

Idea Generation and Survival in an Organizational Innovation Jam

Abstract

This paper aims to contribute to both innovation management theory and ideation practice in firms, by empirically analyzing what factors influence the "life" of an idea within organizations. As the empirical base for our study, we utilize data from a 48-hour IT-based creative session called "*Ideation Jam*" within a Swedish multinational company. During this session ideas were created, developed, and selected by a large number of employees, something which can be regarded as a live experiment emulating what normally occurs in organizations, though in a much more compressed timeframe. The empirical observations allow us to see how ideas generated by the employees within the organization arise, evolve, and die or are selected over time. In addition, we explore how this process of selection and survival of an idea is influenced by the social networks that are generated around it. The findings indicate that the amount of comments (activity) generated around an idea, and its insertion in the early stages into the "*Jam*" (time lag), increase the likelihood that it will eventually be considered a novel and valuable idea, and thus is selected for further development and possible realization. In addition, by employing a core-periphery analysis, we find that the social structure in which the idea is embedded has important implications for its survival. Theoretical and managerial implications that can be drawn from our findings, as well as limitations of our study and directions for future research are discussed.

Keywords: Idea, survival, organization theory, embeddedness, IT-based.

1. INTRODUCTION

Organizations are increasingly concerned with innovation, and in order to create new and profitable businesses, services, products, and processes, or improve already existing ones, a rich flow of ideas stands out as a critical prerequisite. Creativity, in terms of the ability to create knowledge that is both new, i.e., original or unexpected, and useful, i.e., appropriate for the user (Amabile, 1996) is increasingly seen as critical source of sustainable competitive advantage of organizations. It is well known from previous research that the most important source of innovation ideas in companies is their employees (Terwiesch & Ulrich, 2009). The use of different suggestion schemes has for a very long time been an important way for organizations to leverage this innovation potential, by tapping into the joint creativity of employees. However, at present we witness many leading firms abandoning well-known mechanisms for handling ideas such as suggestion boxes and instead move on to use web tools that stimulate and facilitate the generation, development and selection of new innovation ideas from customers and employees located all around the world. Organizations such as LG Electronics, IBM, Microsoft, and Volvo use these web or IT-based solutions to generate ideas that can be used in their innovation activities. As an example of this, IBM has since 2001 been using Innovation jams - focused online brainstorming and collaboration sessions held around a specific topic designed to spark innovation (Bjelland & Wood, 2008).

With the introduction of new IT-based systems for idea generation and management radically new ideation approaches emerge that allow individuals and groups to engage in collective creative efforts, despite geographical and cognitive distances (Sandström & Björk, 2010). These IT-systems of course only constitute an infrastructure, or platform, for efficient and effective generation and development of ideas, as these always start out in the heads of individuals.

However, they do also bring about new possibilities to facilitate and influence employees' creative efforts. By running idea campaigns, competitions, or jams, firms can direct the contributing individuals' attention and innovation efforts towards strategically important areas of their businesses, or to critical aspects of their offerings. Furthermore, the use of these IT-based solutions opens up ample opportunities for more collaborative ideation work. As pointed out in the literature on creativity and innovation management, innovation is to a large extent the result of social interaction and communication (Leonard & Sensiper, 1998), and the increased connectivity provided by IT-supported ideation systems renders it possible to interact and communicate with more individuals, also geographically distant ones, e.g. by giving and receiving comments on ideas.

Alongside the introduction of more proactive and collective IT-supported ways of working with ideation, a radically different idea landscape emerges (Sandström & Björk, 2010). As it becomes easier to suggest an innovation idea, one can expect the mere number of ideas made explicit to increase substantially, in particular if there is active encouragement from management to propose new ideas. Whereas this normally is desired by organizations, this also means that more ideas are competing for a limited set of resources. Secondly, the possibility to see and comment on others' ideas actually changes the entire ideation process, as it does not only include merely the moment of idea creation, but also the subsequent commenting, adding of information, and refinement of them, in the end resulting in a more extended and collective process. Thirdly, more individuals are given the possibility to actively contribute to the organizations' stock of ideas, as geographical and cognitive distances are bridged. In particular, the opportunities for individuals at the peripheries of organizations are substantially improved, and these individuals may also have more incentives to contribute with their ideas and comments, as this is a good opportunity

for them to gain exposure in other parts of the organization.

Taken together, these changes to the ideation process hold an interesting potential for improving ideation performance in organizations. However, it is also clear that this new way of generating and developing ideas brings about fundamental changes to management. In order to exploit the potential of these new ideation approaches, more knowledge is needed about the phenomenon of IT-enabled ideation. This study aims to contribute to this knowledge, by investigating what influences the survival of ideas in these systems, from their genesis to their selection as ideas that are given resources for further development and realization into innovations. Drawing on a broad base of existing theories, influencing factors are derived and tested empirically with data from a multi-national firm using a collective, IT-enabled approach to ideation.

From the study emerges that elevated activity levels, in terms of commenting, are positively correlated with idea survival. It is also seen that ideas generated early on in the ideation process are more likely to survive, indicating a preemption effect when ideas compete against each other for resources. Finally, the empirical observations show that ideas arriving from the organization's peripheries are more likely to survive than the ones stemming from more centrally located sources.

The structure of the paper is as follows. First a theoretical exposition is presented. As this study is a clear example of phenomenon-based research (Von Krogh et al., 2012), there is not yet a specific literature stream constituting a consistent and coherent theoretical base. Therefore, we draw upon a range of different theories, each of which can inform us about specific aspects of the phenomenon of collective, IT-enabled ideation, and allow us to formulate testable hypotheses. Thereafter, the research setting and the methods used are described, followed by results and

analysis. Finally, the findings of the study are discussed and implications for theory and practice are presented and discussed.

2. THEORETICAL BACKGROUND

The main literature on idea generation in groups derives from the brainstorming paradigm (Osborn, 1957). In this paradigm, group members are encouraged to generate as many ideas as possible without concern for quality, as they come to mind, and without criticizing or evaluating ideas as they are presented. In addition, people are encouraged to build on the ideas of others. In the literature there has since long been disagreement about the usefulness and effectiveness of such paradigm compared to idea generation in isolation. On the one hand, in fact, groups using these rules lose productivity because they are afraid of being negatively evaluated, and for the occurrence of events such as social loafing or free-riding, because the participants do not feel accountable or feel that their efforts are not needed by the group (for a detailed review of this topic, see Paulus and Yang (2000). These negative effects on ideation productivity, by means of social or downward comparison processes, may also become normative and be maintained throughout the group session or in subsequent sessions (Paulus & Dzindolet, 1993).

On the other hand, some recent approaches have emphasized the positive aspects of brainstorming sessions. Cognitive theory (Paulus, 2000) suggests that sharing of ideas in groups stimulate additional association of ideas. People that have developed along different paths and in different environments interpret, understand, and evaluate the world differently (Cohen & Levinthal, 1990). High levels of cognitive distance (Nooteboom, 1999) between individuals may create difficulties to build the shared understanding needed to successfully integrate disparate chunks of information, but reducing this cognitive distance could lead to an improvement of the

mutual understanding and promote the generation of new knowledge and useful ideas (Dahlin et al., 2005). As argued by Paulus et al. (2000), idea sharing should be the source of significant stimulation, where ideas from others should lead to novel associations or prime related concepts. The creation of new knowledge emerges as the result of a process of distributed cognition in which specialized workers, each of whom deals with a part of an overall problem, interact to create the patterns of sense making that lead to question and revise routines and create new processes (Boland & Tenkasi, 1995).

Several procedural techniques have been developed to overcome the above limitations, to support idea generation in a way that enhances sense making and mutual understanding and to demonstrate potential benefit that may result from the exchange of ideas. Among these, IT-based systems for idea generation and management represent interesting solutions which so far are largely unexplored (Adamides & Karacapilidis, 2006; Sandström & Björk, 2010). In this study, we explore how ideas generated and discussed by employees within the organization through the use of IT-based systems arise, evolve, and eventually die or are selected over time. Drawing on complementary literature streams that can inform the phenomenon of idea survival, we see that the process of selection of an idea is arguably influenced by three distinct factors, namely attention, social networks and time-span. We will now turn to each of these aspects, leading to the formulation of hypotheses.

3. DEVELOPMENT OF HYPOTHESES

Literature assumes that more attractive ideas are those who have a fit with organizational strategy and with activities carried out on a daily basis by people inside the firm (McAdam, 2004). As suggested by Amabile (1988) in her study on idea generation, teams must share and

discuss their goals, consistent with an appreciation of the organization's strategy. Shifted at the individual level of analysis, Guimares and Langley (1994) found that the most important factor in fostering idea generation is that new ideas are consistent with the company's goal. The fact that the idea is consistent and coherent with objectives that people have to achieve daily facilitates the understanding of the idea and more in general the formation of sensemaking, in turn producing a higher attention around the idea. Consequently, there are several arguments for why ideas that are closely linked to employees' tasks and organizations' strategies and activities would gain more attention from the employees in question, and also be more likely to be regarded as relevant and valuable. Such a view also ought to imply that these ideas receive more comments and feedback than ideas to which employees feel more distant, and given that they are perceived as valuable also will be selected for further development and realization more often than more unrelated and disconnected ideas.

Another aspect related to activity levels in ideation is the possible creation of a fruitful interactive setting, in which ideas and comments are exchanged in a mutually reinforcing manner. The dynamics at play here can look in different ways. An excellent idea could on the one hand trigger a storm of comments supporting it. On the other hand, the dynamics could also be triggered by insightful comments and feedback. Even with an idea of more modest initial novelty and value, intense activity could be sparked by useful comments that make it possible to develop the idea into something more novel and/or valuable. These dynamics have so far not been explicitly investigated, but we can find support for such a view in the literature on creativity and innovation management. The notion that innovation is a social process supported by the communication and interaction between individuals is a view that over time has gained more attention, as seen in e.g. the work of Leonard and Sensiper (1998). Given this, a more interactive

group of contributors is likely to further the generation of good ideas.

Also Nonaka (1994) has highlighted that intense interaction furthers knowledge creation, of which ideation can be regarded a subset. He points out that individual knowledge needs to be put in a social context in order to be amplified, and that this requires the creation of a field or space in which different ideas and perspectives are articulated, thereby leading to new insights (Nonaka, 1994). This notion of a creative field or space has later been refined in terms of the concept of “ba” (Nonaka & Konno, 1998). “Ba” is simply put a space for emerging relationships in which the formation and emergence of new knowledge is encouraged and facilitated. This space can be physical (e.g. office, dispersed business space), virtual (e.g. e-mail, IT systems), mental (e.g. shared experiences, ideas, ideals) or any combination of them. Hence, a virtual space for self-organized interaction in terms of proposing ideas, adding information, and commenting on ideas could be a fruitful setting for generating good ideas for innovation, and the attention and energy reflected in activity levels around an idea would thus be an indication of its quality, and thus also its probability for selection. Taken together, the different aspects of ideation activity levels and its inter-relationship with ideas selection mechanisms lead us to our first hypothesis.

HP1: The higher the activity generated around an idea, the more likely it is that this idea will be selected for further development and possible realization.

The unit of analysis of our second hypothesis is the social network generated around an idea, which can be defined as the people that discuss that idea. Ideation has been defined as a process where creative people frame problems and select, integrate, and augment information to create understanding and answers (Tece, 2001). Prior studies have mainly focused on elements of the network structures (Burt, 2004; Perry-Smith, 2006) and the network content (Kijkuit & van den

Ende, 2007) that create the conditions for the generation of useful ideas. Less explored is, instead, the issue of how social networks can facilitate the acceptance of the ideas generated by employees at work (Kijkuit & van den Ende, 2010; Björk et al., 2011). In line with the latter line of research, we look at the social structure of the attention generated around an idea, and more specifically on how this can bring benefits to the acceptance of the idea and its transformation in an R&D project.

The basic idea of social network analysis is that an individual's development of a creative frame of reference does not take place in social isolation. Instead, it is shaped by interactions with others who are engaged directly or indirectly in similar endeavors. Focusing on creativity as a process, rather than as an outcome, and moving from the individual level to the organizational level, we can assume that creativity involves not only individual engagement but also the emerging structuration of who engages and when they engage (Weick, 1995). In particular, when the level of interdependence is high, a collective mind can emerge and, with it, a communal view of what makes sense. Especially during ideation jam sessions, individuals and groups participate in creative processes in an iterative fashion. Individuals develop ideas, present them to the group, learn from the group, work out issues in solitude, and then return to the group to further modify and enhance their ideas. But what kind of structures around an idea favours its selection?

Moreover, what features should the actors commenting on the ideas have?

Social network techniques are, in general, useful tools to describe the social structure that surrounds the ideation process within organizations. Two-mode matrices, in which the rows correspond to employees contributing to the generation process and the columns to a different class of entities - namely ideas, have been shown to be well suited for the description of the structures that idea jam sessions create within organizations (e.g. Björk et al. 2011). Figure 1

provides an illustrative example of the two-mode network we studied in the present research.

Figure 1 about here

Although quite complex, this structure indicates that ideas have a different network location into the jam, which is in turn jointly given by the number of comments that an idea receives, as well as by the individual employees contributing to them. Proximity in the network indicates the extent to which two ideas are connected directly and indirectly through mutual commentors. Ideas placed at the center of the network are more involved in the complex structure of comments provided by individual employees.

The overall social structure that comments produce within the jam may have important implication for the ideation process. As stated above, the activity surrounding each idea, through comments provided on it by interested employees, has in general positive effects for idea success. However, the novelty and innovation that an idea may release is also likely affected by the overall cognitive structure that the structure of comments unfolds within the jam. People may be more engaged in the innovation process providing comments on two or more ideas. In this situation, employees start sharing their interest, attention and subsequent contribution toward different ideas. Given the limited amount of time available for the jam, employees' contributions to each idea likely decrease as far as the number of ideas to which they contribute increases. In addition, common contributors create indirect relationships between ideas within the jam. Such a

degree of interconnectedness between ideas increases either as they have a higher number of shared contributors and/or their common commentors start commenting on other ideas.

The interconnectedness of ideas in the jam likely creates an *overlap* in the cognitive structure, and generates the risk of over-embeddedness (Uzzi, 1997). Over-embeddedness in general refers to the distortive effects that strong and closer relationships may create increasing –rather than decreasing- the competition between social actors. As the number of common contributors for ideas increases and/or the number of other ideas commented on by a given contributor increases, ideas in the jam start striving for a most vital –but limited– resource available in this context, namely employees’ attention and creative contribution. This ecological perspective creates the condition to hypothesize that as the degree of overlap between ideas increases there will be a limited number of ideas which will be able to benefit from cognitive resources that individual employees are able to channel into the jam. Recalling what was said earlier, we can also assume that the degree of overlap is higher for ideas located at the center of the network. For ideas that are in the “periphery”, instead, the risk of competition is much lower because they are less densely connected with the rest of the network, showing a limited number of third parties in common with other ideas. On the basis of these arguments, we advance the following research hypothesis:

HP2: The belonging of an idea to the periphery of the two-mode “employee-idea” network increases the likelihood that this idea will be selected for further development and possible realization.

Finally, we note that much of the creativity literature has ignored the dimension of time. This is likely the result of a tendency of researchers to define creativity as an outcome, rather than a

process (Drazin et al., 1999). This definition leads researchers toward static models that emphasize explaining variance in the dependent variable (creative outcomes), rather than examining how the dynamic process of creativity unfolds over time (Mohr, 1982).

Creativity can also be defined as a group-level process. The complex, creative projects taken on by large organizations require the concerted engagement of many individuals, rather than just one or a few. By the means of idea jams, individuals and groups participate in creative processes in an iterative fashion. Individuals develop ideas and then “present” them to the group, with the aim to receive feedback, learn from the group, and then return to the group to further modify and enhance their ideas. This iterative, interactive nature of group creativity requires that individuals first choose to engage in individual-level creativity.

In this paper we theorize that the collective forms of creativity and quality of ideas are likely affected by the temporal distribution of idea generation in idea jams. Time is indeed of quintessential importance to explain patterns of competition as well as variation in attention dynamics that organizational members can give to novel ideas generated.

Ideas which appear earlier in the jam are likely to receive more comments from other members of the organization. Because ideas are more likely to benefit from opinions and feedbacks of colleagues to the extent to which more comments are received, their chances to survive and pass through the selection process internal to the organization increase when the ideas appear early in the session. The competitive process which the temporal nature of the jam likely unfolds also seems important. As time elapses, the number of ideas increases and these cumulate in the jam. *Ceteris paribus*, this reduces and modifies the “structure” of attention that individual employees give to ideas. This seems to be a matter of quality rather than of quantity. Indeed, although we

cannot exclude that the contribution of interesting individuals persist, as ideas and comments cumulate in the session, the time and information for individuals to fruitfully contribute to ideas likely decrease. In addition, psychological studies inform us about “recency effect”, according to which people tend to begin recalling and to recall better those “object” which are at “end of the list” (Baddeley, 1986; Bjork & Whitten, 1974). As new ideas are created and incorporated into the idea jam, the structure of the overall attention that the organizational community address towards ideas changes. First, the attention of individuals spread amongst a higher number of ideas. Moreover, a selective attention arises because people start to shift their interest toward the more recent ideas entered into the jam. This overall reduces the contributions and efforts that single ideas receive from individual employees’ thoughts, reflections and feedback. Finally, we cannot exclude that some heuristics apply in the selection process of ideas. Managers who are called to assess single ideas may be more favorable towards ideas which appear first in the session. In the eyes of managers, a careful and long incubation process might underlay ideas which appear earlier into the jam. Or, they might choose early ideas simply because of the high number of comments received. In light of the above discussion, we hypothesize that:

HP3: The longer the elapsed time between the beginning of the idea jam and the emergence of an idea, the lower the likelihood of that idea’s survival in the organization.

Taken together, we focus on the social and time-related aspects of ideation and investigate the role of three types of factors: (i) activity, which refers to the number of comments each idea received by others individuals; (ii) embeddedness, which refers to the social structure that was generated around the idea once this has been inserted; (iii) time lag, which refers to the stage when, in terms of timing, the idea has been inserted in the jam.

4. RESEARCH METODOLOGY

4.1 Research setting and data collection

A business unit within a large global company based in Sweden has been selected in order to test the stated hypotheses. The selected business unit is a research-focused unit which centers on innovation and through that support the other business areas and business units of the global company. One such activity is to run idea jams, which is a 48-hour IT-based creative session in which employees are invited to contribute with ideas and comments on ideas during the set time frame. The idea jam is preceded by a period of marketing initiatives in which the employees through e-mail get links to web pages on the intranet with inspiration and stimulation within the specific area of the idea jams. These inspiration sessions can for example present a specific type of customer and the need that they have today that are not fulfilled, or present a more general need in terms of e.g. new ideas that contribute to a better environment. The employees are invited to participate during the 48-hour idea jam session. During the jam, employees can contribute with both ideas and comments and when the jam is over ideas are selected to move further to innovation projects or not.

For this study, one specific jam was selected. The selected idea jam focused on five different areas and was active during 48 hours. During this session, ideas were created and developed by a large number of employees, something which can be regarded as a live experiment emulating what normally occurs in organizations, though in a much more compressed timeframe and IT-supported. This also meant that employees all over the world could contribute.

Real data on all ideas, comments and contributing employees during this idea jam have been extracted from the company's internal data system. In addition to this data, three interviews have

been performed with two persons responsible for the idea jam in order to get an understanding of how the jam was carried out and how the evaluation and selection processes were performed. In addition, the researchers have continuous interaction with the selected company and thereby have had many opportunities to ask clarifying questions of how the idea jam has been carried out.

Each of the five different areas had a number of moderators to help coaching the idea jam. The moderators of each area were also in charge of specifying a top ten list of the most promising ideas and in the cases they needed, they could also use experts who worked specifically with the different areas. Thereafter, the final evaluation of all the selected ideas from each area was done with the experts of innovation within the research unit focused on innovation. Some of the ideas were finally grouped together as they were regarded as similar and/or complemented each other in an innovation project.

4.2 Variables and measures

Dependent variable. The dependent variable was the ideas that were selected to move further into innovation projects, hence taking a value of 1 if the idea had been selected to move further or 0 if it was not selected.

Independent variables. Three main explanatory variables have been used in this paper. The first, termed *Comments*, is measured considering the total number of comments received by each idea inserted in the jam. This measure seems particularly suitable to capture the overall attention that the idea has created around itself and the amount of energy and activity it has generated. The second variable, named *Embeddedness*, represents the position of a given idea in the overall social structure of the comments it has generated around itself. By using the social network

analysis software package UCINET VI (Borgatti et al., 2002), we computed the core-periphery measure. By computing a network's core-periphery measure, one attempts to determine which nodes are part of a densely connected core and which are part of a sparsely connected periphery (Borgatti & Everett, 1999). The network, to put it in another way, consists of just one group to which all actors belong to a greater or lesser extent (Scott, 1991). For interested readers, a detailed description of core-periphery algorithm for two mode network may be found in Everett and Borgatti (2005). This variable assumes the value of 1 for ideas belonging to the core and 2 for the ones that instead belong to the periphery of the two-mode network. The third main variable of theoretical interest is *Time lag* (since beginning of jam), which is measured as the (natural log of) time in minutes elapsing between the moment the ideas entered the jam and the beginning of the jam session.

Control variables. We created several control variables featuring other characteristics in order to capture other factors that potentially explain the selection of ideas. (1) *Gender*. A first control relates to the gender of ideators, which takes on 1 for male, and 0 for female. (2) *Manager*. Holding a managerial position in the organization implies the possibility to direct and receive comments, as well as to influence indirectly the likelihood of the idea to be selected. A dummy variable, considering whether the ideator has a managerial position, takes on 1 for managers, and 0 otherwise. (3) *Invited*. Since only the employees of five business areas were invited to the idea jam, but employees from different areas could also participate, we included a dummy variable that takes on 1 for employees invited, and 0 otherwise. (4) *Competition*. We controlled for the competition that potentially exists between ideators and employees commenting each generated ideas. In this case, we do not want to capture the competition amongst ideas, but we rather control for the possibility that the beneficial effects of employees' comments and feedback

provided were somewhat influenced negatively because of the competition between ideators and their colleagues. The Euclidean Distance was computed for each couple of individuals involved in the jam, taking into consideration their attributive characteristics (role, business area, gender). This measure was then multiplied by -1 so that the higher this measure, the higher the degree of competition. (5) *Area*. Location-specific factors as well as membership in a specific business area may also affect idea selection. This variable has been operationalized as a categorical variable that assigned individuals who generated ideas to their reference business area. We used five binary variables (one of which, Area 1, was adopted as baseline category in our statistical analysis) to identify whether each ideator was employed into one of the five areas involved in the jam. (6) *Author's activity*. This variable counts the number of comments posted by each individual who entered ideas into the jam in order to control for the activity generated by ideators. (7) *Time lag (since previous idea)*. Finally, we controlled for the time (expressed in minutes) that elapsed between the creation of a given idea and the moment in which the previous idea was inserted into the jam. We included this control to consider the possibility that patterns of comments were simply affected by the time elapsing between consequent ideas.

5. ANALYSIS AND RESULTS

Overall we investigated 351 ideas which were created and then commented upon in the idea jam in the organization. Out of all ideas, only 30 ideas survived and went through the internal assessment process. Selected ideas received a total of 121 comments, i.e. on average 4 comments per idea. The number of comments for not selected ideas was 966, which means 3 comments per idea on average.

Table 1 provides a preliminary description of the ideas selected and not selected, as well as the total and average number of comments, making distinction of the different organizational areas to which ideas pertain and come from.

Table 1 about here

This initial inspection indicate that the highest number of ideas come from the area “New Business” (#106), which is also the area in which a higher number of ideas survived and passed through (#9). The highest number of comments relate - again - to the area “New Business” (#287), the highest number of comments were received from ideas pertaining to the area “Uptime” (#3.37). The area less involved in the idea jam is “Emerging Markets”, for which only 42 ideas were created in the jam session.

As anticipated, one of main the contributions of the present analysis is the temporal dynamics of ideas and comments in the idea jam. Table 2 illustrates the overall distribution over the 48-hour timeframe of all ideas created, distinguishing between those selected and those that did not survive.

Table 2 about here

As Table 2 shows, ideas are uniformly distributed along the jam session. We witness however a decreasing number of ideas selected as time elapses from the beginning of the session. Almost one third of all ideas selected are concentrated in the first quintile of the jam session. This is also supported by the graph in Figure 2, which shows the pattern of the number of proposed and selected ideas over time during the 48 hours.

Figure 2 about here

As for contributors, 224 employees participated to the idea jam by commenting at least once on the ideas. The graphs that represent, over time, the patterns of the number of comments are reported in Figure 3. The number of comments posted in the Jam seems to follow a pattern in “waves”, with the most interesting peaks, respectively, achieved shortly after the start (8 hour), between the twenty-fourth and 32 hours, and in the last hours of the life of the Ideation Jam session. Out of the all contributors, only 81 were formally invited to the jam, whereas 143 participated voluntarily to the ideation process. Furthermore we see that 124 employees held a managerial position, and 100 were professionals.

Figure 3 about here

Table 3 presents the results of our regression analysis. Given the dichotomous nature of the dependent variable, a logistic regression technique was used in our analysis. We adopted a step-wise approach in model building. The first model, which only incorporates control variables, is here considered a model against which all subsequent models are evaluated. Models 2, 3 and 4 incorporate the different independent variables of theoretical interest, and are important to test our research hypotheses. Model 4, in particular, is a model with the full set of predictor variables¹.

Table 3 about here

Results shown in Table 3 document that among all control variables included, two are significant. The first is “Gender”, which seems interesting because it indicates the presence of a gender effect in ideation within the organization we have surveyed. Ideas coming from male employees are more likely to be selected and to survive in the internal assessment and selection process. It is also interesting to notice that there are two areas in which ideas are less likely to

¹ Mean VIF was 1.55. Correlation analyses are not displayed in the text. A number of additional statistical analyses are available from the authors upon request.

survive. Ideas related to Areas 3 and 4 are less likely to be selected than those coming from Area 1, which represents the baseline in our analyses.

Model 2 documents that the variable “Comments” is positively and significantly related to the dependent variable ($\beta = 0.186$; $p < 0.01$), indicating that the higher the number of comments received by a given idea, the more likely it will be selected for further evaluation in the organization. Recalling our first hypothesis, which stated that the higher the activity generated around an idea, the more likely it is that this idea will be selected for further development and possible realization, this result provides evidence that the attention and energy reflected in activity levels around an idea is likely to improve its quality, and thus its probability for selection. Overall, this confirms our research hypothesis.

Model 3 incorporates and adds to Model 2 our second variable of theoretical interest, namely “Embeddedness”. In our second hypothesis we proposed that the belonging of an idea to the periphery of the two-mode “employee-idea” network increases the likelihood that this idea will be selected for further development and possible realization. Being part of the periphery reduces the risk for an idea to overlap with other ideas, thus alleviating internal competition for employees’ attention, interest and their feedbacks. The parameter of this variable is positive and significant ($\beta = 0.843$; $p < 0.05$) indicating that the social context in which ideas are produced indeed matters. Specifically, this result demonstrates that those ideas that lie in the periphery of the overall ideation social context within the organization are more likely to survive the internal selection assessment. Overall, these findings confirm our second research hypothesis.

In the third hypothesis we proposed that the longer the elapsed time between the beginning of the idea jam and the emergence of an idea, the lower the likelihood of that idea’s survival in the

organization. Model 4 in Table 1 incorporates the variable “Time lag (since jam beginning)”, and shows that the parameter is negatively and significantly associated to idea survival ($\beta = -0.279$; $p < 0.05$). This finding indicates that ideas promptly inserted into the idea jam were more likely to survive, and hence pass through in the organizational selection process. Ideas which firstly enter in the jam are carefully evaluated and commented. As time passes, ideas accumulate into the jam, and this generates competition amongst ideas. Patterns of attention and feedbacks towards ideas change in this situation because employees start contributing to more ideas at the same time. In addition, the latest ideas included in the jam are likely to attract the attention of contributors, who have less cognitive resources to dedicate to all interesting ideas that cumulate into the jam. This overall confirms our third hypothesis.

All control variables we discussed still maintain their significance in all regression models. We finally remark that the comparison of Model 4 against a baseline Model (only intercept) shows that the inclusion of variables regarding the research hypotheses overall improves the goodness-of-fit of the entire model ($LR_{\text{Baseline}} = -101.560$; $LR_{\text{Model4}} = -86.179$).

6. DISCUSSION

6.1 Scientific contribution

Innovation management theory informs us that good ideas come from the good “stock” and that the social structure in which innovation is produced is of quintessential importance for its success. In this context, organizations are taking the challenge to foster ideation and innovation within their boundaries implementing new systems aimed at fostering the internal creative and innovation potential. Having good ideas is important. However also comments and constructive feedbacks on generated ideas are important because of the necessity to give priority to a those

limited opportunities on which organizations have the possibility to develop further. The present study has explored for the first time the dynamics of comments and feedback generated with a 48-hour IT-based mediated jam, which was created to increase interaction and communication among organizational members. We explored the patterns of comments surrounding all ideas generated, then deriving a social structure representing relations between employee and commented ideas. We assumed that the attention, interest and subsequent contribution that employees provide are fundamental resources for which ideas strive and compete. The observed social structure was important to predict some characteristics which encompassed the cognitive dynamics, which in turn influenced the likelihood of idea success in the organization.

Our findings expand prior theories concerning IT-based ideation jam. First, our results show that the jam creates participation even beyond the planned boundaries. People start to participate and to engage into discussion around ideas even whether they were not invited to participate. We also show that complex interconnections emerge in idea jam sessions whenever employees provide comments on generated ideas. Extant research has viewed this kind of network as a clear signal of collaboration and integration among people and their knowledge. In the present study, we theorize that indirect competition arises between ideas when they share common third individuals who start commenting two or more somewhat related ideas. Ideas connectedness -or overlap- overall affects their chance to be selected and go through the internal innovation process. An additional contribution is provided by our investigation of the dynamics of ideation process in the jam session. The structure and dynamics of cognition within the jam are thus extremely important for idea survival.

Although our study is focused on ideas, our results may also contribute to the more general stream of innovation management. Prior research has widely demonstrated that the social

network structure is important for a number of innovation outcomes. Networks of individuals both within and between organizations is of quintessential importance in this vein. However, our study documented that the cognitive structure which two-mode, “individual x idea”, networks are similarly important. This kind of networks enable the understanding of the innovative performance from a different angle, taking into consideration the contribution that ideas (or even products or patents) receive from employees – individually and as a collective. This may help to capture the actual benefits that all individuals provide to the process leading to innovation, including indirect contributions provided through specific comments or feedbacks from people other than the ideator. Others may help the ideator to overcome problems he/she is not able to solve alone. In other words, whereas some tangible outcomes are easily attributable to certain individuals, ideas and the entire ideation process underlies complex cognitive dynamics which IT-mediated jams contribute to generate and reinforce. Innovation and ideation are mainly social processes. This study provides additional evidence about the emergence and evolution of these processes within organizations.

6.2 Managerial and practice implications

Our results have important managerial and practice ideator-level implications. First, this study provides the organizational actors involved in the idea jam some strategies to increase the likelihood that their ideas will be selected. Posting the idea in the initial stage of the jam, attracting a large number of comments, especially if they come from heterogeneous and non-redundant commentors, have important implications for its survival and further development and realization. Second, our results provide insights for ideation practice within firms. Ideation jam represents an online brainstorming session, and even with participants from different locations of the company around the world, the jam should be managed to take advantage of many of the

strengths of traditional brainstorming sessions where people could raise their ideas freely. Because of its online format, however the jam could also present many of the peculiar difficulties common to large brainstorming sessions such as, for example, many ideas completely impractical to organization's businesses. In addition, given the limited time available, conversations could be more difficult than in traditional sessions, with a great loss of time on the part of the ideators to respond to comments of any kind. Overall, with this study, we have thrown light on these dynamics to make sure that, in future, the jam could be designed in the most effective and efficient manner possible. We believe that it's important, particularly for an organization trying to adopt lessons from the jam, to think of these changes as part of the purposely built iterative process of the jam and of innovation itself. Exactly how far these changes and the idea jam can drive organizations and how thoroughly it can put underexploited technologies to use is just beginning to be seen.

6.3 Limitations and direction for future research

Our findings should be interpreted in light of some important limitations, each indicating clear directions for future research. First, our research only considers an ideation jam performed for a limited time of 48 hours. Future studies may include a timespan of several days to produce more robust results. Second, we are aware of the several peculiarities that characterize our sample. Despite some problems of generalizability, however, we believe that the issues addressed remains of general interest and relevance for innovation and ideation management studies. Third, we analyzed only five business areas whose work is strongly focused on research and development. Organizations have different subunits that are characterized by different goals, objectives, outputs, and standards. Future studies are encouraged to explore whether our results are robust by moving in other contexts, and to analyze idea jams involving all employees

belonging to the investigated organizations. In this way they will overcome the idiosyncrasies that may have influenced our results. Finally, despite we included a number of control variables, controlling for other factors may better help to disentangle and to better understand the factors underlying the selection of ideas. For example, could be used variables that take into account how ideators share ideas with people (i.e. customers or stakeholders) outside the organization.

7. References

- Adamides, E.D., & Karacapilidis, N. 2006. Information technology support for the knowledge and social processes of innovation management. *Technovation*, 26: 50-59.
- Amabile, T. 1988. How to kill creativity. *Harvard Business Review*, 76: 77-89.
- Amabile, T. 1996. *Creativity in context*. New York: West-view Press.
- Baddeley, A.D. 1986. *Working Memory*. Oxford: Oxford University Press.
- Bjelland, O.M., & Wood, R.C. 2008. An inside view of IBM's "Innovation Jam". *MIT Sloan Management Review*, 50: 32-40.
- Bjork, R.A., & Whitten, W.B. 1974. Recency-sensitive retrieval process. *Cognitive Psychology*, 6: 173-189.
- Björk, J., Di Vincenzo, F., Magnusson, M., & Mascia, D. 2011. The impact of social capital on ideation. *Industry and Innovation*, 18: 631-647.
- Boland, R.J., & Tenkasi, R.V. 1995. Perspective making and perspective taking in communities of knowing. *Organization Science*, 6: 350-372.
- Borgatti, S.P., & Everett, M.G. 1999. Models of Core/Periphery Structures. *Social Networks*, 21: 375-395.
- Borgatti, S.P., Everett, M.G., & Freeman, L.C. 2002. *Ucinet for Windows: Software for Social Network Analysis*. Harvard: Analytic Technologies.
- Burt, R.S. 2004. Structural holes and good ideas. *American Journal of Sociology*, 110: 349-399.
- Cohen, M.D., & Levinthal, D.A. 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35: 128-152.
- Dahlin, K.B., Weingart, L.R., & Hinds, P.J. 2005. Team diversity and information use. *Academy of Management Journal*, 48: 1107-1023.

- Drazin, R., Glynn, M., & Kazanjian, R. 1999. Multilevel theorizing about creativity in organizations: a sensemaking perspective. *Academy of Management Review*, 24: 215-286.
- Everett, M., and Borgatti S.P. 2005. Extending Centrality. In P.J. Carrington, J. Scott, & S. Wasserman (Eds.), *Models and Methods in Social Network Analysis* (pp. 57-76). Cambridge: Cambridge University Press.
- Grant, R. 1996. Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organization Science*, 7: 375-387.
- Guimares, T., & Langley, K. 1994. Developing innovation benchmarks: an empirical study. *Benchmarking for Quality Management and Technology*, 1: 1351-30-36.
- Katila, R., & Ahuja, G. 2002. Something old, something new: A longitudinal study of search behavior and new product introduction. *Academy of Management Journal*, 45: 1183-1194.
- Kijkuit, B., & Van den Ende, J. 2010. With a little help from our colleagues: A longitudinal study of social networks for innovation. *Organization Studies*, 31: 451-479.
- Kijkuit, B., & Van den Ende, J. 2007. The organizational life of an idea: integrating social network, creativity and decision-making perspectives. *Journal of Management Studies*, 44: 863-882.
- Leonard, D., & Sensiper, S. 1998. The role of tacit knowledge in group innovation. *California Management Review*, 40: 112-32.
- McAdam, R. 2004. Knowledge creation and idea generation: a critical quality perspective. *Technovation*, 24: 697-705.
- Mohr, L. 1982. *Explaining organizational behaviour*. San Francisco, Jossey-Bass.
- Nonaka, I., & Konno, N. 1998. The concept of “Ba”: building a foundation for knowledge creation. *California Management Review*, 40: 40-54.

- Nonaka, I. 1994. A dynamic theory of organizational knowledge creation. *Organization Science*, 5: 14-37.
- Nooteboom, B., Vanhaverbeke, W., Duysters, G., Gilsing, V. & van den Oord, A. 2007. Optimal cognitive distance and absorptive capacity. *Research Policy*, 36: 1016-34.
- Osborn, A.F. 1957. *Applied imagination*. New York, Scribner's.
- Paulus, P.B., & Dzindolet, M.T. 1993. Social influence processes in group brainstorming. *Journal of Personality and Social Psychology*, 64: 575-586.
- Paulus, P.B., & Yang, H-C. 2000. Idea generation in groups: A basis for creativity in organizations. *Organizational Behaviour and Human Decision Processes*, 82: 76-87.
- Paulus, P.B., Larey, T.S., & Dzindolet, M.T. (2000). Creativity in groups and teams. In Turner, M. (Eds), *Groups at work: Advances in theory and research*, pp. 319-338. Hillsdale, N.J.: Hampton.
- Paulus, P.B. 2000. Groups, teams and creativity: The creative potential of idea generating groups. *Applied Psychology: An International Review*, 49: 237-262.
- Perry-Smith, J.E. 2006. Social yet creative: the role of social relationships in facilitating individual creativity. *Academy of Management Journal*, 49: 85-101.
- Rosenkopf, L., & Nerkar, A. 2001. Beyond local search: Boundary-spanning, exploration, and impact in the optical disc industry. *Strategic Management Journal*, 22: 287-306.
- Sandstrom, C., & Bjork, J. 2010. Idea management systems for a changing innovation landscape. *International Journal of Product Development*, 11: 310-324.
- Scott, J. 1991. *Social Network Analysis: A Handbook*. Sage Publications, London.
- Stuart, T., & Podolny, J. 1996. Local search and the evolution of technological capabilities. *Strategic Management Journal*, 17: 21-38.

- Terwiesch, C., & Ulrich, K.T. 2009. *Innovation Tournaments: Creating and Selecting Exceptional Opportunities*. Harvard Business Press, Boston.
- Uzzi, B. 1997. Social structure and competition in interfirm networks: the paradox of embeddedness, *Administrative Science Quarterly*, 42: 35-67.
- Von Krogh, G., Haefliger, S., Spaeth, S., & Wallin, M.W. 2012. Carrots and rainbows: Motivation and social practice in open source software development. *MIS Quarterly*, 36: 1127-1145.
- Weick, K.E. 1995. *Sensemaking in organizations*. Thousand Oaks, CA: Sage.

Table 1 – Organizational Areas, # of Ideas and # of Comments in the idea jam

Areas	# ideas	Not selected	Selected	# comments	Average # of Comments
Area 1	42	36	6	134	3.1905
Area 2	76	68	8	247	3.2500
Area 3	63	60	3	203	3.2222
Area 4	106	97	9	287	2.7075
Area 5	64	60	4	216	3.3750
Total	351	321	30	1087	3.0969

Table 2 – Temporal distribution of ideas in the idea jam

Quintiles (temporal)	Not selected	%	Selected	%	Total	%
(early) 1	60	18.69	11	36.67	71	20.23
2	64	19.94	7	23.33	71	20.23
3	63	19.63	6	20.00	69	19.66
4	65	20.25	5	16.67	70	19.94
(late) 5	69	21.50	1	3.33	70	19.94
Total	321	100	30	100	351	100

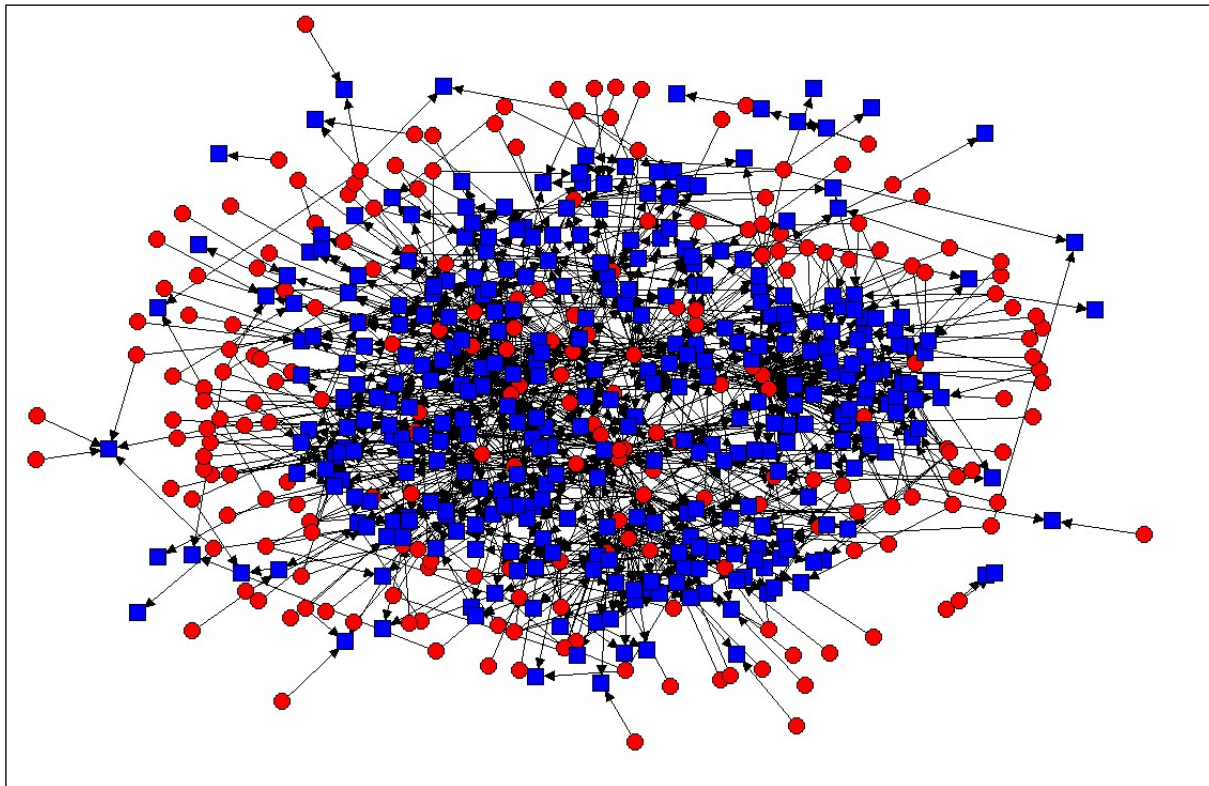
Table 3 – Logistic regression modeling the likelihood of ideal survival

	Model 1	Model 2	Model 3	Model 4
Variables	Coefficient (S.E.)	Coefficient (S.E.)	Coefficient (S.E.)	Coefficient (S.E.)
Interpect	-5.158*** (1.743)	-5.524*** (1.665)	-6.902*** (1.898)	-4.578*** (1.782)
Gender	-1.650** (0.744)	-1.682** (0.663)	-1.625* (0.643)	-1.535** (0.646)
Manager	0.393 (0.284)	0.430 (0.321)	0.469 (0.353)	0.415 (0.374)
Invited	0.664 (0.573)	0.571 (0.570)	0.649 (0.610)	0.644 (0.611)
Competition	1.818 (2.117)	1.655 (2.053)	1.940 (2.178)	1.526 (2.136)
Author's activity (n° comments)	-0.035 (0.307)	-0.397 (0.352)	-0.442 (0.364)	-0.423 (0.342)
Area 1 (omitted)	-	-	-	-
Area 2	-0.551 (0.507)	-0.530 (0.494)	-0.617 (0.460)	-0.700 (0.526)
Area 3	-1.558*** (0.353)	-1.835*** (0.438)	-2.113*** (0.344)	-1.942*** (0.340)
Area 4	-0.800*** (0.407)	-0.691* (0.362)	-0.880** (0.402)	-0.791* (0.407)
Area 5	-1.274 (0.936)	-1.269 (0.890)	-1.403 (0.992)	-1.457 (1.014)
Time lag (since previous idea)	0.014 (0.009)	0.014 (0.010)	0.015 (0.010)	0.015 (0.010)
Comments (n° of)	-	0.186*** (0.048)	0.217*** (0.046)	0.231*** (0.049)
Embeddedness	-	-	0.843** (0.376)	0.839** (0.404)
Time lag (since jam beginning)	-	-	-	-0.279** (0.113)
<i>Regression diagnostics</i>				
Observations (N)	351	351	351	351

Wald χ^2	286.13	1738.83	7599.96	26103.03
Pr > χ^2	0.000	0.000	0.000	0.000
R-sq (Nagelkerke)	0.122	0.155	0.178	0.192

Note: *** p < 0.01; ** p < 0.05; * p < 0.1; clustered robust standard error in parentheses

Figure 1 – Two-mode “employee x idea” network



Note: red circles are employees (n = 224) and blue squares indicate ideas (n = 351)

Figure 2 – Patterns of the number of ideas (proposed and selective) over time (48h)

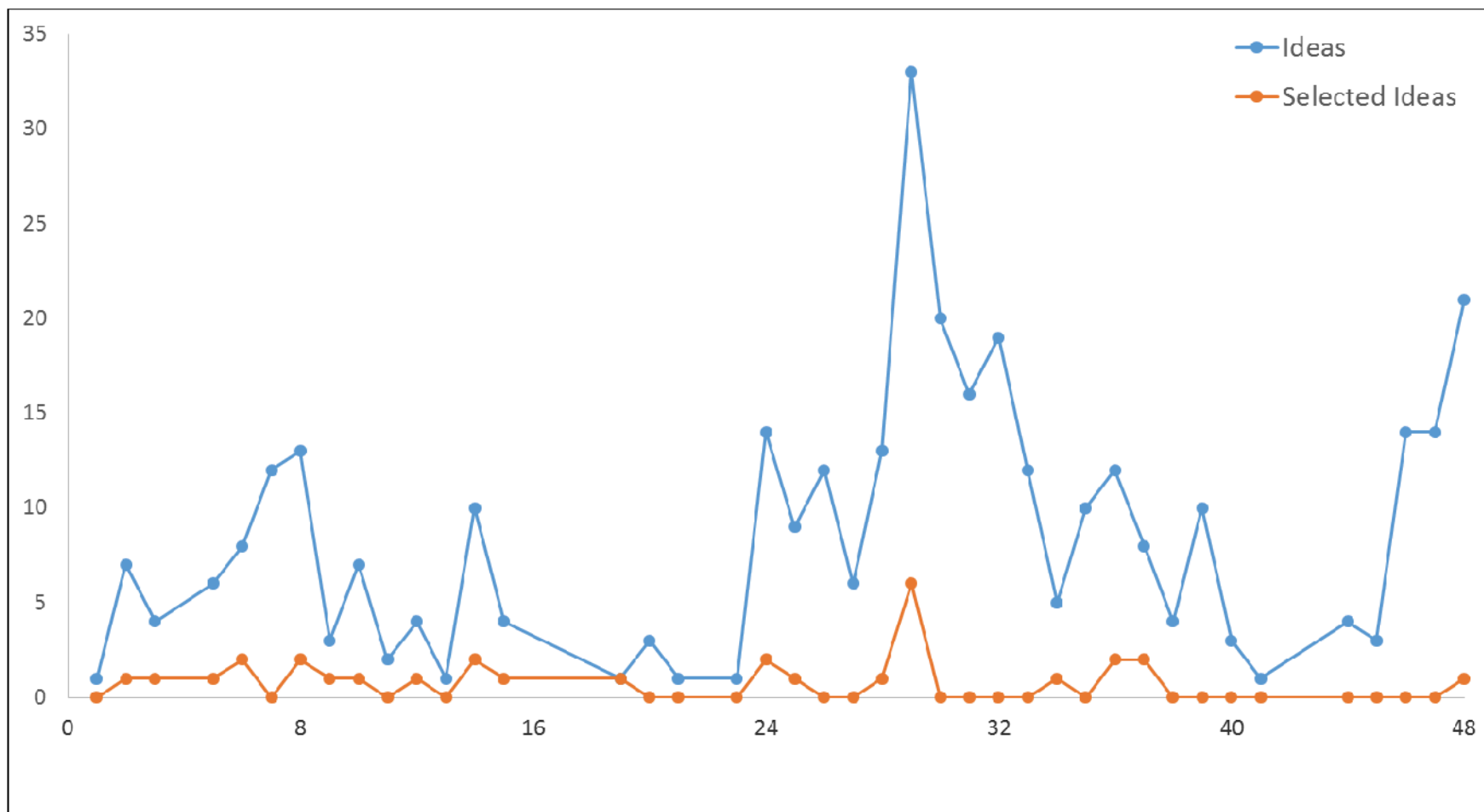


Figure 3 – Patterns of the number of comments over time (48h)

