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Identifying the Antecedents of Posts' Popularity on Facebook Fan Pages

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ABSTRACT

Informed by the related theories of agenda-setting and framing, the purpose of this paper is to identify the antecedents of posts' popularity on Facebook Fan Pages. Posts' popularity is conceptualized as the volumes of Likes, Comments and Shares attracted by the entries. Building on prior studies, the paper proposes a conceptual framework that identifies four categories of antecedents—presentation, brand awareness, engagement and temporal—that could be related to posts' popularity on Facebook Fan Pages. The framework was validated by drawing 10,000 posts from 50 Facebook Fan Pages. The posts were measured in terms of the dimensions of the four categories. Hierarchical regression was used for analysis with volumes of Likes, Comments and Shares as the three separate dependent variables. Several dimensions from all the categories of antecedents were found to have a significant bearing on Likes, Comments and Shares. In particular, the presentation category emerged as being the most important in promoting posts' popularity. The findings have implications for social media brand managers.

Keywords: content analysis; engagement; Facebook; friendvertise; social media marketing

INTRODUCTION

Facebook has almost become the de facto standard for social networking websites. Attracting close to 70% of the traffic share alone, it is supported by over one billion daily active users on average (Pinto and Yagnik, 2017). Its dominance is unlikely to be challenged any time soon in part because Facebook has cemented strong and enduring social ties among its users (boyd and Ellison, 2007; Sabate et al., 2014).

Many brands leverage Facebook to raise brand awareness. Brand managers are now able to crowdsource marketing by submitting posts on Fan Pages. Users who subscribe to Fan Pages have the option of liking the contributed posts, commenting on them, and sharing them with others (Zadeh and Sharda, 2014). Notifications of such activities trigger a ripple effect through users' social networks. This phenomenon where users are unwittingly turned into marketers is known as friendvertising (Maurer and Wiegmann, 2011).

The extent to which a given brand is able to friendvertise on Facebook is partly reflected in how well its posts become popular by attracting Likes, Comments and Shares. However, it is challenging for brands to make their posts popular among users, who are always bombarded with overwhelming volumes of information. To aggravate the problem, Facebook users have short attention span (Akinyoade, 2019).

Meanwhile, recent research on brand management suggests that brands do not always utilize Facebook Fan Pages strategically (Azar et al., 2016). As a result, it is quite possible for numerous posts submitted on Fan Pages to remain ignored. Without a steady stream of popular posts, users are likely to lose interest in brands' Fan Pages. Scholars have therefore recognized the need to identify possible antecedents of posts' popularity on Facebook.

Nonetheless, current scholarly efforts are possible to be extended in at least two ways. First, several studies measured posts' popularity using only the volumes of Likes and Comments (e.g., De Vries et al., 2012; Sabate et al., 2014; Swani and Milne, 2017) but ignored Shares. However, the social activity of sharing posts has comparable friendvertising effects as liking them, and commenting on them. Hence, a holistic conceptualization of posts' popularity needs to include Shares as well (Luarn et al., 2015; Pinto and Yagnik, 2017).

Second, the extant literature has yet to develop a comprehensive framework that could explain posts' popularity on Facebook Fan Pages. Some studies considered characteristics such as richness of posts (De Vries et al., 2012) but overlooked time-related aspects. Other studies that shed light on time-related aspects (Sabate et al., 2014) failed to consider the role of posts in promoting user engagement. Synergizing these studies is needed to enrich the scholarly understanding of Facebook as a marketing platform.

Hence, the objective of this paper is two-fold. First, it proposes a conceptual framework that identifies four categories of antecedents—presentation, brand awareness, engagement and temporal—that could make posts popular on Facebook Fan Pages. The presentation category includes properties that reflect how the message in posts is delivered. The brand awareness category covers properties of posts that allow brands to develop their online presence. The engagement category encompasses properties that allow brands to interact with users. The temporal category comprises time-specific properties of posts.

Second, the paper attempts to validate the proposed framework empirically. For this purpose, 10,000 posts drawn from 50 Facebook Fan Pages were analyzed in terms of how the volumes of Likes, Comments and Shares were related to the four categories of antecedents.

This paper is novel on both theoretical and methodological fronts. With its conceptual footing on the theories of agenda-setting and framing (as explained later in the Literature Review section), it synergizes various perspectives including those from advertising (Lohtia et al., 2003), marketing (Killian and Hulland, 2016) and information science (Coursaris et al., 2016) to propose a framework of posts' popularity on Facebook Fan Pages.
Methodologically, this paper is the first to examine the popularity of Facebook posts by

drawing data from a broad spectrum of popular brands worldwide. In so doing, it extends previous works, the datasets for which were either restricted to brands belonging to a specific domain (Sabate et al., 2014) or those popular within a particular geographical region (Chua and Banerjee, 2015).

The rest of the paper proceeds as follows. The next section reviews the literature, which culminates in the conceptual framework. This is followed by a description of data collection, measurement and analyses. Results are presented next. Thereafter, the key findings gleaned from the results are discussed. The paper concludes by highlighting its implications, limitations and directions for future research.

LITERATURE REVIEW

As part of their social media marketing efforts, many brands seek to communicate with the online community by submitting posts on Facebook Fan Pages. Users who subscribe to Fan Pages are able to respond to the posts in at least three ways. They could like the post to signal their affirmation (Zell and Moeller, 2018). They could comment on the post to express a variety of opinions qualitatively (Rowe, 2015). Furthermore, they could share the post to display it on their own profile walls (Zadeh and Sharda, 2014). Notifications of these activities permeate through users' social networks, thereby allowing brands to friendvertise (boyd and Ellison, 2007; Cvijikj and Michahelles, 2013; Maurer and Wiegmann, 2011). Hence, this paper conceptualizes popularity as the activities that posts attract in terms of Likes, Comments and Shares (Luarn et al., 2015; Pinto and Yagnik, 2017).

Using the related theories of agenda-setting and framing as the basis, this paper argues that the ways in which a post is submitted on Facebook Fan Pages will predict its fate in terms of popularity. The theory of agenda-setting was traditionally meant to explain how the mainstream media can influence the prominence of issues among the audience (McCombs and Shaw, 1972). The mainstream media influences the public agenda by guiding audience attention to specific topics. In today's digital media environment, scholars have started to recognize the power of Facebook to set the public agenda in the context of political communication (Feezell, 2018).

Meanwhile, research on brand management highlights the importance of brands to make their presence felt on Facebook in order to be "discoverable, connected, timely and insightful" (Pinto and Yagnik, 2017, p. 51). In fact, post popularity of brands has been indicated to be positively related to not only sales but also stock prices (Lin et al., 2017). Therefore, it is reasonable to assume Facebook's agenda-setting prowess in not only political communication but also brand communication. And if Facebook is powerful enough to set the public agenda surrounding a brand, posts submitted on Facebook Fan Pages should—at least in part—determine the positioning of the brand among the public.

Moreover, setting the agenda requires framing messages carefully with emphasis on points that will appeal to the public. Specifically, a framing effect is said to occur when a communicator presents a message strategically to the intended audience so that the agenda could be set in the desired way (Druckman, 2001).

This is particularly pertinent in the case of brand communication because a brand would obviously try to create a favorable impression among its fans on Facebook. To do so, it is certainly not expected to submit posts in an ad-hoc manner. Rather, the brand could frame its posts strategically to make the entries receptive to Likes, Comments and Shares. Therefore, investigating the relationship between the ways in which are posts are framed, and their popularity represents a theoretically-meaningful research endeavour.

In this vein, current efforts appear fragmentary (De Vries et al., 2012; Sabate et al., 2014). For example, as pointed out earlier, some studies focused on the richness of posts but ignored time-related aspects (De Vries et al., 2012). Furthermore, even though users often join Fan Pages to show support for the brand (Bagozzi and Dholakia, 2002), the extent to which posts focus on the brand per se to attract Likes, Comments and Shares has not been widely investigated.

Therefore, this paper seeks to dovetail related studies (De Vries et al., 2012; Luarn et al., 2015; Pinto and Yagnik, 2017; Sabate et al., 2014) by synergizing various perspectives including those from advertising (Lohtia et al., 2003), marketing (Killian and Hulland, 2016) and information science (Coursaris et al., 2016). Taking into consideration the needs for comprehensiveness and parsimony, it proposes a conceptual framework that identifies four categories of antecedents—presentation, brand awareness, engagement and temporal—that could be related to posts' popularity on Facebook Fan Pages as measured by the volumes of Likes, Comments as well as Shares.

Presentation category

The presentation category encompasses those properties that reflect how the content of the message in posts is delivered on Facebook Fan Pages. The ways in which posts are presented on Facebook can have a direct bearing on their visibility. This in turn can determine the extent to which posts are able to prompt users to Like, Comment or Share. Hence, the following research question (RQ) is formulated for investigation:

RQ 1: How does the presentation category relate to the popularity of posts on Facebook Fan Pages?

Guided by prior research (Coursaris et al., 2016; De Vries et al., 2012), this paper identifies two dimensions of the presentation category—length and media richness. Length is a measure of the verbosity of posts. Posts that are overly wordy cannot be read easily. This is because Facebook shows only a fragment of a long post, and requires users to click on an additional link to read the entire content. In contrast, short posts can grab the eyeballs readily

(De Vries et al., 2012). Media richness is the level of visual captivation offered through posts. Enhanced media richness in posts framed with images, animations or videos can enable brands to make themselves conspicuous (Coursaris et al., 2016; Lohtia et al., 2003).

Brand awareness category

The brand awareness category encompasses those properties of posts on Facebook Fan Pages that allow brands to develop their online presence among users. These properties could have a bearing on posts' popularity because Fan Pages are intended to update users with information about brands (Bagozzi and Dholakia, 2002; De Vries et al., 2012). By helping users stay abreast with brand information, posts could become popular. Hence, the following RQ is formulated for investigation:

RQ 2: How does the brand awareness category relate to the popularity of posts on Facebook Fan Pages?

Taking the cue from related studies (Cvijikj and Michahelles, 2013; Ruiz-Mafe et al., 2014), this paper identifies three dimensions of the brand awareness category—brand centrality, competitor comparison, and corporate social responsibility (CSR). Brand centrality serves as a proxy for the prominence of the brand in posts. Posts with brands taking center stage could be endearing to users, who often join Facebook Fan Pages to remain apprised about the brands' development (Bagozzi and Dholakia, 2002; Swani and Milne, 2017). Competitor comparison refers to juxtaposing a brand with its competitors. Comparison with competitors based on criteria such as product features and price enhances brand presence (Cvijikj and Michahelles, 2013; Ruiz-Mafe et al., 2014). CSR denotes the portrayal of brands as philanthropic contributors to society. Posts highlighting CSR efforts could help users identify with the brands (Eisingerich et al., 2011; Kent and Taylor, 2016).

Engagement category

The engagement category encompasses those properties of posts on Facebook Fan Pages that allow brands to forge connections and develop rapport by interacting with users. These properties could have a bearing on posts' popularity because users are known to appreciate entries that facilitate engagement (Maurer and Wiegmann, 2011). Besides, users are often endeared to posts that promote brand loyalty and interaction (De Vries et al., 2012). Hence, the following RQ is formulated for investigation:

RQ 3: How does the engagement category relate to the popularity of posts on Facebook Fan Pages?

Inspired by related studies (Hansson et al., 2013; Oeldorf-Hirsch and Sundar, 2015; Wang and Fessenmaier, 2003), this paper identifies five dimensions of the engagement category—contest organization, deal provision, member tagging, member recognition, and targeted marketing. Contest organization refers to notification about specific contests set up by a brand for its users to participate. The use of contests in posts could serve as game-based marketing strategies to promote engagement (Hansson et al., 2013; Killian and Hulland, 2016). Deal provision relates to giving incentives such as prizes or discounts to users. Lucrative deals could enhance users' attention toward posts, thereby promoting participation (Wang and Fessenmaier, 2003). Member tagging refers to the use of the tagging feature offered by Facebook in posts to connect with others. Tagging could foster a sense of community, thereby promoting engagement between users and brands (Oeldorf-Hirsch and Sundar, 2015). Member recognition refers to the expression of appreciation in posts toward users who are fans of the brand. Brands that recognize and appreciate fans' contributions could be viewed as being engaging (Hansson et al., 2013; Liu and Shrum, 2002). Targeted marketing entails focusing on demographic slices based on criteria such as interest and religion. Brands could use targeted posts to interact with not only the general community but also specific sub-groups (Wright et al., 2010).

Temporal category

The temporal category, as the name suggests, encompasses the time-specific properties of posts on Facebook Fan Pages. They could have a bearing on popularity because users look to Facebook regularly to browse the constantly rolling stream of fresh posts (Pinto and Yagnik, 2017). Hence, the following RQ is formulated for investigation:

RQ 4: How does the temporal category relate to the popularity of posts on Facebook Fan Pages?

Informed by related studies (e.g., Coursaris et al., 2016; Chandrasekhar and Stanley, 2013; Sabate et al., 2014), this paper identifies two dimensions of the temporal category—post interval, and seasonal relevance. Post interval is a measure of time between the submissions of posts on Facebook. When post interval is short, new entries occupy the top of the Fan Page only for a while before being continually pushed downward by even newer posts. This in turn could prevent the entries from becoming popular (Brech et al., 2017; Dolan, 2016). Seasonal relevance refers to the presence of references to festivals in posts. Seasonally relevant posts submitted around festive seasons could pique substantial attention from users (Chandrasekhar and Stanley, 2013; Coursaris et al., 2016).

Summary of the conceptual framework

Overall, the proposed conceptual framework identifies 12 dimensions altogether (two from the presentation category, three from the brand awareness category, five from the engagement category, and two from the temporal category) that could make posts on

Facebook Fan Pages popular by attracting Likes, Comments and Shares. It is summarized in Table 1.

While reviewing the literature for the development of the conceptual framework, a few other dimensions were also identified. Examples include informativeness, entertainment, and time/day of posting. However, they were not deemed appropriate to be included.

Informativeness was not included because the current conceptual framework offers a granular treatment of the type of information that a post carries. For example, the dimension of brand centrality suggests whether posts contain brand-centric information while that of competitor comparison denotes whether the entries contain information about multiple brands.

Entertainment was not included because of methodological considerations. In particular, previous works have coded entertainment based on whether a post contains funny anecdotes (Khan et al., 2016). However, this paper opines that humor is too subjective to facilitate reliable coding.

Finally, time/day of posting was not included because its association with the popularity of posts is possible to be confounded by differences in time zones. Facebook's proprietary EdgeRank algorithm could further make it challenging to make valid inferences (Ruths and Pfeffer, 2014).

Insert Table 1 about here

METHODOLOGY

Data collection

Related studies on Facebook Fan Pages often relied on datasets that were limiting in scope, and thus thwart generalizability. For example, some datasets were restricted to Fan

Pages for brands belonging to only a specific domain (Sabate et al., 2014) while others were confined to Fan Pages for brands popular only within a particular country (Chua and Banerjee, 2015). Of late, brand management scholars have been particularly vocal in calling for further research involving a wider context of investigation (Pinto and Yagnik, 2017; Powell, 2017).

Therefore, compared with previous works, this paper sought to identify a broader spectrum of brands that are popular worldwide. It followed a four-step process as explained below:

The first step sought to identify an initial pool of about 10 domains that have consistently been known for their social media presence. For this purpose, resources from social media analytics companies such as IgniteSocialMedia, SimplyMeasured and SocialBakers were trawled and inspected. Each of these companies has been used in prior works such as Walton et al. (2012), Cavazos-Rehg et al. (2015), and Parganas et al. (2015) respectively to obtain social media-related data or statistics.

In the second step, five domains were selected from the initial pool of 10 using simple random sampling. These included automobiles, entertainment, fast-moving consumer goods (FMCG), retail and technology.

In the third step, the top 30 brands in terms of global fan base on Facebook were shortlisted from each of the five domains using statistics from SocialBakers. This ensured a wide representation of brands within each domain.

In the fourth step, 10 out of the shortlisted 30 brands from each domain were selected using simple random sampling. This resulted in a set of 50 brands uniformly distributed across the five domains (10 brands x 5 domains). The selected brands are listed in Table 2.

Insert Table 2 about here

From each of the 50 Fan Pages, the most recent 200 English posts submitted by the brand were admitted into the dataset. Thus, there were a total of 10,000 posts uniformly distributed across 50 Fan Pages. This certainly represents a wider context of investigation vis-à-vis previous works such as De Vries et al. (2012), Khan et al. (2016), and Pinto and Yagnik (2017); which analyzed 355 posts from 11 Fan Pages, 1,922 posts from 15 Fan Pages, and 421 posts from four Fan Pages respectively.

For each post, the following fields were archived: content, submission time, and the volumes of Likes, Comments as well as Shares. All posts were submitted within a span of five months from the data collection period: from March to July 2016. This ensured that each of them had a comparable window of time to attract Likes, Comments and Shares.

Measurement and quantitative content analysis

Three of the 12 dimensions identified in the conceptual framework (cf. Table 1) were measurable directly from the retrieved data. These included length, member tagging, and post interval. Length was measured as the number of words. In terms of member tagging, posts were labelled as one if Facebook's tagging feature was used, zero otherwise. Post interval was measured as the number of days elapsed between the submission of the current post, and that of the previous post.

The remaining nine dimensions of the antecedents identified in the conceptual framework were measured using quantitative content analysis (Krippendorf, 1980; Luarn et al., 2015). Three research assistants, who were graduate students of Information Systems in a large public university in Asia, were recruited as coders. The content analysis procedure was informed by Landis and Koch (1977), and Krippendorf (1980). A coding schema (cf. Table 3) was jointly developed by the authors in consultation with the coders.

For the presentation category, only media richness required quantitative content analysis. In particular, posts' media richness ranged from videos (highest) and animations to images and text-only (lowest). When a combination of different media was used (e.g., a mixture of text and images), posts were coded at the highest possible level.

For the brand awareness category, posts that focused on the brand were coded as brand-central. Those comparing the brand with its competitors were deemed to involve competitor comparison. Posts that highlighted the brand's philanthropic contributions were coded as CSR efforts.

For the engagement category, posts notifying users about contests were deemed to be related to contest organization. Those that attempted to incentivize users by offering prizes or discounts were coded as deal provisions. Posts that appreciated users' contribution were deemed to serve the purpose of member recognition. Those that catered to specific demographic slices were coded as instances of targeted marketing.

For the temporal category, only seasonal relevance required quantitative content analysis. Posts were coded as seasonally relevant if they made references to festivals such as the Christmas or the New Year.

Insert Table 3 about here

Data analysis

This paper examines how the four categories of antecedents—presentation, brand awareness, engagement and temporal—identified in the conceptual framework could predict the number of Likes, Comments and Shares. Hence, hierarchical regression was used for data analyses with Likes, Comments and Shares as the three dependent variables. The number of fans for a given Fan Page along with the domain of the chosen brands were added as control variables.

Each dependent variable had five hierarchical models of independent variables. Model 1 included the control variables. Model 2 through Model 5 included the variables corresponding to the presentation category, the brand awareness category, the engagement category, and the temporal category respectively. All inferences about how specific independent variables were related to the three dependent variables were drawn based on the results of the final model.

The three dependent variables—Likes, Comments and Shares; the control variable number of fans; as well as the independent variables length in words and post interval were logarithm transformed to account for their skewness (Luarn et al., 2015; Sabate et al., 2014). For the categorical or nominal independent variables such as vividness and brand centrality, the coded value of zero was taken as a baseline for comparison. Put differently, dummy variables corresponding only to the non-zero coded values were included in the regression models (De Vries et al., 2012). Spearman correlations between any two pairs of variables were below 0.7. Moreover, all variance inflation factors were below the recommended threshold of 10. These confirmed the absence of multicollinearity (O'brien, 2007).

Issues of validity, reliability and model testing

This paper relied on a large dataset encompassing user-generated content and associated meta-data. The use of such data obtained from social media does not negate the need to address the longstanding issues of validity, reliability and model testing. Hence, efforts were made to tackle each of these as far as possible.

For one, during the process of developing the conceptual framework, variables with contentious validity and reliability were dropped. As indicated earlier, time/day of posting was not taken into account because differences in time zones coupled with Facebook's EdgeRank algorithm can invalidate the inferences (Ruths and Pfeffer, 2014). Again, entertainment was not considered because it is a subjective concept that thwarts reliable coding (Khan et al., 2016).

Validity of the variables identified in the conceptual framework was ensured through an in-depth review of the literature. Such an approach is recommended in previous research (e.g., Casaló et al., 2011; Chen et al., 2014). As shown in Table 1, all 12 dimensions in the conceptual framework are theoretically supported.

To ensure reliability when coding the variables, inter-coder reliability was established. Specifically, the coding was done in two phases. In the first phase, pilot coding was carried out by the coders independently on a set of 600 posts selected from the dataset based on simple random sampling. The size of the sample chosen for pilot coding exceeded the threshold recommended by Lacy and Riffe (1996). This ensures that agreement with respect to these posts is representative of the pattern that would occur if all entries were coded by all coders. Taking the nine dimensions together, the mean pair-wise kappa coefficient was 0.91, indicating sufficient inter-coder reliability (Krippendorf, 1980). The coders conferred among themselves to discuss the disagreed results. The final coded values in the pilot dataset were determined by the majority of the coders. In the second phase of the coding, the remaining 9,400 posts (10,000 – 600) were coded separately by the coders. Each of them received comparable volume of randomly-selected entries. They were not given deadlines to minimize any chance of fatigue-induced coding errors.

Finally, model testing was done through hierarchical regression. To ensure that the explanatory power of the conceptual framework is not over-estimated, two control variables were included. First, the number of fans for a given Fan page was controlled. This was necessary because fan count is likely to correlate with the chances of a post attracting Likes, Comments and Shares.

Second, the domain of the five chosen brands—automobiles, entertainment, FMCG, retail and technology—was controlled using dummy variables. Taking the automobiles domain as a baseline, the dummy variables corresponding to the other four domains were added to the model. This allowed accounting for potential variances across the domains of the brands. With these measures in place to tackle the issues of validity, reliability and model testing; the results presented next show the robustness of the proposed conceptual framework.

RESULTS

Table 4 shows the descriptive statistics of the dataset while Table 5 presents the hierarchical regression results (final model). With respect to Likes, statistically significant positive relationship emerged for the presence of images ($\beta = 0.47$, $p < 0.001$) as well as videos ($\beta = 0.37$, $p < 0.001$), brand centrality ($\beta = 0.04$, $p < 0.001$), competitor comparison ($\beta = 0.10$, $p < 0.001$), CSR ($\beta = 0.04$, $p < 0.001$), member tagging ($\beta = 0.05$, $p < 0.001$), targeted communication ($\beta = 0.06$, $p < 0.001$), and post interval ($\beta = 0.09$, $p < 0.001$). In contrast, the number of Likes exhibited statistically significant negative relationship with length ($\beta = -0.09$, $p < 0.001$), contest organization ($\beta = -0.03$, $p < 0.01$), and seasonal relevance ($\beta = -0.04$, $p < 0.001$). Among the independent variables, the presence of images ($\beta = 0.47$, $p < 0.001$) emerged as being the strongest determinant of the number of Likes attracted by the posts.

With respect to Comments, statistically significant positive relationship could be found for the presence of images ($\beta = 0.34$, $p < 0.001$) as well as videos ($\beta = 0.30$, $p < 0.001$), brand centrality ($\beta = 0.07$, $p < 0.001$), competitor comparison ($\beta = 0.03$, $p < 0.001$), and post interval ($\beta = 0.15$, $p < 0.001$). In contrast, the number of Comments exhibited statistically significant negative relationship with member tagging ($\beta = -0.03$, $p < 0.05$), and seasonal relevance ($\beta = -0.05$, $p < 0.001$). Among the independent variables, the presence of images ($\beta = 0.34$, $p < 0.001$) emerged as being the strongest determinant of the number of Comments attracted by the posts.

With respect to Shares, statistically significant positive relationship could be found for the presence of images ($\beta = 0.13$, $p < 0.001$) as well as videos ($\beta = 0.16$, $p < 0.001$), brand centrality ($\beta = 0.07$, $p < 0.001$), targeted communication ($\beta = 0.05$, $p < 0.001$), and post interval ($\beta = 0.12$, $p < 0.001$). In contrast, the number of Shares exhibited statistically significant negative relationship with length ($\beta = -0.14$, $p < 0.001$), contest organization ($\beta = -0.04$, $p < 0.001$), member recognition ($\beta = -0.08$, $p < 0.001$), and seasonal relevance ($\beta = -0.03$, $p < 0.01$). Among the independent variables, the presence of videos ($\beta = 0.16$, $p < 0.001$) emerged as being the strongest determinant of the number of Shares attracted by the posts.

Although several variables were statistically significant for all the dependent variables, an inspection of the variance explained by the separate models conveys that the four categories of antecedents—presentation (RQ 1), brand awareness (RQ 2), engagement (RQ 3), and temporal (RQ 4)—identified in the conceptual framework do not manifest in the same way. After accounting for the control variables, the largest increment in variance explained was contributed by the presentation category for Likes (from 21.80% to 27.80%, $\Delta R^2 = 6.00\%$), Comments (from 21.40% to 24.20%, $\Delta R^2 = 2.80\%$) as well as Shares (from 17.50% to 20.10%, $\Delta R^2 = 2.60\%$). This in turn suggests that the presentation category is the most important category when it comes to posts' likelihood to garner Likes, Comments and Shares.

Insert Table 4 and Table 5 about here

DISCUSSION

The paper gleans five key findings. First, the proposed conceptual framework performed reasonably well in shedding light on the popularity of posts on Facebook Fan Pages. The explanatory power of the final hierarchical regression model compared favourably with that of prior studies such as De Vries et al. (2012) as well as Zhang and Peng (2015). Majority of the measures corresponding to the presentation category, the brand awareness category, the engagement category, and the temporal category of antecedents were significantly related to the volumes of either Likes (R^2 = 30.10%, adjusted R^2 = 30.00%), Comments (R^2 = 27.00%, adjusted R^2 = 26.80%), or Shares (R^2 = 22.80%, adjusted R^2 = 22.60%). Hence, the ways in which posts were framed seemed to have a bearing on their popularity. This in turn calls for mindfulness on the part of brand managers while submitting posts on Facebook Fan Pages. In particular, they should be careful about the presentation of posts. This is because the presentation category emerged as being the most important.

Nonetheless, the ways in which posts are framed on Facebook Fan Pages did not always have a consistent bearing on Likes, Comments and Shares. For example, member tagging in posts was positively related to Likes, negatively related to Comments, and unrelated to Shares. This is a new finding that has at best received some cursory attention in the literature. For example, prior works suggested that commenting could be more cognitively challenging than either liking or sharing (Cvijikj and Michahelles, 2013).

While Comments could be used to voice a range of opinions, Likes and Shares signal a positive attitude toward brands. Between the two, liking is less time-consuming than sharing. Likes could serve as a throwaway action compared with Shares, which require users to write something about what they are sharing. In other words, sharing entails clicking a button as well as writing some comments. Overall, convincing users to Like could be easy while enticing them to Share seems difficult. This could be a reason why the analyses had the highest explanatory power for Likes, intermediate explanatory power for Comments, and the least explanatory power for Shares.

Second, with respect to the dimensions of the presentation category (RQ 1), length was negatively related to posts' likelihood to foster knowledge sharing while media richness exhibited a generally positive association. Lengthy posts failed to appeal perhaps because Facebook only shows a fragment of long entries. Users are required to click on an additional link to read the entire content. The use of rich media, specifically in the form of images or videos, made posts attractive to Likes, Comments and Shares. Consistent with the literature (Coursaris et al., 2016; De Vries et al., 2012; Lohtia et al., 2003), visually captivating posts could engage users.

Third, the relationship between the dimensions of the brand awareness category (RQ 2) and posts' popularity was mostly positive. As suggested in prior studies (Bagozzi and Dholakia, 2002; Swani and Milne, 2017), posts with brands taking center stage were more popular than those with brands featured only at the periphery. Posts attempting to compare a given brand with its competitors drew substantial attention through Likes and Comments but failed to attract Shares. This extends previous works by suggesting that competitor comparison is inadequate in motivating users to share posts (Cvijikj and Michahelles, 2013). Posts highlighting brands' CSR efforts attracted Likes but did not necessarily attract Comments or Shares. The throwaway action of Likes notwithstanding, such posts were perhaps viewed as advertising gimmicks that are rarely materialized (Eisingerich et al., 2011; Hansson et al., 2013; Zhang and Peng, 2015).

Fourth, the relationship between the dimensions of the engagement category (RQ 3) and posts' popularity yielded mixed results. Contrary to the literature (Killian and Hulland, 2016; Wang and Fessenmaier, 2003), posts framed to notify users about contests or deals did not attain popularity. Since users often use Facebook for entertainment purposes (boyd and

Ellison, 2007), they are perhaps hardly amused by such commercial-type information about brands (Swani et al., 2013). Member tagging attracted Likes but muted Comments. On being tagged by brands, users perhaps expressed appreciation through Likes without necessarily feeling compelled to express personal opinions. Quite counter-intuitively, member recognition in posts made users unlikely to share the entries on their profile walls. This new finding suggests that users do not want to be seen as endorsing brands on Facebook. Nonetheless, as suggested in prior works (Wright et al., 2010), targeted marketing efforts in posts attracted popularity, specifically through Likes and Shares.

Fifth, with respect to the dimensions of the temporal category (RQ 4), post interval was positively related to popularity while seasonal relevance exhibited negative association. A long post interval would mean low submission frequency. The lower the submission frequency, the higher was the likelihood of posts to attract Likes, Comments and Shares. Under high submission frequency, posts do not always become popular perhaps because users could be overwhelmed with information overload (Dolan, 2016). Contrary to the suggestions in prior works (Coursaris et al., 2016), seasonally relevant posts failed to become popular. A possible explanation is that users are either too fatigued or overly distracted to respond to posts during festive seasons. As brands increasingly seek to capitalize on festivals for maximizing social media outreach, such efforts could backfire by intensifying the already-existent information overload on Facebook.

CONCLUSION

This paper presented a conceptual framework identifying four categories of antecedents—presentation, brand awareness, engagement and temporal—that could be related to posts' popularity on Facebook Fan Pages. Posts' popularity was conceptualized as the volumes of Likes, Comments and Shares attracted by the entries. Several dimensions from all the categories of antecedents were found to have a significant bearing on posts' popularity.

This paper is significant on the research front for three reasons. First, it dovetails the literature to present a framework of antecedents—more holistic than previous studies (e.g., De Vries et al., 2012; Sabate et al., 2014)—that could make posts on Facebook Fan Pages attractive to Likes, Comments and Shares. This paper makes an attempt to synergize the fractured body of the literature in this area. In this way, it contributes to a better understanding of Facebook as a marketing platform from a scholarly perspective. It also serves as a call for future research to further expand and refine the current framework, and empirically validate it by drawing data from other social media applications such as Instagram and Twitter.

Second, this paper contributes to research by conceptualizing brands' marketing efforts as posts' popularity on Facebook Fan Pages that was measured as the volumes of Likes, Comments and Shares. This is in line with the few recent works such as Luarn et al. (2015). In contrast, most previous related studies had examined only the volumes of Likes and Comments (e.g., De Vries et al., 2012; Sabate et al., 2014; Swani and Milne, 2017) but ignored Shares, which has comparable friendvertising effects as liking or commenting.

Nonetheless, it has to be acknowledged that the conceptualization used in this paper is not exhaustive. This is because Facebook is often frequented by lurkers who might visit Fan Pages without necessarily engaging in liking, commenting or sharing activities (Simon et al., 2013). Instead, they could spread the information using other social media applications such as Twitter, or even through offline word-of-mouth. In this vein, this paper invites future research to devise new yardsticks that would enable tracking the effectiveness of brands' omnichannel marketing efforts more holistically.

Third, unlike previous works (De Vries et al., 2012; Khan et al., 2016), this paper controlled for the total number of fans in the analysis. After all, if the framing of posts is supposed to set the public agenda surrounding a brand, the size of the crowd on board should be accounted for. The paper finds that the total number of fans was positively related to all of Likes, Comments and Shares. The finding lends support to the underlying assumption of the related theories of agenda-setting and framing (Druckman, 2001; Feezell, 2018; McCombs and Shaw, 1972): Framed messages can set the public agenda if and only if they are able to reach their intended audience in the first place.

From the managerial perspective, this paper has implications for brands with a huge fan base on how to manage their Facebook Fan Pages. Specifically, it recommends brand managers to submit posts that are visually captivating through the use of rich media such as images or videos. They should submit posts that focus on the brand by comparing it with its competitors. CSR efforts and targeted marketing strategies could also be incorporated in posts occasionally. Such posts might be interlaced with substantial time lags to avoid overwhelming users. However, posts should not focus on contests, and refer to festive seasons. Strategies such as member tagging, and member recognition might also be avoided.

Overall, these recommendations serve to remind brand managers not to strive too hard to persuade users on Facebook. A relatively cautious and laid back approach might work better than an overly aggressive one to appear favourable to the online community.

Moreover, given that the number of fans was positively related to Likes, Comments and Shares; brands need to promote subscription to their Fan Pages in the first place. A substantial fan base is crucial for a brand to be impactful on Facebook.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This paper needs to be viewed in light of five limitations. First, the examined dataset was limited only to brands with fairly large fan base on Facebook. Caution is advocated in generalizing the findings to brands with a relatively smaller fan base. To address this limitation, future research could validate the proposed conceptual framework by drawing data from brands that have fewer fans on Facebook.

Second, the proposed conceptual framework contained only four categories of antecedents—presentation, brand awareness, engagement and temporal—to predict posts' popularity on Facebook Fan Pages. This modest progress in the literature paves the way for future research to develop an even more comprehensive framework that could incorporate antecedents related to other categories such as customer service and users' herd instinct.

Third, the coding scheme for some of the dimensions in the framework could be further granularized. For example, vividness of posts was coded based on the presence of images, animations or videos without considering fine-grained characteristics such as the quality of images, or the duration of videos. Moreover, based on the coding scheme, some dimensions had limited variance in the dataset (e.g., competitor comparison—cf. Table 4). Future research could adopt a granular coding scheme to yield greater variance, thereby facilitating a more rigorous test of the proposed conceptual framework.

Fourth, this paper used a coding procedure to convert the brand posts into quantitative data suitable for statistical analyses. While such an approach was informed by previous works (e.g., Chua and Banerjee, 2015; De Vries et al., 2012; Sabate et al., 2014), future research could consider offering a more qualitative treatment to brand posts. This would help identify more nuanced factors that dictate posts' popularity.

Fifth, the data collection procedure had little control over the operational logic of EdgeRank, the algorithm that manages the flow of information on Facebook's timeline. It remains unknown if such behind-the-scene algorithms had any impact on the visibility of posts submitted by a given brand, thereby influencing the likelihood of the entries to attract Likes, Comments and Shares. To ensure greater control, future research could explore ways to extend the proposed conceptual framework to other social media platforms where information flow is not regulated by proprietary algorithms.

Besides the directions for future research highlighted above, this paper invites interested scholars to uncover differences in users' intention to Like, Comment and Share on Facebook. The literature is currently silent on the antecedents that are unique to liking, commenting and sharing activities. By serving as a call to plug this research gap, the paper hopes to advance the scholarly understanding of brands' use of Facebook for marketing purposes.

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Table 1: Conceptual framework of antecedents that could make Facebook posts popular

Antecedents with Dimensions	Brief Definitions	References
Presentation: properties that reflect how the message in posts is delivered.		
Length	Verbosity	De Vries et al. (2012)
Media richness	Visual captivation	Coursaris et al. (2016)
Brand awareness: properties of posts that allow brands to develop online presence.		
Brand centrality	Brands taking center stage	Bagozzi and Dholakia (2002)
Competitor comparison	Brands compared with competitors	Ruiz-Mafe et al. (2014)
Corporate social responsibility	Brands as philanthropic contributors	Kent and Taylor (2016)
Engagement: properties of posts that allow brands to interact with users.		
Contest organization	Notification about contests	Killian and Hulland (2016)
Deal provision	Offer of incentives	Wang and Fessenmaier (2003)
Member tagging	Use of the tagging feature	Oeldorf-Hirsch and Sundar (2015)
Member recognition	Appreciation toward users	Hansson et al. (2013)
Targeted marketing	Focus on demographic slices	Wright et al. (2010)
Temporal: time-specific properties of posts.		
Post interval	Time between submission of posts	Brech et al. (2017)
Seasonal relevance	Reference to festive season	Chandrasekhar and Stanley (2013)

Table 2: Brands selected for data collection

Automobiles	Entertainment	FMCG	Retail	Technology
Audi sport	AMC	Amway US	Amazon	Facebook
BMW	Disney	Burger King	Auchan	Google
General Motors	Game of thrones	Coco cola	Costco	HP
Honda	Le Tour de France	Colgate	eBay	IBM
Mercedes-Benz	Marvel	McDonalds	Home depot	Intel
Suzuki	NBA	PandG	Ikea USA	Microsoft
Tesla	PlayStation	PepsiCo	Kroger	Samsung Mobile
Toyota	UEFA Champions League	Quest Nutrition	Target	Sony
Volkswagen	Warner Bros	Starbucks	TESCO	Yahoo
Volvo	Xbox	Unilever	Walmart	YouTube

Table 3: Coding schema for the quantitative content analysis

Antecedents with Dimensions	Remarks for coding
Presentation	
Media richness[a]	1: posts contain images 2: posts contain animations 3: posts contain videos 0: otherwise
Brand awareness	
Brand centrality	1: posts focus on the brand 0: otherwise
Competitor comparison	1: posts compare the brand with its competitors 0: otherwise
Corporate social responsibility	1: posts highlight brands' philanthropic contributions 0: otherwise
Engagement	
Contest organization	1: posts notify users about contests 0: otherwise
Deal provision	1: posts incentivize users by offering prizes or discounts 0: otherwise
Member recognition	1: posts appreciate users' contributions 0: otherwise
Targeted marketing	1: posts cater to specific demographic slices 0: otherwise
Temporal	
Seasonal relevance	1: posts refer to festivals such as the Christmas or the New Year 0: otherwise

[a] When a post met multiple criteria, it was coded at the highest possible level.

Table 4: Descriptive Statistics of the dataset (N = 10,000)

	Mean	SD	Value	Frequency in %
#Fans	18.07 millions	28.36 millions		
Automobiles domain			0	80.00
			1	20.00
Entertainment domain			0	80.00
			1	20.00
FMCG domain			0	80.00
			1	20.00
Retail domain			0	80.00
			1	20.00
Technology domain			0	80.00
			1	20.00
Length in words	151.24	111.40		
Brand awareness				
Brand centrality			0	28.00
			1	72.00
Competitor comparison			0	99.00
			1	1.00
CSR			0	96.30
			1	3.70
Media richness			0	4.10
			1	81.50
			2	0.30
			3	14.10
Engagement				
Contest organization			0	91.00
			1	9.00
Deal provision			0	93.00
			1	7.00
Member tagging			0	64.20
			1	35.80
Member recognition			0	82.00
			1	18.00
Targeted marketing			0	61.40
			1	38.60
Temporal				
Post interval in days	1.40	7.32		
Seasonal relevance			0	85.60
			1	14.40

Table 5: Standardized coefficients from Model 5 of the hierarchical regression analyses

	Likes	Comments	Shares
#Fans	0.43***	0.43***	0.07***
Entertainment domain	0.08***	0.10***	0.23***
FMCG domain	-0.16***	-0.12***	-0.30***
Retail domain	0.01	0.09***	-0.13***
Technology domain	-0.07***	0.02	-0.07***
Presentation (RQ 1)			
Length in words	-0.09***	-0.02	-0.14***
Media richness (1: image)	0.47***	0.34***	0.13***
Media richness (2: animation)	0.02	0.02	0.01
Media richness (3: video)	0.37***	0.30***	0.16***
Brand awareness (RQ 2)			
Brand centrality (1)	0.04***	0.07***	0.07***
Competitor comparison (1)	0.10***	0.03***	0.01
CSR (1)	0.04***	-0.01	0.01
Engagement (RQ 3)			
Contest organization (1)	-0.03**	0.01	-0.04***
Deal provision (1)	-0.01	0.01	0.01
Member tagging (1)	0.05***	-0.03*	-0.01
Member recognition (1)	0.01	-0.01	-0.08***
Targeted marketing (1)	0.06***	0.02	0.05***
Temporal (RQ 4)			
Post interval in days	0.09***	0.15***	0.12***
Seasonal relevance (1)	-0.04***	-0.05***	-0.03**
Variance explained			
Model 1 R^2 (ΔR^2)	21.80% (21.80%)	21.40% (21.40%)	17.50% (17.50%)
Model 2 R^2 (ΔR^2)	27.80% (6.00%)	24.20% (2.80%)	20.10% (2.60%)
Model 3 R^2 (ΔR^2)	28.70% (0.90%)	24.80% (0.60%)	20.60% (0.50%)
Model 4 R^2 (ΔR^2)	29.20% (0.50%)	24.90% (0.10%)	21.40% (0.80%)
Model 5 R^2 (ΔR^2)	30.10% (0.90%)	27.00% (2.10%)	22.80% (1.40%)

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$