

Organisational creativity in context: Learning from a failing attempt to introduce IT-support for creativity

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Abstract

As a much needed quality in today's businesses, creativity is an important area of research. Whilst implementing and evaluating computer support for electronic brainstorming, it was noticed that the sheer presence of technology does neither guarantee usage nor success. Contextual factors such as organisational culture and attitudes seem to have an equally important role, and this observation called for a more focused analysis of the motivational aspects of creativity management. Based on the empirical data from the electronic brainstorming system evaluation and literature on organisational creativity, three general pieces of managerial advice to promote corporate creativity are suggested: reconsider the use of extrinsic rewards; recognise creative initiatives, and; allow redundancy.

Keywords: creativity management; intrinsic motivation; reward systems; information technology

A NEED FOR CREATIVITY

As noted by many commentators, the importance of creativity in industry has risen dramatically during the last few decades. During the peak of the industrial era, a company could prosper from slowly developing and refining one single product or service. The increasing pace with which business now reshapes itself – propelled by the new capabilities offered by information technology (IT) – places higher demand on the organisational members to be able to see and grasp new opportunities. Globalisation, and the competition that accompanies it, further adds to the need for creativity in an entrepreneurial way, and it is argued that employees of tomorrow will be valued more for their ability to create new knowledge than for being able to manage known facts (di Sessa, 1988; Reich, 2002; Drucker, 1993; Carr, 1994). Successful handling of creativity is therefore a factor of increasing importance and should be considered a vital aspect of (knowledge) management.

Creativity is typically defined as the development of ideas that are 1) novel or original, and 2) useful (or potentially so) (Oldham and Cummings, 1996; Amabile et al., 1996b; Paulus, 2000), and creativity is seen as a prerequisite for innovation (e.g., the implementation of useful ideas in the organisation). An important part of the creative process is therefore to support and enhance idea generation (Paulus, 2000) and a traditional approach has been to encourage employees to submit their ideas to a suggestion system. This approach has been used in US and European companies since at least 1880 (Robinson and Stern, 1997), and companies with suggestion systems have shown that this leads to production improvements. The ideas submitted are typically attended to and reviewed by a Proposal-Handling Committee (PHC). Good suggestions are usually rewarded in some way, whilst not so good proposals are rejected.

Although being a well-known approach in practice, relative little research exists on suggestion systems (Frese et al., 1999). Nonetheless, a number of serious shortcomings with the suggestion system approach have been identified (Frese et al., 1999; Stenmark, 2001b). Firstly, there is a problem of communication. Suggestions are seldom shared within the organisation. Good ideas may be implemented locally but remain unheard of in other parts of the organisation, resulting in the "reinventing-the-wheel"-syndrome. Other ideas may be prematurely rejected due to the user's inability to accurately communicate the vision that he or she has, or the PHC's limited capacity to understand

and appreciate the quality of a perhaps innovative – and thus unconventional – suggestion. Had these ideas only been made public, they could have started other creative ideas elsewhere in the organisation (Stenmark, 2001b). Secondly, many ideas are never proposed at all – for several reasons. One thing generally recognised as a serious performance blocker is evaluation apprehension: the fear of being measured by ones' peers. We are reluctant to present "silly" ideas if we risk losing face in front of our colleagues. Instead, we keep our potentially revolutionary ideas to ourselves, again missing an opportunity for organisational benefit (Diehl and Stroebe, 1987; Stenmark, 2001b) Another reason is the threshold an official suggestion system constitutes: we may feel that our idea is not worthy of being submitted as an official proposal or we may lack the ability or motivation to write-up our proposal in the form required for a suggestion to be accepted (Frese et al., 1999). These problems threaten to undermine the system since Diehl and Stroebe (1987) has shown a high correlation between quantity and quality. Receiving many ideas is thus a fundamental principle if you want good ideas (Frese et al., 1999).

To address these shortcomings, this action-oriented study aimed to promote the idea generation phase by pairing the suggestion system approach with the principles underpinning brainstorming as posited by Osborn – *i.e.*, large quantities, elaboration on others' ideas, and absence of criticism (Osborn, 1953). This hybrid approach resulted in the implementation of an online suggestion system prototype called Mindpool. The technical features of this prototype have been described in detail elsewhere (Stenmark, 2001b; 2002) and shall only briefly be accounted for in section 4. The focus in this paper is on the organisational implications derived from the evaluation of the system.

Next, we are going to look at existing theories on creativity before describing the site and the research methodology used in this work in section three. Section four briefly describes some of the fundamental features of the Mindpool system. Thereafter, the results are accounted for in section five and discussed in detail in section six. The paper finishes with conclusions and managerial implications in section seven.

1 THEORIES ON ORGANISATIONAL CREATIVITY

Much has been written on creativity and from many different perspectives. As noted by Oldham and Cummings (1996), a large body of literature has been concerned with the *individual* aspects of creativity, and this line of primarily psychology related work has dominated the creativity research for decades. Although this work has its merits, creativity depends also on *contextual* factors such as management style and work climate (Agrell and Gustafson, 1996), and in this paper we have highlighted this emerging area. During the last ten or so years, research that focuses on contextual factors has become more substantiated, and organisational creativity has been defined as a function of individual abilities, group norms, and organisational culture (Paulus, 2000).

Amabile's work on the social psychology of creativity (cf. Amabile, 1983; Amabile *et al.*, 1996a) is generally regarded as a classic in the empirical study of creativity. One fundamental principle for creative work identified by Amabile is the importance of intrinsic motivation. Intrinsic motivation is defined as "motivation that arises from the individual's positive reaction to qualities of the task itself; this reaction can be experienced as interests, involvement, curiosity, satisfaction, or positive challenge" (Amabile *et al.*, 1996a, p. 115). Extrinsic motivation, in contrast, is defined as "motivation that arises from sources outside the task itself; these sources include expected evaluation, contracted-for reward, external directives, or any other similar source" (Amabile *et al.*, 1996a, p. 115). Strong evidence exists showing that the use of rewards in creative work has a detrimental effect on performance (Frese et al., 1999), especially if the reward is used to induce people to do things they otherwise would not (Amabile et al., 1996a). Amabile and colleagues continue to define control (ability to influence one's work conditions), playfulness (opportunity and resources to experiment freely), organisational climate (attitudes towards change, failure, and risk taking), work settings (degree of surveillance) and individual differences as major social factors influencing creativity (Amabile, 1983; Amabile *et al.*, 1996a; 1996b).

Working explicitly with suggestion systems, Frese et al. (1999) suggest a set of contextual factors including system responsiveness, suggestion inhibitors, supervisor support, self-efficacy, and rewards. Paulus (2000) has a similar model where he refers to social as well as cognitive stimulation. He concludes that challenging goals, structured interactions, autonomy, supportive management, and, perhaps most important, cognitive diversity are the factors that best seem to facilitate creativity in groups. Oldham and Cunnings (1996) emphasise motivation, complexity of work, management style, and the individual style of creativity (incremental or radical) to be the most vital aspects of organisational creativity. Although commentators have pointed to the need of a comprehensive set of creativity indicators, no such schema has emerged. Oldham and Cunnings (1996) suggest that perhaps too little research is devoted to the study of creativity in organisational settings. Nonetheless, a core of common elements can be identified in the above work and these have been gathered in table 1. I shall elaborate further on the four strongest themes and use them in the subsequent analysis.

Table 1. Factors enhancing organisational creativity as reported in the literature

Theme	Amabile et al., 1996a	Frese et al., 1999	Paulus, 2000	Oldham and Cunnings, 1996.
Motivation	Intrinsic vs. extrinsic motivation	Quality of work, financial rewards	Challenging goals, accountability	Motivation, job satisfaction
Autonomy	Influence on work	Job control	Self-managed teams	Absence of external control
Work settings	Supportive evaluation, collaborative flow	Job complexity	Cognitive diversity, structured interaction	Job complexity
Climate	Attitudes towards change, risk taking	Management support	Supportive environment	Management style
Additional aspects	Work load, slack, time to experiment		Cognitive style	Creative style

1.1 Motivation

Reward has since long been the main motivation for work, and most adults would not engage in their profession without monetary compensation. Financial rewards may therefore indeed be a factor for employees' willingness to develop and submit ideas (Frese et al., 1999). At least this is the assumption underpinning many companies' suggestion system policies (Robinson and Stern, 1997). However, consistent reports show that working primarily for extrinsic motivation has, counter to what most practitioners seem to assume, a negative impact on creativity (Amabile et al., 1996a; Robinson and Stern, 1997; Frese et al., 1999). Instead, one should focus on intrinsic motivation. Frese and colleagues note that people are motivated to develop ideas when they feel they thereby can positively impact their work situation, and found that the prospect of better work, i.e., easier or safer, predicted submitting suggestions (Frese et al., 1999). Paulus (2000) find that challenging goals paired with accountability of performances also help raise motivation and that being motivated is an important social stimulation for group creativity. Although acknowledging the importance of motivation, Oldham and Cunnings (1996) understand motivation as an umbrella concept linked to job satisfaction, and identify significant relations between motivation and the other aspects described below.

1.2 Autonomy

Control from administrative superiors, both financial and conceptual, typically affects creativity negatively (Deci et al., 1989; Oldham and Cunnings, 1996). In contrast, higher degree of self-control over one's work – including both choice of task and method for completing task – stimulates and enhances creativity. This sort of self-organising is referred to as individual autonomy (Nonaka and Takeuchi, 1995; Amabile et al., 1996a; Paulus, 2000). Being in control of one's work makes possible the kind of experimentation that stimulates the generation of new ideas (Amabile et al., 1996b; Frese et al., 1999). Whilst acknowledging that autonomy facilitates group creativity, Paulus (2000) note that self-management often is related to and often confounded with other organisational factors such as

motivation and work settings, and point out that there is therefore difficult to correctly measure the impact of autonomy on group effectiveness.

1.3 Work settings

Amabile et al. (1996b) stress the importance of work group support, for instance through a free and collaborative flow of ideas and a fair and supportive evaluation of suggestions. Allowing ideas to flow across the organisation increases the probability of creative idea generation as the exposure to other stimuli increases (Nagasundaram and Dennis, 1993; Amabile et al., 1996b). Paulus (2000), arguing in the same vein, emphasise the fact the cognitive diversity (in groups) increases the number of potentially novel combinations that can arise and claim that diverse, but overlapping, knowledge is a primary basis for idea generation. A similar and related aspect is job complexity. It has been noted that complex and challenging jobs that require a variety of skills are more likely to motivate and promote creativity than are simple and routine jobs (Oldham and Cunnings, 1996). Higher complexity of work also means that employees must further develop their skills, which, in turn, leads to more learning and increases the chance of thinking of new ideas (Amabile et al., 1996b; Frese et al., 1999).

1.4 Climate

Organisational climate can include inhibiting factors such as fear of failure, pre-occupation with routines and traditions, excessive reliance on salient rewards, suspicion towards new ideas, lack of management support for innovations, or a too rigid organisational structure that cannot adjust to the changes innovation may bring. It may also contain the exact opposite (Amabile et al., 1996a).

For creativity to flourish, a certain level of risk taking must be allowed (Amabile et al., 1996b). Research has shown that when people feel free to suggest unusual ideas without having to worry about reprimands, they are likely to be more innovative. This suggests the organisation be flexible enough to encompass whatever unexpected innovations that may surface (Amabile et al., 1996a). Management obviously play an important part in this. Oldham and Cunnings' (1996) review of management style shows that support rather than control from supervisors helps foster creativity, although an individualised or selective approach is warranted. Also Frese et al. (1999) and Paulus (2000) comment on the importance of a supportive environment. Whilst Frese and colleagues find no relation between submitting ideas to suggestion system and supervisor support, they instead suggest that supervisors may be more important in shaping the quality of the ideas rather than in generating them. Paulus, finally, stresses the need to overcome social inhibitors such as evaluation apprehension and free riding by implementing and nurturing a supportive environment. In other words, not only management need to be supportive, but the environment as a whole.

1.5 Additional aspects

Trying to find common patterns and themes in the literature, it is important to acknowledge that the above themes are somewhat overlapping and the boundaries between them are blurred. In addition, there are great individual differences to creativity that obviously also are important to understand. For example, people have different cognitive and creative styles. Paulus (2000) reminds us that whilst some prefer surroundings where stimuli are similar, others actively seek cognitively dissimilar domains. In any given group, there will be cognitive differences and individuals will thus not be equally stimulated. Having examined both suggestion systems submissions and patent disclosures written, Oldham and Cunnings (1996) further point out that there are also differences creative styles, ranging from adaptive, i.e., striving to "do things better" by incrementally improving current activities, to innovative, i.e., wanting to "do things differently" by radically changing the current practice (p. 628). Traditional suggestion systems typically seem to fit the first category of adaptive creativity.

Another issue not covered above is the work load, the amount of slack time, and the opportunity to experiment. Amabile et al. speak of playfulness. Play at work occurs when people have enough time and freedom to constructively experiment with ideas not immediately useful from a business

perspective. Though not all play is creative, all creative acts include an element of play (Amabile et al. 1996a). Enabling this at an organisational level requires an amount of redundancy not often seen in today's slim organisations (Nonaka and Takeuchi, 1995).

When presenting and discussing the empirical data in sections five and six, we shall return to and use the above themes. Before starting with the data, however, we need to learn more about the setting of this research and how the investigation was carried out, and go through a quick explanation of the electronic brainstorming system used.

2 SITE AND METHODOLOGY

We shall here briefly describe the research setting where the study was carried out and account for the methodological approach taken.

2.1 Research setting

This research was carried out at Volvo Information Technology's headquarters in Göteborg, Sweden. Volvo IT is an IT service providing company within the Volvo group, and at the time for the research, they had approximately 2,500 employees worldwide. Roughly 900 of these worked at the head office.

Despite being an IT service company, Volvo IT was heavily influenced by the industry legacy from its manufacturing siblings. Volvo IT had a process-oriented organisation, arranged to meet the business requirements of the other corporate companies, which for many years had been the only customers. Volvo IT tried to maintain a governance function for IT solutions, assuring that synergies between the various companies within the Group were exploited. A high degree of standardisation was thus hailed as the optimal situation, and Volvo IT's centralised mainframe operation, which had received several international awards for high efficiency and cost-effectiveness, had always been the backbone of the company's business. Volvo IT was, however, not the exclusive provider of IT services within the Group, who could purchase their services also from external providers. As long as mainframe processing was the core of the business, Volvo IT was on top of the competition, but the shift towards more web-enabled solutions opened the field for new and smaller players. This put new demands on creativity and the ability to quickly produce new business solutions.

Although not institutionalised, brainstorming as a method for idea generation and problem-solving was widely adopted within the company and had been used for many years. Brainstorming should here not be understood in the strict Osbornian sense but rather as an unprejudiced and informal meeting where also "wild" and tentative ideas were allowed and encouraged. In the 1980's, the Volvo School – the Group's internal provider of courses and seminars – regularly gave courses in *lateral thinking*, a method for enhancing creativity developed by de Bono, and *mind-mapping*, a technique for developing a more creative and innovative approach to thinking introduced by Buzan. Such non-IT-related topics were removed from the menu during the recession in the early 90's and although the school eventually recovered from the cut backs, courses targeted at enhancing creativity are no longer available.

Volvo IT maintained a traditional box-on-the-wall suggestion system. Employees were supposed to submit ideas and suggestions for improvement to a proposal-handling committee (PHC), which would honour the proposer of a good idea with a financial remuneration. The policy was to let half of the company's first year's savings, which might come to a substantial amount of money, go to the proposer. During 1999, the PHC received 226 proposals and spent a sum of approximately US\$ 45,000 on individual rewards. The numbers for the following years are of the same magnitude. Even if proposals could be sent collectively by a group of people, most of them were submitted by individuals, and it was more usual to see several submissions from the same individual than group submissions.

2.2 Research method

Reviewing the text on electronic brainstorming (EBS), we find that much of the research carried out in the 1980s and early 1990s were laboratory experiments with students as subjects. In a review from 1994, Pervan (1994) reports that 172 out of 203 investigated cases were carried out in research environments and not in business environments. This is understandable, since it is much easier to allocate a group of students than to persuade business executives to invest their time and efforts in research activities. Nevertheless, the use of students is highly problematic for a number of reasons: Student groups are formed solely for the experimental task and thus have no history (Pinsonneault and Kraemer, 1990); Students show substantially other reasons for and reactions to participation than do the business people they are substituting (Dennis et al., 1990). Unfortunately, this problem extends to studies of creativity at large (Paulus, 2000), and too little work has been focusing on real organisational conditions (Oldham and Cunnings, 1996). Acknowledging this critique, this research takes place in a real-world industry setting. Having a desire not only to study and understand but also to intervene in and influence the processes under study, this research approach may be described as action case (Braa and Vidgen, 1999). This hybrid is a mix of understanding and change, designed to balance the trade-offs between being an observer capable of making interpretations and a researcher involved in creating change in practice. Instrumental in this research was the web-based brainstorming application prototype – Mindpool – developed by the author to act as a change agent. The Mindpool prototype system, designed to address and potentially eliminate the production losses typically seen in electronic brainstorming, was made generally available to all employees on the corporate intranet. The system has been presented in detail elsewhere (Stenmark, 2001b; 2002) and is only briefly described in section four.

Before installing and evaluating Mindpool, a base line was established by having a masters student conduct ten semi-structured interviews with employees about their views on creativity, suggestion systems, and management. These interviews, lasting approximately 40 minutes, included both members of the Proposal-Handling Committee (PHC), *i.e.* the people responsible for evaluating submitted ideas, and ordinary office workers. In addition, we explicitly invited 32 users to test the application. Amongst these 32 were the 10 people interviewed earlier. Not all invited users took the opportunity to try the application but the log files revealed that 52 different users accessed the application, indicating that it was instead found and used by people other than only those invited. Most people did only read the suggestions without making suggestions of their own, and this sort of “lurking” was an expected behaviour. During the three-week test Mindpool received 22 suggestions submitted by eight different users and 14 of these were submitted the very first week. After the test period, the application log files were used to randomly select eight users who were interviewed concerning their views of the application. Finally, the result of the masters thesis work was presented and discussed at a workshop, which the masters student, the author, and some 20 organisational members attended. The notes from this discussion and the interview transcripts were thereafter analysed by the author.

Initially, this research set entirely within the electronic brainstorming discourse, and therefore relied exclusively on (technical) EBS literature for design, data interpretation and analysis. Turning out to be a failure, we turned to a broader set of literature, realising we had analyse not only technology itself but also structural and cognitive factors such as culture, motivation, trust and mindset (Orlikowski, 1992). For this paper, the empirical data has been reinterpreted using a different theoretical framework, consisting of text on organisational creativity in a much broader sense. The distillation of the four central aspects of organisational creativity accounted for above and the analysis of the data was not a sequential process but an iterative one where both the data and the literature was been re-read and re-analysed a number of times. Following Orlikowski's (1993) advice, the progress of the data analysis work thus took place on several levels in a comparative fashion, going from broader to narrower and more focused concepts. This process was continued until a satisfactory explanation and stability had been reached.

3 THE MINDPOOL PROTOTYPE

Mindpool is an intranet electronic brainstorming system (EBS) prototype, available to the entire organisation. The idea is to mimic the creative atmosphere found in brainstorm sessions, where no suggestions are turned down but instead are used to spawn new and possibly even better ideas (Osborn, 1953). Mindpool is based on three fundamental design principles; asynchronicity, anonymity, and accessibility. Unlike ordinary EBS, Mindpool supports asynchronous brainstorming, which means that users do not have to be active simultaneously. This removes the temporal restriction present in other media, *e.g.* chat forums. The system further allows the proposer to be anonymous whilst yet providing a mechanism for letting people contact them. The reasons for anonymity are two; firstly, it eliminates evaluation apprehension and thus enables users to submit proposals without risking making fools of themselves – a fact known to have a positive effect on the amount of ideas (Diehl and Stroebe, 1987). Secondly, not revealing the contributor helps separating personalities from the issues, thus promoting a more objective evaluation; especially so when power differences exist amongst the participants (Nunamaker *et al.*, 1991). Accessibility is achieved by the web interface allowing access to all organisational members from their ordinary work places, thereby inviting the entire organisation to be part of the process, rather than just a group of a selected few.

Suggestions are submitted as emails and automatically added to a web page. The web is accessible from all platforms and the persistent nature allows the idea to linger long enough for it to be found by many different people in different locations and contexts, thereby allowing ideas to develop long after the point of introduction. The possibility to add comments directly to the proposal, as is the case in news groups, is absent in Mindpool. This helps shielding the new idea from public negative critique. Still, a mechanism that made it possible to contact the proposer either to ask for or to provide more information was provided. Though the latter may contain criticism, the original idea remains publicly available and can serve as a seed for others, whilst the critique is not displayed. The fact that each contributor can be traced also enables individual recognition, which is otherwise a problem in anonymous EBS. For details about Mindpool and the design rationale, see (Stenmark, 2001b).

The screenshot shows the Mindpool interface with a list of suggestions. Annotations 1, 2, 3, and 4 point to specific elements: 1 points to the date and time, 2 to the subject, 3 to the ID, and 4 to the content of a suggestion.

	Date	Subject	Id
1	2000-02-28 : 08:33:27	Employee of the month	2345
2		Employee of the month	
3			2345
4	2000-02-28 : 08:47:44	More flipcharts	2346
		More flipcharts	
			2346
	2000-02-29 : 10:05:09	Don't open doors	2347
		Don't open doors	
			2347

Annotations:
1: Previous month
Current month
Next month
2: Employee of the month
3: Id
4: Why can't we have some more flipcharts in the meeting rooms? They are always out of paper and you have nowhere to write.

Figure 1: The visualisation of ideas in Mindpool, which shows the date and time (1) of the submission, the subject (2) of the submission, the identification number (3) of the submitter, and the actual content (4) of the suggestion.

Mindpool was intended to be a hybrid system, pairing the principles underpinning brainstorming with the suggestion system approach. The rationale was that; 1) lowering the threshold would increase the number of submissions (and submitters), 2) all submissions would be exposed on the corporate intranet, 3) the multitude and diversity of ideas would stimulate to new ideas, and 4) useful suggestions would eventually emerge out of this cumulative process. Assessing the quality and potential value of each suggestion would still be a task for the Proposal Handling Committee but more people would be engaged in the process and ideas that were not good enough to be implemented organisation-wide could still be picked up and applied locally.

4 EMPIRICAL RESULTS

When interviewed about their view on creativity, many respondents expressed it in terms of problem solving. To illustrate, one respondent defined creativity as "[...] the ability to recognise and solve a specific problem". Most respondents also stressed the importance of stimuli of some kind to spark creativity, and mentioned the interaction with other people as an important source. Aside from the shared view of "input from people" as being an important stimuli, a diversity of other situations were mentioned during the interviews: facing a challenging task; going to conferences; visiting other companies; looking at different applications; or doing physical workout. These activities sparked creativity by mentally taking the user somewhere else. Many of the respondents claimed the characteristics of the work tasks to be important for creativity. Particularly important was if the task was challenging and non-routine:

"I improvise a lot in my work. I get new ideas while doing things [...]. If a task is challenging and fun, you become creative [...]. When I'm focused on a thing or on a work process, I get ideas related to that task. I think it's difficult to just sit down and put on the thinking hat [and produce ideas]; ideas pop up while working."

The above quote also illustrates the opinion shared by all respondents that creativity could not be ordered about. "It's more difficult to be creative when you really have to" is an utterance that well depicts the common view of the interviewees; creativity is highly situated and spontaneous. Management's role, as the respondents saw it, was to create a positive atmosphere of openness and trust and where there was a high tolerance for dissenting opinions.

"It's important to have a positive atmosphere, since it makes people bootstrap themselves. Encouragement is thus very important... that and what sort of manager you have. After all, he's the one who has the final say."

New ideas were not always welcomed, though, and in particular the respondents commented negatively on the tinkering often associated with creativity. Experimenting, they argued, can sometimes be a source of trouble if not carried out in controlled test environments. Several of the respondents actually expressed reluctance for trying out new ideas at work. One Network Operator explained:

"Creativity can cause problems, too. In a production environment that has to work... well, if it is working, you'd better leave it alone and not try to fix it up, because then you create problems."

The saying "If it ain't broke, don't fix it" applied here, according to the informant. However, even had there been an interest in testing new things and had an environment in which experiments could safely be carried out existed, the organisational members were simply too busy to engage in tinkering, they claimed. Several respondents explained that they had no time for extraordinary activities, or to do things outside their immediate duties:

"You [...] don't have time to speculate, or be creative in a general sort of way. We're too tightly governed by budgets and deadlines."

Another interviewee pointed out:

"Not only does it require time but it also takes energy to be creative. [...] If you have too much to do you can't be creative any more."

Sending ideas to the suggestion system was one such activity that became down-prioritised due to the workload. Only two of the interviewees had ever submitted anything to the suggestion system, and in both cases it was several years ago. Another reason to withhold ideas brought up by the respondents was the perceived risk of having to implement the idea yourself, thereby further adding to your workload. One interviewee frankly admitted:

"Should I come up with an idea that would help the company but not give me anything tangible in return, I wouldn't mention it. I mean, should I suggest it to my manager he would probably want me to take care of it. That's how they thank you for being smart: you get more work!"

Although admitting they did not know much about the suggestion system, all respondents believed that a suggestion submitted had to be both concrete and well thought-through to be considered by the PHC. This resulted in the threshold for participating becoming too high. One respondent's comment illustrates this opinion:

"It has to be serious stuff, which makes you a bit reluctant to submit. I mean, it has to be something really worthwhile. Much of what I do is part of my daily work and it's not something you would submit – it's part of my ordinary tasks."

The fact that the suggestion system was a black box underpinned these beliefs since the employees could not see the suggestions submitted by others. This also resulted in some users conveying it as meaningless to submit suggestions since they figured somebody else had probably already thought of the same idea and already suggested it.

Mindpool, in contrast, offered full insight into the suggestion database, which the respondents saw as useful. They commented on this as a quick and easy way to get your view out in the open for others to be inspired by. In particular, they appreciated the facts that ideas were exposed to Volvo as a whole and that the application protected the identity of the proposer. Anonymity was considered an important feature since it would eliminate evaluation apprehension. "People are afraid one would laugh at or ridicule their ideas otherwise, so this is a much needed feature", said one informant. Although the users thought of Mindpool as "potentially useful", the prototype application was no immediate success and usage after three weeks was still rather low. The respondents commented this in terms of the critical mass problem:

"I think this is good, if only you get going and get it up to speed, sort of. [...] There's too little content at the moment – you don't want to be the first one to contribute."

Another reason given for not having tried the Mindpool application was the respondents again did not have the time. According to the interviewees, this sort of pro-active creativity was not explicitly encouraged by management and hence received low priority:

"I haven't got round to it. If you don't do it right away, you forget about it. We haven't time to be creative on pure speculation".

Amongst the informants who had used Mindpool, there were complaint about the lack of structure and order in the system. One user suggested the introduction of an administrator or a moderator whose job would be to screen, sort and categorise the suggestions:

"There should be someone to make sure that there is some order to it and that the suggestions are serious. You know - weed out the crap [...]. That person could perhaps also direct certain ideas to the right place in the organisation..."

Another hampering circumstance was the fact that several interviewees saw Mindpool and the traditional suggestion system as competitors:

"If you have a good idea, why post it here [in Mindpool] instead of submitting it to the PHC? There you might get a reward and you know you'll get a response. In this system [Mindpool] you just post things and you'll never know whether someone uses it."

A similar comment was:

"If I post [my idea] on this web site, someone might take it and send it to the suggestion system, and if it turns out to be useful and rewarded, I don't get a thing. You don't want that to happen."

The fear of being robbed of a good idea that the above quotes illustrate could be traced back to the reward system in place. The possibility of tangible remuneration that the reward system represented was perceived as a motivating factor and the respondents clearly testified that without such a construct there would be no reason to participate:

"If you come up with something useful from a financial point of view, and you know you can get a part of it, you get motivated by the money. It can often be the triggering factor that gets things out in the open."

The respondents considered creativity and inventiveness to be outside their ordinary work tasks and Mindpool was therefore an application that received marginal interests. Unless you received some extra benefit, it did not pay off to be creative and the employees did not bother to engage in creativity that only the company would benefit from.

"The person who suggests something that gets implemented should obviously have a part of it [the profit/savings], not the least so considering that he or she would otherwise not do anything about it."

The interviewees did mention alternatives to monetary compensations, albeit implicitly. They indicated that they were willing to develop their ideas as long as the ideas were in line with their own interests, and provided that they were given adequate time. They therefore advocated the introduction of a separate "creativity forum" separate from the suggestion system, where creative people would be "allowed to spend time" trying to develop ideas they have. To be recognised as a creative person and officially allowed entry to such a group would be like becoming one of the "Knights of the Round Table", as one respondent put it, and that was to be seen as a reward in itself.

5 DISCUSSION

The design of Mindpool, with its distributed and asynchronous nature, enabled company-wide brainstorming by using web technology. Mindpool eliminated the need of large facilities and simultaneous sessions, thereby, in theory, allowing company-wide continuous brainstorming. This novel blurring of boundaries between electronic brainstorming and ordinary work activities should, according to theory, have a positive effect on creativity. Although receiving 22 ideas during the three-week test period meant that we outperformed the suggestion system quantitatively, the creativity-boosting effect was less than anticipated, and even though the prototype worked well technically we considered usage a failure. By including insights from social psychology we embrace a multidisciplinary approach to IS use in organisations. To analyse the reasons for this unsuccessful intervention and derive managerial implications, we focus the discussion on the contextual factors synthesised earlier; motivation, autonomy, work settings, and climate.

5.1 Motivation

It was very obvious from the interviews that the organisational members had financial reward in mind when discussing creativity. The practical experiences with Mindpool confirm the findings derived from the previous work at the same site (Stenmark, 2001b) that organisational members express a concern for not receiving recognition and reward for their contributions. The introduction of Mindpool – which had no such reward mechanisms implemented – made this concern very obvious. The

suggestion system in use remunerates the proposer of a good idea with financial compensation corresponding to half of the company's first year's savings. Although explicitly claiming the reward mechanism to have an encouraging effect, the low usage of both the suggestion system and the Mindpool prototype suggests otherwise. During 1999, the PHC received suggestions from 226 of the 2,500+ employees, which means that less than 10 percent of the organisational members participated actively. The discrepancy between the espoused and the actual behaviour observed at Volvo is consistent with the literature (cf. Amabile et al., 1996a,b; Frese et al., 1999). Research on suggestion systems show that the reliance on extrinsic motivation limits participation to typically 10-15 percent of the employees, as opposed to 70-80 percent when no reward system is used, or when recognition is kept to a symbolic level (Robinson and Stern, 1997). Instead, when being truly interested in a task, the opportunity to indulge in and develop such a task was tacitly conceived as a reward in it self. Being able to do so seem to create an intrinsic motivation less likely to affect creativity negatively, and it therefore appears that motivation should be catered for not by relying on large sums of money – despite the respondents testimonies – but on interests, involvement, curiosity, satisfaction, and positive challenges, such as suggested by the literature (Amabile *et al.*, 1996a).

5.2 Autonomy

One respondent told us that he often improvised during his work. This may suggest that the employees had certain control over their work and the autonomy to take initiatives and attend to tasks in a non-routine way. Such autonomous and self-initiated activities are powerful because they are driven primarily by intrinsic motivation. Research in a corporate setting has shown that professional interest rather than espoused theory is what motivates people (Stenmark, 2001a). When employees are allowed, and in fact encouraged, to pick and pursue their own projects, they are driven by their personal interests. Although Volvo IT employees were allowed to improvise, it was tacitly assumed that improvisation should be limited to problem-solving or other reactive situations only. Time constraints and lack of funds hindered the employees from being creative *proactively*. The documented reluctance to change working, albeit not necessarily optimal, procedures suggests possibly also mental restrictions to certain types of creativity. The testimonies given above suggest that employees were activity driven rather than goal driven (cf. Arbaoui. & Oquendo, 1994), and that their degree of autonomy was de facto limited.

Literature stress the need to go beyond the obvious since planned actions can only take an organisation in directions already anticipated. To reach the unexpected (and innovative), the company must go beyond what is scheduled, and put its trust in the unplanned actions that often are the result of user initiatives (Robinson and Stern, 1997). Often, if not always, these unanticipated and unofficial activities are indeed also user initiated and propelled by the users' intrinsic motivation. The expression "skunk works" was coined during the Second World War by the aircraft manufacturer Lockheed Martins to describe a situation where a small group of technicians were allowed to work outside the established bureaucracy and with minimal management control (Mischi, 1999). It has been shown that creativity and innovation are aided by low formalisation and large degrees of freedom, especially during the initial stages (Kanter, 1988). It is also recognised that creativity often requires extraordinary dedication and commitment, and that most employees would willingly do far more than the company could possibly ask of them if only they were allowed to work with things in which they were really interested. The "creative forum" suggested by one respondent where ideas could be tested and developed could be seen as a way to institutionalise skunk work. However, allowing a group of employees to be creative would have little effect on Volvo's performance as compared to if the entire workforce was encouraged to act more autonomously.

5.3 Work settings

To reduce evaluation apprehension the setting offered by Mindpool was based on anonymity. While at the same time being supportive verbally of this feature, the participants reacted negatively in action to

this arrangement as they felt their contributions were neither recognised nor rewarded. The participants were all used to open office landscapes with only a minimum of sound-insulating screen separating the desks. These acoustic walls were low enough for employees to talk to their neighbours and overlook the entire building floor, and collaboration – both formal and informal – occurred regularly. In such an environment, anonymity is not the attribute one would first think of. Instead, the organisational members seemed to be well aware of each others merits and competencies, and in such a setting increased accountability may have worked better (cf. Paulus, 2000).

The openness and free exchange of ideas that Amabile et al. (1996b) found characterise a creative environment could not be identified at our site. Instead, we witnessed competitiveness causing employees to hide ideas from one another. Competitiveness can indeed stimulate creativity (cf. Paulus, 2000) but in combination with anonymity and salient rewards it did not have that effect at Volvo. We saw two different reasons for not sharing ideas; one was to avoid being robbed and thus miss out on the reward; a second was not to generate additional workload. As to the first, the reward-based suggestion system had been in place for decades but was, as we have seen, not much used. The employees probably thought that they eventually would have time and opportunity to develop their idea to reward-deserving suggestions but apparently this did never happen. Whatever embryonic figments they may have had remained silently in their minds failing to generate either personal or organisational gain. It seems that removing the money at stake would have eliminated much of this problem. As to the second, the employees were afraid to suggest changes that would increase their workload. Their current assignments kept them more than busy and when suggestions are not rooted in a personal commitment, having to implement them is conceived as a punishment. Hence, management should primarily encourage employees to develop their areas of interests. Furthermore, it is possible that tasks that one individual find less attractive, may appeal strongly to someone else in the organisation. Mindpool's ability to make visual ideas to the entire organisation was acknowledged by the respondents. The implications are that suggestions should always be made salient and time should be allocated for those interested in developing the ideas further.

5.4 Climate

Face-to-face brainstorming has been used at Volvo for many years without causing conflicts regarding rewards or recognition. This fact suggests that it is not the brainstorming process *per se* that causes Mindpool to fail but some other, contextual factor. One possible reason may be found in the observation that group work, such as brainstorming, often is carried out locally, with participants from the same department or organisational unit. It can be assumed that people who know and trust one another have higher levels of reciprocity and therefore are more willing to share ideas and information. Under such conditions, *i.e.*, when users are likely to meet one another repeatedly, favours are eventually returned. Mindpool, in contrast, begged users to share their insights with anonymous strangers, without guarantee for reciprocity. However, it is a documented fact that the sharing of advice amongst perfect strangers occurs rather regularly on the Internet. Why would these people take the effort to help unknown and distant others solve their problems? Regardless of why, these interactions, although they occurred with no physical contact and without the true identity of the other participants necessarily being revealed, have been shown to give rise to group identity and create a sense of community (Constant *et al.*, 1996). It is clear that Mindpool did not establish this.

The employees stated that they were more creative when having fun and when being challenged by non-routine work, but their accounts also suggested that their tasks in reality were mostly carried out in a rather controlled environment where spontaneous experimentation were unlikely to occur. Risk taking – identified in the literature as an important aspect of creativity – was not viewed positively. The respondents also acknowledged that management attitudes greatly influenced the creative climate but they did not say much about to what extent they thought this influence was positive or negative in their particular case. Indirectly, however, the statements about tight budgets, heavy work-load, and

reluctance to change suggest no active management support; nor did we find any evidence of support on a peer-to-peer level.

5.5 Additional aspects

Differences in preferences between individuals are obvious and inescapable. This means that there is no magic formula that can be applied to all situations. Many different managerial approaches should be applied simultaneously to cater for the differences amongst the co-workers; the literature has pointed to both differences in both cognitive style and creative style, and the above accounts verify this. We have further seen that our respondents contradict themselves. They all seem to believe that rewards would help them be more creative and yet they testify that the reward system makes them reluctant to share ideas with one another, thereby effectively reduce creativity.

Appreciation of creative work requires a delicate balancing between intrinsic and extrinsic motivation, and must be done skilfully. Whatever reward is chosen, it should be used to recognise the expertise or ability of the group or individual, and the reward should be used to motivate further work and not act as a bribe. Encouraging work-focused feedback (as opposed to person-focused feedback) and discouraging excessive initial critique of new ideas foster a positive attitude towards creativity. By demonstrating that innovations and creativity are valued by communicating the potential of the work and accomplishments that have been made, intrinsically motivated employee initiatives could be further propelled.

In modern society, play and work are tacitly assumed to be mutually exclusive – it is perceived “unprofessional” to play. From a creative perspective, however, this separation is unfortunate since many important discoveries have been made whilst playing. Hence, more room should be allocated for experimenting. Although it is not desirable to reinvent the wheel from scratch, thereby repeating all the errors previously made, it is often necessary to allow every one to build their own wheel. This is due to the strong relationship between knowledge and action. Learning-by-doing is the only way to acquire certain knowledge, and this suggests that enough redundancy should be allocated to allow for the experimenting that leads to this experience. The desire to be taken up amongst the “Knights of the Round Table” that one respondent expressed can be seen as an illustration of the need for time to elaborate on one’s own ideas.

However, activity oriented organisations do seldom allow for much spontaneous self-initiated activities, as testified by the quoted respondent earlier. Tight budgets and deadlines are denying the employees the ability to follow-up on the hunches they get, or to be “creative on speculation” as one respondent put it. In a goal oriented setting, members have more freedom to take whatever approaches to reach the goal. It seems Volvo has cut down the redundancy that, according to Nonaka and Takeuchi (1995), is so vital to knowledge creation. To set free the desire to initiate creative acts that already exists within most people, the company must take appropriate actions. For example, Toshiba and 3M allow their employees to devote 15 percent of their time to self-initiated activities (Robinson and Stern, 1997). At Volvo IT, no such time is allocated

5.6 Limitations and suggestions for future research

This study was originally designed as an action case project, and the introduction of Mindpool was intended to boost idea generation and creativity within the company under study. The design of the Mindpool prototype was based on the electronic brainstorming literature and no particular attention was paid to the contextual factors. When the project turned out to be unsuccessful, we searched the literature to find plausible explanations for this failure. The analysis presented herein is thus applied in retrospect; had the study been designed to test the effect of contextual factors we would probably have used another set of questions and interviewed another set of respondents. However, as with creativity, many good research results come out of the unexpected and, as pointed out by Blythin and colleagues (1997), failures often offers good opportunities for new insights.

Our research was carried out in one Swedish organisation. Contextual factors, including norms and culture, are likely to differ significantly between and even within organisations and countries, and one must ask oneself to what extent these results can be generalised. Brainstorming is a well-known and widely applied technique and reward-based suggestion systems have since long been used in both Europe and the U.S. From a practitioners point of view, it therefore seems likely that the lessons learned here can be applied to organisations other than the one studied. Further, suggestion systems and electronic brainstorming systems have been developed in parallel and seemingly without sharing results and experiences. Although this paper describes a failing attempt to marry the two streams, we continue to believe such a cross-fertilisation has great potentials and would therefore like to see more academic work in this area.

The literature on electronic brainstorming teaches us that such tools may be used to enhance group creativity – in particular if the group is larger than 15 individuals. However, most research behind such findings has been carried out in research settings or using students to substitute for real business people. It has yet to be shown that these findings can be replicated in work settings such as the one described in this paper. More research on creativity is therefore needed in organisational contexts and not only in labs.

The work presented in this paper indicates that anonymity is a coin with two sides. Whilst anonymity has been shown to eliminate evaluation apprehension and thereby contributed to increased participation, we find it reducing accountability and thus having a negative effect in participation. Future research should try to find means to preserve and make salient the contribution of each individual while protecting them from critique.

6 CONCLUSIONS

In this work we intended to improve organisational creativity at Volvo IT by marrying electronic brainstorming and a traditional suggestion system. The action case project turned out to be unsuccessful, but a number of interesting findings could be recorded; findings that may prove useful to both practitioners and scholars.

Firstly, we observe that when (a large sum of) money is at stake, employees are discouraged from sharing thoughts and ideas with their peers. Instead, individuals are keeping their tentative thoughts to themselves, trying to work out something really rewarding. This situation causes a focus on the reward rather than on being innovative. Further, the obvious risk is that the employee may never arrive at the groundbreaking conclusion on her own, without interaction and dialogue with other humans, and we therefore suggest that organisations should reconsider extrinsic motivation in form of (large) financial compensation.

Secondly, although salient rewards seem to have a negative impact on creativity, people in general need to be appreciated and organisations should therefore officially recognise creative initiatives and achievements. This suggests that IT tools intended to support creativity must make salient who contributes to the system – without necessarily revealing every link between proposals and proposers; anonymity is still an aspect that has to be balanced in.

Thirdly, it seems lack of time has a negative impact on creativity. When deadlines and budgets are cut so tight that the employees barely manage to do what is expected, they have very small chances of practice the playfulness that is a pre-requirement for creativity. Organisations should therefore consider allowing redundancy in form of slack time for the employees to be creative. While waiting for that to happen, IT tools for creativity may need to be more unobtrusive and more embedded in day to day routines.

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