Idea Management in Social Networks

A Study of how to Tap into the Ideas of Facebook Communities

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Abstract—**Idea Management (IM) has increasingly been adopted by organizations and companies to innovate their products and services. While the software systems that instrument IM definitely help in managing this practice, we have discovered that IM organizers are having problems to establish, inside these platforms, communities able to support IM initiatives; either they cannot attract enough participants or the participating people are simply not the right ones.**

Acknowledging that most organizations have today a presence in Facebook and are striving to grow active communities inside this social network, we propose to harness the creativity of their already established Facebook communities instead of starting innovation communities inside IM platforms. Facebook can benefit IM with large and diverse pools of active communities who may be more interested in helping tied persons or organizations.

This paper introduces a method that exploits Facebook's technical affordances facilitating the execution of IM inside Facebook communities. Two independent studies demonstrated the effectiveness of the proposal to capture ideas that can lead to innovations. We conclude by discussing the strength and limitations of Facebook's technical capabilities to instrument IM.

Keywords—Collaborative Open Innovation, Collective Intelligence and Crowdsourcing, Idea Management, Social Media Applications

I. Introduction and Motivation

Starting from Von Hippel [1] in the late 70's, researchers have repeatedly pointed out the benefits of widening the source of ideas by empowering the innovation capabilities of organization with opinions and suggestions coming from external communities of suppliers, customers, and the general public [2], [3].

Idea Management (IM) is the process of requesting, collecting, selecting and evaluating ideas to develop new, innovative products, services or regulations, or to improve existing ones [4]. The goal of IM is to capture ideas that can deliver benefits to the organization by leading to innovations or by solving specific problems [5].

The emergence of social and collaborative web-based technologies has transformed the physical suggestion boxes — the former preferred method to listen to customers— into dedicated IM platforms, which lets people propose ideas, as well as rate and place comments on other users' suggestions [6]. Examples of popular IM platforms are IdeaScale (http://ideascale.com), Crowdicity (http://crowdicity.com), Spigit (http://www.spigit.com).

The adoption of IM practices and platforms have been empowering various innovation initiatives around the world. For instance, since 2008 almost 200,000 people have been participating in My Starbucks Idea, the world-wide IM initiative conducted by Starbucks to collect ideas from customers about future products and services [7]. The initiative has been very successful in generating valuable results for the company; more than 300 customer ideas have been already implemented by Starbucks [8]. Similar participation and successful outcomes (in terms of ideas implemented) can be found when analyzing IBM Innovation Jam. In this case, over 150,000 people have participated resulting in the creation of 10 new services and products for the company (e.g., smart health care payment systems, real-time translation services, on-demand mass transit data managing) [9]. Its application includes also the civic domain. In 2009, the population at large of Iceland was invited to contribute to the constitution reform with suggestions, proposals, and ideas [10].

In the context of IM, contributions of participants to provide valuable ideas are seen as strategic assets in the success of IM initiatives [11]. The larger the community of participants the more diverse views are likely to appear; more diversity increases the chances of producing valuable ideas [12].

However, having large number of people participating in online communities is a hard challenge. Previous research reported that half of the 2,872 Usenet groups for health support had fewer than 30 contributors. Similarly, it has been discovered that the median contributors of 9,000 public-sharing information wikis in 2011 was only seven [13]. The same pattern was found in communities that support IM. About half of IdeaScale's public-access IM initiatives (221 out of 456) have no more than 40 contributors [14].

Recognizing the difficulty of attracting people to contribute in communities that support IM initiatives and understanding that most organizations from different sectors (business, non-for-profit, governmental) have been striving to grow active communities in Facebook [15]–[17], we propose an approach that helps organizations to conduct IM in Facebook, enabling them to harvest ideas from their already established Facebook communities. By bringing IM closer to Facebook, the goal is to increase the chances of enlarging the pool of contributors and thus the diversity of perspectives and value of ideas.

We define a method that allows carrying out IM tasks (i.e., innovation problem submission, idea suggestion, voting, commenting, moderation, and content processing) through

Facebook features. The proposal was tested through two independent studies looking to i) understand its effectiveness in helping organizations to capture valuable ideas from their Facebook communities; ii) discover the suitability of Facebook's features to instrument IM; iii) learn if conducting IM in Facebook actually helps to increase participation.

From here on the rest of the paper proceeds as follow. A review of background concepts is presented next. In Section III, we present related works in the area of IM. Right after, in Section IV, our method to instrument IM in Facebook is introduced. Later, Section V explains the experiments conducted to evaluate the method and section VI describes the results of the evaluation. In the light of the results, a general discussion about the effectiveness of the method, and pros and cons of Facebook' features to instrument IM is presented in Section VII.

II. BACKGROUND

A. Idea Management

Idea Management is the process by which organizations approach their communities of clients, employees, suppliers, and interested stakeholders to (1) request ideas, (2) collect and (3) evaluate them, and (4) select the most promising ones to source their innovation needs or to address a defined organization's problem [4].

The execution of IM processes can be supported by specially-designed software tools known as IM systems. A study conducted by Hrastinski et al. [6] on state of the art technologies to support IM showed that IM systems share among them a common set of features. Most of the reviewed tools show to possess features for problem submission, i.e., functionalities that allow organizations to formulate problems and define campaigns through which ideas are collected to address problems. The investigation also found that as part of the problem definition, IM systems allows the creation of ideation categories, which are areas or aspects of the problem that organizers want to focus the discussions on.

A rather common set of characteristics present in the majority of IM systems are features to submit ideas as the way to propose solutions to the problems. The submission can be done within the predefined categories or openly. In addition, IM systems usually offer, according to Hrastinski et al., evaluation functionalities to assess the quality of ideas and solutions through structure feedback mechanisms, like voting (e.g., like/dislike, agree/disagree) and by using more flexible methods such as text-based comments. The research highlighted that comments represent also opportunities for collaboration among users who used them to share topic-related knowledge.

Synthesizing the stream of information generated during idea campaigns is one of the most serious challenges in IM. In fact, Hrastinski et al. confirms that most IM systems today are equipped with tools that help organizers to handle, process, and synthesize the information generated during idea campaigns. Although not reported by the study, we found that more and more IM systems are equipped today with tools to moderate discussions, e.g., content flagging, abuse and duplicate reporting; IdeaScale and Crowdicity are representative examples.

B. Facebook

Apart from its popularity (it has more than one billion active users as December 2015[1]), Facebook provides a series of features that can be exploited to instrument IM tasks. The following does not pretend to be an exhaustive guide to Facebook but a brief presentation of features that we consider relevant for IM.

A recent report from the company mentions that today more than 50 millions small businesses are using Facebook to communicate with their customers and to establish and strengthen relationship with them[2]. Normally, organizations mark presence in Facebook through institutional profiles, so called Facebook pages. From these spaces, page managers can make use of Facebook's input features to generate opportunities of communication by creating multimedia entries known as posts, i.e., textual publications enriched with images, emoticons, videos, and links to external resources.

Posts within Facebook represent the main form of content contribution. Users report brief personal status messages through posts, upload photos and videos via posts, or write messages to their friends' news feed by using posts. They constitute also the central unit of participation as textual comments and replies to posts are the main means of interaction among users. By commenting posts and by replying to comments participants collaborate with each other providing text-based unstructured feedback on others' contributions.

Structured and non-verbal feedback can also be given in Facebook through the thumb-up button enclosed into posts. The 'like' button is commonly used to agree with someone else's publication, either comment or personal post (at the moment this work was conducted the like button was the only possible form of providing structured feedback to posts).

Pages can label their posts with actionable hashtags — clickable words or unspaced phrased preceded by the hash character '#'—. This, apart from giving context to the post and helping to indicate the audience that the post is part of a larger conversation, facilitates the localization of the content. By clicking on hash tags or by asking the search engine to look for hashtags, people can easily discover all posts labeled with the interested hashtag and access to the entire conversation.

Managers may need to intervene in conversations originated within their pages. For such situations, Facebook offers tools to moderate discussions. Inappropriate messages can be excluded from the conversation by hiding comments or by marking them as spam. Authors of spam or inappropriate messages can be blocked preventing further participation. In addition, managers can take less extreme actions and cajole participants for compliance by directly commenting their messages through the reply-to-comment feature.

III. RELATED WORK

IM has been playing a key role in efficiently managing grassroots innovation initiatives [18]. In this context, IM platforms have proven able to properly instrument campaigns for soliciting ideas from large-scale crowds, both in the business

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[1] http://newsroom.fb.com/company-info
[2] http://on.fb.me/1YX0l42

and the public sector [19]. Discussions on how to extend and improve online IM platforms and similar have taken different directions among industrial and academic researchers, from methods to define suggestions, to mechanisms to display streams of ideas, to features to assess proposals, to solutions to find promising contributions [20].

Deliberation maps have been presented in [21] to structure participants' contribution as problem trees containing the problem to solve, potential solutions, and arguments for and against proposed solutions. The use of semantic technologies has been proposed by Westerski et al. to organize, link and classify the proposed ideas using meta data annotations [22]. Improving scoring methods used to rate the ideas has been the goal of Xu et al. who have proposed a reference-based scoring model as an alternative to the traditional thumbs up/down voting systems [23]. Faridani et al. have introduced a two-dimensional visualization plane as an approach to address the filter-bubble effect —narrowing the exposure to recent, popular, or controversial information— of linear listings used to display opinions in online sites [24].

Convertino et al. have targeted information overload in the evaluation phase by employing natural language processing methods to automatically identify the core of the proposals [25]. Along this line, Bothos et al. have introduced the application of information aggregation markets to facilitate the evaluation of the ideas [26].

Social sharing features, e.g., share and tweet buttons, have been the preferred approach to integrate IM platforms and social networking sites. These solutions have been proposed to quickly and easily export content of IM discussions into general purpose social networks (e.g., Facebook, Twitter) for creating awareness, gaining visibility, and attracting new participants. Although pervasively used across the Internet in general and in IM platforms in particular, their effectiveness to actually increase participation and productivity in IM initiatives have been lately put in doubt [27]. Alternatively, IdeaScale and Spigit —two of the big players in the field have proposed solutions that extend Facebook's native features proving IM-specific features, e.g., voting mechanisms, filtering, tagging, and searching functionalities [28], [29].

Through an application that enhanced Facebook with deliberation functionalities (e.g., survey features, polling tools, moderation capabilities), Bendor et al. have examined the suitability of Facebook discussion groups to engage the public in conversations about the innovation of Vancouver's public transportation [30]. Their promising results provide further support to the idea of using Facebook to carry out product/service innovation initiatives. Although sharing the common goal of tapping into the knowledge, opinions, and ideas of Facebook communities to fuel innovation processes, our work differs from the latter in a central aspect. We do not aim at building applications that extend Facebook capabilities nor at developing solutions on top of Facebook, but at developing mechanisms that exploit Facebook's existing functionalities to instrument IM.

IV. IDEA MANAGEMENT IN FACEBOOK

We define a method that allows carrying out IM tasks through Facebook functionalities. A discussion of the rationales that guided our proposal is presented in the remainder of the section.

Facebook pages represent a promising tool for organizations to engage their already established communities of members/customers in IM initiatives. From there, page managers can leverage Facebook's multimedia input features to formulate innovation problems. By including images, videos, and links to external resources, page managers are able to create rich and almost limitless[3] posts that call for solutions to problems. We propose therefore to carry out the *problem submission* capabilities of IM systems by creating Facebook posts that seek to involve Facebook communities in idea campaigns (from now, idea campaign posts).

In the realm of Facebook pages, conversations and discussions unfold through comments attached to posts published by the page managers. Posts keep the "history" of their own comment threads. This, apart from allowing people to engage in asynchronous conversations (they can join and leave whenever it is more convenient to them), represents a reliable alternative to structure and host idea campaigns. *Idea submission* functionality of IM systems can thus be instrumented by requesting participants to submit proposed solutions by placing comments to idea campaign posts.

Facebook's "like" offers a straightforward and effortless mechanism to instrument the *evaluation* of ideas. Participants can therefore express their agreement with the ideas by liking the comments that contain them. The *collaboration* capabilities of IM systems can be implemented through the reply-to-comment feature of Facebook that allows users to directly reply to a comment.

IM Features	Facebook Propositions
1. Problem submission	Define problem through multimedia input features. Place the definition into a post published by the organization Facebook page and labeled with hashtags that identify the campaign launched to collect proposed solutions (idea campaign posts, from now)
2. Idea submission	Place comments to idea campaign posts
3. Idea evaluation	Like and reply to comments that contain ideas
4. Collaboration	Reply to comments that contain ideas
5. Moderation	Hide inappropriate comments, block bad behaved participants
6. Processing and Synthesizing	Search posts labeled with the campaign hash tags

TABLE I: Mapping of IM features to Facebook features

Participation to IM initiatives may need to be moderated and guided toward the goal of the initiative. Critics, complaints, spam, cheats, and low quality contributions are miss behaviors that commonly appear in online communities and can undermine the entire IM initiative [9]. *Moderation* of IM can be achieved in Facebook by the features of blocking, content hiding, and reply-to-comment.

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[3]Sixty-three thousand characters limit the textual contents in Facebook: http://mashable.com/2012/01/04/facebook-character-limit
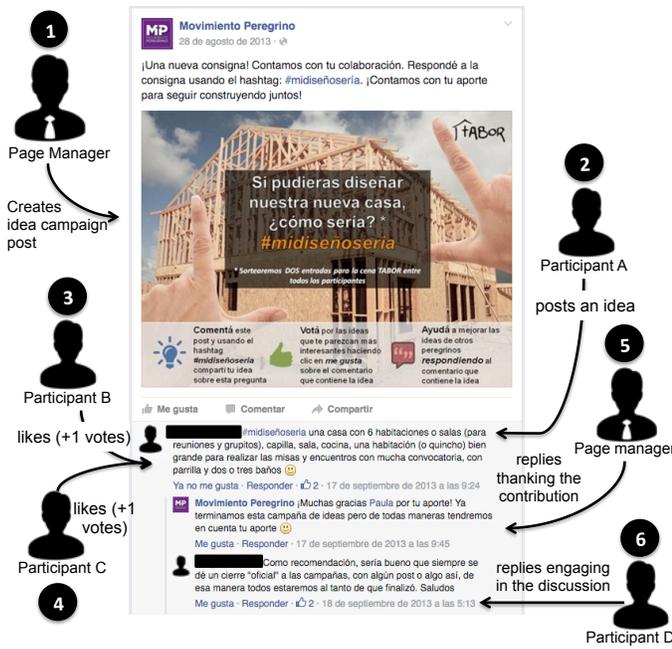
Fig. 1: Mapping method in action

Fully instrument IM high-profile methods for content *synthesizing and processing* with Facebook features will be challenging, however, we understand that the combined use of hashtags, to label idea campaign posts, and search engine, to access the labeled information of the campaigns, can facilitate these tasks. Table I summarizes our proposal to map IM features to Facebook functionalities.

Figure 1 presents the method in action. The innovation problem is submitted via a multimedia post created to launch the idea campaign (1). The post, written in Spanish, contains a short text call to action at the top: "*Respondé a la consigna usando el hashtag [...]*" (Answer the question with the hashtag [...]). Below the introductory text, an image with more details about the campaign is presented. In particular, the image tells the actual question to be answered "*Si pudieras diseñar nuestra casa, ¿cómo sería?*" (If you could design our house, how would it be?), mentions the rewards for participation "*Sortearemos dos entradas para la cena TABOR entre todos los participantes*" (We will raffle among the participants two tickets for the dinner of TABOR), and explains the mechanisms of participation, i.e., submit ideas by commenting the post, cast votes by liking the comments that contain ideas, place opinions on others' ideas by replying to the comments.

After the campaign launching, the flow turns to the organization's Facebook community (Movimiento Peregrino in this case) who can learn about the campaign through their news feed. From then and until the end of the campaign, they can submit ides by commenting to the campaign post (2). Also, they can contribute by using the like functionality to agree with the comments that contain ideas (3, 4). Page managers can take part in the discussion by, for example, replying the participants thanking for their contributions (5). People can get engaged in the campaign not only by liking the proposal but also by participating in thread comments (6).

V. EXPERIMENTS

Our main goal is to evaluate the effectiveness of the method to help organizations in approaching their Facebook communities and capturing valuable ideas that can lead to innovations. We also aim at understanding to which extent Facebook is suitable to instrument IM tasks. In addition, we want to learn whether bringing IM to Facebook increases participation in relation to known rates.

A. Method

To study the effectiveness of the method to capture valuable ideas, we partnered with two organizations, which were interested in gathering ideas from their Facebook communities. The method was explained to each organization and they were asked to employ it for i) submitting campaigns to collect ideas; ii) instructing their communities on how to contribute; iii) moderating participation; and iv) processing the content generated during the campaigns. At the end of the campaigns, we contacted the organizers asking about the quality of the proposals and if some of them are going to be considered for implementation.

To evaluate the suitability of Facebook's features to instrument IM tasks, participants, moderators, and organizers involved in the campaigns were surveyed. A survey was sent to the participants inquiring about the suitability of the proposed method to submit ideas, follow the discussion and digest the information generated during the campaign, and vote on the proposals. In addition, an evaluation on the overall experience was required. The answers were measured on Likert scale ratings [31]. Each question of the survey included also a text-entry form that allowed participants to provide free feedback. We also contacted the moderators of the campaigns asking them to assess the suitability of the method to promote and moderate idea campaigns, and follow the discussion. Campaign organizers were surveyed as well to know their impressions of the method to process, synthesize and evaluate the content generated during the campaigns. Surveys composed of a mix of open-ended and rating scale questions were also used in the latter cases to understand the experience of the moderators and organizers.

B. Organizations and Idea Campaigns

Idea campaigns were conducted with two organizations from different sectors: Indigo, a company that owns a pizza restaurant, and Movimiento Peregrino, a small non-for-profit association of about 400 active members that works on the personal development of young people. Table II summarizes the two campaigns.

Indigo approached its customers in Facebook asking them ideas for a new pizza flavor that they wanted to include in the menu. The campaign lasted for four days and was released through a post that called for pizza flavor ideas. Once a day, the campaign was promoted by re-publishing the campaign post. By contributing with ideas for pizza flavors, the participants entered in a raffle for a free dinner for four persons.

Movimiento Peregrino involved its members in Facebook into a discussion about the interior accommodations and the exterior design of its new headquarter. The initiative lasted for

Campaign	Organizer	Length	Reward
New Pizza Flavor	Restaurant	4 days	Free-dinner for 4 people
New Establishment	Non-for-profit organization	12 days	Two tickets for annual dinner

TABLE II: Case studies conducted to evaluate the proposal.

Fig. 2: Results of the idea campaigns

12 days and the contributors (idea and comment authors and voters) participated in a raffle for two free tickets for the annual dinner of the association. The campaign post was re-published six times during campaign by the page managers. The page fans, also, helped to promote the initiatives by sharing the campaign post within their Facebook contacts.

VI. EVALUATION AND RESULTS

A. Effectiveness and Participation

Out of the 5,540 fans of Indigo's Facebook page, 34 contributed to the campaign by sharing ideas through comments placed on the campaign posts and by liking the campaign post's comments. The small percentage of participation (0.01%, 34 out of 5,540) found is consistent with previous cases of IM [32].

Thirty-three different flavors of pizzas were proposed; two flavors received two votes (likes), and other three ideas got one like each. The rest of the proposals were not voted. Out of the 34 contributors, 85% of them (29 of 34) submitted ideas, while the remaining liked the proposed flavors. Two contributors submitted 20% of the ideas (6 out of 33), the rest contributed with a single idea. The counter-intuitive relation between voting and content creation (15% vs. 85%) —counter-intuitive because we expected voting to surpass content creation since it requires much less effort— may had been due to the fact that only idea author could win the free dinner.

Page managers intervened three times during the campaign, in all cases to thank the participants for their contributions. Zero incidents were reported during the campaigns, i.e., no complaints against the campaign or restaurant, no spams, and none off-topic comments. Through a posterior communication with Indigo's owners, we learned that two of the proposed flavors ended up in the menu of the restaurant.

About 2% of the Movimiento Peregrino's Facebook fans contributed to the campaign (32 out of 1,554). Also in this case the contribution ratio is aligned with previous research regarding contribution in online social systems [33].

Campaign contributors posted 64 ideas and cast 90 votes. Almost 60% participated by voting (19 out of 32), while the remaining contributed with ideas. The distribution of contributions follows a power-law pattern. A small number of "super contributors" dominated the participation. About 60% of the ideas were posted by four people (39 out of 64) while more than 40% of the votes were cast by five contributors.

Although similar incentives were offered in both campaigns to encourage participation, the higher productivity of the participants in the latter case is prominent. Here, almost two ideas
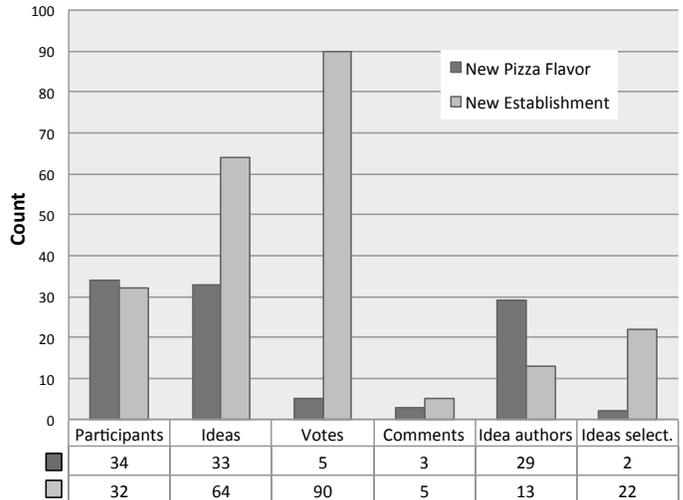
were submitted by each contributor. This high productivity could be associated to the strong tie already existing between the organization and the contributors [13].

Page managers took active part on the discussion by providing encouraging feedback to the contributors. A couple of weeks after the end of the campaign, we were notified by the organizers that out of the 64 ideas submitted during the campaign, 22 of them were under study to be included as part of the design plan of the new establishment. Figure 2 outlines the main results of the case studies.

B. Suitability

Participants, moderators and organizers of the two idea campaigns were surveyed through questionnaires that mixed open-ended and rating scale questions. A 5 points scale was employed in the closed-ended questions and for the analysis we consider answers 1 and 2 as negatives, 3 as neutrals, and 4 and 5 as positives.

Participants Feedback. Out of the 66 total participants (counting both campaigns), 28 replied the survey (about 40% of response rate). Figure 3 shows the feedback from the participants regarding their experience. All questions were answered positively. About 68% assessed Facebook features as suitable for expressing ideas, however, a couple of the participants raised a red flag in relation to the nominative characteristic of Facebook pointing out that "*the fact of having to use real names in Facebook may affect participation since in some situations people feel uncomfortable to share opinions using their identity*". The issue of using real identity to expose ideas and opinions in online communities is inline with previous similar cases [34].

Similarly, three-fourth of the respondents evaluated positively the features of Facebook for following the discussion, i.e., go through the proposals and read them. However, the dissatisfied participants highlighted the difficulties to digest long texts in Facebook emphasizing that people usually ignore extensive publications; "*the problem get worse when using*

Facebook through mobile devices", commented one of the participants. The inclusion of tools to filter, sort, search, and distinguish content will help according to them.

The least approved feature was the use of the like button to assess the ideas. Although being assessed positively by 50% of the respondents, it was especially questioned for its unreliability to capture the real value of ideas. In this sense, the unhappy participants pointed out that it was hard to differentiate whether the person really agreed with the content or just wanted to socially conform with her friends or liked the author of the idea. They suggested the implementation of more sophisticate methods, which range from the use of rating systems to the employment of other reactions additional to like, e.g., "*I love it!*", "*It's fair*", "*I despise the idea*" (similar to what was recently implemented by Facebook to extend the structural feedback on posts[4]). Along this line, a participant claimed that the like feature "*gives a partial overview of people's opinion, since it reflects only the number of people that agree with the idea, but not the number of people that disagree with it*". The participant therefore suggested the inclusion of a functionality to vote down ideas, such as a dislike button.

Despite the noted drawbacks, the vast majority of the participants (22 out of 28, 78%) showed to be satisfied with their experience of using Facebook to take part in idea campaigns. In addition to the analytic results, the positive textual feedback received demonstrates the acceptance of the proposal. "*It is more entertaining to provide feedback and give opinions through Facebook than via other means*", expressed one the participants, while another mentioned that she loved to "*dream together about our future establishment*". Interestingly, a respondent agreed with our vision about the potential of Facebook for idea campaigns "*today people spend more time in social networks than in others more formal online communities, so we should be present (and get information from) where the target people are*". Other participants however expressed their concern about negative aspects of the initiatives. From pure administrative mistakes, such as "*more participation could have been achieved if the organizers explained better the goal of the campaign, and when and how the ideas will be used*" to more behavioral complains like "*people should had been more careful when proposing ideas, there were participants that submitted up to 18 ideas in a single comment, which transformed the experience into something overly cumbersome*".

Moderators Feedback. We also surveyed the moderators of the Movimiento Peregrino's campaign (Indigo's campaign moderators did not reply) asking them to assess the suitability of Facebook to promote and moderate idea campaigns, and follow the discussion. It was found that the toughest task was the promotion of the campaign; "*the hardest part came when we had to promote and keep the campaign at the top of the potential participants' timelines because every post created to advertise the campaign divided the ideas instead of centralizing everything in a single place*". Due to large amount of content generated in Facebook, moderators were forced to continuously promote the campaign. The strategy followed was the re-publication of the campaign post, however, this action
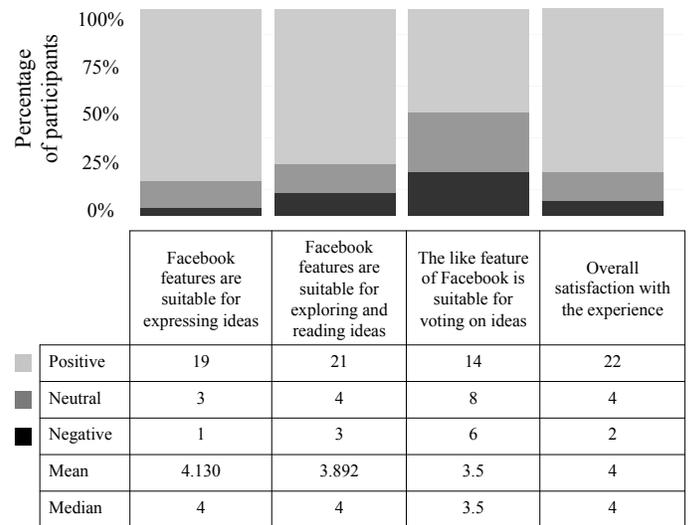
[4]http://newsroom.fb.com/news/2016/02/reactions-now-available-globally

		Facebook features are suitable for expressing ideas	Facebook features are suitable for exploring and reading ideas	The like feature of Facebook is suitable for voting on ideas	Overall satisfaction with the experience
	Positive	19	21	14	22
	Neutral	3	4	8	4
	Negative	1	3	6	2
	Mean	4.130	3.892	3.5	4
	Median	4	4	3.5	4

Fig. 3: Survey results of participants' experience

ended up splitting the campaign information in various posts making the posterior analysis complex and overwhelming.

Facebook's notification system was evaluated as very useful to follow the participants' actions during the campaign. Moderators mentioned that the awareness features allowed to be immediately notified of changes in the campaign post and also lead to increase communication with the participants and among them. Similarly, the reply-to-comment feature was evaluated as a suitable feature for interacting with participants. Sorting and filtering functionalities were identified to be needed in order to ease moderation actions.

Organizers Feedback. The campaign organizers were contacted to know their impressions of Facebook as a tool to organize, digest and evaluate the content generated during the campaign. Only organizers of the Movimiento Peregrino's campaign replied. For them, Facebook posts were found to be suitable as a container of the ideas generated during campaigns. In addition, they highlighted the usefulness of hashtags to localize campaign posts. As pointed out by the organizers, the most remarkable limitation of Facebook as platform for supporting idea campaigns is the absolute absence of features for synthesizing and processing the information generated. Even simple tasks, such as getting basic statistics about the campaign (e.g., number of participants, number of votes, number of distinct ideas, most popular ideas, most voted comments) "*were extremely irritant and time consuming because they had to be done manually after reading all the ideas*". Harvesting the disorganized and redundant corpus of information "*can be a chaos in campaigns with higher participation*", manifested the organizers.

VII. Discussion

This study contributes to the state of the art with an analysis of how social networks like Facebook can be used to conduct idea management campaigns (without using dedicated IM software). The goal was to understand how much of the typical IM features can be mimicked, how well, and which are instead the weaknesses of the approach.

In our experiences, Facebook was found to be an effective means to conduct IM. Both organizations, Indigo and Movimiento Peregrino, were actually able to craft a request for ideas, reach their already established Facebook communities of customers/members and get valuable ideas to fuel their innovation initiatives.

While Facebook may help to reach wider audiences of potential participants, large participation rate is not always guaranteed. In our experiences, the number of contributors is low and levels of participation did not differ much from previous findings [33]. This unveils that engaging large number of participants requires more than simply bringing IM closer to Facebook communities. In this sense, studying the motives that drive people to participate in online communities represents a promising future step in understanding how to encourage contribution [35].

Despite the promising results in the potential of Facebook to elicit and harvest ideas, we learned that the standard features of Facebook are not sufficient to properly instrument all IM activities. We saw that some activities can be covered better than others and that some functionalities (e.g., voting, content processing) need to be improved or extended to become more suitable. In the following, we discuss in details the pros and cons of Facebook features and propose alternatives to overcome the discovered limitations.

The way Facebook supports conversations by threading comments to a post in a single, flat and chronological hierarchy (there is also the possibility to alter the default order and order comments by number of replies) seemed to be appropriate to host campaigns for soliciting ideas and opinions. To ensure a correct outcome, moderators must request participants to post not more than one idea per comment. The notification tools of Facebook appeared to be useful to follow the discussion, engage participants in conversations and interact with them. The employment of hashtags was found to be a convenient method to label idea campaign posts. Facebook tools to hide comments and block users were highlighted to be valuable at the moment of moderating discussions.

Promoting the campaigns was difficult. Instead of re-republishing campaign posts that end up splitting the content, organizers may decide to create independent promotional posts that drive traffic to a unique post that holds all the campaign ideas. Alternatively, they can use paid Facebook ads to promote their campaigns.

Facebook provides a variety of opportunities to express ideas and opinions, yet we discovered that these may also come with its own issues. For example, as it was reported by the participants, long texts are difficult to grasp in Facebook, especially when accessing Facebook through mobile devices. Moderators should encourage participants to be synthetic and brief when expressing their ideas.

The use of real identity represents another constraint discovered during the study. The participants mentioned that in some situations they may feel uncomfortable to share opinions using their real names. Facebook applications can be a valuable ally to comply with the request of allowing anonymous participation. For instance, action links (e.g., post anonymously)[5]

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[5]https://developers.facebook.com/docs/sharing/opengraph/using-actions

can be added to posts. Whenever the participant clicks on the action link of a post she can be redirected to an external web form that allows her to write an anonymous message and the application can take and publish it as a comment to the post.

Organizers struggled to prune, summarize and evaluate the ideas and opinions suggested by the participants. Even if the combination of Facebook search and the use of hashtags facilitated gathering all the pieces of information, they found it hard to make sense of people's contributions. Posts were analyzed manually and ideas extracted one by one. Similarly, understanding the participants' preferences required manually counting the number of likes of each comment and reply. The implementation of Facebook applications that connect the stream of Facebook pages with external tools can be a potential solution to extend the limited functionalities of Facebook to process and synthesize idea campaigns. The end-user oriented spreadsheet-based approach presented in [36] looks promising for collecting information distributed in different Facebook posts. The proposal introduced by Baez et al. [37] to facilitate the organization, classification, evaluation and selection of ideas appears to be an interesting option to efficiently cope with the amount of information generated during IM.

The like feature was discovered to be limited to assess ideas. The reactions (Love, Haha, Yay, Wow, Sad, and Angry), recently introduced by Facebook to allow users express a broader range of emotional feedback on posts, represent a valid example of how the like feature can be improved to provide more precise ways to assess ideas.

As for the limitations of this study, first it studies two cases based on limited samples. The findings are thus not directly generalizable without testing them with larger samples and additional types of IM campaigns, which can affect the attitudes, practices, and behaviors of participants. It is worth noticing that it was not the goal of this study to achieve statistical significance of results yet.

Comparative analyses are required to better understand the strength and limitations of Facebook to instrument IM. In this sense, campaigns with identical settings can be launched in both, IM platform and Facebook. The results can be used to learn similarities and differences in the quantity and quality of ideas, productivity of participants, impact of the proposals (i.e., how many of the ideas were selected for implementation), level of participation (i.e., which proportion of the Facebook community or of the users registered in the IM platform ended up posting ideas, authoring comments, or casting votes).

Findings about the suitability of Facebook's features need to be studied more extensively. One way is to run studies in which the effects of the discovered critical points (rewards, promotion, reporting, voting) are controlled. Another alternative is to repeat the studies but with the current status of the platform and see if the updated version of the limited features, e.g., like, are found to be more suitable to carry out IM tasks.

Lastly, it was the first time both organizations ran an idea campaign within their Facebook communities. This required organizers to intimately get familiar with Facebook, which took time. For instance, the reply-to-comment feature was disabled during the first days of Movimiento Peregrino's campaign so comments could not be collected when the campaign was having peaks of participation. Also, in Indigo's

case moderators did not actively follow the campaigns and participants did not receive feedback for their contributions. We know from previous research that commitment depends on direct feedback [38].

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