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Enhancing creative knowledge-work: Challenges and points of leverage

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ABSTRACT

Purpose: The purpose of this paper is to explore critical success factors in knowledge-intensive creative project work, using product development as an example field.

Design/methodology/approach: Critical-incident based in-depth interviews of 11 product development experts (chosen based on their recommendations and length of experience) were carried out. The results were categorized into thematic classes of critical factors.

Findings: Most challenges were embedded in the context of the product development projects. Collaboration and cognitive-motivational factors such as trust, attitude and intrinsic motivation related issues formed the most common classes of discovered critical factors behind product development project success, along with the mediating categories of goal and autonomy related factors. Furthermore, product development specific skills or knowledge accounted only for a small minority of the identified factors.

Practical implications: The most pressing learning objective becomes not updating product development knowledge, but that of increasing motivation, initiative, trust and collaboration. As the discovered challenges are embedded in the context of work, addressing them ultimately requires project managers to master some of the personnel development aspects traditionally left for human resources management. Training efforts need to be tailored to the project context if they are to have a lasting impact on behavior.

Originality/value: In addition to providing further support for the importance of climate factors, this study suggests that special attention should be directed towards goal setting and autonomy, as they play a significant role in many of the climate and cognitive-motivational constructs increasing creativity.

Keywords: organizational climate, collaboration, creativity, product development, goal setting, control

Paper type: Research paper

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INTRODUCTION

New product development, and the management of creative innovation ideas particularly for research and development projects, has become a recent topic of interest in the project management literature (see for example Pirola-Merlo, Härtel, Mann and Hirst, 2002; Davies and Hobday, 2005; Pons, 2008; Kosaroglu and Hunt, 2009). Thus we increasingly see in the literature a search for a sustainable competitive edge where innovation, continuous learning and the full utilization of all organizational members become key factors. But how does one ensure learning, full utilization and creating new products and services? Whether working with more permanent teams or short-term project groups, project managers need to be aware of the critical challenges and enablers of the human side of projects in order to anticipate them, and to support their successful realization. In fact, Baer and Frese (2003: 63) argue that “*the centerpiece of any change process in companies should be to increase climate factors such as psychological safety and initiative before larger changes and innovations are tackled*”.

This article explores critical factors within product development, a prime example of knowledge-intensive, creative team-based project work. The ill-defined problems of product development are too large for any one individual to tackle, requiring multidisciplinary teams that systematically develop new solutions. New product development can also be a core mechanism in creating new knowledge for the whole organization (Nonaka and Takeuchi, 1995). Thus studying product development can allow research to effectively pinpoint what precedes innovation and successful collaboration.

The antecedents of innovativeness

In order to thrive in the knowledge economy, organizations need to ensure that all members participate in creative processes and knowledge creation (Sawyer, 2004). Innovativeness is a critical issue in sustaining competitive edge especially in mature organizations (Dougherty and Hardy, 1996). However, the key area to tackle is not the “innovation skills” of employees. Creativity and innovativeness are heavily influenced by the organizational context (Amabile, Conti, Coon, Lazenby and Herron, 1996). On the other hand, generating new ideas might not always be the pitfall - as Lieber (1996, 75) stated, “*we know that you have already dreamed up the best ways to improve your business. But if you’re like every other company, those great ideas are probably not being acted upon*”. When reviewing the literature, it becomes apparent that rather than innovation skills, cognitive-motivational states of employees and the organizational climate emerge as the most urgent areas to address. Three constructs – motivation, initiative, and trust – seem of particular importance, and autonomy and goals are prominent in studies exploring what enhances these three constructs.

Motivation was notably identified as an integral part of creativity in Amabile’s (1998) model. Particularly intrinsic motivation promotes creativity (Amabile, 1996, 1998; Simonton, 1999), and it has also been connected to change agents (Frohman, 1997). Of

the several work and intrinsic motivation models presented to date (e.g. Gagné & Deci, 2005; Thomas & Velthouse, 1990; Hackman & Oldham, 1976; Deci, 1975), most are agreed that the central variables are perceived meaningfulness and accomplishment. In other words, a task is motivating if the goal is something valuable to achieve, and efforts towards reaching it are bearing fruit. As having worthy goals is a central antecedent for motivation, lack of goal clarity and prioritization can be expected to have detrimental effects on both motivation and creativity. In addition to the importance of goals, a degree of choice or autonomy presents itself in several studies, such as Gagné's and Deci's (2005) work motivation theory, Hackman's and Oldham's (1976) classic job characteristic model and Amabile's *et al.* (1996) model of creativity-supporting workplace environment factors, for example.

Initiative, or proactiveness, on the other hand, has been linked to successful performance for employees (Seibert, Crant and Kraimer 1999; Crant, 1995), entrepreneurs (Korunka, Frank, Lueger, and Mubler, 2003), and small to medium organizations (Frese, Garst and Fay 2007; Baer & Frese, 2003) alike. Initiative increases the amount of rewarded improvement suggestions submitted by workers (Frese, Teng and Wijnen, 1999), and predicts subsequent innovation (Seibert, Kraimer and Crant, 2001). Initiative also increases both idea creativity and initial engagement in the creative process (Binnewies, Ohly and Sonnentag, 2007). Most noteworthy however, process innovations have been found to increase performance only in a climate of initiative, making achieving this climate a primary goal in any innovation enhancement program (Baer and Frese, 2003). Again, two antecedents rise from most models of initiative or proactive behavior (e.g. Parker, Williams and Turner, 2006; Frese *et al.*, 2007): autonomy and self-efficacy, that is, expectancy that one is able to perform a certain action effectively (Bandura, 1982). Self-efficacy, in turn, is largely dependable of mastery experiences, autonomy and trust. An environment lacking these qualities is unlikely to produce innovations.

In addition to enhancing self-efficacy, trust is also an important enhancer of innovation (Ahmed, 1998). Trust enables channeling employees' energy towards reaching alternative goals (Dirks, 1999). Especially trust in leaders and the organization has predicted variance in behavioral, product, process and strategic innovativeness (Ellonen, Blomqvist and Puumalainen, 2008). Trust is also a key issue in any kind of teamwork, increasing cooperation and collaboration (Mayer, Davis and Schoorman, 1995; Tyler, 2003) and complex knowledge sharing (Chowdhury, 2005). In addition, trust can increase commitment (Dirks and Ferrin, 2001), employee satisfaction (Shockley-Zalabak, Ellis and Winograd, 2000) and initiative (Parker *et al.*, 2006). Autonomy, or level of control, and goals are less prominent in trust antecedent models, which often focus around variations of the perceived ability, benevolence and integrity (including value congruence) of the party to be trusted (Mayer *et al.*, 1995). However, both perceived congruity of goals and perceived control opportunities (especially non-formalized control) have been connected to trust in numerous studies (e.g. Das & Teng, 2001; Mayer *et al.*, 1995; Das & Teng, 1998; Johnson & Grayson, 2005).

As product developers need to continuously develop new solutions, one can expect the importance of climate and cognitive-motivational factors behind innovation – such as intrinsic motivation, initiative and trust – to be heightened compared to more

routine project work. Thus these constructs should appear in smaller samples as well. In addition to direct references, one can also expect the task characteristic building the three constructs to be prominently present. The central role of autonomy and goals-clarity is highlighted, as they both influence innovativeness directly, affecting workers' ability to direct efforts, and via enhancing the creativity-supporting factors of motivation, initiative, and trust. Thus lack of goal clarity and control opportunities for employees will likely greatly hinder progress in any product development project.

STUDY: CRITICAL FACTORS IN PRODUCT DEVELOPMENT

The aim of the study was to identify critical factors that managers and developers should take into account in product development projects. Product development was chosen for the context of the study, as it is especially challenging due to the necessity of continuous improvement and innovation.

Data on the critical success factors was collected from 11 expert product developers. The participants were all chosen based on the recommendation of the product development department heads. They had from 6 to 36 years of experience in their field, the average being 20 years of experience. The participants typically were heads of design in their projects, and the majority had a Master's Degree in engineering. All of the participants were Finnish men, and they represented four large, international companies. They received no reward for participating in the study.

Critical-incident based in-depth interviews (e.g. Flanagan, 1954; Chell, 2004) were held, in which the product development expert participants recounted projects that had gone particularly well and on the other hand, those that had not gone according to plan. These example projects were discussed in detail in order to identify turning points, differences between projects and the most important contributing factors. All interviews were conducted in Finnish, the mother tongue of the participants. The interviews lasted from 71 to 203 minutes, averaging at 121 minutes. They were audiorecorded and later transcribed.

The critical factors were searched from the transcripts, producing a total of 336 mentions of critical factors in product development projects. The mentioned factors were categorized into mutually exclusive categories based on thematic similarity. Nine salient categories arose, and all of them were brought up in at least 7 of the 11 expert interviews (see Table 1).

Table 1. Categories mentioned by each expert

Category	Mentioned by expert											No. of experts who mentioned the category
	1	2	3	4	5	6	7	8	9	10	11	
Collaboration	X	X	X	X	X	X	X	X	X	X	X	11
Autonomy	X	X			X	X	X	X	X	X		8
Goals	X	X	X	X	X		X	X	X	X		9
Time	X		X	X	X	X	X	X		X	X	9
Attitude	X		X	X	X	X	X	X	X	X		9
Trust	X			X	X	X	X		X	X	X	8
Motivation	X		X				X	X	X	X	X	7
PD skills and knowledge	X	X			X		X	X	X		X	7
Communication	X	X	X	X	X		X			X		7
Other	X		X	X	X		X	X	X			7

Results

The critical factors contributing to product development project success and failure identified by the product development experts formed nine categories: collaboration, communication, attitude, trust, motivation, autonomy, goals, time, and product-development specific skills and knowledge (see Table 2).

As predicted based on previous literature discussed in this paper, cognitive-motivational and organizational climate issues were prominent among the results. In fact, the resulting categories are very general in the sense that most of them could have emerged from any knowledge work related profession. Recent similar findings were reported in a study of innovation diffusion of the implementation of information technology groupware in the construction industry (Peansupap and Walker, 2005;2006).

Table 2. Critical factors affecting product development project success

Category	% of all mentioned critical factors
Collaboration <i>incl. holding on to one's own previous solution, unwillingness to adopt others' solutions (9% of the category)</i> <i>conflicting priorities and/or goals (7% of the category)</i>	20%
Autonomy <i>incl. sufficient freedom in framing the problem (32% of the category)</i> <i>problems with bureaucracy (17% of the category)</i>	12%
Goals <i>incl. clarity of goals (21% of the category)</i> <i>maintaining a coherent whole (18% of the category)</i>	12%
Time <i>incl. lack of time (32% of the category)</i> <i>difficulties in estimating time and schedules (32% of the category)</i> <i>time problems caused by changes added too late in the project (16%)</i>	11%
Attitude <i>incl. proactivity (22% of the category)</i> <i>problems with illusions of knowing all relevant information,</i> <i>insufficient questioning (22% of the category)</i>	11%
Trust	10%
Motivation <i>incl. genuine enthusiasm and interest (35% of the category)</i>	10%
Product-development skills and knowledge	6%
Communication	5%
Other	5%

Project challenges related to product development specific skills and knowledge accounted for only 6 % of the identified factors. Instead, the largest category was collaboration-related factors. Participants frequently brought up the need for better collaboration with other departments and professions. Although not always explicitly stated, the examples often illustrated a clear connection with collaboration problems and lack of sufficient trust. However, even when collaboration was embraced, there were several problems with transferring work and ideas. Collaboration combined with communication covered one fourth of the mentioned critical factors.

Motivation, initiative and trust – important antecedents of innovation presented in the literature – accounted for approximately 22 percent of the critical factors.

Proactiveness, genuine interest and enjoying work were frequently mentioned, as was the importance of trust between collaborators and co-workers. Trust and motivation each covered 10 % of the 336 identified factors. Initiative was noticeably less prominent among the results, but was nevertheless the largest subcategory of attitudinal factors.

As hypothesized, autonomy and goals were also prominent in the results, each covering 12% of all the factors. In fact, autonomy and goal-related factors covered slightly more out of the 336 mentioned critical factors than motivation, trust and initiative. Autonomy was highly valued, and especially the experts' control over the definition of the problem was connected to project success (covering 4 % of the mentioned critical factors).

However, lack of time was also one of the most often cited challenges. Insufficient time was often perceived as resulting from factors beyond the employees control, and many felt they had limited influence over scheduling decisions. Lack of time was perceived to have a negative impact on almost all aspects of the project and organization, including product quality, costs, and collaboration. It also had an adverse affect on personal overall work capability.

DISCUSSION

Significance of the results

The results of the study clearly illustrate that even in a field where innovation is essential, most of the acute challenges do not concern innovation skills, but rather the organizational context of innovation – the work communities' culture, habits and practices. Organizational climate and cognitive-motivational related factors such as motivation, trust, proactivity and willingness to collaborate dominated the success factors, as was hypothesized. In addition and according to the hypothesis, goal clarity and autonomy were prominently present. In fact, these two categories combined covered a slightly larger portion of the critical factors than what motivation, trust, and initiative did. This occurred likely as autonomy and goals have both a direct impact on the ability to direct efforts, and an indirect effect on innovativeness via affecting motivation, trust and initiative.

The results provide further support to Baer and Frese's (2003) suggestion that all innovation enhancement efforts should start by addressing climate factors. Similar results highlighting the importance of the context and demonstrating the prevalence of socio-cognitive problems over technical problems have been previously obtained in construction projects (Forgues & Koskela, 2009), and are extended to product development projects by this study. This provides further support for the obtained results. In addition to reminding of the importance of climate factors, this study further suggests that level of control and goals, via their effects on motivation, trust and attitudes, are key constructs in creating such beneficial climates. The identified critical factor categories provide researchers and practitioners alike with a helpful starting point to assess both the reasons behind the current situation and where improvement efforts are likely to bear

most fruit.

Implementation and exploitation

Trust, motivation and attitude covered a third of the identified critical factors in product development projects, and collaboration covered a further fifth of the factors. How should managers seek to foster these qualities? The results suggest that goal setting, goal clarity and autonomy are among the most crucial factors to target, as they formed the second and third largest categories.

On the other hand, time management covered over one tenth of the critical factors, and lack of time came up with almost every disappointing project. Scheduling and prioritizing have also been revealed as acute product development challenges in previous studies (e.g. Björklund and Eloranta, 2009). However, the results do not necessarily imply that project management should directly address these time-related challenges, as autonomy was highly valued by the experts. The product development experts felt bureaucracy hindered them and decreased their energy towards the project. Andersen (1996; 2008) cautions against being too rigid with planning and scheduling in particular with types of projects where there is much uncertainty and the effort of scheduling fine grained activities, rather than planning in broader and more conceptual terms, is counter productive. In fact, the interviews implied that giving greater autonomy for the experts in terms of scheduling and goal setting might go further in achieving the desired result. The scope and direction of most successful project examples had been defined by the product developers. Project managers might rather focus their efforts in aiding in the role and responsibility division between project team members, as well as helping the teams to establish shared priorities.

In addition, the results have implications for both training content and methodology. Regarding training content, product development specific knowledge and skills accounted for only 6 % of all of the mentioned critical factors. Yet traditional supplementary education and training are often heavily focused to subject-specific knowledge, such as new methodologies for idea generation and evaluation. The obtained results indicated a need for a shift from so-called hard to “soft” skills, such as creating a favorable culture and practices for collaboration and innovativeness. Furthermore, the results also raise issues on training methods and contexts. One of the single largest challenges faced in product development projects was lack of time. When coping with insufficient time for prolonged periods, experimentation becomes unlikely, and people typically revert to old, tried and tested, working methods and ideas. As a result, the work does not renew itself, innovations are not made and any new methods learned in separate training are soon forgotten. This further highlights the need for tying learning and improvement efforts to daily project life. On the other hand, it also emphasizes the cost of taking away time from employees’ projects for additional training, and the need for any training to produce a lasting impact on thoughts and behavior in order for the benefits to exceed the costs.

In conclusion, as the discovered challenges are embedded in the context of work, so should the efforts to address them be as well. Instead of innovation and product

development skill training, creating a functioning context (climate and collaboration) for innovation is the key goal in improving project performance. The success of any other improvement attempt is largely dependent on the human side factors (as was illustrated in the case of process innovation effectiveness by Baer and Frese, 2003). These content and context issues ultimately require project managers to master some of the personnel development aspects traditionally left for human resources management, as learning, organizational well-being, employee satisfaction, creativity and project performance become inseparable. In the area of cognitive-motivational and climate factors, there are no one-size-fits-all solutions, and any purely theoretical knowledge risks to remain inert due to the pressing lack of time faced by employees. Both the content and implementation of training should be tailored to the needs and context of the project. Faced with insufficient time, training and improvement efforts must be tied to the daily life context of the project if they are to have a lasting impact on performance.

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