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La vie des idées dans une communauté de création
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Article abstract

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The Life of Ideas during a Community-Based Innovation Contest

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ABSTRACT

Few studies focus on how ideas circulate during community-based innovation contests. This research studies a contest employing two creativity methods: the hybrid and the speedstorming. Participants initially ideated individually, then ideated in pairs, and finally selected ideas for development. A novel research method that permits to track the "life" of ideas is settled. We found that final ideas are moderately original in comparison to the remainder of ideas submitted. We also found that participants did not reveal their most original ideas. Finally, we show that the final ideas were not co-created by the participants but came from solitary individuals.

Keywords: innovation contest, creativity, ideation, co-creation, idea generation, idea selection, speedstorming

RÉSUMÉ

Peu de recherches visent à comprendre comment les idées circulent dans des communautés de création. Cette recherche étudie un concours d'idées organisé selon deux méthodes de créativité (*hybride* et *speedstorming*). Les participants commencent par générer des idées individuellement, ensuite par binôme, enfin, ils sélectionnent ensemble les idées finales. A partir d'une méthode de recherche permettant de suivre les idées, nous observons que les idées finales sont moyennement originales par rapport aux idées générées et que les participants ne révèlent pas leurs idées les plus originales. Enfin, nous trouvons que les idées finales ne résultent pas de co-création mais d'initiatives individuelles.

Mots-Clés : communauté créative; co-création; concours d'idées; créativité; génération d'idées; sélection des idées; speedstorming

RESUMEN

Pocos estudios se centran en cómo las ideas circulan en un concurso de innovación abierta. Esta investigación estudia un concurso que utiliza dos métodos de creatividad: el *híbrido* y el *speedstorming*. Los participantes comienzan creando ideas individualmente, luego en parejas y, finalmente, seleccionaron ideas para desarrollarlas. Se establece un nuevo método que permite trazar el "ciclo de vida" de las ideas. Obtuvimos que las ideas finales son moderadamente originales en comparación con el resto de ideas presentadas, que los participantes no revelaron sus ideas más originales y que las ideas finales no fueron co-creadas, sino que surgieron de individuos aislados.

Palabras Clave: concurso de innovación abierta, creatividad, ideation, co-creación, generación de idea, selección de idea, speedstorming

The past decade has seen the rapid development of innovation contests in many organizations. Adamczyk *et al.* (2012) define innovation contests as:

> Time-limited competitions arranged by an organization or individual calling on the general public or a specific target group to make use of their expertise, skills or creativity in order to submit a solution for a particular task previously defined by the organizer who strives for an innovative solution. (p. 335)

Following the open innovation paradigm, organizations increasingly implement innovation contests to leverage individual and collective creativity of their employees (Di Vincenzo *et al.*, 2014), their customers (Bayus, 2013), or external experts and scientists (Allio *et al.*, 2004). Innovation contests are increasingly being organized for other complex social systems such as universities (Bullinger et al. 2010) and government agencies (Armisen *et al.*, 2015). In such social contexts, participants often do not compete to win prizes, but are asked to cooperate to solve societal, economic, or political challenges. This study examines a public organization context, exploring the case of a non-profit, community-based innovation contest organized by Global Service Jam. Global Service Jam is a non-profit organization of volunteers who form an informal network of individuals with a shared passion for service design (www.planetglobalservicejam.org). Each year, hundreds of people from five continents participate in this community-based innovation contest. This study examines the Global Service Jam that occurred in France during 2014.

Despite the popularity of community-based innovation contests, relatively little is known about how creativity occurs in this context. Although research highlights the importance of innovation contests to access beneficial resources (e.g., expertise, technologies, etc.) for innovation, few detailed investigations into the creative process appear in the literature. This article describes and contributes to a better understanding of the ideation process that occurs during innovation contests. More precisely, this research examines how autonomous co-creation occurs in innovation contests[1]. It is critical to address this knowledge gap toward a better understand of how to manage creativity among diverse

1. In contrast to 'sponsored co-creation', Zwass (2010) defined 'autonomous co-creation' as the fact that "*individuals or consumer communities produce marketable value in voluntary activities conducted independently of any established organization, although they may be using platforms provided by such organizations, which benefit economically.*" (p11). For the sake of simplicity, only the term 'co-creation' is employed in the rest of the manuscript.

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participants (Di Fiore, 2013). It is frequently reported that community-based innovations follow a large-scale brainstorming structure. While this format produces many ideas, the perceived creativeness of the final ideas is frequently disappointing (Kohn & Smith, 2011; Rietzschel *et al*., 2006). There are several reported problems that occur during brainstorming, such as evaluation apprehension (ie. participants withhold ideas because they fear a negative reaction from other participants), production blocking (ie. the fact that participants have to wait for their turn before generating an idea), free riding (ie. participants receive ideas and feedback from others with a minimum of own effort), and group cognitive conformity (ie. the fact that participants copy the same ideas from others) (Mullen *et al*. 1991).

The literature provides some preliminary investigations into two different methods that organizations employ to cope with these problems and improve creativity during innovation contests. One is the 'hybrid' method (Girotra *et al*., 2010), during which individuals initially ideate independently, and then together. Prior research suggests the superiority of nominal groups (ie. individuals working alone) during brainstorming regarding the quantity and quality of ideas generated (Paulus *et al*., 2006).[2] Girotra *et al*. (2010) complement this research, demonstrating that the hybrid method is better for generating and selecting new ideas than group brainstorming. In particular, the authors show that the hybrid method eliminates specific obstacles such as free riding, evaluation apprehension, production blocking or group cognitive conformity (see Figure 2 in Girotra *et al*. 2010). The second method is speedstorming, during which individuals ideate in pairs in a round-robin fashion. Participants interact and brainstorm one-on-one for a short period of time (i.e., a few minutes) before switching partners. In the domain of nanoscience, Joyce *et al*. (2010) found that speedstorming addresses the lack of depth in brainstorming. Indeed, the authors argued that participants of brainstorming often have highly diverse knowledge, which can "*lead to unfocused debate while the group moves from one topic to the next, exhausting the most obvious ideas in the categories they can explore together*" (p. 59, ibid). In contrast, speedstorming creates 'focused interaction', where participants can go quickly and deeply into one's interest areas. Furthermore, the face-to-face interactions in speedstorming permit to overpass the typical problem of productivity blocking (ie., participants of speedstorming wait less time for their turn to speak) or evaluation apprehension in brainstorming (ie., a meeting with one person generate less evaluation apprehension than meeting with several persons). As a consequence, speedstorming is said to eliminate distractions that are created by the presence of multiple goals and increases the engagement of participants.

Despite promising initial evidence, these two methods have never been examined in concert, and little is known about possible disparate and complementary effects. This study explores how ideas evolve during a community-based innovation contest that is organized under both methods. To achieve fine-grained comprehension of creativity undertaken during the France Global Service Jam, we examined two research questions: (1) are the ideas delivered at the conclusion of a community-based innovation contest (i.e., the final ideas) the most creative ones? and (2) are final ideas truly co-created by participants?

Our research is organized as follows. First, we summarize the current debate regarding the capacity of innovation contests to leverage creative ideas, including support for arguments that innovation contests may either stimulate, or inversely block, the development of creative ideas. Then, we introduce a case study methodology as applied to the France Global Service Jam. This study considers ideas to be the unit of analysis (Kijkuit & Van Den Ende, 2007; Perry-Smith & Mannucci, 2015). In doing so, the research protocol permits us to track the organizational "life" of ideas from emergence to either abandonment or selection. Finally, we present our findings, and discuss the managerial and theoretical implications for improving the generation, development, and selection of ideas during community-based innovation contests.

Are Final Ideas from Community-Based Innovation Contests Creative?

Since the early 1980s, a large amount of research has tried to identify individual, team, and organizational factors that influence creativity and innovation (see Anderson *et al*. (2014) for a State-of-the-Science Review). Specifically, this section reviews the main factors related to innovation contests. A review of the literature shows that innovation contests are characterized by factors that enable, but also, hinder creativity. As a consequence, little agreement exists in the literature regarding the capacity of community-based innovation contests to deliver creative ideas. To conclude this section, we report the reasons why hybrid and speedstorming methods might be relevant to community-based innovation contests.

Leveraging Creative Ideas Using Co-Creation

In parallel with traditional innovation contests, during which individual participants compete for prizes, community-based innovation contests have recently gained the interest of management scholars (Hutter *et al*. 2011; Bullinger *et al*. 2010). Based on the qualitative study of open innovation communities, Antikainen *et al*. (2010) found that monetary rewards are not always the best way to motivate participants. Participants of community-based innovation contests value being involved in community cooperation and feedback, or simply find the process to be entertaining (Füller *et al*. 2007). In the same vein, prior research reported that such participants are often intrinsically motivated due to the enhancement of esteem (reputation, feelings of pride) and self-actualization needs (Bullinger *et al*. 2010). This is especially true for participants with certain individual traits like extraversion and openness, who become highly engaged in an open innovation environment (Füller *et al*. 2008).

For ideation, one important aspect of a community-based innovation context is that it favors of co-creation (Enkel & Gassmann, 2009; Zwass, 2010). High levels of both autonomy and cooperation are assumed to increase participants' engagement and motivation to produce creative ideas (Garcia Martinez, 2015). The organizers of community-based innovation contests often pay great attention to establishing collaborative atmosphere

2. Rietzschel *et al*. (2006) found that nominal groups generate more original ideas than interactive groups do.

that would support collective intelligence and creativity (Ekvall, 1996). Some authors, such as Faraj *et al* (2010), have reported that reciprocity behaviors enable the co-creation of ideas in community-based innovation contests. When participants generate ideas cooperatively, they offer help to others with the hope of being helped later (Kathan *et al*., 2015). Participants join such contests because they provide an opportunity to collaborate with others, make ideas visible, and build on others' ideas (Füller *et al*., 2011). This cooperative behavior facilitates the combination of disparate ideas and knowledge toward the improvement of the overall quality of ideas (Gillier *et al*. 2010). By analyzing the ideas produced during an Ideation Jam in a Swedish multinational company, Di Vincenzo *et al*. (2014) found that the most valuable and novel ideas were those that participants commented on most often. According to the authors, comments and constructive feedback on generated ideas are critical to the success of community-based innovation jams. Their results also show that ideas generated early during a community-based innovation contest are more likely to survive and be selected at its conclusion; this finding that corroborates that final ideas from community-based innovation contests are those that participants spent the most time thinking about and working on. Di Fiore (2013) argues that final ideas are more creative when participants can choose which ideas they want to work on. To summarize, prior research has shown that community-based innovation contests encompass factors that significantly facilitate the co-creation of creative ideas.

Reasons Creative Ideas are Blocked During Community-Based Innovation Contests

On the contrary, some authors are skeptical about whether community-based innovation contests lead to more creative ideas. One reason for this is supported by research on social networks. In particular, the social proximity of team members (i.e., the strength of social ties) has been found to influence creativity (Burt 2004; Uzzi & Spiro 2005). Community-based innovation contests often comprise a diverse group of participants with weak a priori relationships. This specific social context, characterized by weak ties between individuals, has been found to foster creativity because diverse knowledge can be combined into novel and valuable ideas. Such loosely connected social systems provide unique perspectives that favor divergent thinking (Perry-Smith, 2006). Unfortunately, weak ties can have also negative consequences on creativity. In particular, the lack of prior relationships among participants may affect trust, which is essential to convergent thinking and idea implementation (Krackhardt, 1992; Uzzi & Spiro, 2005). Participants in community-based innovation contests are not necessarily part of the same organization and often do not know each other very well, thus it is difficult to identify ideas that reflect shared interests. Janzik and Raasch (2011) argue that the nature of ideas that are submitted during community-based innovation contests are frequently too personal and specific. As a consequence, participants often advance ideas that do not fit other participants' interests and competencies (Faraj *et al*., 2011). From this perspective, community-based innovation contests can also be viewed as places where a lot of creative ideas are abandoned or insufficiently developed.

Another reason that creative ideas might be blocked during community-based innovation contests relates to the implications of large-scale brainstorming. Despite the popularity of brainstorming (Osborn, 1953), much research on creative psychology suggests that difficulties may arise when generating creative ideas in large groups; individuals outperform groups of individuals in terms of both quantity and originality of ideas (Diehl & Stroebe, 1987; Mullen *et al*., 1991; Taylor, Berry, & Block, 1958). A frequent explanation is that ideas progressively converge as participants begin to copy one another's ideas (Kohn & Smith, 2011; Nijstad *et al*., 2002). This cognitive bias has been defined as the fixation effect (Jansson *et al*. 1991). Social loafing and productivity loss are other problematic factors commonly found in brainstorming studies (Gallupe *et al*., 1992; Taylor *et al*., 1958). Further, Dubois *et al*. (2014) found that co-design workshops often fail to produce creative ideas because participants lack creativity-relevant skills and design competences.

A final reason concerns the difficulties that participants experience when selecting ideas (Riedl *et al*., 2010). The literature suggests that individuals are often risk-averse and suffer from selection biases; they favor the selection of conventional, feasible ideas over original ones (Blair & Mumford, 2007; Mueller *et al*., 2012; Rietzschel *et al*., 2010). For instance, Criscuolo *et al*. (2017) found that individuals are more likely to select and fund R&D projects with intermediate levels of novelty. In a crowdsourcing context, Piezunka and Dahlander (2014) demonstrated that individuals are more likely to pay attention to familiar ideas than unfamilar ones. Other authors have argued that individuals tend to select their own ideas because they overvalue their novelty (Berg, 2016; Nikander *et al*., 2014).

Thus, to summarize, prior research have also shown that community-based innovation contests encompass factors that significantly hamper the co-creation of creative ideas.

Preliminary Results on The Hybrid Method and Speedstorming

In order to improve the ideation process, two interesting methods have been developed. The hybrid method, proposed by Girotra *et al*. (2010), is structured into two phases. Participants begin by generating ideas individually, and then cooperate later. The authors presented their method as such: "*In the hybrid structure, a group first works independently with no interaction of any kind and with each individual potentially accessing different knowledge and navigating the problem-solving challenge in different ways. The hybrid structure includes a second phase in which the individuals work together to share their findings from the individual phase and to perform additional exploration together*" (ibid. p. 595). Using an empirical design experiment, the authors compare creative outcomes produced by the hybrid and brainstorming methods (i.e., participants working together in teams throughout the process), and find that the best ideas are generated by the hybrid method. The hybrid method is found to generate "about three times as many ideas per unit of time, and that these ideas are of significantly higher quality on average" (Girotra *et al*., 2010, p. 602). The success of the hybrid method is explained by the fact the hybrid method is found to overcome common obstacles encountered in brainstorming such as free riding, evaluation apprehension, production blocking, and group cognitive conformity (Mullen *et al*. 1991).

Speedstorming, as developed by Joyce *et al.* (2010), is presented as such: "*First, people are divided into pairs. The pairs can be matched based on certain characteristics (e.g., with each participant from a different discipline or department), or assigned at random, depending on the aims of the session. Pairs are given a focused topic of conversation, with the aim of generating ideas to pursue collaboratively by the end of each 3–5 minute round. At the end of the round, the pair finalizes their idea on paper, separately rates their impressions of their partner, and then moves on to their next interaction. By the end of the event, each person has generated ideas with several others, and in so doing was able to form initial assessments of each partnership's potential for productive and creative collaboration*" (ibid. p.58). In employing speedstorming methods, the authors found that although speedstorming and brainstorming produce ideas at about the same level of specificity, speedstorming produces ideas that are more specialized and technical. Results also suggest that speedstorming participants are more certain in their assessments of the collaborative potential of others. The authors argue that in comparison to brainstorming participants, speedstorming participants are more focused, engaged, and attentive during discussions. Like the hybrid method, speedstorming reduces social loafing and free-riding, which occur commonly during brainstorming. More specifically, Joyce *et al.* (2010) found that speedstorming eliminates distractions based on the presence of several goals, and increases both the depth of brainstorming and the engagement of participants.

In the next section, we present our case study of France Global Service Jam, during which two methods were used. We also present a research protocol that tracks the movement of ideas from emergence to selection or abandonment.

Research Method: Tracking the "Life" Of Ideas

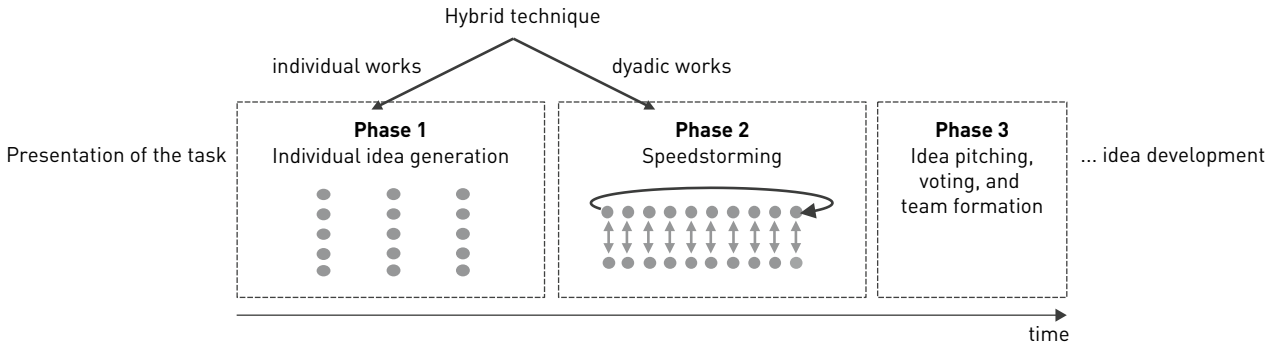
We employed a qualitative case study method to answer our research questions (Yin, 1990). A case study is an appropriate research method for achieving granular exploration in a defined context. Our case was the 2014 France Global Service Jam. This community-based innovation contest, which has occurred annually since 2011, allows participants to develop new services that are inspired by a shared theme. All participants are invited to use creative design-based methods to generate novel ideas for services. In the spirit of cooperation and friendly competition, participants then form small teams to develop some ideas further. The goal is for participants to present their creative ideas after 48 hours have elapsed. Thirty-eight participants were involved in the 2014 France Global Service Jam, and a total of five teams developed a project over one weekend. The following section presents the setting of the contest, including data collection and analysis.

France Global Service Jam

The organization of the France Global Service Jam is fully described in Appendix A. The aim of France's 2014 Global Service Jam was not to solve one precise problem but rather to generate creative ideas. Based on their awareness of the advantages of the hybrid method and speedstorming over brainstorming (see section 2.3), the organizers decide to employ these two methods for the event. The event was open to anyone who wanted to create new services (e.g., B2B, B2C, etc.). Participants did not receive any monetary awards for their efforts. The theme was not revealed until the beginning of the event, when it was streamed through a 15-minute video at the end of an introduction session. In 2014, the theme represented a cardboard box.

The first hour was dedicated to the presentation and reception of participants, and then during the first phase, participants were invited to generate ideas individually for 30 minutes. Each participant shared one idea of his/her choice with another participant, who also shared one idea. Pairs were created randomly for the first round of idea-sharing, and then the pairs changed every five minutes across seven rounds, following a regular order (i.e., 19 participants stayed at a table, and the other 19 moved to the next table at each round so that no participant met the same partner twice). After seven rounds, each participant was invited to pitch one idea. Thirty ideas were pitched, of which the participants chose five. During this phase, participants voted for the idea that they thought was most attractive. Based on Di Fiore's (2013) recommendation, participants joined the team of their choice. During the event, the participants were both free to generate as many ideas as they want and to select the ideas of their choice. Finally, participants freely joined one of 5 teams to develop a project further and submit it to the Global Service Jam website.

FIGURE 1
Organizational structure of the "France Global Service Jam."



Motivation and Characteristics of the Participants

To obtain more information on the participants, each was asked to complete a survey at the beginning of the contest. This study involved 38 participants (i.e., 20 men and 18 women), and the average age was 33.5 years. Twenty-four were professionals and 12 were students. Participants specialized in several fields: 50% marketing, 28% industrial design, 11% engineering design, and 11% computer science. Seventy-five percent reported that they knew fewer than five people at the event, 8% reported knowing more than 20, and 7% did not know anyone before the event. Participants indicated their own experiences with brainstorming, and their expectations regarding the outcome of the event. Assessment was conducted using a 5-point, Likert-type scale. On average, participants reported that they had rarely been involved in brainstorming sessions (mean=1.9), and they had only a vague expectation concerning the outcome of the contest (mean=2.33). Participants reported five different motivations for joining the France Global Service Jam, including (1) developing new ideas for services, (2) co-creating and sharing experiences, (3) having fun, (4) meeting new people and increasing their social networks, and (5) learning how innovation jams work.

Data Collection

We tracked the organizational "life" of ideas from the moment participants were informed about the task until they selected ideas and formed small teams. We collected ideas written individually by participants during the individual idea-generation phase (hereafter, "stock of initial ideas," Phase 1). After each of the seven speedstorming rounds, participants wrote down the ideas that they had shared with peers. All ideas discussed during each speedstorming round were collected, along with the names of their authors (Phase 2). We also collected the same information on the ideas that were pitched. Finally, we identified the five final ideas that were selected by each team, and the list of the team members involved (Phase 3). All data were entered into tables, including, for each participant, their stock of initial ideas, what ideas they shared during each round and with whom, the idea that they pitched, and the small teams they decided to join (Appendix B).

Data Analysis

This section presents the data analysis method. Degree of idea creativeness was assessed based on Guilford's Alternative Uses Task (1967). Four metrics are used: fluency, originality, elaboration, and flexibility. In addition to its popularity, this metric was chosen because the context of France Global Service Jam is similar to the context of Guilford's research. Indeed, the context was also to generate alternative uses of a common object (i.e., a cardboard box, see section 3.1.).

Idea Identification

The first part of our analysis consisted of tracking the paths of the ideas from emergence until either abandonment or selection by the small teams. Ideas entered in the table were associated with the names of their authors, and all ideas were numbered. We then compared the sentences round-by-round with the stock of initial ideas from each participant to identify whether the idea was newly created (i.e., new sentences), a modification of existing ideas (i.e., modification of some parts of sentences), or a repetition of an existing idea (i.e., the same sentence). Thus, this method allowed us to identify when ideas emerged, and which and when ideas were repeated and/or modified. New and modified ideas were compared to ideas shared by peers to identify whether the change was due to an interaction with another participant during speedstorming. We considered that an interaction occurred when ideas were modified after collaboration between two participants. We also considered the existence of interaction when participants expressed someone else's idea (either identical or modified) during a subsequent round. If an idea expressed by its owner remained unchanged, no interaction was recorded. For example, after a meeting, if participant P_1 modified his/her idea, and P_2 expressed the same modified idea, we considered that participant P_2 influenced P_1 but that P_1 did not influence P_2. Analyses of the organizational "life" of the ideas were conducted by two of the authors to achieve precise identification. Appendix C provides an example of the journey of one idea.

Categorization of Ideas

The second part of our analysis was similar to the method used by Kohn and Smith (2011). It consisted of categorizing ideas using two steps: generating representative categories and assigning ideas into those categories. During the first step, we decomposed ideas and pitches into keywords, and matched words with related meanings. We labeled groups of keywords using broader concepts to which they referred. This process was conducted using vacillating propositions and discussions among authors, who created as many categories as possible, while ensuring that the categories were as different as possible from each other. During the second step, two of the authors independently assigned ideas produced during the phases of the contest into one of the 15 categories identified. Each expression of an idea was assigned to the category that was closest to what was proposed. This could not be done concomitantly with the first step because ideas might have included keywords from disparate categories. The number of ideas per category varied from 1 (i.e., online game) to 23 (i.e., smart city). On average, each category contained 9 ideas. Interrater reliability was acceptable (Cronbach's alpha coefficient=0.75). For ideas not placed in the same categories, the sorters discussed the issue until consensus was achieved. Fifty-seven ideas were excluded from analysis because of poor descriptions, and 20 were categorized as "other" because they did not belong to any of the 15 categories.

Creativity Measures: Originality, Fluency, Elaboration, and Flexibility

Originality was measured in relation to the distribution of all ideas submitted. We calculated the degree of originality for each category by counting the number of ideas included in that category—the more ideas included in a category, the less original the category. The creation of categories for measuring the originality of ideas was adapted from Kohn and Smith (2011). In our research, we slightly modified the formula used by the authors. To achieve more precise originality scores for each idea, we created subcategories based on the proximity of ideas within the same category. Finally, we measured originality as the inverse of the number of ideas expressed within the same categories (and sub-categories), with the following formula:

$$\text{Originality}_i = \frac{1}{N_C + \frac{N_{SC}}{N_C}}$$

Where, Originality$_i$ is the originality of idea i, N_C is the number of ideas in the category of idea *i* from the initial stock of ideas, and N_{SC} is the number of ideas in the sub-category of idea *i* from the initial stock of ideas. We included only ideas in the stock in the calculation, though the formula applies to all ideas at each step of the process since an idea repeated many times does not make it less original. All categories appeared at least once in the initial stock.

Fluency was calculated as the number of ideas (e.g., number of ideas per participant, number of ideas per phase, etc.).

Elaboration concerns the number of details contained in an idea. The number of characters for each idea was used to measure elaboration (Riedl *et al*., 2013) (ie. nb words without spaces and punctuation). In the case of abbreviations, a full word was counted.

Flexibility measured the number of times an idea changed categories during Phase 1, and the different rounds of Phases 2 and 3. Tracking these changes for each idea allowed us to know how much the descriptions of the ideas varied during the event.

Interactions among Participants and EI Index

To track degree of collaboration during speedstorming meetings, we considered whether interactions occurred between participants (Section 3.4.1). Meetings with interactions were recorded when a participant modified or repeated another participant's idea during a subsequent speedstorming round. During meetings without interactions, two participants spoke without modifying or repeating an idea. Finally, we adapted the External-Internal (EI) index developed by Krackhardt and Stern (1988) for each of the final teams. The EI index the difference between the number of external interactions (i.e., interactions among participants joining various teams) and the number of internal interactions (i.e., interactions among participants joining the same teams), divided by the total number of interactions, while accounting for limited possibilities of meetings:

$$EI_{Index} = \frac{\frac{e}{te} - \frac{i}{ti}}{\frac{e}{te} + \frac{i}{ti}} \quad (1)$$

Where, *e* is the number of interactions with participants not on the same team, *i* is the number of interactions with people on the same team, *te* is the number of contacts that occured during the seven rounds with people not on their future teams, and *ti* is the number of contacts with people on their future teams. Consequently, an EI index of 1 represented teams comprised of members who did not interact with each other during speedstorming. An index of -1 represented teams comprised of members who interacted among each other during all speedstorming rounds.

Presentation and Interpretation of Results

Abundance of Ideas with Individual Ideation

Results suggest that participants generated a large number of ideas, most of which were proposed during the individual ideation phase (Table 1). One hundred sixty ideas were generated during Phase 1, whereas only 4 new ideas emerged during speedstorming, and none during the pitching phase. During individual ideation, nearly 4 ideas per participant were proposed, on average (min=1 idea/participant; max=6 ideas/participant).

TABLE 1
Ideas in Circulation during the Innovation jam

	Individual idea generation	Speed-storming	Ideas pitched	Ideas selected
Number of new ideas generated	160	4	0	0
Number total of ideas in circulation	160	60	15	5

A reduction in the number of ideas over time may be explained by the fact that the participants progressively shifted from divergent to convergent thinking. Further, a large number of ideas being produced during individual ideation has been previously observed (Rietzschel *et al*. 2010). However, the extremely low number of ideas produced during speedstorming is somewhat surprising. Contrary to Girotra *et al*. (2010), who showed that the first phase of individual ideation increases the number of ideas generated in groups later, our results were different with speedstorming. Generally speaking, participants become committed to ideas that they think of first (Purcell & Gero, 1996), but they do not generate new ideas during speedstorming. One explanation is that contrary to working in groups, speedstorming does not provoke conceptual conflicts among participants. During speedstorming, participants are not forced to alter their ideas to reach collective agreement. Our data show that when individual ideation is followed by speedstorming, participants continue to favor their own ideas and perspectives. Another explanation is the tight deadline of the event. Faced with producing services after the contest, participants might have favored convergence toward fewer ideas during the early stages of the process.

Containment of the Most Original Ideas

The data suggest that the most original ideas were generated during individual ideation, but they did not appear during subsequent phases (Table 2); most participants never presented their most original ideas. Regarding the top original ideas expressed during the entire contest, 8 of 10 were generated during individual ideation. Considering the top 50 most original ideas, 44% were from the initial stock. Regarding flexibility, 59 ideas were expressed at least twice during speedstorming and 25 of 59 ideas changed during the contest. Overall, results suggest that the most original ideas were generated during individual ideation (Phase 1), and the ideas that circulated during speedstorming were of low originality and variety.

The fact that participants did not reveal their most original ideas is intriguing. This observation contradicts the expressed motivations of participants, to develop new ideas for services, co-create, and share experiences during the contest. Several hypotheses might explain these results. One is that participants were unable to identify their most original ideas. Such evaluation biases have been reported in cognitive and psychology literature

(Blair & Mumford, 2007; Mueller *et al*., 2012; Rietzschel *et al*., 2010). Another possibility is related to cognitive bias, as in Stasser (1999), who demonstrates that people working in groups spend more time speaking about information that all members are familiar with, rather than discussing unfamiliar information. The fear of being judged by other participants when expressing novel and non-consensual ideas associates with this bias. A final explanation is that participants did not perceive a high sense of community or did not trust each other. Lack of prior relationships supports this explanation.

Using Speedstorming for Elaborating Ideas

Table 3 shows the average number of characters of ideas per phase; the greater the number of characters, the more elaborated the idea. Data suggest that ideas developed progressively during each phase and during each round of speedstorming. The average length of ideas was 67 characters before speedstorming began (Round 1, Phase 2), and 114 characters at the end of the speedstorming (Round 7, Phase 2). The standard deviation also increased, which indicates that not all participants modified their ideas during speedstorming. Many participants formulated the same idea during all rounds. Specifically, individuals primarily used speedstorming to elaborate their own ideas, but rarely adopted ideas from others. Only 25% of ideas presented were adopted and used by other participants. Each participant focused on his/her own ideas, without building on others'. On average, ideas pitched at the end (Phase 3) were shorter than those presented at the end of speedstorming (Round 7, Phase 2).

One interpretation is that the continuous formulation of ideas enabled participants to clarify their thinking and incorporate new elements progressively. For poorly elaborated ideas, it is difficult to discern whether the nature of the idea or the participant is responsible. We suggest that speedstorming can be employed in two ways. Speedstorming can be employed using a design approach, changing and improving ideas iteratively based on feedback. In this case, the description of an idea evolves with adjustments from key information (e.g., customer segments, technical details, value propositions, etc.). Another way is to employ speedstorming like a marketplace approach, where ideas are 'sold' to interlocutors. In this case, the objective is not to improve ideas but find partners with whom to work during the latter stages of the event. Since ideas pitched at the end (Phase 3) were shorter than ideas presented at the end of speedstorming (Round 7, Phase 2), our interpretation is that participants selected the most important features of their ideas to communicate efficiently and clearly during the pitch.

Idea Selection: Final Ideas are Neither Co-Created Nor the Most Original

Results suggest that the final ideas selected, developed, and delivered at the conclusion of France's 2014 Global Service Jam were not created collaboratively. The five final ideas were not

TABLE 2
Originality Score of the Ideas during the Contest

Originality	Ideas generated in initial stock (phase 1)	Ideas generated during speedstorming (phase 2)	Ideas pitched but not selected (phase 3)	Ideas pitched and selected for development (phase 3)
Very original (%)	9%	5%	0%	0%
Original (%)	0%	0%	0%	0%
Medium (%)	14%	23%	36%	80%
Not original (%)	77%	72%	64%	20%

Note a: Threshold in originality score: very original>0.7; original [0.4;0.7]; medium [0.1;0.4]; not original <0.1.
Note b: these results are only descriptive – no quantitative analysis and statistical tests have been performed.
Note c: For example, an idea that had been written down during speedstorming concerned "creation of a night club in the shape of a cube." The idea received a low originality score because it belonged to the "smart city/home" category, which contained a large number of ideas. In comparison, the idea "a user-friendly website for exchanging ancient and disappearing know-how" had a higher originality score. This idea belonged to the category "Social network/knowledge sharing", which contained fewer ideas.

TABLE 3
Average number of characters and standard deviations per idea during each phase

		Average number of characters of all ideas	Standard deviation
Ideas generated in initial stock (Phase 1)		52	28
Ideas generated during speedstorming (phase 2)	Round 1	67	35
	Round 2	77	42
	Round 3	90	44
	Round 4	98	53
	Round 5	104	54
	Round 6	108	61
	Round 7	114	67
Ideas pitched (Phase 3)		96	68

discussed or shared greatly during speedstorming, and were not the most commented on and debated during speedstorming (Figure 2). Figure 2 shows that the categories of ideas, which were selected for development, obtained fewer comments than other categories. Creators of the five final ideas elaborated on their ideas progressively, but the other participants did not adopt and use the five final ideas during speedstorming. Final ideas were of medium originality in comparison to all ideas submitted during the contest (Table 2). If speedstorming did not serve to co-create original ideas, the EI index demonstrates that individuals presented ideas during pairwise meetings to find partners with whom to collaborate. Results suggest that participants joined teams with members with whom they had interacted most during speedstorming. Of the five final teams, four had a negative EI index during speedstorming (average EI index=-0.2), suggesting that participants interacted much more with their future teammates (see Appendix D).

Discussion and Future Research

Answering the Research Questions

Although community-based innovation contests have become increasingly popular over the last decade, little is known regarding the ideation process involved in this context. This study explores the generation, development, and selection of ideas at a granular level, contributing to a controversial debate in the literature concerning the performance of innovation jams in leveraging collaboration and creative ideas. We asked, "Are the ideas delivered at the conclusion of a community-based innovation contest (i.e., the final ideas) the most creative ones?" Among all ideas generated during the contest, results suggest that final ideas were not the most creative; they had a moderate originality score. The most original ideas emerged during individual ideation at the beginning of the contest, and these ideas were not revealed or transmitted to other participants subsequently. The most original ideas remained invisible to the remainder of the idea-contest community. We also asked, "Are final ideas truly co-created by participants?" Results suggest that final ideas originated from individual ideation rather than true co-creation. Participants commented and collaborated on ideas that were not selected at the conclusion of the contest, and final ideas were not propagated and transmitted among participants.

Theoretical and Methodological Contributions

The results of this research can be divided in three main areas of contribution. First, our review of literature shows that there is a controversial debate in the literature regarding the creativeness of ideas obtained in community-based innovation contests (see section 2). Although this study is limited to a single case study, our findings show that the creative performance of community-based innovation contests should be carefully examined. Our research confirms prior findings regarding the high level of participants' intrinsic motivation (Bullinger *et al.*, 2010). However, our data also shows that the ideas developed in this community-based innovation contest were neither co-created nor very creative. This finding nuances prior literature that may overemphasize the co-creation process (Enkel & Gassmann, 2009; Zwass, 2010). The limited prior relationships and relatively weak design skills of participants seemed to hamper the elaboration of creative ideas. Furthermore, this research confirms the positive influence of weak ties in idea generation (Perry-Smith, 2006). We show that this community-based innovation contest leverages a large number of ideas and triggers initial collaboration. Finally, this study confirms the difficulties of participants to identify and select the more innovative ideas (Riedl *et al.*, 2010; Piezunka & Dahlander, 2014).

Second, this study provides an original research protocol that permitted us to track and follow the evolution of ideas during ideation sessions. We believe this research method may serve as a base for opening the black box of ideation to elucidate how ideas emerge and evolve in different contexts. While most studies in brainstorming consider ideas only as outputs (i.e., by measuring the quality and quantity of submitted ideas), this research proposes a research protocol to track and analyze the life of ideas at a finer-grain level. For instance, this research method enables researchers to identify to what extent an idea is modified over time and by whom. In particular, this research method echoes ad hoc research methods developed to investigate creative thinking in design literature (Goldschmidt, 2014). In a way, this similarity, in terms of research methods, helps bring management and business closer to the design literature. The repertoire of exploratory skills and methods derived from the design field has been recognized as beneficial for business practitioners and education

FIGURE 2
Categories of ideas: number of comments and selection

	Unselected categories	Selected categories
High number of comments	Learning/education Social network/knowledge sharing Feelings, emotions, and health Leisure/hobbies Smart city/home Company performance	Recycling/environment
Low number of comments	Online game Charity/solidarity	Local public project - citizenship Electronic device Youth employment

(Glen *et al*. 2014; Van Aken, 2005). We hope that this research method will facilitate collaboration and knowledge exchange between these two disciplines.

The third contribution concerns the creative tools and techniques that facilitate the communication and exchange of ideas among participants (Adamczyk *et al*. 2012). Extant research suggests that gathering participants is insufficient for producing innovative ideas; there is a need to experiment with new techniques. This study examines the performance of two methods—speedstorming and hybrid methods. Concerning speedstorming, results only partially support results obtained by Joyce *et al*. (2010). Like Joyce *et al*., we found that individuals use speedstorming to test and initiate collaboration, and one advantage of this technique is facilitating group formation. Using this technique, participants can progressively identify partners with whom they share similar interests. Formation of a group is an important step during innovation contests because it is directly associated with participants' satisfaction and motivation. Contrarily, we found that speedstorming enabled participants to elaborate on, or test the potential of, previous ideas better, but did not find that this technique supports the co-creation of original ideas. In contrast to Joyce *et al*. (2010), who study a nanotechnology context, current participants had lower expertise. This difference of knowledge might explain the difficulties that novice participants experienced while combining their ideas during meetings.

Regarding the hybrid method, results corroborate extant research that highlights the importance of individual ideation. Research on the hybrid method demonstrates the advantages of first generating ideas alone and then exploring multiple perspectives and novel combinations of ideas in groups. Contrary to Girotra *et al*. (2010), who study the influence of initial individual ideation on brainstorming, results differed when speedstorming followed individual ideation. The number and originality of ideas did not increase during speedstorming. Participants were committed to the ideas they thought of first during individual ideation (Purcell & Gero, 1996). One explanation is that contrary to group interactions, speedstorming does not provoke conceptual conflicts among participants. During speedstorming, participants are not forced to alter ideas to reach collective agreement; decision-making remains individual, but more research is needed to validate this explanation.

Managerial Implications

Community-based innovation contests are increasingly used by firms, universities (Bullinger *et al*., 2010; Smith *et al*., 2003), and government agencies (Armisen *et al*., 2015). The characteristics of such contests have strong repercussions on factors that enable creativity. Since participation is not usually rewarded monetarily, intrinsic motivation to participate is higher than during traditional innovation contests, offering an advantage of this context. This study suggests that co-creating is insufficient; organizers must facilitate participants' creativity. Participants in a community-based innovation contest are often not experts in a field (Dubois *et al*., 2014). Thus, one recommendation is to start a contest with seminars, where experts are invited to communicate knowledge and technical skills in a domain relevant to the contest. The initial stages of knowledge-sharing have been emphasized in recent methodologies such as Knowledge-Concepts-Proposals (KCP) (Hooge *et al*., 2016). We found that individual ideation enables participants to create original ideas, and that speedstorming enables participants to elaborate on their own ideas. Consequently, one recommendation is to alternate several individual ideation and speedstorming sessions so participants can continuously generate novel ideas with individual ideation and elaborate on them comprehensively during speedstorming. As participant relationships prior to the event were sparse, we found that participants did not reveal their most original ideas to other participants. One recommendation is to modify the protocol of speedstorming. Ideas discussed during speedstorming should be selected by a panel of experts, not participants. Asking participants to produce ideas collaboratively at the conclusion of each round would also encourage idea-sharing. Speedstorming enables participants to identify partners to form teams. Participants joined a team because of their interest in working with specific members, rather than on an idea. Thus, one recommendation is to form teams initially according to participants' wishes, and then choose which ideas the teams will develop.

Limitations and Future Research

This study examines protocols used to track the lives of ideas. Although we asked participants to write down their ideas systematically, some ideas might not have been collected because participants did not wish to disclose them, or perhaps they produced them absent-mindedly. As is common during case studies, more research is required to generalize results to other creative contexts. Lack of prior relationships, the absence of monetary rewards, or the absence of a specific need identification phase, might explain why co-creation was weak. The findings are based on only one case study; future research should compare innovation contests undertaken in both a virtual /physical environment and in both non-profit/for-profit organizations (Barczak *et al*., 2006). The literature should also identify the best order for implementing individual ideation, speedstorming, and group tasks. It remains difficult to understand the reasons why participants did not share original ideas during the contest, though lack of trust and prior relationships might explain this phenomenon. Future qualitative studies based on interviews may reveal the nuances of individual behaviors during community-based innovation contests. Other research gaps concern how both ideas and social networks can be designed interdependently (Perry-Smith & Mannucci, 2015). The lives of ideas might differ drastically in other contexts, such as propagation of scientific ideas in open science. Several studies examine propagation of new scientific ideas in academic fields (Bettencourt *et al*., 2008; Goffman, 1966), which is modeled like the spread of diseases and viruses. In comparison to the high number of s-shaped diffusion models, few theoretical models consider how ideas evolve during their diffusion. Research is needed to predict which ideas are the most likely to be propagated during ideation. Models that consider the diffusion of successive generations of technology (Islam & Meade, 1997), or the epidemiological models of viruses with mutations (Kermack & McKendrick, 1927), offer interesting directions for future ideation research.

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APPENDIX A
Overview of France Global Service Jam (based on Adamczyk *et al*. 2012)

Organizer	Non-profit organization	Global Service Jam is a non-profit and worldwide organization dedicated to the creation of new services (www. planet.globalservicejam.org)
Attraction	Announcement	The innovation jam has been announced in Orléans and online.
Media	Mixed (offline/online)	The Global Service Jam platform provided the task and collected the deliverables. The data analyzed in this research is off-line (same location at Orléans, France).
Task	Open Task	The task given to the participants was very large. The participants were asked to create new services around 'cardboard boxes'. No technologies, needs or markets were favored.
Facilitation	Low	Organizers were only time-keepers.
Degree of Elaboration	Moderate	Ideas were mainly described with PPT slides, sketches and short videos
Target / Eligibility	Unspecified	All individuals were welcomed (students, professionals, academics…).
Contest Period	2 days	France Global Service Jam lasted two days. Global Service Jam replicates such innovation jams annually.
Reward	No-reward	No monetary rewards were given.
Community functionality	Basic	Very basic tools were given to the participants (rooms, papers, pencils…)
Evaluation	Peer review	Participants of the France Global Service Jam evaluate and select the ideas that they wanted to develop.

APPENDIX B
Ideas and Participants

Participant Number	Gender	Team	# of ideas in the initial stock	# of ideas in the initial stock revealed	# of interactions*	Does the participant express more than one idea?	Does the participant generate one the final ideas?
1	M	Team 1	3	1	2	No	Yes
2	F	Team 2	6	0	4	Yes	No
3	F	Team 3	5	1	0	No	No
4	M	Team 4	4	4	3	Yes	No
5	F	N/A**	3	1	2	No	No
6	F	Team 5	3	1	6	No	No
7	F	Team 2	3	2	3	Yes	No
8	M	Team 2	5	1	3	No	No
9	M	Team 3	6	1	2	No	No
10	F	Team 1	6	1	1	Yes	No
11	M	Team 4	2	1	2	No	No
12	M	Team 3	4	1	2	No	No
13	F	Team 4	3	2	3	No	No
14	M	Team 1	4	2	1	No	No
15	M	Team 5	5	1	3	Yes	No
16	M	Team 3	6	2	5	Yes	No
17	M	Team 2	4	2	1	Yes	No
18	F	Team 3	3	2	4	Yes	Yes
19	F	Team 5	3	2	3	Yes	No
20	F	N/A	6	1	1	No	No
21	F	Team 4	6	2	4	Yes	No
22	F	Team 1	4	1	1	No	No
23	F	Team 5	6	1	3	No	No
24	M	Team 1	6	1	7	No	No
25	F	N/A	5	2	2	Yes	Yes
26	F	Team 2	6	2	1	Yes	Yes
27	M	Team 5	4	2	3	Yes	No
28	M	Team 3	2	1	2	No	No
29	M	Team 4	5	4	2	Yes	Yes
30	M	Team 2	4	1	2	Yes	No
31	M	N/A	4	1	1	Yes	No
32	M	N/A	3	2	2	Yes	No
33	F	Team 4	5	1	2	No	No
34	F	Team 5	6	1	2	No	No
35	F	N/A	5	3	2	Yes	No
36	M	Team 2	2	1	1	No	No
37	M	Team 2	1	1	2	No	No
38	M	N/A	2	1	0	No	No

* This measure reflects the number of times where the participant modified or repeated one others' ideas.
** N/A refers to the participants who left the innovation jam before the team formation.

APPENDIX C
Example of the organizational "life" of One Idea

Participant Number	29		
Idea Number	1		
Individual idea generation	Initial description: "3D game to create strong social link"		
	Idea expressed by participants 29		
Speedstorming	Idea repeated	Idea modified	Idea received by participant 29*
Round #1 (with part. #11)	-	-	-
Round #2 (with part. #12)	3D game to create strong social links	-	Improving the autonomy of elders and **disabled people**
Round #3 (with part. #13)	-	3D game to create strong social links with **disabled people**	-
Round #4 (with part. #14)	3D game to create strong social links with **disabled people**	-	-
Round #5 (with part. #15)	3D game to create strong social links with **disabled people**	-	**Exchanging information** on a map during building construction
Round #6 (with part. #16)	-	3D game to exchange information and create strong social links with **disabled people**	-
Round #7 (with part. #17)	3D game to **exchange information** and create strong social links with **disabled people**	-	-
Idea pitching	"3D game to **exchange information** and create strong social links with **disabled people**"		
Team Formation	Team 4 chooses the idea		

Note: For clarity, this table includes only ideas that induced modifications for the studied idea.

APPENDIX D

Interactions per team (inside and outside)

	Team 1	Team 2	Team 3	Team 4	Team 5	N/A**	Inside team	Outside team
Team 1	6	4	0	3	4	5	6	16
Team 2	4	10	3	5	9	2	10	23
Team 3	0	3	6	6	2	2	6	13
Team 4	3	5	6	8	1	3	8	18
Team 5	4	9	2	1	6	6	6	22
N/A**	5	2	2	3	6	2	2	18

Meeting per team (inside and outside)

	Team 1	Team 2	Team 3	Team 4	Team 5	N/A**	Inside team	Outside team
Team 1	6	4	5	6	6	8	6	29
Team 2	4	18	8	8	9	9	18	38
Team 3	5	8	8	8	6	7	8	34
Team 4	6	8	8	10	3	7	10	32
Team 5	6	9	6	3	10	8	10	32
N/A**	8	9	7	7	8	10	10	39

** N/A refers to the participants who left the innovation jam before the team formation.

Example of EI_{index} calculation: $EI_{team1} = \frac{\frac{e}{te} - \frac{i}{ti}}{\frac{e}{te} + \frac{i}{ti}} = \frac{\frac{16}{29} - \frac{6}{6}}{\frac{16}{29} + \frac{6}{6}} = -.29$