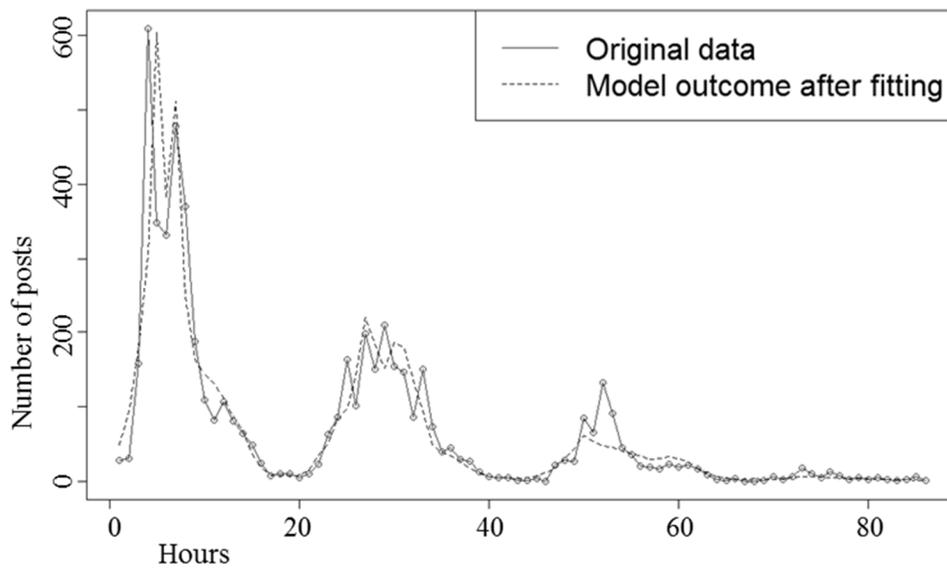**Hourly number of anti-brand messages for one episode**

TABLE 1

Estimated intervention parameters for one specific episode of online anti-brand herding

Estimated parameters	c_i	b_i
Primary media	0.0081	0.25
Secondary media	0.0015	0.092
Small firm interventions	-0.33	0.013
Large firm intervention	1.28	0.029

TABLE 2

Summary of parameter estimates for 40 episodes of online anti-brand herding

		Mean	Median
p		0.046	0.005
q		0.173	0.034
$p+q$		0.219	0.066
q/p		1841	7.011
m		757	440
Intervention parameters:			
Primary media	c_i	0.896	-0.032
	$|c_i|$	1.599	0.249
	b_i	1.441	0.253
Secondary media	c_i	0.377	0.019
	$|c_i|$	0.587	0.064
	b_i	0.827	0.129
Firm small interventions	c_i	1.301	0.171
	$|c_i|$	5.048	4.029
	b_i	0.826	0.195
Firm large interventions	c_i	2.967	1.177
	$|c_i|$	2.878	1.508
	b_i	1.610	0.213

TABLE 3

Characteristics of four types of online anti-brand herds[a]

Environmental Turbulence Dimensions	Parameter	Online anti-brand herd category			
		Product		Value	
		First episode	Subsequent episode	First episode	Subsequent episode
Complexity					
	Number of unique contributors	▓▓▓		▓▓▓	
	Involvement of secondary media			▓▓▓	▓▓▓
Dynamism					
	Word-of-mouth	▓▓▓	▓▓▓		
	Critical post-peak viral effect	▓▓▓	▓▓▓		
Munificence					
	Size of potential audience, m	▓▓▓		▓▓▓	
	Diversity of hashtags	▓▓▓	▓▓▓		

[a] Shaded areas indicate significantly stronger outcomes of the measured characteristics.