WHAT`S A GOOD IDEA?: UNDERSTANDING EVALUATION AND SELECTION OF NEW PRODUCT IDEAS

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ABSTRACT
This paper investigates how ideas for new products are evaluated and selected in industrial companies. It is based on an empirical and explorative study in three companies, using qualitative interviews. The findings indicate that a good idea is the result of a process in which at the same time the idea is generated, evaluated and selected. This process determines which ideas are further developed, which of them reach a formal decision-making forum and, to some extent, the decisions made in these official forums. This process is characterized by a social and a cognitive aspect, overlooked in normative literature. The social aspect is about interaction between people that makes possible to combine formal and informal processes, and rational and non-rational approaches for developing and evaluating ideas with different grades of ambiguity and uncertainty. The cognitive aspect refers to how ideas and company's context are interpreted, in individual and collective levels, for making evaluations on ideas. Implications of these findings for designing supporting methods for evaluation and selection of ideas are discussed; and general descriptions of a practical method suggested.

Keywords: Product development, project selection, idea evaluation, decision making, cognition, innovation, project portfolio management.

1   INTRODUCTION
Innovative companies often generate plenty of ideas for the development of new products and services. However, as the human and financial resources that companies have to realize these ideas are limited, they have to choose. People evaluating and selecting ideas for new products are determining the future competitive position of their companies [1], [2], [3], [4]. Christensen [1] describes how some leader firms lose their positions not because of a lack of capability to cope with technological change, but because of which technologies they decided to prioritize and which they decided to reject. There is empirical evidence that many companies are still unsatisfied with the performance of their processes for evaluation and selection of ideas [2], [3]. Thus a challenge for innovative companies is to evaluate ideas, to judge which of them are good for being developed further, and which ones must be rejected.

Some research areas have suggested work procedures for the evaluation and selection of ideas, such as project management, project selection, new product development, and project portfolio management. This normative literature mainly asserts that an appropriate set of methods and tools, integrated in a formal and sequential decision making process, should lead to optimal decisions [5], [6]. Methods and tools are based on mathematical procedures in which the decision is presented as comparison of numbers [4]; or scoring models for evaluating ideas through a mix of qualitative and quantitative parameters [3]. These methods and tools have been criticized because most of these evaluations must be made before relevant knowledge and reliable information are available [7], which makes the outcome untrustworthy [4], [5]. Besides, these methods often do not reflect the realities and problems faced by managers and companies [8] and they are based on unrealistic assumptions about managers' capabilities for identifying good ideas from bad ones [18].

In new product development literature, some authors have focused on explaining the front end, that is, the early phases of idea development [18]. Front end studies assert that decisions made in formal processes are not enough to explain how decisions are really made in companies. Product development is a multitude of processes, relationships and decisions, and most of them happen outside the formal meetings and before they take place [9], [10]. Thus it seems that supporting methods for evaluating and selecting ideas are not based on an understanding of the phenomena that they address. Furthermore, they are mainly based on a limited number of surveys made in large firms and based on managers` experience [11]. Some aspects appear as poorly explained as which selection techniques are actually used in companies [11], and why the selection process often does not work as it is prescribed in the literature [3]. Particularly, the decision criteria in idea evaluation and subsequent selection process have been overlooked by research, and there is a need for more insight into their complexities [12].

To summarize, ideas that are selected today are determining the future competitive position of companies. Some research areas have suggested work procedures for evaluation and selection of ideas for developing new products. However, they are not based on an understanding of the complexity concerning evaluation and selection of ideas. This makes companies unsatisfied with the methods that they apply. Thus, there is a need of developing supporting methods that are based on an understanding of the process of evaluation and selection of ideas, and that take into account relevant aspects that have been overlooked in the normative literature.

2   PURPOSE

This paper investigates how ideas for new products are evaluated and selected within industrial companies. The purpose is to achieve an understanding of the evaluation and selection process; and criteria used for making those evaluations. The paper also discusses implications of this understanding for the design of work procedures for supporting evaluation and selection of ideas.

3   METHODOLOGY

A qualitative research study, following [13], based on semi structured interviews, was carried out in three companies. The studied companies have product development as a core competitive factor, meaning that the business strategy of each company is based on improving existing products and developing new technological platforms. In addition, they have several innovation alternatives to choose from, problems in making decisions among those alternatives, awareness about this problem and a willingness to change. A general description of them is as follows:

- Company A develops, produces and sells high-tech machinery for the electronics industry. Their product development requires highly qualified personnel in several disciplines and technological areas. The company has about 500 employees, including more than 100 directly involved in development activities.
- Company B develops, produces and sells machinery for diverse industries, including aerospace and electronics. The products have a medium grade of technological complexity, encompassing mechanical and electronic components and software. The company has about 350 employees, including more than 100 directly involved in development activities.
- Company C develops, produces and sells mechanical and electronic solutions for property security. Its products range from low to medium level of complexity. The company has about 1000 employees, including more than 50 directly involved in product development.

In total, 30 respondents were interviewed, among them general managers, business unit managers, products managers, development managers and project leaders. Interviewees were selected from among those with an active role in decision making regarding selection and prioritization of ideas and projects. At least two researchers were present at each interview. Respondents were asked to talk freely about how certain processes were carried out. Six processes where chosen in the interview guide: Handling of ideas; Evaluation and selection of new ideas; Managing of Product development projects; Comparison and prioritization of ideas and projects; Development of strategies for product development; and Resource allocation among projects. Those processes were initially described by the

companies as important and are also named in literature as relevant for selection of ideas. It is not clearly stated in the literature what an idea is, and when an idea reaches the status of a formal development project. In this paper, an idea is considered a proposal for new product, from the first time it is discussed informally, to when it reach a formal forum and a formal decision is made on it.

Analysis of the empirical data was done by combining different techniques, discussions taken in meetings with the companies and within the research group. One approach for the analysis of data was made by an open coding, following [14] and [15]. That is, some interviews were read, line by line, with the intention of interpreting what the interviewee was saying, beyond the question that was asked and the words they used to answer. The statements were labeled by interpreting them without any previous theoretical base. Other parts of the analysis, were made by a specific coding, that is, it was intended to identify the statements in which respondents talk about evaluation and selection of ideas, and the evaluation criteria. Research notes were taken all the time, developing the first interpretations about how the codes could be organized into groups that referred to the same issue. Another approach used for analyzing the data was different techniques for analysis of processes inspired by [16] and [17]. In this analysis, it was intended to understand how different organizational processes worked in reality, particularly, interactions between formal and informal processes, role each actor played in the processes, and how decisions made in one process influence the other process. The analysis were accomplished by all the researchers and validated with the respondents in respective meetings at the companies.

4   EMPIRICAL RESULTS

The empirical data was first classified in two categories: the process of evaluation and selection of ideas; and the criteria that is taken into account for evaluating ideas. As follows are presented what respondents said, organized as: the evaluation and selection process, and the factors for evaluating ideas.

4.1 Evaluation and selection process

When respondents talked about how evaluations and selection of ideas were made, they started describing a formal decision making process. That is, a sequence of actions taken in formal forums by a certain group of persons that is supposed to discuss ideas, and make a decision on them. However, when reading the complete interviews, where respondents talk freely about the whole innovation process, we discovered that they also described other activities that were carried out outside the formal process. These activities happened in a moment of time before the formal decision meeting. They influence to a large extent which ideas reached the formal decision meeting and also the formal decision that was made on them.

A Development Manager described it as follows: *"One talks with colleagues in the coffee-room,…and then if the idea is good so spreads the knowledge to several persons … it is corridor talk in this stage …the problem with that is that … everyone has understood that the idea is going to go further."* This quotation illustrates that before an idea reached a formal decision forum, people engage in conversations in a spontaneous and voluntary way. Furthermore, some people evaluate the idea and come to the judgment: it is good. Then, the idea is spread, and actions are taken for developing the idea further. The decisions afterwards in the formal meetings, are in a great extent, already made in this informal process. In a second company a Product Manager said: *"…I mean, formally (the decision) is made in that (formal) meeting …but before that, in principle, we have already decided it."*

The evaluation process was described by respondents to be characterized by rational tools and formal decision criteria at the same time that they describe the process as characterized by intuition and subjective evaluations. A Sales Manager expressed: *"…it is good to have some kind of model …some kind of calculation about what gives the best result and what is most important to prioritize…"* and later he said: *"…it is in fact more feelings for us…it is often a feeling on customers and a feeling on the market."* Respondents' descriptions led to the interpretation that different approaches are needed in order to being able to handle and evaluate different types of ideas that might arise. The different approaches are related to formal and informal processes and rational and non-rational tools. In other words, it is the type of idea and the situation in which it arise that determines if the evaluation and

selection is more properly approached, for example, by rational models or by intuitive approaches; by formal and sequential processes rather than informal ways of acting.

4.2 Factors for evaluating ideas

When respondents where asked about what criteria they used for determining if an idea was good or bad, their spontaneous answer, in the three companies, was that it had to be money to earn, that is, the idea had to be a good business. Besides, other parameters were named such as the idea has to solve customer problems, be easy for the customer to see value in it, and be technically feasible.

However, there were some factors, different of the criteria that the respondents explicitly named, that were also taken into account when evaluating an idea. Furthermore, these factors influenced, in a high grade, if an idea was to be considered as good or bad. We identified statements in which respondents referred to factors that influenced the judgment of an idea, we encoded them and we ordered them in different categories. As the analysis aims to identify common characteristics of the criteria factors, and not to achieve a list among them, just some of the identified factors are presented as follows.

Core competence

Maybe the most general factor that was named as influencing the evaluation of ideas was what respondents considered was the company's core competence. "*This is our niche. Not to do mp3 players or video cameras. For doing that there are other machines that are better than ours*", said a Development Manager. In another company a Manager considered that some activities within product development should not be done by the company itself, pointing out that "*when it concerns design, we take consultants. We are not good for design, this can others do better*". Thus what people considered that the company's core competence was, despite if it concerns type of products, technologies or activities within product development, meant a factor that would influence the evaluation of the idea by stating if it falls into the boundaries of what the company is able to do better than other companies.

However, the core competence does not seem to be a factor that everyone within a company understands in the same way. The empirical material shows that there are different opinions among people about what the core competence was or what it should be. This Development Manager claimed for what he thought his own company was doing wrong when developing products: "…*we are doing the wrong things, we develop ourselves almost everything that we sell*". In another company, a Development Manager questioned the efforts that his company was doing for growing in a certain market: "…*this market is tough and it is hard to enter and an extremely expensive development. It is uncertain if we are going to earn any money there, while in (another market and product line) we have a lot of opportunities to make money*".

Market position

Another factor influencing the evaluation of ideas is the company's position in the market. For example, when people considered that a certain products line has a leading position, ideas that contribute to maintain this competitive advantage are considered good ideas. This General Manager explained how they maintain their position by setting a standard that hinders competitors to entry in the market: "…*it is about being all time before the others, and be sure that you have patented solutions, as we do in this new platform*". To maintain a leading position in the market seems to be a very strong factor that sometimes makes "bad ideas" to be judged as desirable anyway. For example, a product that according to a financial evaluation is not considered a good business, could be regarded as a good one, if it contributes to defend a market from newcomers. As this Product Manager told it: "…*this is ROI (Return on Investment) that is the most important ... but there are other aspects: to keep competitors in check. It is may be not a fantastic market to be, but we consider that we have to be there anyway*".

Component financial value

Product complexity is a factor that makes the use of financial criteria difficult for evaluating ideas. A particular case of product complexity was that some products were what are called "system products". That is, products that consist of different components that are developed and produced separately.

This Project Leader described what happens when evaluating an idea for developing a component of a system product: "…*we do not sell individual things, but we sell a big system in which it is the whole that makes the customer choose our product. So, making profitability calculations is a bit tricky. One is able to see that some things are profitable while others are very unprofitable, but even unprofitable things may be necessary to have done. This (component) that we have spent, and are still spending, a lot of man-hours on, we give it (to customers) for free ...(this component make) people think that our machines are good and then they buy more ..so, you'd better ask someone else about what is profitable or not*". The components of a "system product" may be developed in different projects, with different people and the development effort implies different investments. In those cases the most difficult part of the evaluation is to estimate the profitability of each individual component in order to decide if the idea for developing is good or bad. Thus the difficulty relies on stating how an individual component of a system product contributes to the profitability of the whole system. Another example found in the empirical material is a product whose improvement influenced the performance of the production process of the customer. Therefore, the challenge in this case is to estimate how the product contributes to the performance of the customer's production process.

Development financing
To develop complex products is expensive, and that is the case of two of the studied companies. A Development Manager explains how the high cost of the development investment requires that a customer participates in the development process from the beginning*: "...these (machines) are so big that we do not have any capability to make a new generation by ourselves; instead it must be a joint collaboration with our customers. Either they are willing to make an order that could be very risky or they are willing to stand for the costs for development*". Thus the evaluation of the idea was influenced by the existence of a customer willing to pay for its development.

This dependency on customer financing becomes even worse when the company is small and has a few big companies as customers. That means that not only the development activities but the whole financial stability of the company depends on few customers. A Development Manager explained the consequence that this dependence had on the development activities: *"...our machines do (a certain function) and (the requirements on this function) increases all the time, so it could happen that suddenly (new requirements) arise that our machines are not able to fulfill. So in this situation we must get involve in improving the (current product), when we actually were developing a whole new product"*. Companies depend on their current customers and that means that their product development must fulfill those current customers` needs. That means that companies must engage on foreseeing their customers´ technical path and the incremental developments needed to cope to future requirements. As a consequence, new ideas for whole new products may be sacrificed in favor of developing the already existent ones further, despite how good the new ideas are considered to be.

Awareness of risk
Respondents expressed awareness about the risk implied in depending on the financing of a certain customer. For example, a project that has already been financed by a customer acquires automatically high priority. Thus, any delay or problem in this project might trig that resources that had been assigned to a new idea must now be assigned to the high prioritized project. Another risk is associated to the difficulty in predicting customers` future needs, as this Product Manger describes: *"...it is not difficult at all to know what we have to do right now, because all the customers are screaming that these products are the most important right now. But the question is if they are still going to scream for them in three years (that is the lead time for developing them)"*. Respondents were also aware about their own companies` convenience versus customers` convenience. However, it might be a criterion interpreted in different ways by different people, as this Product Manager expresses it: *"...the customer says that for buying this (machine) ... so they need them that (something else is developed). Then it becomes an evaluation, I mean, how much we do need this order and is its worth to develop this to achieve the order. Sometimes the answer is yes and sometimes it is no"*. A Product Manager in another company said that in this way: *"...it became good that we do not just look for what is most important for the customers, but what in fact is easiest for us to do. It can be important as well"*.

Contribution to organizational goals

Another factor influencing the decision making process is the way in which each business unit is appraised and rewarded. For example, when business units are evaluated by the results of their own products lines in the current year, it may lead to a situation in which the overall performance of the company becomes a secondary criterion. Thus short term projects with secure profit figures have more chances to be selected. This Development Manager illustrates it in this way: *"business units have to show a certain return, and that makes that ...they probably prioritize projects that give return during the budget year...But sometimes are things that are more important than business units' prioritization."* This quotation gives also evidence about different interpretations among people about what ideas and projects are more important than others. Another organizational aspect influencing opinions about evaluation of ideas is if the development unit is organized as a centralized function serving all business units or decentralized as each business unit having its own development function.

5 ANALYSIS

The analysis of the empirical material aimed to understand the main characteristics of the evaluation and selection of ideas. For doing that, the empirical results exposed in the previous section were analyzed. As a result, we understand the evaluation and selection of ideas as characterized by two main aspects: a social aspect and a cognitive aspect. The social aspect refers to how people interact when evaluating and selecting ideas; the cognitive aspect refers to which factors individuals use as criteria for evaluating the idea and how they interpret them. As follows, based on the analysis of the empirical results, the social and the cognitive aspects are described.

5.1 Social aspect of evaluation and selection of ideas

The empirical study shows that ideas are not generated in a process, and then as a discrete and separate action, a decision is made on it. Instead, idea generation is a process in which people interact by making handlings, evaluations and selections on ideas. Handlings have the form of discussions, seeking of information, prototyping, testing, etc.; evaluations have the form of understanding the idea in relation to certain factors; and selections have the form of decisions that make possible more interactions, handlings, evaluations and selections. The result of this social interaction is simultaneous generation, evaluation and selection of ideas.

In this social process people combine, according to the type of idea, different tools and approaches for handling ideas as rational evaluations, intuitive and subjective judgments, formal processes and informal meetings and conversations. For example, when information about the idea is certain and clear, financial calculations are used and formal meetings used for discussions; and in cases of more uncertain and ambiguous ideas, informal discussions and intuitive judgments are applied.

From the empirical data it was interpreted that some interactions might be spontaneous. In other words, people talk and interact in an informal not pre defined way, based more on personal affinity and trust and not in formal relationships of dependency. Moreover, the empirical data also gives evidence about that some people has formal or informal power, influencing if the idea is widespread or not, and if more handlings and evaluations are made or not, which determines if the idea is further developed or in fact abandoned.

The formal processes, as well as the rational methods applied in them are a part of the process for evaluating and selecting ideas. However, an idea takes a long way before it reaches a formal instance. Outside the formal processes, some ideas are further developed until they reach a formal status, while other ideas are abandoned and never reach a formal instance of evaluation.

Thus the process that occurs before an idea reached a formal instance of evaluation and selection, is the one in which at the same time that the ideas are gradually developed, a screening of ideas is made, and a judgment about the idea achieved among people. It is characterized by interactions between people, the combination of formal and informal processes and rational and non-rational tools, and affected by trust and power. This process determines which ideas reached a formal instance of evaluation and, in a great extent, influence the formal decisions that are taken.

5.2 Cognitive aspect of evaluation and selection of ideas

The empirical material shows that when individuals evaluate an idea, they use certain factors as criteria. The analysis made in this paper does not focus on listing these factors, but on understanding what characterizes the factors, how they are interpreted, and how they are used for evaluating ideas. The number of factors identified is very large, and while some factors were explicitly named by respondents when they were asked about what criteria they used for evaluating ideas (as financial value, value for customers, technical feasibility, etc.), other factors where discovered when analyzing the empirical material (core competence, market position, component financial value, development financing, awareness of risk, contribution to organizational goals, etc.).

Each factor might be considered as a mean for placing the idea in the context of the company. The different factors are in some way mirroring different dimensions of the company's context. In other words, an idea is not evaluated by considering its characteristics isolated from the company context, but by regarding it in relation to the context defined by a given factor. For example, in the results it was shown how ideas of new products that are considered as bad business might be evaluated as good ideas if they help to hinder competitors.

However, the idea is considered as good or bad depending on which factor is chosen. In the example given before, the factor determining the evaluation of the idea could have been the financial value and not the contribution to maintain a market position. Thus it is necessary to understand why in given circumstances certain factors are chosen for evaluating an idea. In the empirical material, each respondent named some factors when describing evaluation of ideas but no respondent described all the factors. That leads to the interpretation that when evaluating an idea, each individual used just some of the factors that were founded, and that different individuals might give priority to different factors.

Some aspects influencing which factor to use are the type of idea, the organization of the product development function, and the internal rewarding system. Examples in the empirical data are: a business unit that considers as good ideas the ones that are very certain and give return during the budget year; and a Manager considering that some overall goals were more important that business units' particular perspective. In other cases, different factors might state contradictory criteria, forcing to choose some of them. For example, respondents talk about the contradiction that sometimes arises between the fulfillment of customer needs and the company's own strategic goals.

While different individuals might use different factors for evaluating the same idea, it would be interesting to know what happens when different individuals use the same factor. In the empirical material several statements were identified referring to different opinions or points of view regarding the same factor. For example, when talking about core competence or market position, respondents gave evidence of the existence of different opinions about how it should be interpreted. Furthermore, other respondents spoke about some situations in which the evaluations are made by intuition by certain people, what lead to the interpretation of a subjective interpretation of certain factors. Thus different people could have different ways of understanding the same factor.

Another aspect that contributes to different interpretations is that both factors and ideas are affected by uncertainty and ambiguity. For example, when several components that are developed independently conform the same final product, it is difficult to state the profitability of each individual component, leading to different opinions of the value of an idea for developing a certain component. Furthermore, a new idea might also trig a reinterpretation of the factors. For example, when a new idea means a new market and customers; it might provoke a reinterpretation of the strategic convenience of focusing on the current market and customers. New ideas, especially in an early stage of development, might also be affected by ambiguity in its definition and goals, making difficult the interpretation of the different factors and the evaluation of the idea, and leading to the existence of different opinions.

Thus, evaluation and selection of ideas has a cognitive aspect, related to how people interpret ideas and the factors used as criteria. Different individuals might give priority to different factors and the same factor might be understood in different ways by different people. Some aspects influencing

which factor to use and its interpretation are the organization of the development function, rewarding system, factors stating contradictory criteria, and the grade in which the idea is affected by uncertainty and ambiguity. This cognitive aspect influence in a great extent how an idea and the organizational context are understood, and consequently influence the development of the collective judgment about an idea.

6 DISCUSSION

Normative literature proposes models based on formal processes and rational tools for managing evaluation and selection of ideas. These models are suitable when ideas present a low grade of uncertainty and ambiguity. Moreover, they contribute to fulfill some organizational needs as achieving efficiency, control and planning, understanding of work procedures, and legitimizing ways of acting [9], [21], [22], [23]. However, according to Fonseca [19], normative models consider ideas as static and finished entities detached from the process of its creation. Ideas are reduced to written descriptions of goals, customer needs, technical specifications, and commercial and financial forecasts. Thus the process, in which the idea and the knowledge embedded in it were generated, is overlooked in the normative literature. Before ideas reach a formal instance of evaluation, people interact for generating those ideas. In other words, the ideas that reach a formal instance are the result of a screening process that has already happened before those formal instances take place. Thus normative models are not enough to explain how ideas are really evaluated and selected.

Some authors have studied development activities on an idea before it reaches a formal forum of decision. This early stage of an idea is called front end, and explains how ideas are developed, evaluated and screened trough sense making in social networks [18]. Some aspects of this front end approach are similar with our empirical analysis, but there are also some differences. Front end literature considers a sequential view of the development process, in which the social dynamic and the sense making processes that occurs in the early phases of an idea seems to not play a significant role in later phases of development. We argue that the social and cognitive aspects of the early phases of an idea strongly influence the formal decisions that are made afterwards, because people participating in formal forums, also are involved in the previous phases. Furthermore, it was stated before that interaction between people makes possible to combine formal and informal processes, and rational and non-rational approaches for developing and evaluating ideas with different grades of ambiguity and uncertainty. However, ideas may become uncertain or ambiguous at any stage of its development, also in the phase of formal development projects [20], [23]. Consequently, the social interaction and its dynamics in the use of formal and informal processes, and rational and non-rational approaches are not an organizational capability constrained to a clearly defined front end. It is an organizational competence that determines the potential capability for being innovative [21], [22]. Moreover, companies that do not achieve a certain dynamics in this social interaction might have unintended and negative consequences [20], [21], [22]. For example, Engwall [23] asserts that potentially good ideas, which are affected by ambiguity in the early stages, might be rejected if they are forced to accomplish the requirements of formal and sequential management models.

Concerning the cognitive aspect, the analysis of the empirical data shows that the ways in which people interpret ideas and criteria factors is determining the evaluation of the idea. In other words, there is a difference between information and meaning. Information becomes knowledge at the moment of its human interpretation, and different people might interpret the same information in different ways [24], [25]. However, this process of sense making of the idea in relation of the organizational context for achieving a collective understanding does not finish when the idea leaves the front end. It occurs also in the formalized phases of the development. For example, in a formal instance of evaluation, is not evident how each decision maker would interpret a certain criterion, i.e. "strategic fitness", and how would relate it to the new idea.

The social and cognitive aspects of this process of generation, evaluation and selection of ideas are relevant. They are in fact the ones that are, in a great extent, determining which ideas reach a formal decision status, the decisions that are made in those formal forums, and in some extent, the organizational capability for being innovative. If the process in which ideas are generated, evaluated and selected, and its social and cognitive aspects, remains overlooked and unsupported by the models

prescribed in normative literature, the question we address now is: what to support in the process of evaluation and selection of ideas and how?

6.1 What to support and how

Based on the analysis and discussion made before, and literature about social and cognitive aspects of innovation, some points to focus on are suggested as follows.

- According to Gustafsson [26], the necessary skills to recognize different situations and to put it in practice the most suitable approaches and tools, is able to be learned. Thus an aspect to support is awareness among people about the importance of combining formal and informal processes, and rational and non-rational approaches, according to different types of ideas; and the negative effect on the potential organizational innovation capability, if just certain approaches are emphasized.
- Stacey [28] and Fonseca [19] suggest that for supporting the social aspects in innovation, focus should be put on the quality of participation in ordinary, everyday conversation; what makes people trust each other; and the process in which people make sense of their own engagement with others in informal conversations.
- Concerning supporting cognitive aspects, Miller [24] argues that more focus should be put on interpretation and sharing of information, and not only on accessibility of the information. Furthermore, Mabounje [29] asserts that when making decisions under uncertainty, people use knowledge already stored in their minds for interpreting the new and unknown situation, and that might hinder the consideration of data outside habitual patterns of thought. Thus is important for people to know how other people interpret information, using different points of view and intuitive ways of thinking; and to exercise individual and collective interpretation of information.

Supporting the previous mentioned aspects mean a challenge both for researchers and practitioners. For example, the emphasis on formal and rational approaches is, in some extent, forced by factors that are beyond the control of the people within the organizations as societal beliefs, political ideologies and research paradigms [22]. Besides, social interactions that are informal and spontaneous, are not possible to be designed nor managed [19]. Furthermore, the cognitive processes are in a great extent unconscious for people [27], [30]. Therefore, supporting social and cognitive aspects characterized by informality, spontaneity and unawareness seems to contradict their own nature of being informal, spontaneous and unconscious.

Thus, based on the previous discussion, the question at this point is: how to support the social and cognitive aspects of evaluation and selection of ideas? According to Fonseca [19], interaction that has the potential of producing an innovation, is not possible to be managed from an external standpoint, one just can participate in it. Hence, in this paper is presented one alternative for a supporting method that aims to develop the potential individual and collective capability for participating in a social and cognitive process. It consists in playing games in which the interaction and its social and cognitive aspects are recreated. Mabounje [29] and Hansen [31] states that playing games are recommended for providing: the cognitive benefit of drawing on the imagination to develop new insight, the social benefit of developing new frames of interaction, and a safe context in which to explore new forms of practice. Furthermore, Carleton [32] and Mabounje [29] recommend different ways of communication as physical prototypes, metaphors and theatrical performance for enhancing the articulation of complex and tacit knowledge, reducing ambiguity, and allowing collective sense making.

As follows is suggested, in general terms, how a game for supporting the social and cognitive aspects of evaluation and selection of ideas, could be implemented:

- The game is based on simulating situations of evaluation and selection of ideas by generating different scenarios. The different scenarios are related to new ideas, changes in the environment, and unexpected problems in ongoing projects that require reinterpretation of the organizational context before decision making can take place.
- People are going to interact for interpreting the organizational context in the new hypothetical situation, and making evaluations and decisions on new ideas, prioritizations and resource

allocations. In that way, the individual and the collective potential capabilities of evaluating new ideas in different context scenarios is developed.

- The main goal is playing, without any other purpose than the activity of playing itself. Is this activity of playing that enhances the quality of participation of people in ordinary conversations by connecting them, and allowing them interplay freely. At the same time, playing enhance the exchange and development of the knowledge structures of individuals and groups by knowing how other people think and the perspectives they use.

- It is suggested that the participants in the meeting are chosen randomly from different functions, backgrounds and hierarchies, thus enabling people that do not meet often to interact. People meet outside the daily activities of the company, making it possible to discuss and make decisions in a playful way without the constraints, stress and rationale of business activity.

- As some evaluations and decisions are based on intuition and tacit knowledge, different ways for communicating are used as physical prototypes, drawings, metaphors and performing.

7 CONCLUSIONS

When an idea reaches a formal forum to be evaluated, it has already happened a long process in which this and other ideas, have been gradually generated, evaluated and selected. A good idea is the result of this process, in which the idea is gradually created by successive handlings and conversations, made possible because people participating in those handlings and conversations have achieved a common opinion that the idea is good. As a result, some ideas are developed further until they reach a formal instance of evaluation, and some are abandoned never reaching a formal instance. This process is characterized by a social and a cognitive aspect, and it remains overlooked by normative literature and unsupported in the models that it prescribes.

The social aspect is about the interaction between people in which new ideas arise. This social interaction makes possible to combine formal and informal processes, and rational and non-rational approaches for developing and evaluating ideas with different grades of ambiguity and uncertainty. It influences in a high grade the organizational capability for being innovative.

The cognitive aspect refers to how the idea and the company's context are interpreted, in individual and collective levels, for making evaluations on ideas. A new idea implies that the organizational context must be reinterpreted, different people might interpret the company's context in different ways, and this individual and collective interpretation is determining if the idea is evaluated as good or bad.

The social and cognitive aspects are not limited to a front end phase, but they are characterizing decisions and handlings made in the whole development process. Besides, the social and cognitive aspects influence the organizational capability for coping with some types of ideas and projects, no matter in which phase of development they might be.

For supporting this process focus should be put on: recognizing different types of ideas and managing them by a suitable combination of formal and informal processes, and rational and non-rational approaches; the quality of participation in ordinary conversation; and individual and collective interpretation of information. Designing work procedures for supporting the social and cognitive aspects of evaluation and selection of ideas means a challenge both for researchers and practitioners, because these aspects are characterized by informality, spontaneity and unawareness; and might be affected by factors that are beyond the control of the people within the companies.

More research is needed regarding the feedback effect that evaluation and selection models might produce in the output of the idea generation process. In other words, it is not clear if the way in which the ideas are evaluated and selected determines which kinds of ideas are being generated. Particularly, Kijkuit [18] advocates for more research regarding how people's experience in the generation of past ideas may affect their participation in generation of future ideas. Furthermore, empirical studies in different types of companies and products ideas than the ones presented in this study, can provide new elements for further development of the findings of this paper.

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