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Mining Blogs and Forums to Understand the Use of Social Media in Customer Co-creation

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Social media have been used by some companies to support customer co-creation in recent years. However, few academic studies have been done to investigate the use of social media in customer co-creation. To understand the current state-of-the-art and future trends about the use of social media in customer co-creation, we conducted two studies to analyze relevant posts on blogs and social media-based online forums. This study reveals some interesting patterns, themes and future trends in this specific area. Recommendations are given to help managers engage in co-creation activities with customers.

Keywords: social media; customer co-creation; text mining; blog mining; online forums; user-generated content; case study

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1. INTRODUCTION

Customer co-creation has received increasing attention in the past few years. Many companies and online retailers such as Nike, BMW Group, Dell.com, Domino's Pizza, Starbucks, Coca-Cola, McDonald, LEGO, Heineken and Rickshaw Bag works have been partnering with customers to co-create products or services on the Internet. For example, Domino's Pizza allows consumers to create their own pizza using a special 'build-your-own' pizza tool on the company's web site; Rickshaw Bag works allows each customer to design and customize their own bag before it is made to order. As co-creation offers personalized experience for customers to meet their specific needs, preference and interests, customer co-creation has become a popular business strategy and an increasingly accepted model for innovation nowadays [1–3]. Through a survey of 311 executives in major industries, Cognizant [4] found that 'organizations that structure their innovation processes by combining internal teams with customer input report higher satisfaction with a variety of innovation areas than companies that don not employ this structure'. A marketing study conducted by Fuchs *et al.* [5] reveals that consumers are more likely to purchase products they had a hand in selecting due to a sense of ownership and customers are willing to pay more, have increased future loyalty intentions, and have a higher likelihood of speaking positively about the product.

To further improve customer co-creation experience, many of these companies and online retailers have used social media tools to support the customer co-creation practice recently. Social media tools have been used to engage customers into the interactive co-creation process, share what they have built, get feedback from other customers to improve a specific user-generated design, and even help customers design a product or service together [6]. Thus, using social media for customer co-creation is sometimes called social co-creation. The mutual support between customers also reduces the need and cost for the customer service offered by the companies or online retainers [7]. Martini *et al.* [3] suggest that social media tools cannot only help generate creative ideas but also add value to customers' online shopping and co-creation experience.

More and more businesses realize that they could be rewarded by embracing customers as co-creation partners in their business activities. Customers are now seen as a source of value creation and competitive advantage by many companies [8]. However, there is still a lack of research on the use of social media for customer co-creation. To improve the understanding of the

use of social media in customer co-creation, we conducted a blog mining study to examine the latest development, existing issues and trends about social media and customer co-creation. Blog mining has been recently used to conduct Internet-related research and achieved meaningful results [9, 10]. As there are few studies on social media for customer co-creation available in academic literature, we considered blog mining as an appropriate approach for our research. The goal of this blog mining study is to help interested researchers understand the current status and future trends of this specific research area. In addition, we conducted a case study by using text mining method to analyze posts available in a customer co-creation forum provided by Zooppa, which is a global social network for creative talent that partners with companies to launch user-generated advertising campaigns.

The rest of this paper is organized as follows. Section 2 provides a brief review about the use of social media for customer co-creation and text mining. Section 3 describes our research questions and two separate studies to answer the research questions. Section 4 provides recommendations for using social media to enhance customer co-creation. Section 5 presents conclusion and future research.

2. LITERATURE REVIEW

2.1. Use of social media for customer co-creation

There are extensive literatures about customer co-creation. Prahalad and Ramaswamy [11] consider co-creation as the process during which consumers take an active role and co-create value together with the company. Roser *et al.* [12] define customer co-creation as a form of collaborative creativity initiated by firms to enable innovation with their customers. Piller and Ihl [13] describe customer co-creation as 'a set of methods that establish an active, creative and social collaboration process between producers and customers (users) in the context of new product development'. Kohler *et al.* [14] suggest that co-creation often occurs during the innovation process and joint product development activities. For example, more and more customers are co-creating value with the company by generating and evaluating new product ideas, elaborating, evaluating or challenging product concepts, and creating virtual prototypes [14]. According to Di Gangi and Wasko [15], co-created value is defined as the mutual benefits gained by the organization and users when engaging in a user-generated content website. To successfully co-create value, both the users and the organization must capture benefits. Co-created value typically takes place when interactions between the customer and the company occur [16]. Thus, managing the quality of the interaction between the company, customers and customer communities is critical for value co-creation [11, 17].

An interaction platform is needed to engage customers into the value co-creation process. Ramírez [18] advises that companies should provide tools to customers to actively involve them in the co-design or co-development of future offerings. Interaction platforms, related tools/resources and incentives should be leveraged to encourage customers to participate in the innovation activities and to facilitate firm–customer–customer interactions during the value-creating process [7]. Furthermore, a company needs to develop strategies to effectively use and support the interaction platform because a company's interaction with a customer may have both positive and negative impacts on the customer's value creation [16].

Social media tools hold great promise as an interaction platform for implementing customer co-creation [19–21]. Social media may allow a company to engage customers more efficiently and at a lower cost than using traditional communication and marketing tools such as flyers, TV ads and broadcasting [3]. In particular, social media made it possible to engage a larger number of customers to contribute to a co-design or co-development initiative [7]. By using social media to obtain customer input and feedback directly throughout the product development life cycle, companies lower the 'risk that the product will not meet consumer needs upon launch' [22]. Recently, social media tools such as Facebook, Twitters, Blogs, Wikis, Foursquare, YouTube and Discussion Forums have been used as the interaction platforms to enable customer co-creation by some companies. By using social media as the interaction platform, individual customers and customer communities share, co-create, discuss and modify user-generated content and products [23, 24].

There are few academic researches investigating the interrelationship of customer co-creation and social media [3]. A search of the literature only found several studies that investigate the use of social media for customer co-creation. Martini *et al.* [3] conducted a case study with a large Italian food manufacturer company and examined this company's customer co-creation practice enabled by social media. They found that this company used social media tools to engage customers into generating both incremental and radical innovative ideas. By working closely with customers to realize new user-generated ideas or suggestions, social media change this company's innovation practice from the initial stage of idea exploitation to a stage in which both idea exploitation and exploration are simultaneously accomplished. Piller *et al.* [7] proposed a typology of co-creation activities to assess the impact of social media in innovation processes based on customer co-creation. Their study found that social media cannot only make economic-exchange relations more collaborative and social, but also turn relations formerly based on social-exchange into 'money markets' (relations relying on economic exchange). For example, customers can sell their co-designed products to their clients.

2.2. Text mining

As an emerging technology, text mining aims to extract meaningful information from unstructured textual data [25–27].

To glean useful information from a large number of textual documents quickly, it has become imperative to use automated computer techniques [26, 28]. Text mining is focused on finding useful models, trends, patterns or rules from unstructured textual data [25, 29, 30]. Different from traditional content analysis, the main purpose of text mining is to automatically identify useful patterns or trends hidden in the text documents [31, 32].

Text mining techniques have been used to analyze large amounts of textual data. Abdous and He [30] used text mining techniques to analyze the online questions posted by video streaming students and identified a number of learning patterns and technology-related issues. Fuller *et al.* [33] used text mining to detect deception and lies in real-world data. Their results show that automated text mining techniques have the potential to aid those who must try to detect lies in text. Hung [34] used clustering analysis as an exploratory technique to examine e-learning literature and visualized patterns by grouping sources that share similar words, attribute values and coding rules.

Some major applications of text mining include clustering, information extraction (text summarization), sentiment analysis and link analysis [32, 34]. Currently, there are a wide range of tools that can be used for text mining and analysis, such as the SPSS Modeler (formerly Clementine), Leximancer, SAS Enterprise Miner and NVivo. Owing to the powerful capabilities of text mining, it is believed that applying text mining to textual data including messages posted on social media such as blogs can yield interesting findings [10, 31, 35]. For example, blog mining has been used by quite a few researchers in information and Internet-related studies because blogs are freely and publicly available online, and contents were created by self-motivated bloggers independently of the study [9]. An analysis of active blogs can add currency and relevancy to research studies [10]. Chau and Xu [10] applied blog mining to analyze the blog content related to hate groups and identified some interesting demographical and topological characteristics in these groups. Panigrahi [36] described the characteristics of blogs and provided a comprehensive discussion on how blogs are analyzed or mined. He also suggested that clustering blogs based on content similarity is a very useful technique in many areas. As social media adoption by small businesses have received a lot of attentions in recent years, many relevant discussions were posted by marketing consultants and small business owners on blogs first in the past years before they appear in academic publications. Thus, those blogs are a very useful data source for learning about social media adoption trends by small businesses. A limitation with blog mining is that the information on blogs is not peer reviewed as journal publications and often represents personal opinions and attitudes. Thus, researchers need to be careful of the inherent bias on blog posts when they analyze the content of blog posts. One way to mitigate this limitation is to combine blog mining with other approaches for a more comprehensive understanding of the topics that are under investigation.

Another popular application of text mining is sentiment analysis, which is also called as opinion mining. Sentiment analysis is concerned with the automatic extraction of positive or negative opinions from (unstructured) text [37]. Texts often contain a mix of positive and negative sentiment and for some applications it is often useful to identify the polarity of sentiment in text (positive, negative or neutral) and even the strength of sentiment expressed [37, 38].

3. RESEARCH STUDIES

3.1. Research questions

We conducted two separate studies to answer the following research questions:

(i) What themes and trends can be found by mining blog posts related to the use of social media for customer co-creation?
(ii) What do customers say on a social network-based online customer co-creation forum?

In the following two sections, the first study answers the first research question. The second study is conducted to answer the second research question.

3.2. Study 1: Mining blog posts about the use of social media for customer co-creation

The number of companies that adopt customer co-creation into their product or service development activities is steadily growing [7]. The growth creates many opportunities for researchers to understand the inter-relationship between social media and customer co-creation. To get a broad perspective on the state-of-the-art and future trend about the use of social media for customer co-creation, we applied the blog mining method in our study.

As a result of the blog mining, we identified some representative themes and trends associated with the use of social media for customer co-creation. Below is a description of the procedures and findings.

First, we conducted Google Blog Search (http://www.google.com/blogsearch) with the phrase: '*social media*' + *co-creation*. Google Blog Search is specially designed to retrieve content from blogs that are freely and publicly available on the Internet. After the query search, Google returned a large number of blog posts that are created by numerous Internet bloggers. As a result, Google showed a message that >47 400 results were found in 0.10 s as of 16 February 2013. However, a step-by-step examination of the result pages found that Google actually displayed only 345 relevant blog posts (as of 16 February 2013) and automatically filtered other blogs posts which were considered to very similar to the first 345 blog posts. Figure 1 displays the number of related blog posts by year from 2008 to 2012 (excluding Year 2013). The figure indicates that enabling

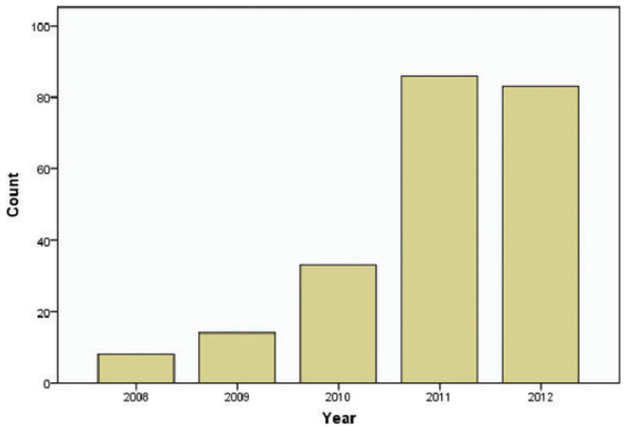

FIGURE 1. The number of related blog posts by year.

co-creation with social media was a new phenomenon in 2008 but has gradually received more attentions over the past several years. The number of blog posts about co-creation with social media reached a peak in 2011 and slightly declined only in 2012. The reason for the decline is unclear and may be worth further exploration.

Secondly, we used two popular text mining and analysis software, SPSS Clementine text mining tool and NVivo 9, to analyze the content collected from the blog posts. We mainly used SPSS Clementine's linguistic methods (extracting, grouping, indexing, etc.) to explore and extract key concepts, generate categories and help us quickly gain insights from the textual data. We mainly used NVivo 9 software to conduct various query searches. The query searches were mainly used to test ideas, find interesting patterns, connections and unusual information based on the research questions.

Figure 2 lists the main steps for the blog mining process used in our study. By following the listed four steps (collecting blog posts, pre-processing, applying text mining and evaluating the mining results and recognize actionable information), we were able to identify new knowledge, including patterns, issues and themes from the collected textual data. Typically, conducting text mining and analysis requires continuous evaluation of the data and multiple rounds of refinement to achieve rich findings [28, 29].

As a result of the blog mining of our sample data set, we were able to quickly identify and summarize a number of themes based on our collective knowledge and experience. Then, we grouped these themes into different categories. Table 1 lists some of the main themes we found.

A further description of some of the main patterns/themes from the blog mining is listed as follows:

(i) A high level of customer engagement with social media is needed to ensure that customers will persistently contribute to the co-creation process regardless of financial payment [3, 7]. Simply reaching out to customers or superficial engagement are not enough to realize a successful social co-creation.

(ii) Besides seeking input from the general public, companies can use social media to engage specialized online communities composed of designers, developers, programmers, engineers, healthcare professionals and others [39, 40].

(iii) Incentives are important to customer co-creation. Companies must reward the customers as the co-creator because co-creation requires a lot of time and efforts. Reward can be in different formats, including financial payments, public recognition, etc. A study by Nambisan and Baron [41] indicates that customers' actual experiences and their beliefs about the expected benefits significantly influence their actual continued participation in value co-creation.

(iv) Employing multiple strategies to engage customers on social media. For example, companies can use activities such as challenges, contests, competitions, online group meetings and crowdsourcing to attract the general public and specialized online communities [7]. Many of these activities typically include phases for entry submission, community voting and selection of winners.

(v) Currently, customer co-creation was most applied in the early product development stage such as idea generation or customization [42]. More involvements in the whole product development cycle such as co-production, decision-making for pricing, co-launching, co-advertising and co-marketing of the product are needed [43].

(vi) Identifying which social media tools should be used for customer co-creation. Williams [44] suggests that companies use social asset tracking scorecard to score their ability to utilize different social media tools and use social co-creation maturity index to assess the relative maturity of each social media tool for co-creation purposes.

(vii) Companies need to share with their customers about how they use customer input and co-creation in the whole business process so that customer would be motivated to continuously participate in the co-creation [7, 45].

(viii) Managing the risks involved in the co-creation process. Gassmann *et al.* [46] identified some negative side-effects associated with co-creation such as dependence on customers' views, interests, behavior personality and experience, potential loss of know-how, etc. Dijk [45] suggests that good community management and clear rules of engagement can tackle many of the risks during the co-creation process.

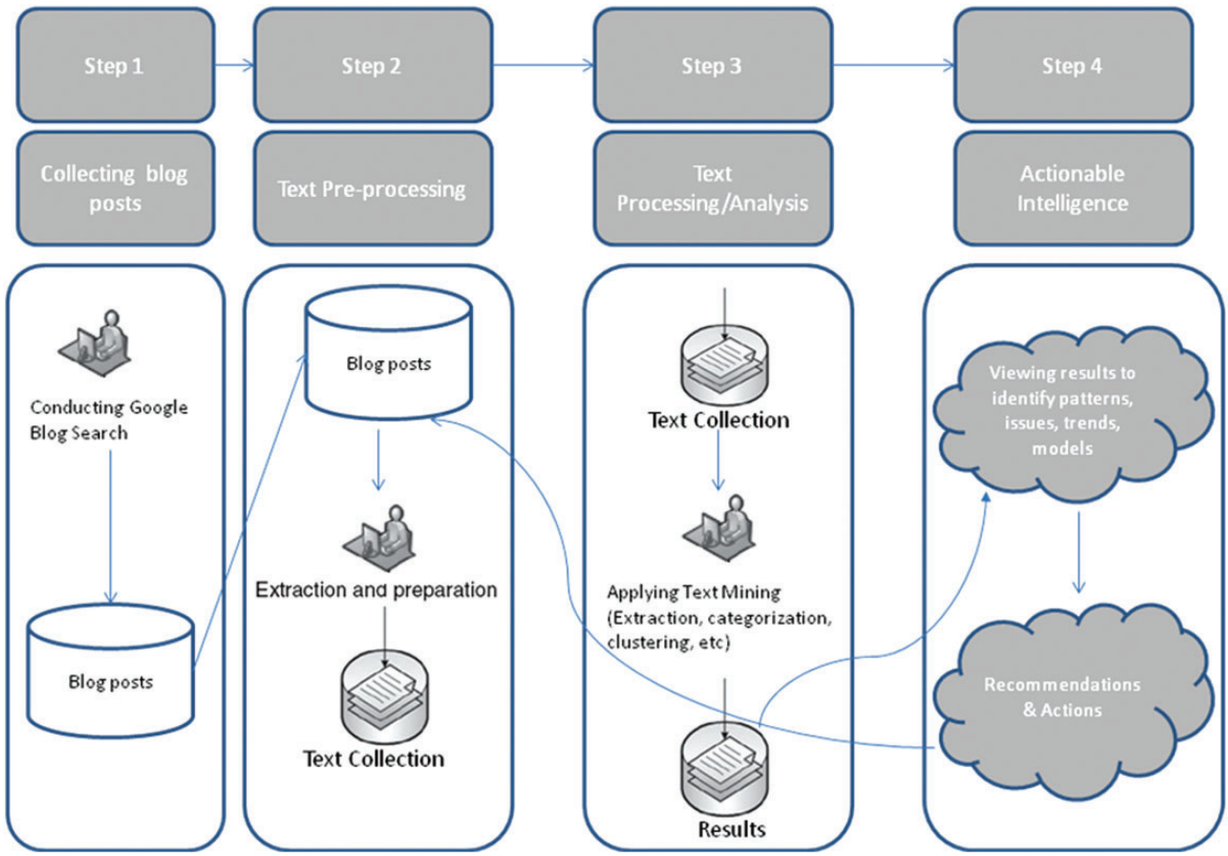

FIGURE 2. A process for blog mining (Adapted from [30]).

We have identified a few trends related to social media for co-creation from the blog mining study.

First, some companies start to integrate social co-creation with customer relationship management (CRM) systems. As social media continue to grow, it becomes necessary to combine the social media data with existing customer data in the CRM system. For example, Salesforce and Dell are making social CRMs, which add social media features to existing CRM systems [39].

Secondly, some companies are developing mobile social co-creation apps. As more and more customers use mobile devices to access websites and social media, there is a strong need to develop mobile social co-creation apps. It is expected that an increasing number of platform-specific mobile social co-creation apps will be offered by companies to facilitate social co-creation [39, 40].

Thirdly, the co-creation community will continue to grow. More and more customers will be involved in co-creation and develop values by interacting with companies [47]. In addition, big brands will be more likely to build their own social co-creation platforms since they have more resources and relatively higher level of experience with social media; small businesses will increasingly use existing online crowdsourcing communities such as Quirky, Zooppa, Innocentive, Jovoto, MoFilm, Neocha Edge and Brandfighters to build customer co-creation communities and expand their innovation capability [39, 40].

Fourthly, we will see more systematical and structured collaboration between customers and companies. Customer co-creation will continue to expand to more systematical and structured collaboration, which involves the whole life cycle of product or service development and the customer knowledge will be integrated into all the decision processes of a company [43, 48, 49].

3.3. Study 2: Mining posts on a social network-based online customer co-creation forum

To answer the second research question, we conducted a case study by used text mining and sentiment analysis methods to analyze posts available in a customer co-creation forum provided by Zooppa (http://zooppa.com). Zooppa is a global social network for creative talent that partners with companies to launch user-generated advertising campaigns. Inspired by the

TABLE 1. Main themes and categories.

Category	Main themes
Benefits	. Bringing better products to market more quickly . Developing products at lower costs and reduced risks . Accelerating innovation . Gaining deep marketing insights . Getting more advocators . Increasing customer loyalty . Improving business process . Facilitating organizational change
Issues, concerns or challenges	. How to identify innovators and valuable contributors from the customers? . How to monitor and correct incorrect usage information in the customer co-creation process? . How to assess, revise and optimize the co-creation process to achieve a satisfactory outcome? . Niche market only due to small sample size: a small number of customer co-creators may be not representative of the whole customer population . Copyright concerns (customers may demand certain property rights) . Conflicts between customers' interest and organizational interests or product development direction . Regulatory concerns in certain industries such as healthcare . Risk management such as potential loss of control, deviant co-creation and unforeseen design . Trust issue such as risks of the consumer passing on know-how knowledge to competitors . Budget concerns caused by the cost of running co-creation contests or campaigns
Co-creation strategies/methods	. Incentives (financial payment, licensing contract, non-monetary acknowledgments) . Campaigns, challenges, contests, competitions . Hold online group meetings . Seek input from private or specialized virtual community . Crowdsourcing
Examples/case studies	. Case studies, use cases and examples from various companies such as Coca-Cola, McDonald and Nike . Case studies and examples from various countries such as the USA, Europe and Latin American . Interview transcripts with experts . Sharing experience and lesson learned
Education/training	. Co-creation-related workshops and conferences . Co-creation-related books . Best practice guides on developing in-house co-creation planning and facilitation skills
New trends	. Integration of social co-creation and CRM . From co-creation toward structural collaboration . More small businesses adopt co-creation . More brands will create ongoing co-creation platforms to invite ideas from customers . Co-creation community will continue to grow . More platform-specific co-creation apps

principles of crowdsourcing, Zooppa's website hosts numerous brand sponsored advertising competitions. Currently, Zooppa has over 160 000 members worldwide and allow its members to submit entries to brand-sponsored video contests and graphic design contests for cash awards. It also provides features for members to vote and comment on user-generated ads. Many companies, including Siemens, Ebay, Pizza Hut, Nike, Intel and Google, have used the Zooppa crowdsourcing platform to launch user-generated advertising campaigns. So far Zooppa members have won over $1 million worldwide. The purpose of the case study was to closely examine popular video advertising contests and get insights into how customers actually use social media to support their co-creation for making innovative videos. Below is a description of the procedures and findings.

First, we picked two of the most popular video advertising contests (Pizza Hut, Hut, Hut! Contest and Dating 101: All the Moves contest) at Zooppa. The reason that we pick them is because the two contests' forum got the most messages from their participants during our research period. Zooppa's social network-based online forums allow an Internet user to login in using his or her Facebook account and post messages. Specially, the forum 'Pizza Hut, Hut, Hut! Contest' had 90 posts and the forum of 'Dating 101: All the Moves contest' had 62 posts. Each post has at least one sentence. Some posts have a large paragraph with over 10 sentences. We manually copied these posts from their forums and saved all the posts into a word file on the hard drive for analysis.

Next, we loaded the word file into a different software tool named Leximancer (www.leximancer.com) for text mining. The reason why we use Leximancer instead of other tools is that Leximancer has an attractive feature called sentiment analysis which provides ability to identify sentiments by showing probability of a concept being mentioned in a favorable or unfavorable context. As a text mining tool, Leximancer uses a statistics-based algorithm to analyze the content of collections of textual documents and to visually display the extracted information in a browser by means of a conceptual map [50]. The concept map provides an overview of the material, representing the main concepts contained within the text and how they are related [51]. Leximancer automatically extracts concept terms by looking for words that most frequently appear in the text, developed a list of concepts contained in the text, and their relationship to each other. These concept terms are further clustered into higher-level 'themes' and are visible as large circles on the concept maps. Those concept terms appearing in comparable or semantically similar contexts will be clustered together in the map space [50, 52]. The themes are heat-mapped to indicate importance. According to the Leximancer manual [50], the most important theme appears in red, and the next hottest in orange and so on according to the color wheel. The Leximancer software has been used by quite a few researchers [52–55] to examine large amount of texts in the past few years.

After applying the Leximancer software to mine the forum posts, we explored the concept map generated on individual

FIGURE 3. A generated concept map.

concept levels and on the theme level. Themes are concept clusters that represent the most semantically connected groups of concepts. Leximancer produced several types of concept map that contains the extracted concepts and their interrelationships. The concept map contains the names of the main concepts that occur within the text. Figure 3 shows a concept map generated from our data set. The map uses large circles to represent key themes, uses dots to represent concepts, uses brighter color and larger theme circles and concept dots to indicate greater importance within the text [50, 54]. In general, concepts that are strongly semantically linked will be close to each other and form clusters [52].

After reviewing the generated concept terms and themes, we identified five major clusters and collectively decided a proper descriptive name for each of the clusters. However, as this step requires human intelligence, both determining the number of the clusters and labeling the clusters are subject to the knowledge of the researchers. The emergent clusters and main concept terms in the text were summarized in Table 2.

Furthermore, we used the sentiment lens provided by Leximancer to view the particular sentiment of the above concept. Leximancer uses a large list of sentiment terms embedded in the software to measure associations of the concepts with positive or negative terms [53]. For example, 'competent' is positive term and 'incompetent' is a negative term. As a result, we found both positive and negative sentiments about specific aspects of the video contests. Some concepts are associated with more positive sentiments than

TABLE 2. Emergent concept clusters.

Concept clusters	Main concept terms
Questions related to video design	Feature, time, logo, engaging, creative, background sound, music
Questions related to video submission	Upload issue, release form, deadline, browse issue, large files
Question related to prizes	Winner announcement, judgment criteria, honorable mentions, finalists, extra awards
Questions related to contest requirements	entry, eligibility, qualification, rules, copyright release
Expressing personal feeling	fun, upset, awesome, sad, happy, disappointed, confusing

negative sentiments or vice versa. For example, some customers expressed confusion and dissatisfaction over the concept 'contest requirements'. The reason is mainly related to the change of the rule by the brand because the brand extended the deadline of the contests multiple time and added new requirements for the final video artifact. Positive sentiments are also detected for some concepts such as 'prize' and 'technical support' because Zooppa offered additional awards and efficient technical support to participants of the video contests. The sentiment analysis method provides a quick way to facilitate broader understanding of customer perceptions of the co-creation process and outcomes.

The case study revealed some issues and insights of using social media to support the customer co-creation process. First, although the companies in the case study expected the video contests to lead to the creation of innovative high-quality videos for their brands, it seems that these companies did not have very clear requirements and understanding about what they wanted. As a result, the initial instructions they provided for their interested customer were ambiguous and lack very detailed requirements and clear guidelines. As a result, many customers had various questions on contest requirements, video design, video submission and prizes and needed further clarification. The results of case study show that social media provide a great way for these customers to ask questions and get support from the companies. Social media also provide a way for customers to support each other by refining the questions or sharing concerns among themselves. Secondly, we found that these companies not only used social media-based online forums to further understand customer questions and address their technical concerns but also used customer input to improve their video contest instructions and to create more specific requirements on what they thought innovative high-quality videos really mean. This confirms the benefit of using social media for customer co-creation. Thirdly, although the refinement of the video contest instructions and video design requirements were beneficial, it caused some confusion and complaints among a few customers. Some customers expressed concerns that they already created the videos based on their understanding of the initial instruction and thus they were upset of the revisions of the contest instruction or requirements. As a result, the companies decided to increase the number of prizes and extended the contest deadline in order to make participants happy. Although the final results were good in general, the companies did pay a higher cost for their sponsored contests than originally planned in order to keep their good public reputation and make the video contest successful. A lesson learned from the case study is that companies should do a pilot-testing of their customer c-creation plan before the formal contest in order to reduce or minimize possible issues in the customer co-creation process.

4. RECOMMENDATIONS FOR USING SOCIAL MEDIA IN CUSTOMER CO-CREATION

We learned a lot of insights from our in-depth analysis of the relevant blog posts and social media-based online forum messages. We found that many companies are increasingly interested in using social media as a platform for customer co-creation. However, there are some issues and challenges for successfully implementing social media for customer co-creation. It is important for companies to follow a methodology to use social media in customer co-creation. Before the implementation, each company needs to determine whether they are ready to achieve quality customer co-creation with social media. Based on the literature review and our practical experience, we offer the following recommendations for corporate managers who are interested in developing a formal process to use social media in customer co-creation in the near future.

First, managers need to develop risk management strategies when they use social media to engage customers in value co-creation. Despite many benefits, the results from both Study 1 and Study 2 reveal potential issues and risks (e.g. copyright concerns, conflicts between customers' interest and organizational interests) in using social media for customer co-creation because companies have to 'give up a substantial amount of control to an unknown crowd' [56]. To achieve their desired outcomes, companies need to develop a set of risk management practices to identify, assess and control risks in association with the use of social media to assist customers in value co-creation.

Secondly, managers should benchmark other successful companies for learning what makes them successful in terms of using social media to assist customers in value co-creation. Managers can monitor and analyze other successful companies' social media sites to find out how they launched campaigns, challenges, contests, competitions on social media and what incentives they provided to customers, how frequently they updated the content, how they responded to comments or complaints from social media users, etc. For example, the

companies in Study 2 handled the complaints by increasing the number of prizes and extending the contest deadline. Seeking out and studying the practices used in other successful organizations that produce the desired results can help managers develop the absorptive capacity [57] for successful use of social media in customer co-creation.

Thirdly, as no two organizations are identical, managers should pilot test the learned social media practices through a small number of employees and/or customers before applying these social media practices in a formal process to engage in co-creation activities with customers. In study two, the initial instructions provided by companies were ambiguous and caused many confusions and complaints. A pilot test of the co-creation activities with a small number of users will help reduce the issues and increase the reputation and quality of the co-creation activities.

Fourthly, sustaining long-term customer engagement in co-creation activities is a big challenge and needs more efforts than providing incentives to customers. Research shows that both extrinsic and intrinsic motivation can have a deep influence on human behavior [58]. Extrinsic motivation is caused by the desire to attain a reward or avoid a punishment. Intrinsic motivation involves performing an activity for its own sake such as enjoyment or satisfying personal needs. Managers need to adopt multiple engagement strategies to sustain customers' interest and continued participation. For example, the mining results from Study 1 suggest that managers should inform customers on the work in progress and share with customers what steps their companies are taking based on customer input. Closing the feedback loop will motivate customer to continuously engage in co-creation activities with the companies [7, 45].

The study has several limitations. First, we only applied the phrase 'social media' + co-creation to find the blog posts. These keywords may be insufficient to locate all relevant blogs about customer co-creation on social media. Future researchers may need to try a few more keywords such as Twitter and Facebook to search for more blog posts on the Internet. Secondly, the automated text mining may not reveal all the relevant patterns or themes. It is possible that we missed some themes in our results. To overcome the limitations and gain a more comprehensive picture, it would be beneficial to use several different mining tools to process the same text collection. Researchers may also benefit by combining the mining results with outcomes from other type of analysis such as traditional conceptual analysis or content analysis. Thirdly, the evaluation, analysis and interpretation of the mining results were limited by the experience and skills of the authors to find patterns and themes that are latent in the generated concepts. For example, selecting descriptive labels for the identified clusters depends on researchers' experience/knowledge and is sometimes challenging because a good label should not only summarizes the central concept of a cluster but also uniquely differentiates it from other clusters in the collection [59, 60]. However, determining the themes and labels from the mining results is sometimes challenging. As people have different preference, experience and knowledge, a possible way to address this challenge is to incorporate crowdsourcing into the evaluation of the mining results. Crowdsourcing has emerged as an effective method to solve semantics-intensive problems [61]. Future researchers could leverage crowdsourcing platforms such as Amazon Mechanical Turk Service to help evaluate the mining results and determine the themes and labels. Fourthly, Leximancer as a machine analysis tool has a limitation when it is used to process data sets which could produce false positives as a result of simplifying complex original data [55, 62].

5. CONCLUSION

More and more companies are using customer co-creation as a way to engage consumers and meet customers' desire to influence products or services. By engaging customers to create new products/services or improve existing products/services, companies can gain a deeper understanding on customers' behavior and desires, adapt more quickly to changing trends and achieve sustainable competitive advantage [3, 12, 63–67].

Social media tools offer a creative way for customers to develop value by collaborating or interacting with companies and other customers. Combining customer co-creation with social media tools is not only a natural extension of the co-creation process but also an effective platform to engage customers for innovation [68]. At present, using social media in customer co-creation is a hot topic in information technology, marketing and management disciplines [69] and there are few journal articles on this theme in the literature. Different from other studies related to customer co-creation on social media, this study used text mining as an approach to mine relevant posts on blogs and social media-based online forums. As this topic is relatively new, few prior studies related to customer co-creation on social media specifically used text mining to mine blog posts. As a result of the text mining and sentiment analysis [70–73], a number of themes were identified from the raw data gathered from blogs and forum posts. This paper makes contributions to the social media literature by revealing the essential role of social media in co-creation and by presenting the current state-of-the-art and future trends about the use of social media in customer co-creation. Practical insights and recommendations for corporate managers who are interested in developing a formal process to use social media in customer co-creation are provided.

In conclusion, the results of this study show that customer co-creation is a growing trend and there are still many open research issues, concerns and opportunities along the line of social co-creation. These issues and concerns will have to be effectively addressed or overcome in order for social co-creation to become more effective. For example, many companies do not know how to measure or assess their social media efforts for customer

co-creation. As a result, it is hard for them to decide whether their social media investments are paying off. To solve this issue, new assessment metrics will have to be developed. Furthermore, companies that are interested in enabling co-creation with social media can also learn useful insights from this study which can be used to guide their social media for customer co-creation initiatives. As far as our future research is concerned, we plan to survey a few companies that are using social media for customer co-creation in order to get a deeper understanding and insights of issues and concerns that are related to social co-creation. Eventually, we hope to develop some guidelines to help companies develop more effective social media strategies and approaches for customer co-creation.

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