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Modeling the relationship between firm and user generated content and the stages of the marketing funnel☆

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ABSTRACT

While research has successfully linked social media to separate customer metrics, an in-depth conceptual and empirical understanding of how social media affects the stages of the marketing funnel is currently lacking. We draw on extant theories of consumer information processing and source credibility to conceptually link and contrast the relationships between firm generated content (FGC) dimensions of neutral *valence*, positive *valence* and *vividness*, user generated content (UGC) dimensions of *volume* and *valence* and the marketing funnel stages of awareness, consideration, purchase intent and satisfaction. Using daily aggregate brand-level data for 19 brands across seven industries, our analysis shows that UGC dimensions have a stronger relationship with awareness and satisfaction while FGC dimensions are more effective for consideration and purchase intent. Specifically, we observe that FGC *vividness* has the strongest relationship with consideration and purchase intent, while UGC *valence* dominates UGC *volume* for these stages. Our results also show that brands with higher corporate reputation have stronger relationships between dimensions of FGC and the marketing funnel stages. Findings by consumption category show that UGC and FGC dimensions have larger positive relationships with awareness for durables and non-durables, and with consideration, purchase intent, and satisfaction for services. Thus, overall, our study offers critical managerial insights into social media marketing regarding how to leverage both FGC and UGC in managing the marketing funnel and brand reputation.

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1. Introduction

With the accelerating digital revolution, brands are gradually shifting towards social media as their mainstream marketing communications channel (The CMO Survey, 2018). Increasingly brands design, post and manage different types of content on social media platforms to engage with their customer base, increase awareness and interest of their products, and possibly influence their customers' purchase behaviour (Batra & Keller, 2016). While by default such Firm Generated Content (FGC) is professionally designed and managed by the brand's marketing team, social media platforms also allow users to create their own content such as

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user posts on brand pages, and comments, shares, and likes on brand posts. Such User Generated Content (UGC) differs from FGC in that while the former reflects the “wisdom of the crowd”, the latter is part of “social advertising” about the brand.

The effectiveness of social media has become a central issue in marketing research. In this stream of research, studies have thoroughly investigated the performance consequences of UGC in terms of sales (Babić Rosario, Sotgiu, De Valck, & Bijmolt, 2016) and stock market performance (Tirunillai & Tellis, 2012). Other studies have contrasted the effects of UGC, FGC and traditional media in their impact on above mentioned performance metrics (e.g. Kumar, Bezawada, Janakiraman, & Kannan, 2016). However, marketing research has recently acknowledged that the social media-firm performance link largely occurs through its effect on consumer attitudes and behaviour (e.g. Hewett, Rand, Rust, & van Heerde, 2016), and has thus called for more emphasis on investigating the effectiveness of social media on customer-related metrics (Bharadwaj, 2015). In this respect, studies have looked at the relationships between FGC, UGC and hard marketing metrics, including acquisition, purchases as well as soft marketing metrics such as consumer attitudes. For example, de Vries, Gensler, and Leeflang (2017) investigate the effect of social media on customer acquisition. Kumar et al. (2016) examine the effect of social media on the customer engagement and purchase process. Finally, Hewett et al. (2016) show that corporate communications, news media, and user-generated content on social media create an “echoverse” for brand communications in their effect on consumer attitudes and bank deposits. Table 1 presents a review of existing marketing literature on the topic.

Taken together these studies provide the initial evidence and intuition behind the relationship between FGC, UGC and the entire marketing funnel composed of awareness, consideration, purchase intent and satisfaction. Research has shown that these sequential stages are important for terminal financial metrics such as sales or stock market performance, as well as for customer acquisition and retention (Petersen, Kumar, Polo, & Javier Sese, 2018). However, research has not yet provided a theoretical rationale for, nor empirically investigated, the relationships between multiple dimensions of FGC and UGC and the sequential stages of the entire marketing funnel.

Against this background, the aim of this study is to address the following research questions.

- (1) *What is the theoretical rationale behind the relationships between FGC, UGC and the marketing funnel consisting of awareness, consideration, purchase intent and satisfaction?*
- (2) *Which dimensions of FGC and UGC have the strongest relationship with each stage of the marketing funnel?*
- (3) *What are the possible boundary conditions of such relationships?*

To answer these questions, we build a theoretical framework based on theories of consumer information processing and source credibility to link FGC neutral and positive *valence*, FGC *vividness*, UGC *volume* and *valence* with the four stages of the marketing funnel: awareness, consideration, purchase intent and satisfaction. UGC *volume* and *valence* capture the frequency and sentiment of UGC, respectively. The volume of FGC captures the frequency of brand posts, FGC *valence* captures their sentiment and FGC *vividness* captures their richness ranging from text to videos. We collect a unique dataset for 19 brands across seven industries.

Table 1
Review of relevant studies.

Study	Multiple dimensions of FGC	Multiple dimensions of UGC	Performance metric	Moderators	Level of analysis	Multiple markets
Stephen and Galak (2012)	✓	✓	Sales	✗	Firm-level	✗
Tirunillai and Tellis (2012)	✗	✓	Firm value	✗	Firm-level	✓
Goh, Heng, and Lin (2013)	✓	✓	Sales	✗	Firm-level	✗
Scholz, Landherr, Dorner, and Probst (2013)	✗	✓	Awareness, interest, purchase	✗	Firm-level	✗
Nam and Kannan (2014)	✗	✓	Firm value	Brand strength	Firm-level	✓
Schulze, Schöler, and Skiera (2014)	✓	✓	Reach	Utilitarian/hedonic products	Firm-level	✓
Stephen, Sciandra, and Inman (2015)	✓	✓	Engagement	Audience mix	Firm-level	✓
Srinivasan, Rutz, and Pauwels (2015)	✗	✓	Sales	✗	Firm-level	✗
Kumar et al. (2016)	✓	✗	Spending, cross-buying and customer profitability	✗	Customer-level	✗
Hewett et al. (2016)	✓	✓	Customer Attitudes and Bank deposits	✗	Firm-level	✗
de Vries et al. (2017)	✗	✓	Brand-building metrics and customer acquisitions	✗	Firm-level	✗
Colicev, Malshe, Pauwels, and O'Connor (2018)	✗	✓	Abnormal returns and risk	Utilitarian/hedonic products	Firm-level	✓
This study	✓	✓	Marketing funnel: Awareness, consideration, purchase intent, satisfaction	• Corporate reputation • Consumption category	Firm level and supplementary study at customer level	✓

For these brands, we collect daily-level FGC and UGC dimensions from Facebook, marketing funnel stages from YouGov and control variables from Kantar, CRSP and Lexis Nexis databases. For empirical analysis, we employ the Panel Vector Auto Regression (PVAR) model.

Overall our study offers the following contributions and implications. First, we propose a conceptual framework that links FGC and UGC dimensions to the stages of the marketing funnel thus contributing to the research stream on theoretical foundations of social media effectiveness (Kannan & Li, 2017). Specifically, we build on consumer information processing theory to argue that FGC and UGC have distinct informative and persuasive effects on consumers in each stage. The informative effect is prevalent in the awareness stage, in which higher exposure to brand identifiers generates brand recall. We find that both UGC *volume* and UGC *valence* have a positive relationship with awareness, which is stronger than that of FGC dimensions. In contrast, persuasive effects dominate in the consideration and purchase intent stages. In this respect, we draw from source credibility theory that postulates that the interplay between source expertise and source trustworthiness determines the strength of persuasive effects of FGC and UGC. Given that FGC has higher source expertise that prevails over the higher source trustworthiness of UGC, it should have a stronger persuasive effect on consumers. Empirically, we find that FGC *vividness* has the strongest relationship with consideration and purchase intent, which prevails not only over other dimensions of FGC but also over dimensions of UGC. This finding adds to the stream of research that compares the effects of source expertise and trustworthiness on consumer attitudes and brand sales (e.g. Erdem & Swait, 2004). We also find that FGC has a weaker relationship with satisfaction than UGC.

Second, based on source credibility theory, we hypothesize that brands with a higher (vs. lower) corporate reputation have higher source trustworthiness of FGC and thus a stronger relationship with consideration and purchase intent. Indeed, we find that highly reputable brands benefit from all FGC dimensions while brands with a low corporate reputation must be careful in designing FGC strategies that can backfire. Specifically, such brands have almost no leverage from FGC in the consideration and purchase intent stages, with FGC positive and neutral *valence* having a negative effect. Thus, such brands should first try to increase their corporate reputation before engaging in social media content strategies. One positive finding for such brands is that the effects of UGC are mostly positive, suggesting that they can still benefit from their official presences on Facebook by encouraging the creation of brand-related UGC. In terms of consumption categories, we find that UGC and FGC dimensions have stronger positive relationships with awareness for durables and non-durables than for services. We also find a larger, positive, relationship between UGC, FGC and consideration, purchase intent and satisfaction for services. Given that service brands typically have more customer-oriented social media pages, they can effectively persuade consumers and offer efficient customer post-purchase service.

Third, our finding that FGC prevails over UGC in consideration and purchase intent stages adds to the debate on relative effectiveness of social media content. Previous research has provided extensive evidence of a stronger relationship between UGC (vs. FGC) and firm performance (Colicev et al., 2018; Goh et al., 2013). While we confirm that UGC has a stronger relationship with the top (awareness) and bottom (satisfaction) metrics of the marketing funnel, FGC has a stronger persuasive effect on the mid-funnel metrics (consideration and purchase intent). This implies that, conditional on awareness, FGC should more effectively translate into sales than UGC. This finding adds to the stream of research that argues for the power of brand generated content on social media (e.g. Kumar et al., 2016). One of the reasons behind these contrasting findings is that most previous research has considered solely the volume of FGC, without decomposing it into its multiple dimensions, as is the case in our study. Once FGC dimensions are investigated separately, we observe a strong positive relationship with the mid-funnel metrics, especially for FGC *vividness*. This should add more firepower to CMO's agendas when arguing for a positive return on investment on social media.

2. Research background

2.1. Firm generated content (FGC) and user generated content (UGC)

Firm Generated Content (FGC) is defined as content created by marketers on official brand pages on social media channels (Kumar et al., 2016; Stephen & Galak, 2012). Examples of FGC on Facebook include textual brand posts promoting latest deals or brand-created videos about new product launches. For example, studies have shown that the volume of FGC is related to higher customer purchases and brand sales (Kumar et al., 2016). In this study we consider all relevant content characteristics of FGC that are part of brands' content strategies on social media. FGC *volume* captures the frequency of brand posts, FGC *valence* captures their sentiment which can be positive, negative¹ or neutral and FGC *vividness* captures their richness ranging from text to videos.

User Generated Content (UGC) is defined as brand-related content created by users (Tirunillai & Tellis, 2012). Examples of UGC on Facebook include user posts on the brand's wall; engagement with brand posts by liking, sharing and commenting; as well as user-created stories about the brand. The most relevant dimensions of UGC, highlighted in previous research, are *valence* and *volume* (see recent meta-analysis by Babić Rosario et al., 2016). In our study, UGC *volume* captures the frequency of UGC while UGC *valence* captures the sentiment contained in such posts.

¹ We note that brands rarely use negative language in their social media communications (Hewett et al., 2016) (in our case <0.01% of the posts) and thus FGC negative *valence* is not considered in this study.

2.2. The marketing funnel

The marketing funnel is generally accepted to be composed of four stages: awareness, consideration, purchase intent and satisfaction (De Haan, Wiesel, & Pauwels, 2016; Rogers, 1995). Awareness refers to the extent to which customers know of a brand's existence; consideration involves customers' willingness to potentially buy from the brand; purchase intent implies that customers have mentally committed to a purchase; while customer satisfaction captures the post-purchase product experience. While many marketers prioritize the consideration and purchase intent stages, due to their direct link to firm sales, both awareness and satisfaction help determine progression towards purchase and loyalty, respectively (Oliver, 1999). In the next section, we provide the conceptual underpinnings of the relationships between FGC, UGC and each stage of the marketing funnel based on the theories drawn from consumer information processing and source credibility.

3. Conceptual framework

In Fig. 1, we summarize our conceptual framework. We draw on extant theories of consumer information processing and source credibility to argue how, why and to what extent FGC and UGC can affect the stages of the marketing funnel. Initially, we discuss the two main effects of FGC and UGC on consumer behaviour: the informative effect and the persuasive effect. Next, we build on source credibility theory that argues that the persuasive effect depends on source trustworthiness and source expertise. Finally, we argue that brands with higher corporate reputations can offset the lower trustworthiness of FGC.

3.1. Informative and persuasive effects of FGC and UGC

Consumer information processing theory postulates that marketing communications have two effects on consumers: an informative effect and a persuasive effect (Herr, Kardes, & Kim, 1991; Riley, Hovland, Janis, & Kelley, 1954). The informative effect supposes that marketing communications, such as FGC and UGC, makes consumers aware of a brand's existence and its characteristics. Similarly, the persuasive effect supposes that content can convince consumers of brands' benefits and persuade them to buy the brand's products (Herr et al., 1991). As discussed above, the persuasive and informative effects determine how and to what

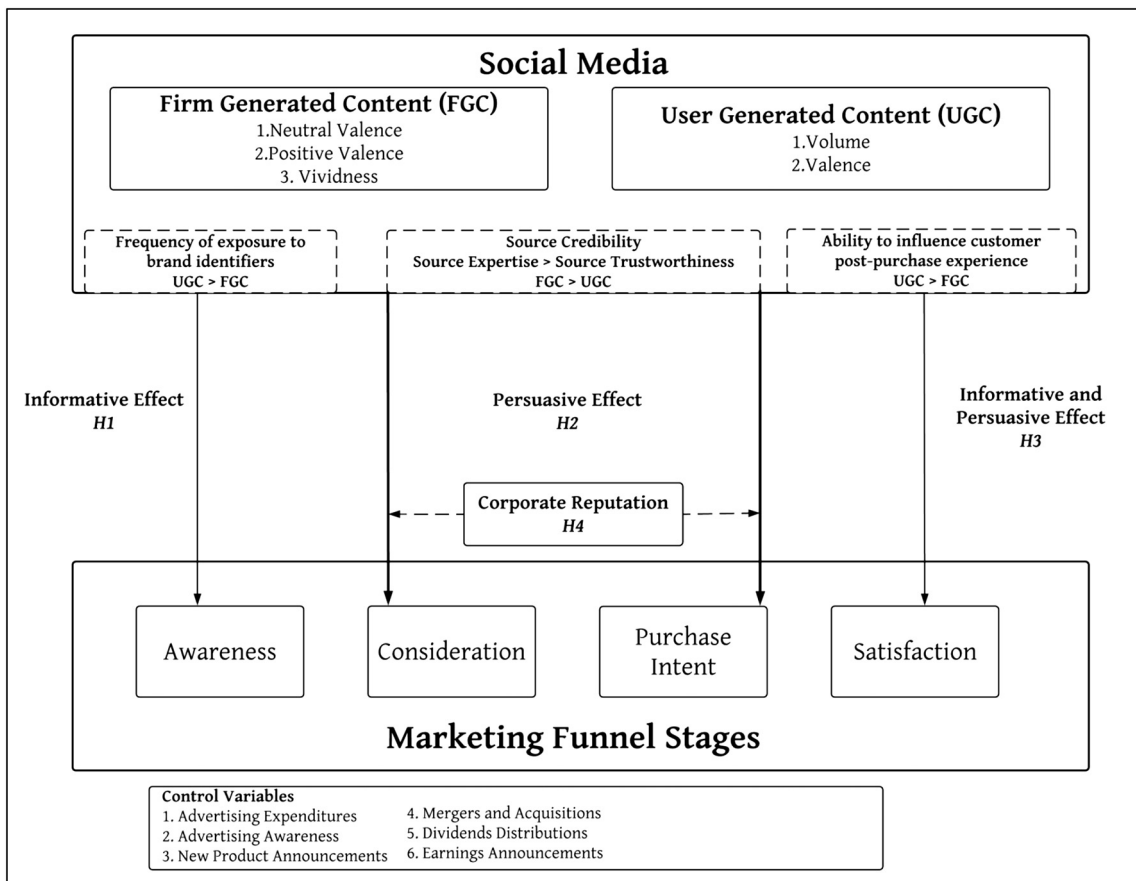


Fig. 1. Conceptual framework.

extent FGC and UGC are related to the stages of the marketing funnel. However, persuasive and informative effects alone may not reveal the relative strengths of FGC and UGC, for which we use source credibility theory.

3.2. Source credibility of FGC and UGC: trustworthiness and expertise

We build on source credibility theory that is closely related to the strength of persuasive effects of marketing communications. Source credibility refers to the extent to which a source is perceived as possessing expertise relevant to the communication topic and can be trusted to give an objective opinion on the subject (Goldsmith, Lafferty, & Newell, 2000). Thus, source credibility is composed of two main dimensions,² source *trustworthiness* and source *expertise*, that are postulated to determine the strength of the persuasive effect of marketing communications (Harmon & Coney Kenneth, 1982). Expertise is derived from knowledge of the subject and measures the extent to which a communicator is perceived to be a source of valid assertion while trustworthiness refers to the believability of the source (Sternthal et al., 1978). As discussed above, persuasive effects are key for consideration and purchase intent stages, and we postulate that source expertise and source trustworthiness determine the relative effectiveness of both FGC and UGC in these stages.

3.3. FGC, UGC and awareness stage (H1)

The foundation of all brand and marketing effort is the creation of brand awareness. When consumers are exposed to brand identifiers, they may subsequently recognize and remember the brand when making purchase decisions. Since consumers now spend large proportions of their time on social media, such platforms have become important vehicles for generating brand awareness (eMarketer, 2017). The interactive nature of social media considerable scales up the potential for exposures to brand-related content. Content on social media, whether firm or user generated, can become viral in a matter of hours. For example, UGC video, “United breaks guitars” song, amassed 150,000 views in just 24 h and is still accessible, having collected 18 million views at the time of writing. Similarly, companies such as Taco Bell and Coca-Cola regularly design vivid FGC that gathers thousands of impressions on a daily basis (Jackson, 2017). Such examples demonstrate how social media can be highly effective at rapidly spreading brand identifiers, both positive and negative, to a wide population, thus increasing brand awareness.

Earlier we postulated that FGC and UGC are related to brand awareness through the informative effect. It is well-established that more frequent exposure to brand-related content, such as FGC and UGC, leads to higher brand recognition and recall (Lee, 2002). More specifically, the theory on the mere exposure effect implies that, since all content appears on users' newsfeeds, its mere availability helps to generate brand awareness (Gordon & Holyoak, 1983). Thus, irrespective of whether the content has positive or negative *valence*, or is more *vivid*, more exposure should increase brand awareness. Thus, we do not distinguish between the specific dimensions of FGC and UGC but rather contrast the overall strength of their relationship with brand awareness.

Because of the nature of social networks, we postulate that consumers are more frequently exposed to UGC than to FGC. Although FGC by default contains brand identifiers that generate brand recall and keep the brand top of the audience's mind, social media platforms' newsfeed mechanism prioritises UGC, making it more viral and visible. Indeed, users only receive FGC if they have previously subscribed or “liked” the brand in question, meaning that FGC is limited to audiences already aware of the brand. UGC, in contrast, can be seen by users unaware of the brand. This “snowball effect” allows UGC to have a higher informative effect in the awareness stage. Thus, we propose the following general hypothesis:

H1. UGC dimensions have a stronger positive relationship with Awareness than FGC dimensions.

3.4. FGC, UGC and consideration and purchase intent stages (H2)

In the next stages of the marketing funnel, consumers typically decide whether (or not) to include the brand in their consideration set and develop purchase intentions (De Bruyn & Lilien, 2008). Firstly, during the consideration stage, consumers evaluate alternatives and identify brands that could potentially satisfy their needs. Here marketing communications try to positively contrast the brand with its competition by highlighting attractive features and generating positive feedback from customers. If successful, consumers subsequently formulate purchase intentions towards the brand, which have been shown to be positively associated with actual spending (Morwitz, 2014).

In these stages, marketers aim at persuading consumers rather than merely informing them. Thus, we postulate that FGC and UGC affect consideration and purchase intent stages through the persuasive effect. As argued above, source trustworthiness and source expertise define the extent to which marketing communications are persuasive. When messages originate from highly expert or trustworthy sources they produce greater attitude changes than messages from less expert or trustworthy sources (e.g. Petty & Cacioppo, 1986).

UGC and FGC differ in source trustworthiness and source expertise. Since UGC is based on first-hand experience and not driven by profit motives, it is typically perceived to be more trustworthy than FGC (Ho-Dac, Carson, & Moore, 2013). Repeated surveys by Nielsen (2013) show higher trust among consumers in UGC (84%) than FGC (69%). Thus, if consumers put more weight on source

² These two dimensions have consistently emerged in many factor analytic studies and have repeatedly been shown to have a systematic effect on social influence (Erdem & Swait, 2004; Sternthal, Phillips, & Dholakia, 1978).

trustworthiness, then UGC should have a stronger positive relationship with consideration and purchase intent than FGC. In contrast, FGC has higher perceived source expertise than UGC. While consumers may be able to estimate source expertise in person-to-person communications, UGC is largely unverified, making it difficult for consumers to establish UGC's source expertise (Huang, Hsiao, & Chen, 2012). Given that FGC comes from an official source – the brand itself – it contains more complete and detailed information about brands' products, and thus communications contained in FGC are more likely to be perceived as expert. Since experts are more persuasive than non-experts (Cacioppo & Petty, 1981) and if consumers put more weight on source expertise, then FGC should have a stronger positive relationship with consideration and purchase intent than UGC.

Previous research strongly suggests that source expertise is associated with greater persuasiveness than source trustworthiness. For example, Weiner and Moven (1985) found that source expertise is more strongly aligned with consumer attitudes, beliefs, and intentions than trustworthiness. O'Hara, Netemeyer, and Burton (1991) show a higher correlation between source expertise and the theory of reasoned action's cognitive chain, while Ohanian's (1991) investigation into the effectiveness of endorsed commercials found that expertise dominated trustworthiness in terms of message efficacy. Similarly, more recent research finds that source expertise predominates over trustworthiness when evaluating the effect of online marketing communications on consumer behavior. For example, Senecal and Nantel (2004) found that users rely more on expert online recommendation sources rather than trustworthy information when making online product choices. Similarly, Winterich, Gangwar, and Grewal (2018) report higher effects of expertise than trustworthiness in the context of evaluations of advertising effectiveness for celebrity endorsers. We argue that the evidence from extant research directly translates to the social media environment. In the consideration and purchase intent stages, consumers face high perceived purchase risk, which can be mitigated by seeking out expert advice rather than relying on social media chatter (Nam & Kannan, 2014). UGC may contain large amounts of noise and clutter (Ruths & Pfeffer, 2014), obliging more intensive information processing. While UGC is more trustworthy, FGC should be more persuasive given the higher expertise in delivering product related persuasive communications and content design. Thus, we argue that source expertise dominates source trustworthiness and thus consumers put more weight on FGC in the consideration and purchase intent stages. We propose the following hypothesis:

H2a. FGC dimensions have a stronger positive relationship with Consideration and Purchase Intent than UGC dimensions.

We argue that FGC *vividness*, given its higher persuasive appeals, has the highest positive relationship with consideration and purchase intent. Media richness theory suggests that vivid content, in contrast to content valence, has a higher capacity to facilitate information understanding and should be able to better resolve ambiguity and facilitate persuasion (Daft & Lengel, 1986). For example, the famous phrase “a picture is worth 1000 words”, implies that brands can more easily communicate attractive product features with videos or photos rather than with other types of content. In the context of social media, research has shown that vivid content is more attractive and engaging than other types of content and has a larger effect on message likability (Berger & Milkman, 2012). Thus, overall, vivid content may help consumers to more effectively evaluate the brands and we argue that FGC *vividness* is more persuasive than FGC positive and neutral *valence*. We thus formulate the following hypothesis:

H2b. FGC *vividness* has a stronger positive relationship with Consideration and Purchase intent than FGC neutral and FGC positive *valence*.

Recent meta-analysis has shown that UGC *valence* dominates UGC *volume* in their effect on sales (Babić Rosario et al., 2016). On the one hand, UGC *volume* expresses brand popularity and network size of the brand's user base. Thus, higher UGC *volume* can be effective in signalling to consumers that a brand is generally “talked about” on social media. However, UGC *volume* does not provide details of whether the brand is liked or not by consumers. Therefore, it does not necessarily help consumers understand whether brands are appropriate for their needs. For example, a high number of “likes” on a brand's Facebook page indicates general interest towards the brand but does not provide information about (positive or negative) brand performance (de Vries, Gensler, & Leeflang, 2012). In contrast, UGC *valence* contains more detailed information on negative and positive aspects of the brand. For example, positive UGC *valence* helps consumers reduce the perceived risk associated with a future purchase, with negative *valence* producing the opposite effect (Dimoka, Hong, & Pavlou, 2012). Therefore, given that UGC *valence* is more diagnostic, it helps consumers formulate correct product expectations and leads to a larger amount of persuasive cues (Herr et al., 1991). Accordingly, we formulate the following hypothesis:

H2c. UGC *valence* has a stronger positive relationship with Consideration and Purchase intent than UGC *volume*.

3.5. FGC, UGC and post purchase satisfaction (H3)

Customer satisfaction measures the extent to which customers are satisfied or dissatisfied with the brand and depends on personal experience, perceived quality, and fit between expectations and reality (Szymanski & Henard, 2001). And while research has argued that satisfaction is the most relevant post-purchase marketing funnel metric, compared to other stages of the marketing funnel, satisfaction has the lowest sensitivity to marketing communications (Hult, Morgeson, Morgan, Mithas, & Fornell, 2017). Given that consumers must first experience the product and then make up their own minds in terms of brand experience, the persuasive effects of FGC should be much lower in the satisfaction stage. However, FGC can still affect consumers through the informative effect. Consumers regularly visit brand social media pages to obtain information on how to effectively use a product. FGC can be aimed at answering such post-purchase requests by providing “how-to-do” and best practices for the product use. For

example, Microsoft regularly offers tips on its Facebook page on how to solve issues of compatibility between the operating system and other software. In addition, consumers can also request for additional service on brand social media pages. For example, Amazon allows consumers to post questions about delivery and deals. Then Amazon uses their FGC to respond to these questions. Other consumers might observe such FGC and in turn, also ask for service. This informative effect of FGC can potentially lead to higher customer satisfaction.

In terms of UGC, it can help narrow the gap between expectations and actual product experience. After the purchase, consumers might try to reduce cognitive dissonance by seeking out advice from others with similar experiences (Festinger & Stanford, 1957). Indeed, customers whose expectations were (not) met typically read reviews to find (dis)confirmation of their views (Shoham, Moldovan, & Steinhart, 2017). Even dissatisfied customers can be affected by UGC due to herding behaviour and social pressures (Berger, 2014). In addition, similarly to FGC, UGC can have an informative effect by offering “tips and tricks” on product use. For example, Facebook is filled with user-generated videos showing the unpacking of consumer electronics and highlighting their “hidden” features. Such UGC potentially increases customer satisfaction. Given the larger role of UGC in the satisfaction stage, we hypothesize that:

H3. UGC dimensions have a stronger positive relationship with Customer Satisfaction than FGC dimensions.

3.6. Moderating role of corporate reputation

Corporate reputation refers to the image of the firm in the minds of customers and provides signals regarding the quality of its products or services (Yoon, Guffey, & Kijewski, 1993). The concept has been shown to influence customers' response to a firm's marketing programs (Roberts & Dowling, 2002). For example, Algesheimer, Dholakia, and Herrmann (2005) find that high corporate reputation positively affects customers' interactions with a brand community. In addition, customers who buy from reputable firms tend to be loyal and may even advocate such firms to their peers (Bartikowski & Walsh, 2011). What immediately follows from source credibility theory is that if brands can also increase their source trustworthiness, they can be more effective with their FGC. Research has shown that brands that enjoy higher corporate reputation are perceived as being more trustworthy and credible (e.g. Berens, Van Riel, & Van Bruggen, 2005). Corporate reputation influences consideration and purchase intent because consumer perceptions of the source trustworthiness and source expertise of FGC are part of the information they use to judge the quality of the brand's products and therefore whether they want to buy them or not. Thus, we postulate that FGC is more persuasive if it comes from a reputable brand, and formulate the following hypothesis:

H4. FGC dimensions have a stronger positive relationship with Consideration and Purchase Intent for high corporate reputation brands than for low corporate reputation brands.

4. Research methods

4.1. Sample

Given the fast pace of social media interactions, we select a daily time interval for our key variables. We collect identical metrics for many brands to make valid, reliable and generalizable inferences. Our large dataset comes from multiple sources. We obtain daily measures of marketing funnel stages through the YouGov BrandIndex database. We augment these data with brands' FGC and UGC activity by incorporating data from a marketing research company that specializes in social listening. We collect a rich set of controls, including advertising expenditures from Kantar Media group, advertising awareness from YouGov and brand-related events, such as new product introductions and mergers and acquisitions activity from Lexis-Nexis, as well as earnings and dividends announcements from CRSP.

To select our sample of brands, we cross-checked our data sources to establish for which brands we could collect the portfolio of required variables needed for our study. We successfully obtained comprehensive data on 19 brands in seven industries, including service firms: General Electric and Shell (Energy), American Express and Citibank (Financial Services), Amazon and Disney (Media and Communications); durable goods: Ford, Honda and Toyota (Automotive) and Dell, Hewlett-Packard, IBM, Microsoft and Sony (Computers and Technology); and non-durable goods: Gap and Nike (Apparel) and McDonalds, Starbucks and Coca-Cola (Gastronomy). We merge the social media (FGC and UGC), marketing funnel stages and control variables to derive a final dataset composed of 19 brands covering 264 days, resulting in 5016 brand-day observations. Table 2 shows the variable operationalization, which we detail below.

4.2. Marketing funnel stages (YouGov BrandIndex)

Through its BrandIndex panel (<http://www.brandindex.com>), YouGov monitors brands across multiple industries by surveying 5000 randomly selected panel participants from a panel of five million subjects on a daily basis. The database has previously been used in marketing studies to fetch brand-level customer attitudes and behaviour (e.g. Hewett et al., 2016). YouGov data collection methods assure representativeness, validity, and consistency of the measures and aims to reduce measurement error and common method bias. First, YouGov weighs its sample by age, race, gender, education, income, and region. In their daily survey YouGov

Table 2

Variable operationalization and descriptive statistics.

Variable	Description	Source	Mean	SD	Min	Max
<i>Endogenous variables</i>						
UGC valence	The ratio of positive user posts to the total number of user posts	Facebook	0.192	0.264	0	0.929
UGC volume	The volume of UGC measured as the number of “People Talking About This” (“PTAT”) of a brand ^a . We take the natural log of PTAT.	Facebook	11.00	1.438	0	14.26
FGC vividness	The ratio of the brand’s multimedia posts (videos, photos, links and music) to the total number of the brand’s postings on a certain day	Facebook	0.626	0.474	0	1
FGC neutral valence	The number of neutral brand posts	Facebook	0.197	0.574	0	13
FGC positive valence	The number of positive brand posts	Facebook	1.014	3.082	0	49
Awareness	Brand Awareness stage of the marketing funnel measured as whether customers are aware of the brand.	YouGov	94.35	3.943	71.00	100
Consideration	Brand Consideration stage of the marketing funnel measured as whether customers are including the brand in the consideration set.	YouGov	29.14	14.48	0	84.31
Purchase intent	Brand Purchase Intent stage of the marketing funnel measured as whether customer is intending to purchase the brand.	YouGov	9.250	6.220	0	34.88
Satisfaction	Brand Satisfaction stage of the marketing funnel measured as whether customers are satisfied with the brand.	YouGov	23.78	14.28	−10.24	79.81
<i>Exogenous (control) variables</i>						
Advertising expenditures	The dollar amount spent on advertising (TV, radio, newspapers) ^b . Natural log.	Kantar Media	6.534	2.609	2.565	12.34
Advertising awareness	The advertising awareness measured as whether the customer was recently exposed to brand advertising. Natural log.	YouGov	−0.271	0.184	−0.997	0.204
New product announcements	Announcements of new products	Lexis-Nexis	0.0308	0.184	0	3
Merger and acquisitions	Whether a firm has undergone identity changes	Lexis-Nexis	0.00581	0.0760	0	1
Dividend distributions	Corporate action on distributing dividends to their shareholders	CRSP	0.0130	0.113	0	1
Earning announcements	Corporate action on announcing the quarterly earnings to their shareholders	CRSP	0.0156	0.124	0	1

Notes: All values are daily (N = 264 days).

^a “People Talking About This” (“PTAT”) metric implies that users voluntarily engage in telling a story about a brand (Facebook Insights).^b To be able to perform the analysis at the daily level we attributed the constant previous months’ advertising expenditure to each day of the current month.

captures a representative sample of current and potential customers, using a large sample to help reduce sampling error. Second, the YouGov panel has also substantial validity as it uses a large set of participants to capture the “wisdom of the crowd” and between-subject variance. Third, YouGov assures consistency among measures by administering the same set of questions for each brand. Fourth, in any single survey each participant is only asked about one measure for each industry, thus reducing common method bias and measurement error. Finally, YouGov data is collected daily, and thus rapidly incorporates changes in stages of the marketing funnel.

For each stage of the marketing funnel, we rely on the respective YouGov metric (see Table 2). Further details on YouGov’s data collection and exact items are provided in Web Appendix A.

4.3. Firm generated and user generated content (FGC and UGC)

We collect FGC and UGC from the largest social media platform, Facebook. We use a third-party provider that archives publicly available social media data using automated web tools to collect the required dimensions of FGC and UGC. We cross-checked the vendor’s data collection method using a two-step process. First, over a period of ten days, we accessed each brand’s Facebook page, manually collecting our desired metrics (e.g. “number of brand posts,” “user posts on brand News Feed”). Second, we compared this collected data with the data vendor’s records, finding no discrepancies and confirming the reliability of the archives.

We capture FGC via “brand posts” from brands’ corporate Facebook pages. To extract the FGC *valence*, we ran a sentiment analysis on the 20,074 brand posts collected using a Naïve Bayes classifier to extract sentiment from each post. We subsequently operationalize FGC neutral *valence* and FGC positive *valence* as the number of neutral and positive posts respectively on a given day. Finally, to operationalize FGC *vividness*, we calculated the ratio of vivid posts (those containing videos, photos, and/or audio) to total posts on a given day.

To operationalize the UGC *volume*, we followed *Facebook Insights* and collected the daily “People Talking About This” (PTAT) metric for each brand. PTAT measures the number of stories that users created about a brand (Colicev, O’Connor, & Vinzi, 2016), consolidating the volume of user actions directed towards a brand (e.g., user comments/shares/likes on brand posts, hashtags, and user posts on the brand wall). Subsequently, to capture the UGC *valence* we collected the textual posts made by users on the brand’s News Feed during the study period. This resulted in an overall corpus of 189,557 textual user posts for the nineteen brands. We ran a Naïve Bayes classifier to extract sentiment from each user post, operationalizing the UGC *valence* as the ratio between the number of positive user posts and the total number of user posts on Facebook brand pages on a given day.

Importantly, we check to what extent Facebook and YouGov user populations overlap. We first verify the demographic characteristics of the YouGov panel and compare them to demographic characteristics of the Facebook platform (Business Insider,

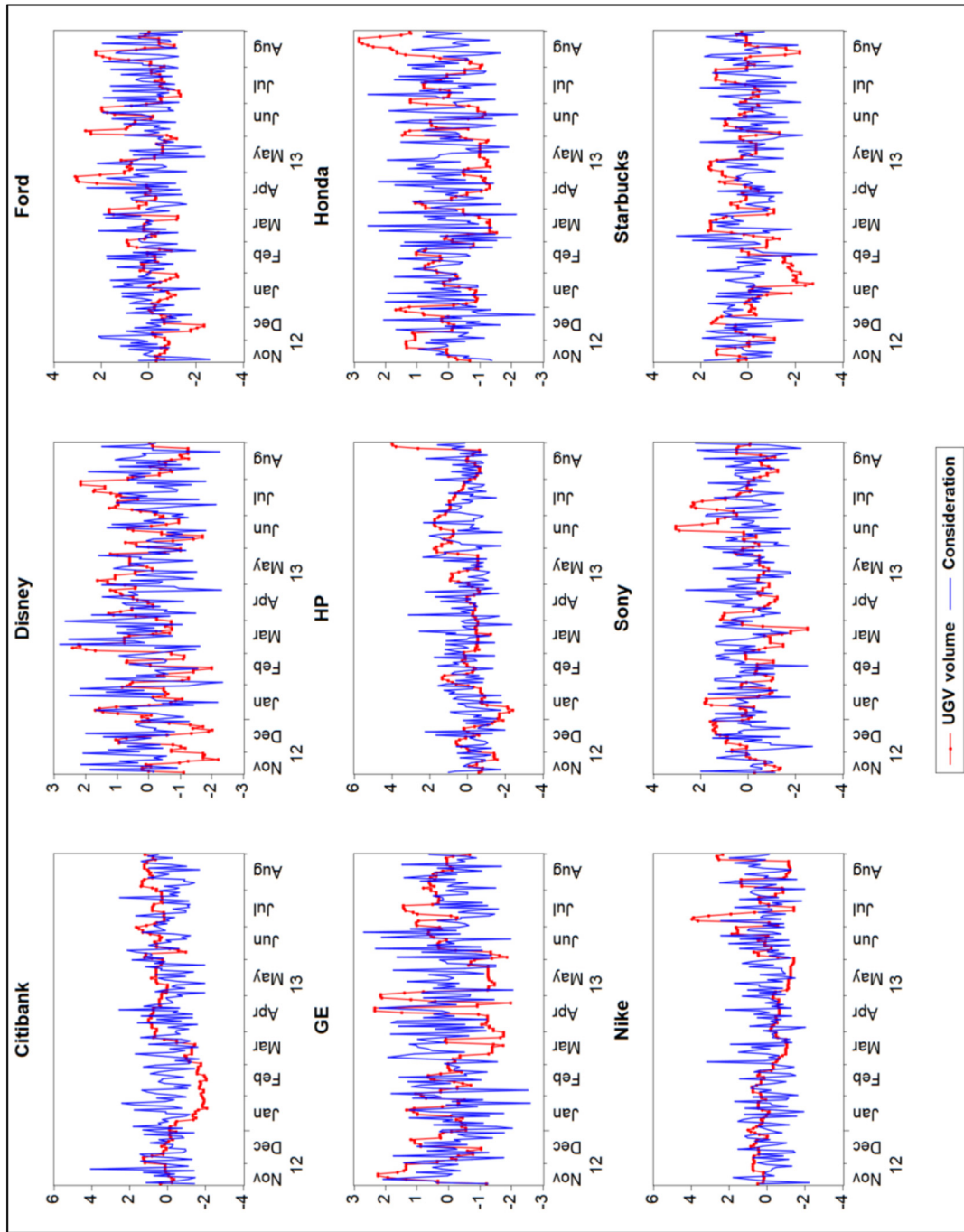


Fig. 2. Model-free evidence (UGC volume and consideration). Note: This Figure shows how UGC volume and Consideration evolved over the study's time span for nine brands. We standardized the data to make the scales comparable. We observe that spikes in UGC volume are followed by spikes in the Consideration stage.

2014), finding similar characteristics for both audiences. Given that they are both quite representative we can be more confident that this relationship would hold in larger samples and across the general population. Second, we consult the YouGov database and ask for additional data. We check the level of panelists' awareness (95.1%) and visit regularity of Facebook (68.1%). This presents initial evidence that users who answer YouGov questions can be also exposed to FGC and UGC related to the brand. Finally, we observe from model-free evidence that there is a link between FGC, UGC and YouGov (see Section 4.5).

Overall, we believe that our measures can be reflective of the overall population of brand followers (e.g., on other social media platforms and offline) and of brand consumers in different stages of the marketing funnel. Thus, we believe that FGC and UGC metrics serve as useful proxies for the underlying constructs of brand's social media presence and YouGov metrics proxy for the actual number of consumers in each stage of the brand's marketing funnel.

4.4. Control variables

We follow previous literature (e.g. [Trusov, Bucklin, & Pauwels, 2009](#)) to collect a set of control variables. First, we collect the total monthly dollars spent on advertising on different media platforms (television, radio, newspapers) as reported by Kantar Media. Given that our main dataset is at the daily level, we substitute the immediately previous month's advertising expenditure for daily observations in the current month. Second, given that advertising represents actual spending but not reach, we also control for daily advertising awareness (from YouGov) which captures whether advertising has effectively reached the audience. Third, we collect brand-related news and events that could affect both social media chatter and the marketing funnel. We access Lexis-Nexis database and gather information on new product introductions and M&A activity. These are count variables representing the total number of announcements related to such events for each brand per period. Finally, we also control for earnings and dividend announcements using two additional count variables, obtained from the CRSP event file.

4.5. Model-free evidence

Before discussing the econometric model, we show time series charts illustrating some dynamics between social media and the marketing funnel. As an example, [Fig. 2](#) shows how UGC *volume* and consideration stage evolved over the study's time span for nine brands. We observe that spikes in UGC *volume* are followed by spikes in the consideration. We also present the descriptive statistics, correlations tables and time-series plots in Web Appendix A.

4.6. Panel vector autoregressive (PVAR) model

We adopt the PVAR model ([Holtz-Eakin, Newey, & Rosen, 1988](#)), which allows for unobserved brand-level heterogeneity and accounts for potential endogeneity by: a) jointly estimating the system of equations via Generalized Method of Moments (GMM) using past lags as instruments, b) allowing dynamic feedback loops between endogenous variables, c) controlling for the effects of exogenous variables, and d) controlling for non-stationarity, serial correlation, and reverse causality that may lead to spurious regression problem ([Wooldridge, 2010](#)). We use [Abrigo and Love \(2016\)](#)'s *pvar* routine in Stata.

4.6.1. Methodological steps in PVAR

PVAR analysis consists of several methodological steps that resemble those of the time series VAR model (please see Table B1 in Web Appendix B). We discuss these steps below while readers are referred to Web Appendix B for further details.

First, we verify the need for a dynamic system of equations by applying Granger causality test. This test assesses whether each focal variable has informational value in predicting the future values of other variables, and thus provides preconditions for the use of PVAR. In panel data, as the relationships between variables that exist for a brand can also exist for other brands, the use of cross-sectional information involves considering such heterogeneity across brands. We apply the panel version of the Granger causality test known as [Dumitrescu and Hurlin \(2012\)](#) test that accounts for brand heterogeneity. We have five dimensions of UGC and FGC and four stages of the marketing funnel. Out of these 20 possible relationships, 18 show significant Granger causality ($p < 0.1$) (see Table B2 in Web Appendix B). Thus, we confirm the need for a PVAR model.

Next, we verify whether variables are stationary, and thus can enter the system in levels, or evolving, and may need to be differenced, by using unit root tests. We apply the panel unit root tests that are multiple-series unit root tests that can be applied to panel data structures (for an overview see [Baltagi \(2013\)](#)). To guard against erroneous conclusions, we apply a wide range of panel unit root tests. The Levin-Lin-Chu (LLC) and the Breitung tests assume that the persistence parameters (i.e., coefficients of the lagged variables) are common across cross-sections. In addition, we also use the Fisher-ADF panel test that allows the persistence parameters to vary freely across cross-sections. The null hypothesis of these tests is that of a unit root. We report the results in Table B3 in Web Appendix B observing that all the variables are stationary and thus enter the PVAR model in levels.

Next, we apply lag-selection criteria for the PVAR model. We use consistent moment and model selection criteria (MMSC) and maximum likelihood-based model selection criteria such as Akaike information criteria (AIC), Bayesian information criteria (BIC) and the Hannan-Quinn information criteria (HQIC). Such criteria should be used in conjunction with the Hansen's J statistic ([Hansen, 1982](#)) that checks whether the overidentification restriction is rejected at 5% significance level. In Table B4 in the Web Appendix B, we report the different criteria described above. Overall, the lag-selection criteria suggest using second lags for the PVAR model.

4.6.2. Model specification

We adopt the reduced form of PVAR model in which each dependent variable is a linear function of its own past values, the past values of all other dependent variables, exogenous variables, and an error term. Based on Granger causality and unit root tests, we specify the PVAR model in Eq. (1):

$$\begin{bmatrix} \text{Satisfaction}_{it} \\ \text{Purchase Intent}_{it} \\ \text{Consideration}_{it} \\ \text{Awareness}_{it} \\ \text{FGC(positive)}_{it} \\ \text{FGC(neutral)}_{it} \\ \text{FGC(vividness)}_{it} \\ \text{UGC(valence)}_{it} \\ \text{UGC(volume)}_{it} \end{bmatrix} = \sum_{n=1}^p \begin{bmatrix} \gamma_{1,1}^n & \dots & \gamma_{1,9}^n \\ \vdots & \ddots & \vdots \\ \gamma_{9,1}^n & \dots & \gamma_{9,9}^n \end{bmatrix} \begin{bmatrix} \text{Satisfaction}_{it-n} \\ \text{Purchase Intent}_{it-n} \\ \text{Consideration}_{it-n} \\ \text{Awareness}_{it-n} \\ \text{FGC(positive)}_{it-n} \\ \text{FGC(neutral)}_{it-n} \\ \text{FGC(vividness)}_{it-n} \\ \text{UGC(valence)}_{it-n} \\ \text{UGC(volume)}_{it-n} \end{bmatrix} + \begin{bmatrix} \varphi_{1,1} & \dots & \varphi_{1,7} \\ \vdots & \ddots & \vdots \\ \varphi_{9,1} & \dots & \varphi_{9,7} \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \\ X_5 \\ X_6 \\ X_7 \end{bmatrix} + \begin{bmatrix} u_{1i} \\ u_{2i} \\ u_{3i} \\ u_{4i} \\ u_{5i} \\ u_{6i} \\ u_{7i} \\ u_{8i} \\ u_{9i} \end{bmatrix} + \begin{bmatrix} e_{1it} \\ e_{2it} \\ e_{3it} \\ e_{4it} \\ e_{5it} \\ e_{6it} \\ e_{7it} \\ e_{8it} \\ e_{9it} \end{bmatrix} \tag{1}$$

where $i = 1, \dots, I (=19)$ brands, $t = 1, \dots, T (=264)$ daily observations. The off-diagonal terms of the matrix Γ_n estimate the indirect effects among the endogenous variables, the diagonal terms estimate the direct effects. We include brand fixed effects (μ_i) that account for any time-invariant brand factor. Table 2 defines the vector of endogenous and exogenous variables. In addition to six control variables, the exogenous vectors contain a deterministic trend to capture the impact of omitted, gradually changing, variables.

The joint estimation of the system of equations is implemented based on the Generalized Method of Moments (GMM) estimator. Arellano and Bover (1995) proposed forward orthogonal deviation (also known as Helmert transformation) that subtracts the average of all available future observations and does not induce autocorrelation in the error terms. Since past realizations are not included in this transformation, past lags remain as valid instruments and can be used to estimate the coefficients by system GMM. We further improve the efficiency of the estimation by including a longer set of lags (from lag 2 to lag 6) as instruments (Abrigo & Love, 2016). Finally, we implement heteroscedasticity-robust standard errors.

4.7. Main model results (H1-H3)

We summarize the effects between the endogenous variables through impulse response functions (IRFs) (Pesaran & Shin, 1998). We use the Cholesky ordering based on the results of Granger causality tests to impose a causal ordering on the variables. A possible difficulty with the Cholesky decomposition is that researchers must determine a-priori a causal ordering of the variables in the system. The first variable in the system will affect all other variables, but the others cannot directly influence this first variable. We, therefore, continuously change the ordering of the endogenous variables and compute averages over the different responses as a consequence of one standard deviation shocks and do not observe significant differences in results.

Table 3
Impulse responses of stages of the marketing funnel to FGC and UGC Dimensions for the overall sample and corporate reputation splits.

	Awareness	Consideration	Purchase intent	Satisfaction
<i>a) Overall sample</i>				
UGC valence	0.224 ***	0.810 **	0.403 **	1.048 ^{ns}
UGC volume	0.248 ***	0.330 ***	0.127 **	1.481 **
FGC vividness	-0.109 *	2.722 ***	2.214 ***	1.455 ^{ns}
FGC neutral	0.112 **	0.903 ***	0.955 ***	0.193 **
FGC positive	0.190 ***	-0.579 ^{ns}	-0.457 ^{ns}	-1.552 ^{ns}
<i>b) High corporate reputation brands</i>				
UGC valence	0.114 ^{ns}	0.642 ^{ns}	0.224 *	0.153 ^{ns}
UGC volume	0.378 ***	0.932 ^{ns}	-0.288 ^{ns}	0.948 ***
FGC vividness	0.739 ^{ns}	0.025 ^{ns}	0.184 *	0.458 ^{ns}
FGC neutral	0.470 ***	1.025 *	0.334 ***	1.381 *
FGC positive	0.532 ^{ns}	0.571 ^{ns}	0.220 *	0.595 **
<i>c) Low corporate reputation brands</i>				
UGC valence	-1.085 ^{ns}	0.386 **	1.265 **	1.351 ***
UGC volume	-0.952 ^{ns}	0.386 **	0.344 ***	3.222 ***
FGC vividness	1.833 ***	-0.912 ***	0.209 *	-0.675 **
FGC neutral	2.369 ***	-2.157 ***	0.164 ^{ns}	-2.171 *
FGC positive	0.325 ***	0.179 ^{ns}	-0.274 **	-1.242 ***

ns= non-significant. Bold font implies significant effects.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

We derive standard errors using Monte Carlo simulation approach with 1000 runs in each case (Nijs, Srinivasan, & Pauwels, 2007) and sum the significant IRFs to obtain our final effects for each variable (Sims & Zha, 1999). PVAR also reveals feedback loops among variables which we report in Table C1 in Web Appendix C. Table 3a presents the results for the overall sample which we report below.

In H1 we argued that UGC dimensions have a stronger positive relationship with awareness than FGC dimensions. We find that, consistent with our expectation, FGC neutral *valence* and FGC positive *valence* are both positively related to awareness (0.112, $p < 0.05$ and 0.190, $p < 0.01$ respectively). This implies that textual FGC is effective in making the brand more recognizable. However, we find that FGC *vividness* has a negative relationship with awareness (-0.109 , $p < 0.10$). Thus, contrary to our expectation, more vivid FGC, such as videos or photos, leads to lower brand awareness. One explanation is that vivid posts might direct consumer attention away from the brand. For example, vivid posts may conceal the brand logo and can make the brand name less memorable. Next, we find that both UGC *volume* and UGC *valence* have a positive relationship with awareness (0.248, $p < 0.01$ and 0.224, $p < 0.01$ respectively). In addition, the *t*-tests show that UGC dimensions have a stronger positive relationship with awareness than FGC dimensions ($p < 0.05$), thus confirming H1 and adding to the literature on the power of consumer voice in creating brand recall and recognition (e.g. Godes & Mayzlin, 2004).

In H2a we argued that FGC dimensions have a stronger positive relationship with consideration and purchase intent than UGC dimensions. FGC *vividness* and FGC neutral *valence* both have a positive relationship with consideration (2.722, $p < 0.01$ and 0.903, $p < 0.01$ respectively) and purchase intent (2.214, $p < 0.01$ and 0.955, $p < 0.01$ respectively). FGC positive *valence* is not significant for both stages. This implies that consumers might repute positive FGC as overly ambitious, subjective and pushy, echoing prior research that suggests that a positive tone in brand communications is not effective (Stephen et al., 2015). We also find that UGC *volume* and UGC *valence* both have a positive relationship with consideration (0.330, $p < 0.01$ and 0.810, $p < 0.01$ respectively) and purchase intent (0.127, $p < 0.05$ and 0.403, $p < 0.01$ respectively). For both stages, *t*-tests confirm that FGC dimensions have a stronger positive influence than UGC dimensions ($p < 0.05$), thus providing evidence for H2a. This finding is intriguing but in line with our theoretical argument that source expertise of FGC dominates source trustworthiness of UGC when consumers process persuasive communications. We also find confirmation of H2b that FGC *vividness* prevails over FGC positive *valence* and FGC neutral *valence* for both consideration and purchase intent stages (all $p < 0.05$). Thus, vivid FGC seems to be more attractive and engaging than other dimensions of FGC and results in larger persuasive appeals for consumers (Berger & Milkman, 2012). We also find confirmation for H2c that UGC *valence* prevails over UGC *volume* for both consideration and purchase intent stages (all $p < 0.05$), confirming that consumers are persuaded by diagnostic opinions contained in the valence of UGC.

In H3 we argued that UGC dimensions have a stronger positive relationship with satisfaction than FGC dimensions. We find that FGC neutral *valence* is positively related to satisfaction (0.193, $p < 0.05$) while FGC positive *valence* and FGC *vividness* are not significant. This suggests that while brands have lower ability to affect customer satisfaction, they can still use neutral FGC to provide “how-to-do” and best practices for the product use and answer to customer service requests. We also find that UGC *volume* has a positive relationship with satisfaction (1.481, $p < 0.05$) while UGC *valence* is not significant. This finding suggests that, to reduce cognitive dissonance in post purchase stage, consumers rely on UGC *volume* rather than on UGC *valence*. Consumers might infer that a larger *volume* of UGC around the brand can indicate a larger brand popularity and thus can help them be more satisfied with their purchase. This is also explained by theories of herding behaviour and social pressures (Berger, 2014). Finally, *t*-

Table 4
Impulse responses of stages of the marketing funnel to FGC and UGC dimensions by consumption category.

	Awareness	Consideration	Purchase intent	Satisfaction
a) Services				
UGC valence	0.668***	1.184***	0.197**	5.913***
UGC volume	0.477***	0.664*	-0.626^{ns}	-0.636^{ns}
FGC vividness	-0.408^{***}	3.333***	0.540***	-1.218^{***}
FGC neutral	0.162 ^{ns}	1.820***	1.177***	1.519***
FGC positive	0.416 ^{ns}	-1.226^{***}	0.976 ^{ns}	-1.297^{***}
b) Durables				
UGC valence	2.754***	0.721 ^{ns}	0.131**	0.636***
UGC volume	0.964 ^{ns}	-0.837^{***}	-0.128^{ns}	-0.534
FGC vividness	-0.546^{***}	0.581***	0.176**	-0.432^{***}
FGC neutral	0.927***	0.494***	0.236 ^{ns}	0.383**
FGC positive	-0.508^{***}	-0.528^{***}	-0.355^{ns}	0.688***
c) Non-durables				
UGC valence	0.654 ^{ns}	0.711***	1.327***	0.140 ^{ns}
UGC volume	1.266***	-0.728^{***}	0.578***	0.077 ^{ns}
FGC vividness	0.642***	-0.519^{ns}	0.233**	-0.243^{ns}
FGC neutral	0.308 ^{ns}	0.324 ^{ns}	0.298**	-0.379^{**}
FGC positive	0.311***	-0.394^{**}	0.396 ^{ns}	-0.763^{***}

ns = non-significant. Bold font implies significant effects.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

tests confirm that UGC dimensions have a stronger positive influence than FGC dimensions ($p < 0.05$), thus providing support for H3. Together with the results for H1, this finding implies that UGC is more effective than FGC in the bottom and top part of the marketing funnel.

4.8. Corporate reputation (H4)

In H4 we argued that brands with a higher corporate reputation (CR) benefit to a larger extent from FGC in the consideration and purchase intent stages than brands with a lower corporate reputation. To collect the CR measure, we rely on YouGov's survey measure of brand reputation. We first compute the average CR for each brand over the time-period of investigation. We then rank-order the 19 averages (one average per brand) and compute the 25% percentile (low CR) and the 75% percentile (high CR). The lower CR brands are Citibank, McDonalds, Gap and Starbucks while the high CR brands are Amazon, Coca-Cola, Microsoft and Sony.

While moderating effects in regression models are tested via interaction effects, such an approach is burdensome in case of PVAR models. Usually, the results from PVAR models cannot be directly interpreted due to sheer multicollinearity and researchers are advised to use impulse response functions (IRFs), as we did in our analysis. The standard errors for such IRFs are obtained via Monte-Carlo simulations. If interaction effects were to be included in PVAR models, the IRFs would have to be multiplied to capture non-linear effects. Given that the distributional properties of such nonlinear IRFs and their standard errors are generally unknown (Kalliovirta, Meitz, & Saikkonen, 2016), the most common approach to test moderating effects in PVAR models is to use subsample splits.

We estimate the same PVAR model for each group and present the results in Table 4a–b. We concentrate on results that are pertinent to our H4. For high CR brands, we find that FGC neutral *valence* has a positive relationship with consideration (1.025, $p < 0.1$) while other FGC dimensions are not significant. For purchase intent, we find that FGC *vividness*, FGC neutral *valence* and FGC positive *valence* all have a positive relationship for high CR brands (0.184, $p < 0.1$, 0.334, $p < 0.01$ and 0.220, $p < 0.1$, respectively). This finding confirms our conjecture that brands with higher CR can largely benefit from FGC on Facebook. In contrast, for low CR brands, we find that FGC *vividness* and FGC neutral *valence* both have a negative and significant relationship with consideration (-0.912 , $p < 0.01$ and -2.157 , $p < 0.01$, respectively). We also find that low CR brands have a negative effect of FGC positive *valence* on purchase intent (-0.274 , $p < 0.05$). These findings might be explained by a lower perceived level of source trustworthiness for brands with lower CR. Consumers might prefer not seeing any form of brand-originated communication from low CR brands given that it reminds them of brands' low reputation. This implies that brands with lower CR should be careful when using FGC on Facebook as content strategies might backfire. Overall, *t*-tests strongly support H4 that FGC has a stronger positive relationship with consideration and purchase intent for high CR brands than for low CR brands (all $p < 0.01$).

4.9. Supplementary analysis on consumption categories

Past studies have shown that the effectiveness of marketing communications varies across product categories (e.g., Bart, Stephen, & Miklos, 2014). Accordingly, to provide a more nuanced understanding of our main model results, we estimate a PVAR model for each of the three large product categories: services (GE, Shell, American Express, Citibank, Amazon and Disney), durables (Ford, Honda, Toyota, Dell, HP, IBM, Microsoft, Sony) and non-durables (Gap, Nike, McDonalds, Starbucks, Coca-Cola). We present the results in Table 4a–c. We highlight the findings in the Discussion section.

4.10. Supplementary analysis at individual customer-level

To provide robustness to our results, we complement our main brand-level analysis with individual customer level data³ which was previously used in the Kumar et al. (2016) study. In this analysis we investigate the impact of UGC and FGC on customer engagement and spending. The advantage of this analysis is that it can account for heterogeneity in customer responses (e.g. Kumar et al., 2016). We provide an overview of this analysis below and refer the reader to Web Appendix C for a detailed discussion.

The data comes from a large specialty retailer owning multiple stores selling wine products based in the Northeast United States. The data contains information on customers' social media activities and their purchase behaviour since the inception of the retailer's social media presence. This dataset allows us to capture the effect of social media on the top (customer engagement) and bottom (customer spending) stages of the marketing funnel. The scanner panel dataset spans multiple years and comprises extensive purchase data of consumers that are tracked through a loyalty program. Beginning in August 2009, the retailer established its presence on a major social networking platform (e.g., Facebook) and started to encourage customers to engage on its social media page. In this respect, contents generated by the retailer constitute FGC, whereas contents created by the consumers are considered UGC. We use two years of data and randomly select 200 participating customers in the retailer's social media page from the matched sample. We also include email and catalogue as other forms of marketing communications in our analysis.

We find that both FGC (0.1987, $p \leq 0.01$) and UGC (0.0131, $p \leq 0.05$) shorten the time duration taken by the customers to engage with the firm's social media page, i.e., the time taken to become "fans" of the firm. FGC has a higher influence on building a

³ We thank the review team for pointing this out and encouraging to include individual level analysis in this study.

“fan” base. Furthermore, our results show that both UGC (0.0172, $p < 0.01$) and FGC (0.0120, $p < 0.05$) have positive effects on customer spending. However, we do not find any significant difference between the relative effects of UGC and FGC on customer spending. Overall, the results from the supplementary analysis lend support to the significance of UGC and FGC in influencing stages of the marketing funnel at the individual customer level.

4.11. Robustness checks

4.11.1. Alternative lag specification and GMM instruments

We specify our model with alternative lag structures and check whether varying the number of lags as instruments for PVAR estimation can alter the results. We confirm that our main results hold, regardless of alternative lag structures or instrument specifications. We report the results in Web Appendix C.

4.11.2. Exclusion of control variables and alternative brand samples

As a final robustness check we exclude the control variables and estimate the model for a larger (51) set of brands for which we did not have information on control variables. We find that most of the results are in the same direction as our main model results. We report the results in Web Appendix C.

5. General discussion

We propose and test a conceptual framework on how, why and to what extent FGC and UGC affect the marketing funnel. Specifically, we investigate how FGC positive *valence*, FGC neutral *valence*, FGC *vividness* and UGC *volume* and UGC *valence* are related to the marketing funnel composed of awareness, consideration, purchase intent and satisfaction for 19 brands in seven industries. In the discussion below, we present the major implications and highlight the managerial relevance of our findings. We also highlight the main findings in Table 5.

First, our theoretical framework composed of six hypotheses is based on theories of consumer information processing and source credibility. We propose that the persuasive and informative effects of marketing communications determine how and to what extent FGC and UGC are related to the stages of the marketing funnel. The informative effect is key in the awareness

Table 5
Summary of the findings.

	Stages of the marketing funnel			
	Brand awareness	Brand consideration	Purchase intent	Satisfaction
Overall sample	H1: UGC > FGC ✓	H2a: FGC > UGC ✓ H2b: FGC vividness > FGC neutral > FGC positive ✓ H2c: UGC valence > UGC volume ✓		H3: UGC > FGC ✓
Findings	<ul style="list-style-type: none"> ☑ UGC has a stronger <i>informative</i> effect than FGC ☑ FGC vividness has a negative relationship ☑ All other dimensions of FGC and UGC have a positive relationship 	<ul style="list-style-type: none"> ☑ FGC has a stronger <i>persuasive</i> effect than UGC ☑ FGC vividness has the strongest relationship among all FGC dimensions ☑ UGC valence dominates UGC volume 		<ul style="list-style-type: none"> ☑ UGC has a stronger <i>informative</i> and <i>persuasive</i> effect than FGC ☑ Among all dimensions, only FGC neutral and UGC volume have a positive relationship
Corporate reputation (cr)		H4: FGC (high CR) > FGC (low CR) ✓		
Findings	<ul style="list-style-type: none"> ➢ For High CR brands, only FGC neutral and UGC volume have a positive relationship ➢ For Low CR brands, all FGC and UGC dimensions have a positive relationship 	<ul style="list-style-type: none"> ☑ For High CR brands, FGC dimensions have a stronger positive relationship than for Low CR brands ➢ For High CR brands, FGC neutral has a positive relationship with consideration while all dimensions of FGC have a positive relationship with purchase intent ➢ For High CR brands, UGC valence has a positive relationship with purchase intent ➢ For Low CR brands, FGC vividness has a positive relationship (purchase intent), and other dimensions of FGC have a negative relationship ➢ For Low CR brands, both UGC volume and valence have a positive relationship 		<ul style="list-style-type: none"> ➢ For High CR brands, FGC neutral and FGC positive valence have a positive relationship ➢ For High CR brands, UGC volume has a positive relationship ➢ For Low CR brands all FGC dimensions have a negative relationship ➢ For Low CR brands both UGC volume and valence have a positive relationship
Consumption categories	<ul style="list-style-type: none"> ➢ UGC and FGC dimensions have larger positive relationships for durables and non-durables than for services 	<ul style="list-style-type: none"> ➢ UGC and FGC dimensions have larger positive relationships for services than for durables and non-durables 		<ul style="list-style-type: none"> ➢ UGC and FGC dimensions have larger positive relationships for services than for durables and non-durables

stage in which more frequent exposure to FGC and UGC leads to higher brand recognition and recall. We postulate that, due to higher virality and reach, UGC has a stronger relationship with awareness than FGC and find confirmation for this hypothesis. The persuasive effect is relevant for the consideration and purchase intent stages in which source credibility dimensions of source trustworthiness and source expertise define the extent to which FGC and UGC are persuasive. We hypothesize that higher source expertise of FGC dominates the higher source trustworthiness of UGC and determines the higher persuasive effect of FGC on consideration and purchase intent. We find confirmation for this hypothesis, contrasting previous research that showed a more pronounced effect of UGC on brand sales (e.g., Stephen & Galak, 2012). Overall, our conceptual framework and empirical analysis advances current research on social media marketing (Kannan & Li, 2017).

Second, while previous research has disregarded the multiple dimensions of FGC and focused on the effect of FGC *volume*, we show that it is beneficial to decompose FGC into *valence* and *vividness* to show which of these dimensions are more effective. We find that FGC positive *valence* is not persuasive in the consideration and purchase intent stages, suggesting that a positive tone in FGC is perceived as being overly commercial and pushy. It implies that one of the hallmarks of marketing communications in traditional settings – adopting positive language – may not be effective in the social media context. However, it follows directly from the theory that to be perceived as more expert, FGC must be more objective and vivid rather than optimistic. Accordingly, when evaluating brands' products, consumers are less affected by self-promoting information from brands (Chiou & Cheng, 2003) and rely on more objective and persuasive sources such as FGC neutral *valence* and FGC *vividness*.

Third, based on our conceptualization, we demonstrate the role of two moderators in the social media –marketing funnel link: corporate reputation (CR) and consumption category. We find that for high (low) CR brands, the relationship between FGC and awareness is weak (strong). We believe this is due to the initial high levels of awareness of high CR brands, making additional marketing efforts less effective. Indeed, in the Web Appendix A in Figs. A1–A4 we observe high level of awareness for high CR group, which lends further support to our conjecture. Interestingly, for purchase intent, we find that the high CR group benefits from any form of FGC, while the lower CR group suffers from a negative relationship between positive *valence* of FGC and purchase intent. This confirms our conjecture that brands with better reputation enjoy more credibility among customers, even if they use more positive language in their FGC. This is further confirmed in post-purchase, in which high (low) CR brands have a positive (negative) relationship between all three dimensions of FGC and satisfaction. These findings suggest that brands with good corporate reputation have more leverage in terms of how they use social media and as such are important for CMOs seeking tactics to operationalize social media marketing strategies.

We also find nuanced effects for consumption categories. For awareness, we find that UGC and FGC dimensions have larger positive relationships for durables and non-durables than for services. This finding highlights the fact that customers have more motivation to search for information about durables and non-durables than services echoing the finding from the advertising field (Zhou, Zhou, & Ouyang, 2003). Thus, FGC and UGC can be a good source of product-related information for durable and non-durable goods because it offers diverse customer perspectives, allowing potential purchasers to better gauge the fit of the product with their own needs and preferences (Chen, Wang, & Xie, 2011). For consideration and purchase intent, we find that UGC and FGC dimensions have larger positive relationships for services than for durables and non-durables. Indeed, consumers often feel little involvement in buying nondurable products because they are purchased frequently, are inexpensive, and have few differentiating attributes. In addition, given that durable goods have longer inter-purchase intervals and tend to be higher priced, consumers may face a higher perceived risk of the purchase (Park, Lennon, & Stoel, 2005). For satisfaction, we find that UGC and FGC dimensions have larger positive relationships for services than for durables and non-durables. Due to the nature of service firms they tend to have a larger volume of post-purchase service requests. For example, banks and airlines attract more service requests and complaints than non-durable brands. In addition, service firms have more customer-oriented social media pages, implying more targeted FGC.

Finally, the results from individual customer-level analysis supplement our main findings. We find that FGC (vs. UGC) has a higher influence on customer engagement in a firm's social media page in terms of building a “fan” base. Given that all “fans” on the retailer's social media page were already engaged in a transactional relationship, we expect that becoming a “fan” influences their “consideration” in subsequent purchase behavior. Our results also indicate that both UGC and FGC increase the spending of “fans.”

6. Future research directions

Our research has limitations, which subsequent studies might address. First, our theoretical framework postulates that FGC has higher source expertise and UGC has higher source trustworthiness, and that expertise dominates trustworthiness. Our hypotheses are grounded in theory and findings from previous research. However, it would be beneficial to test them in an experimental setting. Studies can investigate whether UGC is indeed more trustworthy and FGC more expert, and if so, to what extent FGC expertise is prevalent. Second, we only use publicly available data from Facebook, while other social media platforms, most notably Instagram and Snapchat, have since become important. Future studies could incorporate data from multiple or alternative platforms to help develop a more comprehensive picture and increase generalizability. Third, our marketing funnel stages capture the self-reported metrics of the potential customer base. Merely measuring respondents' intentions results in the formation of favourable judgments about the brand that otherwise would not have been formed (mere-measurement effect (Morwitz, 2014)). However, it is possible that the relationship between FGC and UGC and actual customer spending is different to the customer intentions. Indeed, when we relate FGC and UGC at the individual customer level we find that UGC prevails over FGC. Due to the unavailability of data, we only relate the volume of UGC and FGC to two stages, customer engagement and spending, leaving

room for future research to show how different dimensions of FGC and UGC affect to the entire marketing funnel at customer level. Fourth, although we include a rich set of controls and estimate a PVAR model that accounts for reverse causality, non-stationarity, and autocorrelation, we do not have a clear exogenous variation in our data. Thus, we do not claim causal relationships between variables and look forward to future research that employs field and natural experiments. Future research might also investigate the themes in FGC to provide further explanations for why vividness of FGC has a strong effect on consideration and purchase intent. Finally, our results are conditional on the level of brand expenditures on other media (e.g. TV, print, etc.). For example, our finding that UGC have a stronger relationship with awareness than FGC, can be indeed conditional upon how much the brands in our sample have spent on advertising. We propose that future research considers how FGC and UGC dimensions are related to the marketing funnel, conditional upon the amount of dollars spent on other media.

Appendix A. Supplementary Material

Supplementary material to this article can be found online at <https://doi.org/10.1016/j.ijresmar.2018.09.005>.

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