How Do Firms Use Social Media: Topic Modeling of Twitter Brand Posts of Four Indonesian Skincare Brands

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HOW DO FIRMS USE SOCIAL MEDIA: TOPIC MODELING OF TWITTER BRAND POSTS OF FOUR INDONESIAN SKINCARE BRANDS

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Abstract

Manuscript type: Empirical paper
Research Aims: This paper aims to identify the topics of social media posts (on Twitter) from local skincare brands in Indonesia.
Design/methodology/approach: This descriptive study applied text analysis methods, specifically frequency analysis and topic modeling with the Latent Dirichlet Allocation (LDA) method. Data were collected from the top four skincare brands with over 10,000 followers using Twitter Academic API interfaced through the Twarc package in Python. The dataset contained 1290 tweets from Wardah, 17,491 tweets from Avoskin, 1,968 tweets from Somethinc, and 590 tweets from Whitelab. The data analysis used quanteda and topicmodels packages from R software.
Research findings: The findings revealed that the brands’ tweets can be categorised into 8-10 topics, which can be distilled further into three significant functions proposed by Saxton and Waters (2014): information, promotion and mobilisation, and community building and dialogue.
Theoretical Contribution/Originality: This study adds to the body of knowledge regarding social media marketing by adding insights into how local Indonesian brands carry out their social media marketing efforts.
Practitioner/Policy Implication: The findings implied that marketing managers should emphasise providing timely and relevant information as a base that can be used to build dialogic communication efforts with their audience.
Research limitation/Implications: This study only looked at four brands in the local skincare product category. In addition, this study applied automated topic modeling with LDA, which needed an a priori number of topics, which might affect the topic labelling. Furthermore, this study’s scope was limited to categorising the brand posts without examining the effects of brand post types on engagement metrics. Future studies can examine more samples by observing other product categories, applying thematic analysis to code each tweet, and comparing the results to topic modeling results. Lastly, future studies can examine the relationship between brand post types/categories and engagement metrics such as likes, comments, and retweets.
Keywords: Social Media, Topic Modeling, Skincare, LDA, Twitter
INTRODUCTION
Over the last few years, social media has taken an essential role in brand promotions as brands use social media for advertising, communicating, and engaging their customers, mainly because firms view social media as cheaper, faster, and more effective than traditional methods (Oliveira et al., 2022). Past studies have suggested that promotional activities through social media posts, such as liking or sharing brand posts (e.g., Akpinar & Berger, 2017; Liu et al., 2021), can affect customer engagement. Social media includes all internet-based applications that create and exchange user-generated content while allowing collaboration and interaction between participants (Kaplan & Haenlein, 2010). This definition covers a wide range of applications, such as microblogs (e.g. Twitter), social networking sites (e.g. Facebook), and content community sites (e.g., YouTube) (Alves et al., 2016).

The existence of social media allows the use of social media marketing as a standard practice that utilises online relationships function that can reach and engage customers and businesses in a highly personalised, seamless, omnichannel, and realistic manner (Johansson & Zhu, 2023). The type of message topic implemented as part of the social media communication strategy is essential in social media marketing as it can affect audience engagement outcomes such as likes or shares (Ahn et al., 2021). Previously, Liu et al. (2021) examined the Twitter postings of 15 luxury brands and classified the message characteristics of the luxury brands’ tweets based on Kim & Ko's (2012) social media marketing dimensions. They found that tweets focusing on entertainment, interaction, and trendiness increase customer engagement. Akpinar & Berger (2017) investigated the appeals (informative vs emotional appeals) contained in online video ads shared among users in video-sharing services and suggested that ads that convey emotional appeals tend to be more likely to be shared. Ahn et al. (2021) identified the topics contained in tweets related to disasters and suggested that topics from tweets were related to specific engagement outcomes, such as retweets and favourites. These studies indicate that message content strategy is essential in social media marketing. Hence, understanding how brands frame their content is an essential step toward increasing engagement with the audience.

This study intends to contribute toward understanding the nature of social media marketing strategies by examining the
dimensions of brand posts on Twitter using the Indonesian skincare product category as a case study. The skincare product category was chosen as the focal product category due to its increasing market size and market growth. According to Statista (2023), Indonesia’s skin care product category has grown steadily and is expected to reach USD 2.8 billion by 2028. In the skincare product category, local brands have emerged and gained a position in the top 10 most purchased skincare products in Indonesia’s online marketplace (Compas, 2021). The local skincare industry actively uses social media to promote their products and engage their audience. Local skincare brands’ official accounts have gained a substantial number of followers. For instance, as of July 2022, the top four skincare brands with more than ten thousand followers were Wardah Beauty (@Wardahbeauty) with 107 thousand followers, followed by Avoskin (@Avoskinbeauty) with 74 thousand followers, Somethinc (@Somethinc4u) with 35.9 thousand followers, and White Lab (@Whitelab_id) with 21.4 thousand followers.

This study aimed to identify the topics of social media posts from local skincare brands in their social media marketing activities. This study is intended to formally examine and describe how local Indonesian brands (in this case, skincare brands) communicate with their audience on social media. Understanding the topics brands use to communicate with their audience through social media can help elucidate their communication strategies to engage their audience. It can be used as an example to help other brands in similar or different categories craft their social media marketing messages to engage their customers. The authors focused on Twitter as a source of social media marketing activity since it is one of the most popular social media platforms (Liu et al., 2021), and significant local skincare brands have actively used it.

Past research has examined social media posts to understand how organisations (i.e., marketers or organisations) deliver information and engage their audience. Examples of past research that studied the topics contained in social media communication activities include the luxury products category (e.g., Liu et al., 2021), disaster communications (e.g., Ahn et al., 2021), smart cities in Italy (Blasi et al., 2022), and online ads shared through community video sharing applications (Akpinar & Berger, 2017) to name a few. Research that identifies topics or themes from social media brand posts is essential since it is the first step
toward understanding the factors that drive consumer engagement with brand posts and the resulting customer-brand relationship outcomes.

Additionally, this study can shed light on how brands engage with their customers, mainly through social media. Furthermore, research on brand posts can help quantify social media adoption for brand communications. The authors argue that although similar studies have been frequently published in the academic literature, this study offers a benefit in quantifying and formalising how local brands in Indonesia’s skincare industry use social media to engage their customers. The authors propose that examining topics in social media marketing posts from different product categories can contribute insights towards understanding social media marketing strategies across different products, particularly in Indonesia.

LITERATURE REVIEW

Social Media Marketing

Social media marketing is “the utilisation of social media technologies, channels, and software to create, communicate, deliver, and exchange offerings that have value for an organisation’s stakeholders” (Tuten & Solomon, 2017). Social media marketing aims to increase brand awareness, stimulate sales, improve brand image, and generate traffic to online platforms by encouraging users to share or post content (Felix et al., 2017). Social media marketing allows marketers to reduce prejudice and misunderstanding of brands and increase brand value by exchanging information and ideas with customers (Yadav & Rahman, 2017). Felix et al. (2017) proposed that social media marketing should be an interdisciplinary and cross-functional construct to create stakeholder value by utilising social media (combined with other communication channels). Using this view, Felix et al. (2017) maintained that social media marketing has four interdependent dimensions (scope, culture, structure, and governance) that must be comprehensively managed.

Based on a study by Felix et al. (2017), the first dimension (scope) relates to how companies use social media. Defenders use social media as a one-way communication instrument to inform or entertain consumers or stakeholders. At the same time, explorers tend to use social media to make reciprocal collaborations with different stakeholders such as clients, suppliers, government agencies, and employees. According to Felix et al. (2017), the second dimension is “social media marketing culture”, which is
characterised as a continuum between conservatism and modernism. The former refers to a more traditional, encapsulated mass advertising approach, while the latter refers to a more flexible and open social media culture. The third dimension involves social media marketing structure, which varies from a hierarchical structure (i.e., centralised structure with clearly defined tasks) to a networked structure (in which all employees are responsible for social media marketing tasks). Lastly, the fourth dimension concerns social media marketing governance (autocracy vs anarchy), related to how the firm establishes rules and guidelines that control social media marketing responsibilities. In this dimension, autocracy refers to a condition characterised by precise regulations about allowing people to interact on social media. In contrast, anarchy refers to the absence of such rules or guidelines.

Despite the approach firms use to manage social media marketing, studies suggest that marketing activities are essential for marketers. Kim and Ko (2012) suggest that social media marketing strategically engages customers and builds value, relationships, and brand equity. According to Kim and Ko (2012), in the context of luxury brands, consumers perceived brands’ social media marketing activities from five dimensions: entertainment (i.e., through content provision and customised information search), interaction (i.e., through information sharing and opinion exchange with other people), trendiness (i.e., through provision of up to date information), customisation (i.e., through means of customised information search and customised service), and word of mouth (i.e., by enabling customers to pass information from brands’ social media to others).

In a later study, based on actual tweets from various luxury brands’ social media, Liu et al. (2021) confirmed the relationship between four out of five dimensions of social media marketing activities (i.e., entertainment, interaction, trendiness, and word of mouth) proposed by Kim and Ko (2012) and customer engagement with brand-related social media contents. Similarly, based on a 214 social media users survey, Cheung et al. (2020) reported that interaction, electronic word of mouth, and trendiness directly influenced consumer brand engagement and ultimately improved brand awareness and image. However, Cheung et al. (2020) noted that the effect of Kim and Ko’s (2012) social media marketing activities may be context-bound. Cheung et al. (2020) found that in the smartphone industry, the impact of entertainment in influencing consumer brand
engagement was non-significant, while in Liu et al. (2021), who studied luxury brands, entertainment significantly affected consumer brand engagement. Findings from Cheung et al. (2020) and Liu et al. (2021) suggest that each product category or industry might have different characteristics of social media brand posts and their impact on influencing engagement.

**Social Media Message Typologies**

According to Ahn et al. (2021), message features (e.g., topic, style) can be explained by uses and gratifications theory. Uses and gratifications theory (Katz et al., 1973) states that audiences actively select media based on purpose and motivations. Audiences’ social and psychological characteristics, societal structure, social relationships, groups, and personal involvement mediate audiences’ communication behaviour and its effects (Rubin, 2009). Ahn et al. (2021) suggest that based on uses and gratifications theory, people have different motivations that underlie their social media use, such as to get information, form relationships and socialise with others, or to communicate with others, and hence, organisations (as communication source) tend to use social media consistent with their purpose and characteristics strategically. Hence, it can be surmised that social media message posts would vary across entity types (e.g., firms/brands, government, media, non-profit, or the general public). Social media marketing activities rely on social media posts, which depend on content strategies crafted and implemented in social media posts. Content strategies focus on determining what should be shared with an organisation’s stakeholders based on understanding stakeholders’ needs, concerns, and interests (Men & Tsai, 2012).

Men and Tsai (2012) proposed six categories of corporate posts: promotion-specific posts, product-specific posts, company-specific posts, product-related educational or entertainment information, requests for responses, and non-brand-related posts. Meanwhile, Saxton and Waters (2014) proposed three primary categories of firm social media posts: information, community building and dialogue, and promotion and mobilisation.

According to Saxton and Waters (2014), information refers to a one-way messaging strategy that focuses simply on information-sharing. It usually contains information about a firm, its mission, programs and services, or other relevant information a firm considers vital for its audience. The second category, dialogue and community building, contains posts that create conversational engagement
between a firm and its stakeholders and stimulate interactions between its social media users. According to Saxton and Waters (2014), the last category of social media posts is promotion and mobilisation. These posts are geared toward empowering and urging a firm’s audience to do something on behalf of the firm, such as posting about fundraising, sales, sales promotion, and calls to action in general.

Past studies have examined how businesses structure social media posts to aid their marketing and brand positioning efforts. For instance, Garner (2022) applied netnography and thematic analysis to classify posts, comments, and media from an independent dairy farm in Kansas, USA. Garner (2022) found that the dairy farm’s social media posts can be classified into six categories. The first category was about the farm, its owners, and workers; The second category was about health claims, all-natural food references, and the benefits of their products. The third category comprises posts (or reposts) of articles criticising corporate organisations and government entities. The fourth category consists of posts about ethical and moral themes, including promoting good causes. The fifth category consists of posts that showcase the struggles experienced by the dairy farm or other farmers. The last category included posts about the farm’s passion for providing high-quality products for their customers. Another study by Chen et al. (2017) reported five social media content strategies used by firms in China: information dissemination, promotion and mobilisation, social listening, customer service and dialogue, thought leadership, and non-company-related content. Shen & Bissell (2013) reported four categories: events (e.g., posts that share a calendar), product (e.g., posts that discuss product launch, reviews, or tips), promotion (e.g., posts that try to stimulate consumer demand), and entertainment (i.e., posts that encourage direct interactions between a firm and its audience.

**RESEARCH METHOD**

Past studies that examine social media marketing brand posts (e.g., Chen et al., 2017; Garner, 2022; Men & Tsai, 2012; Saxton & Waters, 2014; Shen & Bissell, 2013) applied content analysis coupled with thematic analysis/qualitative methodology on Facebook posts. In this study, the authors applied a text-mining approach. According to Delen and Crossland (2008, p.1710), text mining is “the process of deriving novel information from a collection of texts”.
Based on several sources, Delen and Crossland (2008) maintain that text mining can be applied for the following purposes: information extraction (e.g., identifying key phrases and relationships between the phrases), topic tracking, summarisation, categorisation, clustering, concept linking, and question answering.

The data were taken from the official Twitter accounts of four popular Indonesian local skincare brands with over 10,000 followers. The brands in our dataset included the following brands: Wardah (@Wardahbeauty), Avoskin (@Avoskinbeauty), Somethinc (@Somethinc4u), and White Lab (@Whitelab_id). The data were obtained through the Twitter Application Programming Interface (API). Our dataset covered January 1, 2021, and December 31, 2021. The data analysis follows the workflow delineated in Figure 1. The initial stage of the research is data collection using the Twitter Application Programming Interface (API). The dataset contained 1290 tweets from Wardah, 17,491 tweets from Avoskin, 1,968 tweets from Somethinc, and 590 tweets from Whitelab.

The next stage involves pre-processing. The pre-processing and subsequent data analysis were carried out using R version 4.2.2 (R Core Team, 2022) and implemented through R Studio (RStudio Team, 2020). Pre-processing included tokenisation (i.e., breaking the sentences contained in the tweet into single words/tokens), stopword elimination (i.e., words that very often appear in sentences but do not carry information value, such as prepositions or supporting verbs), lemmatisation (i.e., changing words back to its root form so that exact words with different inflexions can be counted as the same word). Since Twitter contents may contain slang and informal spelling of words, it was necessary to create a dictionary of different informal spellings of the same word and slang words expressed in tweets.

The third step in data analysis involves conducting a descriptive analysis of the tweets to identify the most frequently used words in each brand’s posts. The fourth step follows this step, topic modeling using the Latent Dirichlet Allocation (LDA) approach. LDA is part of the probabilistic topic modeling (Blei, 2012). According to Blei (2012), probabilistic topic modeling consists of algorithms that seek to discover and annotate extensive document archives with thematic information; these algorithms are used to analyse the words in the original text document to uncover the themes that run
through them. LDA is a generative probabilistic model based on hierarchical Bayesian analysis. It follows a generative process that assumes that documents are represented as random mixtures over latent topics, with each topic characterised by a distribution over words (Blei et al., 2003). LDA assumes that each word may belong to more than one topic, and the LDA model generated from the documents allows the calculation of the subsequent probability of each word belonging to a topic, hence providing a measure of the correlation between words and topics (Blei et al., 2003). Each topic identified by the LDA model can be profiled based on the most correlated terms. Similarly, the model can infer each topic’s probability of association with documents, allowing researchers to profile documents based on the topics more frequently discussed in each document (Blei et al., 2003).

RESULT AND DISCUSSION

Descriptive Analysis

Table 1 shows the top ten keywords from each brand in our dataset. Our dataset contained 1,290 tweets from Wardah, 17,491 tweets from Avoskin, 1,968 tweets from Somethinc, and 590 tweets from Whitelab. Based on the descriptive analysis, Avoskin and Wardah seem more actively trying to engage their audience. From the words in the top ten list, a significant number of words in the top 10 list were product-related words, which characterise the informational aspect of social media posts. Wardah and Avoskin use the terms “dear” and “ladies” to call their audience.

In contrast, Whitelab and Somethinc use the word “kak,” a polite gender-neutral pronoun, to call another person if the communicators do not know each other. Another notable point is that Wardah (1290 tweets in the dataset) posed more informative keywords in its top keywords list. Wardah mentioned some terms related to its product (e.g., colourful, serum) and words used to call their audience (e.g., Ladies, Dear). At the same time, top keywords in Somethinc tend to consist of product-related information.

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**Fig 1. Data Analysis Workflow**

![Data Analysis Workflow Diagram]
Table 1. Top Keywords from Brands in The Dataset

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Freq</th>
<th>Keywords</th>
<th>Freq</th>
<th>Keywords</th>
<th>Freq</th>
<th>Keywords</th>
<th>Freq</th>
<th>Keywords</th>
<th>Freq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wardah</td>
<td>862</td>
<td>Dear</td>
<td>8245</td>
<td>Kak</td>
<td>186</td>
<td>Kak</td>
<td>103</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ladies</td>
<td>241</td>
<td>Avo</td>
<td>3098</td>
<td>Whitelab</td>
<td>154</td>
<td>Somethinc</td>
<td>98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kulit</td>
<td>211</td>
<td>Kulit</td>
<td>1687</td>
<td>Serum</td>
<td>81</td>
<td>Oksidasi</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dear</td>
<td>198</td>
<td>Avoskin</td>
<td>1530</td>
<td>Brightening</td>
<td>53</td>
<td>Serum</td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produk</td>
<td>176</td>
<td>Produk</td>
<td>1182</td>
<td>Whitelabers</td>
<td>38</td>
<td>Kulit</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yuk</td>
<td>168</td>
<td>Semoga</td>
<td>1120</td>
<td>Acne</td>
<td>35</td>
<td>Minthinc</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colorfit</td>
<td>154</td>
<td>Sahabat</td>
<td>1046</td>
<td>Launching</td>
<td>30</td>
<td>Promo</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serum</td>
<td>154</td>
<td>Serum</td>
<td>902</td>
<td>Shopee</td>
<td>27</td>
<td>Retinol</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td>149</td>
<td>Yuk</td>
<td>705</td>
<td>Skin</td>
<td>26</td>
<td>Super</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td>118</td>
<td>Retinol</td>
<td>631</td>
<td>Mugwort</td>
<td>26</td>
<td>Shopee</td>
<td>54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Topic Modeling Results**

An LDA topic modeling was conducted using the topic models (Grün & Hornik, 2011) package run within R software to answer our research question. Topic modeling with LDA requires the researcher to specify the number of topics to extract. To suggest the number of topics to extract, the authors adopted the approach suggested by Cao et al. (2009), who proposed selecting the number of topics to extract based on topic density.

The metric was calculated using the ldatuning package (Nikita, 2020). In addition to metrics by Cao et al. (2009), ldatuning also calculates metrics based on propositions from Arun et al. (2010) and Deveaud et al. (2014) for comparison. Figures 2(a), 2(b), 2(c), and 2(d) show the plot of the three metrics for Wardah. Based on the plots, the optimal number of topics based on Cao et al. (2009) is eight for Wardah, ten for Avoskin, nine for Somethinc, and ten for Whitelab.

![Figure 2(a). Plot of Topic Numbers Based on Selected Metrics (Wardah)](image)

![Figure 2(b). Plot of Topic Numbers Based on Selected Metrics (Avoskin)](image)
Tables 3, 4, 5, and 6 contain topics and keywords associated with each topic from the four skincare brands. Topic labels were obtained by observing the original tweets classified into each topic by LDA topic. The authors read the tweets associated with each topic and annotated the appropriate labels based on the contents of the actual tweets.

Due to its nature, LDA can classify seemingly similar tweets (with subtle differences) into different topics, hence there were topics with similar topic labels (for example, in table 3, *Wardah* had three tweets labeled as “product line information”, each seemed to refer to different product lines).

**Table 3. Topic Label and Top Keywords (Wardah)**

<table>
<thead>
<tr>
<th>Topic Label</th>
<th>Top Keywords</th>
<th>Tweet Example</th>
<th>Categories Based on Saxton and Waters Typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic 1: Response to customers’ complaint</td>
<td><em>TV, masyarakat, menghentikan, mendukung, perhatian, penayangan, iklan, program, negatif, melanggar</em></td>
<td>@a<strong><strong>i @T</strong><em>7 @T</em></strong>_C**P Terima kasih untuk perhatiannya. Kami telah meminta TV terkait untuk menghentikan penayangan iklan produk kami. Kami fokus pada program TV yang bisa memberi manfaat bagi masyarakat, dan tidak pernah mendukung hal bersifat negative &amp; melanggar norma masyarakat.</td>
<td>information</td>
</tr>
</tbody>
</table>
Topic 3: Giveaway

Wardah, series, giveaway, pemenang, special, tweet, ikutan, yuk, review, package

Siapa yang belum ikutan giveaway special collaboration Wardah ColorfitXLamica? Yuk, jangan sampai ketinggalan karena kamu masih bisa ikutan sampai hari Senin besok, lho! Klik tweet di bawah ini untuk ikutan giveaway-nya! https://t.co/8SJ****

Topic 4: Product benefits

Kulit, Wardah, kandungan, vitamin, wajah, mengandung, acid, extract, jerawat, serum

Wardah Perfect Bright Creamy Foam ini diformulasikan dengan Vitamin B3 dan Licorice Extract sebagai Double Lightening Agent yang membantu mencerahkan wajah dan jaga kelembaban kulit. Selain itu, juga ada kandungan Pore Cleansing Agent yang membersihkan kulit hingga ke pori. https://t.co/G***

Topic 5: Experience Sharing

Sharing, lip, colorfit, produk, Wardah, ombre, shade, look, lipstick, tips

@s****on Thank you for sharing your love to others! Pasti dia juga ngerasain kasih sayang yang kamu curahin.

Topic 6: Special Event-Related Sales Promo

Wardah, produk, semangat, discount, special, raya, store, exclusive, hampers, ramadhan

Kamu juga bisa dapetin kesempatan untuk mendapatkan iPhone 12 dan berkah ramadhan lainnya dari Wardah, lho! Yuk, submit ide kamu sekarang! Yuk, absen di reply untuk kamu yang udah submit ide

Topic 7: Product Line Info

Wardah, serum, kulit, lightening, gel, hydra rose, secret crystal, pakai


Topic 8: Engagement

Tweet, reply, #beautymovesyou, experience, share, @Wardahbeauty, follow, hashtag, like, retweet

Caranya cukup screenshot shade Colorfit Last All Day Lip Paint di bawah ini dan share hasil yang kamu dapetin di kolom reply!\n\n\nCaritain shade lip paint favorite kamu dan gunakan hashtag #ColorfitLipPaint. Jangan lupa like dan retweet tweet ini, ya! Good luck, Ladies! https://t.co/8Yg****

Table 4. Topic Label and Top Keywords (Avoskin)

<table>
<thead>
<tr>
<th>Topic Label</th>
<th>Top Keywords</th>
<th>Tweet Example</th>
<th>Categories based on Saxton and Waters Typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic 1: Product usage tips</td>
<td>Kulit, penggunaan, toner, malam, retinol, seminggu, disarankan, reaksi, serum, bersamaan</td>
<td>@ba***c Halo dear, untuk ysb vit c serum dan alpha arbutin boleh ya digunakan bersamaan. Jangan lupa perhatikan reaksi kulit masing-masing ya dear. Kemudian untuk azeclair sebaiknya digunakan 2-3x dalam seminggu di malam hari saja yah</td>
<td>information</td>
</tr>
<tr>
<td>Topic 4: Product Line Info</td>
<td>YSB, serum, toner, niacinamide, kulit, vitamin, Alpha Arbutin, hyacross, salicylic acid, marine collagen</td>
<td>@ta****ana Halo dear, Avo bantu infokan yah: Non exfo: YSB Alpha Arbutin, YSB Vitamin C, YSB Hyacross, YSB Marine Collagen, dan YSB Niacinamide. Exfo: YSB Salicylic Acid, YSB Lactid Acid, dan YSB Azeclair.</td>
<td>information</td>
</tr>
<tr>
<td>Topic 5: Contact</td>
<td>Avostore, yuk, langsung, coba, join, wa, info, Instagram, via, official</td>
<td>@Zu<strong><strong>6 Yuk dear join Avostore.‘ Bisa coba hubungi nomor WA Avostore official di nomor 0895-</strong></strong>-2***6 ya.</td>
<td>community building and dialogue</td>
</tr>
<tr>
<td>Topic 6: Giveaway</td>
<td>Tweet, ikutan, reply, spesial, giveaway, pemenang, share, selamat, beruntung, gift</td>
<td>Siapa di sini yang udah ikutan #CleanseYourTimeline? Siap-siap ya, sore ini Avo akan umumkan siapa yang beruntung mendapatkan masing-masing 1 mystery box berisi produk dari @HmnsId &amp; Avoskin. Coba dong share dulu foto-foto anabul kalian dengan reply tweet ini.</td>
<td>promotion and mobilization</td>
</tr>
<tr>
<td>Topic 8: Response to customers’ purchase</td>
<td>Semoga, cocok, suka, hasil, review, kulit, memuaskan, happy, pakai, coba</td>
<td>Selamat untuk @<strong><strong>ur , semoga produk pertama Avoskin yang kamu coba nanti cocok dan kulit kamu suka ya. Buat kamu yang belum menang tenang aj, nanti malam Avo akan siapkan sesuatu yang spesial lainnya buat kamu! <a href="https://t.co/ggF">https://t.co/ggF</a></strong></strong></td>
<td>community building and dialogue</td>
</tr>
<tr>
<td>Topic 9: Greetings</td>
<td>Semoga, mantap, #Avoskinlovebox, sehat, pakai, cantik, setuju, happy, cerah, awet</td>
<td>@wit<strong><strong>rosee @la</strong><em>_id @Somethinc4u @clin</em></strong>id Happy Birthday Dear Fina! Semoga bahagia dan sehat selalu. <a href="https://t.co/8VXe">https://t.co/8VXe</a>***</td>
<td>community building and dialogue</td>
</tr>
</tbody>
</table>
Topic 10: Product Recommendation and Tips

Series, retinol, YSB, miraculous, share, tips, rekomendasi, toner, serum


Table 5. Topic Label and Top Keywords (Somethinc)

<table>
<thead>
<tr>
<th>Topic Label</th>
<th>Top Keywords</th>
<th>Tweet Example</th>
<th>Categories based on Saxton and Waters Typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic 1: program info and call to action</td>
<td>Instagram, besok, coba, launch, live, twitter, Somethinc, tweet, spill, jam</td>
<td>JOIN OUR VIRTUAL LAUNCH, Rabu, 5 mei 2021 jam 4:45 sore di IG; Tiktok. Gak cuma bisa dapetin Free Products loh, kamu juga bisa nanya tentang produk ini besok sama @funskincare_Launch Exclusive ini available di @ShopeeID jam 00:01 malam ini!#AGEDONTCARE #Somethinc <a href="https://t.co/bhw">https://t.co/bhw</a>***</td>
<td>information</td>
</tr>
<tr>
<td>Topic 2: giveaway</td>
<td>Suka, Somethinc, yak, join, skin care, giveaway, ceramic, shade, pilih, pakai</td>
<td>GIVEAWAY ALERT. VOTE Somethinc di TOKOPEDEA BEAUTY AWARDS dan dapetin 1 Pcs Ceramic Skin Saviour versi tube yang super gemas!!</td>
<td>promotion and mobilization</td>
</tr>
<tr>
<td>Topic 3: Response to customer product purchase and use experience</td>
<td>Love, semangat, happy, review, glad, progress, ditunggu, enjoy, soon, gel</td>
<td>@s<strong><strong>i So happy!! Glad ur skin love it. @sk</strong></strong>n Glad u love it!! Thx u kakk</td>
<td>community building and dialogue</td>
</tr>
<tr>
<td>Topic 4: shopping and product launch info</td>
<td>Somethinc, produk, launch, coba, beli, website, official, makeup, skin care, harga</td>
<td>Untuk Mini Size hanya bisa didapatkan eksklusif di website official kami: <a href="https://t.co/TPR****">https://t.co/TPR****</a>. Untuk Full Size akan serentak dijual hari ini di semua platform official kami jam 7 malam saat launch party usai yaa. FREE WORLDWIDE SHIPPING untuk order $60 USD</td>
<td>information</td>
</tr>
<tr>
<td>Topic 5: Response to inquiry related to product issues</td>
<td>Oksidasi, retinol, aman, warna, kuning, transparan, berubah, kulit, efek</td>
<td>@SashaGreimas @friedelcraft Silahkan dibaca ya. kurlebnya: Oksidasi itu normal bagi Retinol &amp; akan terjadi. Retinol memiliki 5 unsaturated bonds &amp; yg sebenarnya plg penting a/ bond OH yg berada di ujung molekul yg responsible dgn efek retinol ke kulit. Selama bond OH ini ga oksidasi, retinol masih berfungsi <a href="https://t.co/csmifemG9e">https://t.co/csmifemG9e</a></td>
<td>community building and dialogue</td>
</tr>
<tr>
<td>Topic 6: product usage tips</td>
<td>Serum, kulit, pakai, spot, niacinamide, jerawat, bakuchiol, toner, BHA</td>
<td>- 2% BHA Salicylic Acid Liquid Perfector Dark Spot Reducer Ampoule. silahkan coba pakai itu tiap hari ya &amp; jangan lupa dilengkapi dengan cleanser, toner, &amp; moisturizer yang cocok untuk kulit kamu <a href="https://t.co/0yfYx***">https://t.co/0yfYx***</a>.</td>
<td>information</td>
</tr>
<tr>
<td>Topic 7: product and contest announcements</td>
<td>Sunscreen, serum, jam, pagi, lengkap, muka, glowing, malam, order,</td>
<td>Selamat kamu pemenang terakhir. Tungguh yah topi &amp; sunscreen comfort corrector serum nya. Kirim alamat ke DM yah. Aku tunggu 24 jam. Thank you! <a href="https://t.co/qVn9****">https://t.co/qVn9****</a></td>
<td>information</td>
</tr>
</tbody>
</table>
Table 6. Topic Label and Top Keywords (Whitelab)

<table>
<thead>
<tr>
<th>Topic Label</th>
<th>Top Keywords</th>
<th>Tweet Example</th>
<th>Categories based on Saxton and Waters Typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic 1: product launch promotion</td>
<td>Discount, shopee, launching, exclusive, sociolla, tanggal, tokopedia, promo, tersedia, Whitelab</td>
<td>LAUNCH DAY! Whitelab Intensive Care Serum exclusive launching at sociolla! Dapatkan discount sebesar 25% dari tanggal 1-14 Maret 2021!</td>
<td>promotion and mobilization</td>
</tr>
<tr>
<td>Topic 2: Review solicitation, and response toward reviews/inquiries</td>
<td>Review, stay tuned, aman, pakai, ditunggu, rutin, maksimal, hasil, perubahan, share</td>
<td>@w****s Thank you Kak reviewnya, dipakai rutin yaa utk hasil maksimal Whitelab Underarm Cream siapa yang udah coba? Share review kalian dong. @ci*****r Stay tuned yaa</td>
<td>community building and dialogue</td>
</tr>
<tr>
<td>Topic 3: Product usage tips</td>
<td>Serum, pakai, peeling, retinoid, acne, malam, intensive care, kandungan, brightening, essence</td>
<td>[FAQ] How to layer all Whitelab Serum (Brightening Face Serum, Acne Calming Serum, Peeling Serum, Intensive Care Serum) #Whitelab #tips #skincaretips #layering <a href="https://t.co/qzE">https://t.co/qzE</a>****</td>
<td>information</td>
</tr>
<tr>
<td>Topic 4: product ingredients and benefits</td>
<td>Skin, Whitelab, mugwort, sunscreen, gel, niacinamide, mask, uv, ingredients</td>
<td>Whitelab Mugwort Pore Clarifying Mask memiliki kandungan utama yaitu: ‘Mugwort’ ‘Niacinamide’ Green Tea Leaf’ Centella Asiatica Powerful ingredients for your pores &amp; skin</td>
<td>information</td>
</tr>
<tr>
<td>Topic 5: brand ambassador and collaboration</td>
<td>Whitelab, brand, ambassador, azof, bunga, citra, lestari, photoshoot, tebak, beauty</td>
<td>THE WAIT IS OVER. Proudly Announce Bunga Citra Lestari as Whitelab Brand Ambassador Whitelab, Not Your Ordinary Skincare! #Whitelab #Whitelabid <a href="https://t.co/Cq7sKe">https://t.co/Cq7sKe</a>***</td>
<td>promotion and mobilization</td>
</tr>
<tr>
<td>Topic 6: product ingredients and benefits</td>
<td>Whitelab, stay tuned, toner, soothing, manfaat, exfoliating, testimony, pemakaian, Acid AHA BHA, gently</td>
<td>Whitelab Exfoliating Toner (AHA 6% (Glycolic Acid 5%+ Lactic Acid 1%) + Niacinamide 2% + Salicylic Acid (BHA) 1% + Lactobionic Acid (PHA) 0,01%) #WhitelabTonerOnDuty #TonerOnDuty #Whitelab #Whitelabid <a href="https://t.co/h4Xu">https://t.co/h4Xu</a>***</td>
<td>information</td>
</tr>
</tbody>
</table>
Discussions

Topic modeling revealed that the pattern of each skincare brand post consists of several topic labels varying from 8 to 10 topics per brand. The brand with the most miniature topic labels was Wardah, with eight separate topic labels, followed by Somethinc (nine).

Meanwhile, Avoskin and Whitelab had each ten topic labels. Wardah’s topic labels comprised responses to customer complaints, product line information (2 labels), product benefits, giveaways, special event-related sales promotions, experience sharing, and engagement. Somethinc’s topic labels consisted of program information and call to action, giveaways, responses to product purchase and use experience, shopping and product launching information, responses to inquiries about product issues, product usage tips, product ingredients and benefits, product and contest announcements, and sales promotion. Meanwhile, Avoskin’s topic labels consisted of product usage tips, product recommendations and tips, product information.
consultation/recommendation, product line information, giveaways (2 labels), contact, sales promotion, response toward customer purchase, and customer review/feedback. Lastly, Whitelab’s topic labels consisted of product launch promotion, brand ambassador and collaboration, review solicitation and response toward reviews/inquiries, product usage tips, product ingredients and benefits (4 labels), product usage tips, and giveaways.

The topic labels correspond to the social media’s typology of functions (Lovejoy & Saxton, 2012; Saxton & Waters, 2014): information, community building and dialogue, and promotion and mobilisation. Column four in Tables 3, 4, 5, and 6 mapped the individual topic labels to the three primary functions of social media. From the tables, the information function is one of the most dominant functions carried out by each brand, followed by promotion and mobilisation. Out of all the brands, Whitelab’s Twitter brand posts seem to be characterised mainly by information functions. Based on analysis of the tweets, in line with Lovejoy & Saxton, (2012), this study noted that despite its one-way nature of information sharing, on average, the majority of tweets that fall under the information function also presented links to relevant resources to supplement the limited space available on Twitter. This study supported the observation made by Lovejoy & Saxton (2012) that despite offering the opportunity to facilitate dialogue between an organisation and its customers, it seems that information seems to be the primary form of communication efforts, not only in the non-profit sector but also in commercial organisations such as skincare brands.

Furthermore, Lovejoy & Saxton (2012) suggested the information-community-action hierarchy of engagement that starts with information sharing as the basis for engagement, provides something to talk about, stimulates community dialogue and community building, and finally leads to action. However, the authors observed that in the context of skincare brands, the hierarchy may not be as sequential as in Lovejoy and Saxton’s non-profit context. Our findings suggest that skincare brands used the three functions as pillars that support each other but may not be in a hierarchical manner, as suggested by Lovejoy and Saxton (2012).

This difference is possible due to the skincare industry’s commercial nature, which relies on information to build awareness and occasional sales promotions to help stimulate
consumers’ purchases, particularly during product introduction. Community-building is needed to sustain identification and loyalty from the brands’ consumer base. This assertion corresponds to Lovejoy and Saxton’s (2012) proposition that in contrast to non-profit organisations where dialogue is the top of organisations’ communication objectives, most for-profit organisations’ top communication objectives are promotion, marketing, and mobilisation.

This study also noted that besides information, the second most prevalent topic labels were related to Lovejoy and Saxton’s (2012) promotion and mobilization function, and these posts were used as a means to engage the brands’ customers. For instance:

“Sahabat Avo, menjelang tanggal 14 besok Avo mau bikin tebak-tebakan nih tentang PHTE. Yuk tes seberapa kamu kenal PHTE dengan cara ikutan games ini, kira-kira kamu bisa jawab berapa pertanyaan nih? Jangan lupa RT & Like agar semakin banyak yang ikutan games ini ya.” (Avoskin)

“WHITELAB IS TURNING ONE GIVEAWAY. Dalam rangka ulang tahun pertama, Whitelab mau bagi-bagi hadiah yaitu SEMUA PRODUK WHITELAB untuk 2 pemenang. Caranya: Follow @Whitelab_id, RT & like tweet ini, Reply harapan kalian untuk Whitelab\nGOODLUCK#WhitelabIsTurning ONE https://t.co/Ii3zJhT***.” (Whitelab)

“DALAM RANGKA KEMBARAN SKINCARE SAMA OPPA LEE JE HOON, Mimin mau GA 3 Granactive Snow Retinoid + 3 Ceramic Skin Saviour utk 3 pemenang! Rules: 1. Follow account ini, 2. Reply tweet ini dengan "Somethinc x Lee Je Hoon", That is it! Close Besok yaLETSGO https://t.co/jUvytr***.” (Somethinc)

“3 lucky winners akan mendapatkan hampers Wardah Colorfit Series dan akan diumumkan besok! Tweet sebanyak-banyaknya agar kesempatan kamu mendapatkan special package dari Wardah semakin besar! Good luck, Ladies #WardahColorfit https://t.co/aZOaXU***.” (Wardah)

To get their customers to interact with the brands, brands must offer various opportunities that entice them to interact with the brand on social media (Liu et al., 2021). This study demonstrates that skincare brands actively use giveaways to mobilise their social media followers to engage with the brands (by liking, sharing, and commenting). Past studies have indicated a direct
relationship between engagement and brand loyalty (Dwivedi, 2015; Fernandes & Moreira, 2019; So et al., 2014). Dwivedi (2015) suggests that brand engagement represents rewarding experiences of emotional, cognitive, and behavioural aspects. If a brand can deliver these experiences, customers would be more inclined to preserve their relationship with the brand. In a study by Chen et al. (2023), establishing customer rapport can stimulate more engaging and personalised encounters, increasing relationship value dependence and brand loyalty.

Past research suggested sustaining customer interactions is critical to building trust and maintaining relationships in an exchange process (Chou et al., 2023). Furthermore, Chou et al. (2023) stated that repetitive interactions would build a sense of belonging and generate customer engagement. Hence, by engaging customers using activities built around giveaways, brands can build a sense of belonging, brand identification, and trust towards the brand, creating future benefits such as brand loyalty. Gómez et al. (2019) suggested that dimensions of social media brand engagement included passion and enthusiasm for the brand and its social media platform. Exciting giveaways, discounts, and incentives potentially enable customer interaction participation and increased engagement. Customers who engage with a brand on a social media platform feel an increased brand relationship quality, eventually benefiting the brand through loyalty, attachment, and word of mouth (Gómez et al., 2019).

Brands in this study’s samples also performed community-building and dialogue functions through brand posts. The message strategies employed to stimulate dialogue and community building used in our sample include asking their customers to share their product use experience, such as the following tweets from Wardah and Whitelab.

“Coba siapa di sini yang udah rutin melakukan double cleansing? Yuk coba sharing di bawah, apa sih produk Wardah favorit kamu untuk double cleansing? [link]” (Wardah)

“Whitelab Underarm Creamâ€” siapa yang udah coba? Share review kalian dong.”

“Share review kalian tentang Mugwort Pore Clarifying Mask yuk!” (Whitelab)

Besides asking for reviews, other social media brand post strategies used by skincare brands in our sample include acknowledging/appreciating their customers
for sharing their product experience or product purchase. For example:

"@gl****up Bagus banget gambarnya! Terima kasih udah sharing pengalaman kamu menggunakan produk Wardah ya, dear."

@A****z @nu****d @la****d @cl****d Wardah Hydra Rose Gel to Foam Cleanser! Terima kasih sudah sharing skincare routinemu bersama Wardah, dear. (Wardah)

"Selamat untuk @je*****ur , semoga produk pertama Avoskin yang kamu coba nanti cocok dan kulit kamu suka ya. Buat kamu yang belum menang tenang aja, nanti malam Avo akan siapkan sesuatu yang spesial lainnya buat kamu! https://t.co/8VX*****q.” (Avoskin)

"@su*****ni So happy!! Glad ur skin love it."

"@sk****n Glad u love it!! Thx u kak"

"@ru***in Enjoy!! Cant wait to se your skin progress” (Somethinc)

Some of the brands also actively greet their customers in their social media posts, for example wishing their customers happy birthday, wishing for recovery from illness, or simply wishing luck at winning giveaways such as demonstrated by Avoskin in the following excerpts:

"@w****ee @la****d @cl****d Happy Birthday Dear F**a! Semoga bahagia dan sehat selalu. https://t.co/8SVX****q”

"@b*****ly @O*****e @he******un @bu*****ng Semoga sekarang udah sehat ya dear dan semoga beruntung dapetin #AvoskinLoveBox bulan ini.”

Besides the applications discussed in the previous paragraphs, the community building and dialogue function were also used to responding to inquiries:

"@C****ID Hai dear, mohon maaf ya atas ketidaknyamanya. Avo coba langsung bantu via WA ya agar bisa langsung teratasi. silahkan langsung wa kesini dear https://t.co/NDMhuU****” (Avoskin)

"@sh****yo Beda-beda sih dear, semua kondisi tersebut punya serum yang berbeda-beda untuk penanganannya. Coba Avoskin bahas detail lagi via WA ya, silahkan langsung WA ini ya : https://t.co/NDMhuU****” (Avoskin)

"@f*****n @n****ts @G****25 @f****ft Warna aslinya memang kuning transparan bunda. Silahkan lihat di story nya Retinol ya. Jika oksidasi, selayaknya spt vit c, semakin
menguning - lama2 jd cokelat. Yg bunda tanyakan adalah Aman/tidaknya bukan? Kalau ini pertanyaannya, selama warnanya belum mencoklat, jawabannya aman (Somethinc)

Kent and Taylor (1998, p.325) define dialogue as “any negotiated exchange of ideas and opinions”. Kent and Taylor (1998) suggested five principles to build dialogic relationships: the dialogic loop, the usefulness of information, the generation of return visits, the ease of interface/intuitiveness, and the rule of conservation of the visitors. They explained that the dialogic loop refers to the willingness of organisations to commit themselves to be queried with questions, concerns, and problems by the public. The second principle involves making practical, searchable, and well-organized information available to the public. The third principle suggests that organisations need to provide updated information, issues, discussions, or any forms of varied communication content and strategies to entice customers to make repeat visits to the organisation’s social media channels. The fourth principle relates to the presentation of the contents. Organisations need to ensure that their messages are well-formatted and easily understood. In social media settings, this principle relates to the more reasonable uses of emojis and graphics so that readers can easily read and understand messages. The final principle is about managing content appearance and substance so that the audience does not feel annoyed and leave/not return to the organisation’s social media channels.

Based on observation of the tweets from the four skincare brands, the authors also had similar observations with that of Wang and Yang (2020). In line with Wang and Yang (2020), this study suggests that the skincare brands in our sample tend to pay attention to the usefulness of information principle. The brands provided up-to-date information about several things, such as products, news, events, and announcements, using limited text space, pictures, and links to various resources. The data also suggests that a dialogic loop was evident in the brands’ social media posts (i.e., brands respond to questions and comments and actively interact with their audience on Twitter). The dialogic loop can make the audience feel that the firms recognise and care for their audience, and this can reinforce their audience’s sense of belonging (Wang & Yang, 2020). Men et al. (2018) state that public engagement can be enhanced through organisations’ dialogic communication on social media. Hence,
organisations must maintain dialogic communication to foster engagement.

However, this study observed a slight difference from Wang and Yang (2020)’s suggestion that non-profit and for-profit organisations closely follow the principle of information usefulness in their social media posts. However, for-profit organisations tend to emphasise the dialogic loop principle more. Our study reported that most topic labels were informational, indicating that firms in our sample still tend to focus on the usefulness of information as a significant approach in their social media strategy. It is worth noting that Wang and Yang (2020) used a random sampling of 50 firms from the Fortune 500 2014 list and 50 non-profits from the top 100 non-profits reported in the Nonprofit Times. Perhaps the difference can be attributed to the scale of the firms, the firm’s industry, and customer/social media audience characteristics.

CONCLUSION

In this study, the authors identified the topics contained in brand posts of four Indonesian skincare brands (Wardah, Avoskin, Somethinc, and Whitelab) using automated topic modeling by the Latent Dirichlet Allocation method. The results indicated eight topic labels for Wardah, ten topic labels for Avoskin, nine topics for Somethinc, and ten topics for Whitelab. The topics corresponded with Saxton and Waters’ (2014) three functions of social media posts: information, community building and dialogue, and promotion and mobilisation. We observed that information was the dominant function that characterised the brand posts of the four skincare brands, followed by promotion and mobilisation, community building and dialogue. We recommended that future research examine the relationship between each function and engagement metrics to verify whether one function can be better at generating engagement than others. As a managerial implication, we suggest that brands should increase their community building and dialogue function while at the same time maintaining and enhancing the information usefulness of brand posts, as dialogical communication can provide benefits for the brands in terms of increased customers’ sense of belongingness and engagement, which ultimately can increase loyalty.

Theoretical Contribution

Businesses worldwide have widely used social media, including in Indonesia. This study contributes toward understanding how Indonesian skincare firms used social media
to support their marketing efforts. Social media’s strength, compared to other communication tools, is in its ability to stimulate dialogic communication with customers and the public in general. This study contributes to understanding the pattern of social media communication used by local firms (skincare brands). This study identified that the topics used by four skincare brands in the sample can be classified into three primary social media functions, as Saxton and Waters (2014) suggested: information, promotion and mobilisation, and community building and dialogue.

The findings in this study can be validated by examining other samples, such as those from different firms in various product categories like packaged food and beverages, services, or automotive industries. This will help determine if firms in those categories similarly utilised their social media channels. This study examined Twitter as the focal social media. Future studies could examine other social media platforms, such as Instagram or Facebook, to explore the similarities and differences in brand post strategies across various social media platforms. While this study has identified the communication pattern used in social media brand posts, this study did not look into the effectiveness of each topic label or social media function in generating engagement metrics (e.g., like, share/retweet, comments). Future studies can expand on this study by examining whether each type of social media brand post (information, promotion and mobilisation, community building, and dialogue) can influence engagement differently.

Managerial Implication

This study suggests that brands, particularly local skincare brands’ social media posts, can be categorised into topic labels corresponding to three broad social media functions, as Saxton and Waters (2014) suggested. Based on the findings, the authors suggest the following practical contributions. Firstly, brands must intensify dialogic communication and community building in brand posts. Wang and Yang (2020) suggested that brands can increase dialogic communication efforts by ensuring that they always provide regularly updated, relevant information for their priority audience (customers), as it can increase the chance of getting comments, retweets, and likes. In addition, brands need to ensure that the tone used in the brand posts reflects “human voice”, which is “the adoption of a particular tone of computer-mediated language that is informal, casual, and conversational, conveying openness and feedback in
dialogue (Cheng & Lee, 2023, p.3). This study also observes that the brands in our sample built around their dialogic communication efforts around information, including sales promotion and product launch information. The brands were able to leverage the information and use it as an opportunity to get engagement from their audience. This approach can be replicated by other brands in other industries as well.

**Research Limitation**

One of the limitations of this study is its limited sample. This study only observed four local skincare brands with more than 10,000 followers. Adding more firms from this category should add more insights into the industry’s social media marketing practice. A more thorough observation can be obtained by observing several other product categories (perhaps fashion, automotive, or services) to get more patterns/characteristics of social media brand posts.

This study’s method was limited to automated topic modeling to classify brand posts and identify the topics used by local skincare brands in their posts. Automated topic modeling required input as to the number of topics to extract. This study employed metrics suggested by Cao et al. (2009) to select the number of topics to extract. However, as Figures 3(a), 3(b), 3(c), and 3(d) suggest, sometimes the recommendation from one metric differs from that of other metrics. The issue of how many topics to extract should be taken with caution.

Another limitation of this study is that it only explored the message topics and did not make inferences as to whether these message topics (specific topics as indicated by topic labels as well as the broader topic as indicated by Saxton and Waters' (2014) functions of social media) had any effect on yielding engagement from the brands’ audience. Therefore, future research can analyse whether message types affect engagement (like, comment, retweet/share).
REFERENCES


