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Creativity, trust and systematic processes in product development

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ABSTRACT

This paper addresses the challenge of striking a balance between, on one hand, mitigating uncertainty through the existence of systematic processes and structures and, on the other, stimulating creativity through allowable variation in work processes and structures. Both objectives are fundamental aspects of product development work. Our main finding is that both objectives can be achieved simultaneously. We introduce trust as a mediating variable. We show first, that being systematic in the processes for obtaining information and applying explicit organizational rules and structures in product development work creates an atmosphere of trust in the organization. Second, we show that trust increases creativity. The paper contributes to an understanding of how and why trust is important in product development organizations and of how trust can be actively managed. Above all, the paper contributes to the understanding of how uncertainty and creativity should be managed in organizations conducting product development.

1. Introduction

This paper addresses the balance between mitigating uncertainty and stimulating creativity in product development. Facing the inherent uncertainty in product development work (e.g., Stockstrom and Herstatt, 2008), firms are advised on one hand to decrease variation through systematized processes and structures (e.g., Cooper, 1992) and on the other, they are also advised to increase variation in processes and structures in order to stimulate creativity in product development work (Amabile et al., 1996). Both systematized processes and structures (e.g., Cooper, 1992), and creativity (e.g., Bassett-Jones, 2005) are central aspects of innovation. Achieving both requires balance, as expressed by Clark and Fujimoto (1991, p. 161) "The challenge in product development is not so much unilateral pursuit of organic structure and permissive management style as a subtle balance of control and freedom, precision and flexibility, individualism and teamwork".

At its most general level, this paper argues that there is no inherent tradeoff between being systematic with processes and structures while also stimulating creativity in product development work. More specifically, the paper shows that the process for obtaining information can be systematic and organizational rules and structures can be explicit – while the climate in the organization remains nevertheless creative. The compatibility of these apparent contraries lies in how *trust* is achieved and managed within organizations.

Previous research has modeled trust as an outcome of predictability (e.g., Lewicki and Bunker, 1996), i.e., when the actions of organizational members are perceived as predictable, trust will increase. Systematic processes and structures exist in order to decrease variation and thereby increase predictability. We argue, therefore, that systematic processes and structures will foster trust in an organization.

Previous research has identified trust as an important element in product development because it enhances learning and stimulates creativity (Barczak et al., 2010). This paper therefore explores the following research question: *can trust function as a mediating variable that, enables firms to combine systematic processes and structure with creativity*? We propose and then test the proposition that when goodwill trust is high in an organization, product development activity can benefit from being systematic in processes and structures without crowding out creativity.

In doing so, this paper makes four key contributions. First, we show that trust can emerge beyond the simply the scope of individual interaction. More specifically, our study describes how systematic processes and structures contribute to predictability in an organization and thereby foster trust. Second, we show how trust can be actively managed within an organization. We are able to do so by translating the abstract notion of predictable behaviors into the tangible notion of systematic processes and structures. Because processes and structures are the result of active management, the results of this paper imply that trust can also be actively managed. Third, we analyze trust in two dimensions – goodwill

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trust and competence trust. We argue that whereas goodwill trust and creativity are closely related, competence trust does not necessarily stimulate creativity. This finding complements earlier studies arguing for a relationship between trust and creativity (Bidault and Castello, 2009, 2010; Chen et al., 2008). Fourth, by introducing trust as a mediating variable, we find that being systematic in processes and structures does not necessarily crowd out creativity. Thereby, we elaborate on previous theoretical suggestions (Feldman and Pentland, 2003; Gilson et al., 2005) that systematized rules and routines can result in creativity.

First – in Section 2 – we outline a conceptual framework that defines the role of trust as a mediating link between being systematic and being creative. In Section 3, we describe and justify the sample and data collection process and the constructs and measures of investigation. In Section 4, we account for the analytical processes applied and for results. Finally, in Section 5, we discuss our findings and their implications for research and practice as well as their limitations.

2. Theoretical background and hypotheses

2.1. The supposed tradeoff between systematic processes and structures and creativity

Organizations need both to explore new knowledge and to exploit existing knowledge in order to create both radical and incremental innovation (e.g., Benner and Tushman, 2003; March, 1991). Incremental innovations are exploitative (products designed to meet customers' existing needs), and radical innovations are explorative (meet the needs of emerging customers). In most organizations product development work includes elements of both exploration and exploitation, yet the mutual pursuit of these two forms of innovation remains a central challenge.

Adding to this challenge is the inherent uncertainty in product development because for each new product the organization faces new problems that require novel information and imaginative problem-solving. In this paper, *uncertainty* is defined as *the difference between the amount of information required to perform a task and the amount of information already possessed by the organization* (Galbraith, 1973, p. 5). The three types of uncertainty (or in Galbraith's terms information gaps) relevant to product development are commonly referred to: market-related uncertainty; technology-related uncertainty and project scope (Davila, 2000). These types of uncertainty affect both the outcome and the process of product development.

Because the effects of uncertainty are potentially significant to product development, a good deal of research provides advice on mitigating uncertainty. When conditions are uncertain, firms are advised to systematize their methods for obtaining information (Arora and Gambardella, 1994; Davila, 2000; Holt, 1978; Horsmans, 1979). A systematic (as opposed to trial-and-error) process for gathering information about customer needs or technological advancements makes it easier to overcome the information gaps that Galbraith refers to. In addition, firms are advised to form explicit organizational rules and structures in order to moderate uncertainty. This line of argument can be traced back to the works by Robert Cooper (e.g., 1992) that led to the development of 'phase-gate' processes that many firms have subsequently adopted.

The process for developing a new product is less vague in an organization where employees know how to interact and with whom to interact. Taken together, systematized (as opposed to trial-and-error) processes and explicit organizational rules and structures detail how and by whom work should be performed. Their goals are to reduce the variance associated with the task (Gilson et al., 2005; March, 1991) and thereby make operations more consistent and the product development process less uncertain.

Product development also calls for creative thinking (Amabile et al., 1996; Heinze et al., 2009; Iwamura and Jog, 1991). Amabile (1998) and Amabile and Conti (1999) argue that freedom in processes increases intrinsic motivation and helps employees make the most of their skills. Individuals who rely on well-known routines and rigid organizational rules and structures become less willing or able to try out new ideas – thus hampering creativity. Therefore, in order to be able to stimulate creativity, defined as the production of novel and useful ideas (Amabile et al., 1996), firms are advised to *enhance variation to optimize the fit between team efforts and outcomes* (Gilson et al., 2005, p. 523).

Mitigating uncertainty and stimulating creativity is consequently described in the literature as a balancing act. Systematized processes have been linked to the concept of exploitation and incremental innovation, as expressed by March's (1991): "exploitation includes such things as refinement [. . .] efficiency, selection, implementation, execution." Freedom in processes, on the other hand, has been linked to creativity, exploration and radical innovation. The purpose of this paper is to complicate and nuance the apparent tradeoff between having systematic processes and structures versus creativity. This we do by explicitly attending to the concept of trust. The main question we address is (1) can trust function as a mediating variable, thus enabling firms to combine systematic processes and structures with creativity? In order to answer this question, we will first address the role trust plays in product development, and we do so by answering the following two questions: (2) can systematic processes and structures foster a climate of trust in organizations? And (3) is there a link between goodwill trust and creativity in organizations? These questions are addressed from Sections 2.2 to 2.5.

2.2. The role of trust in product development settings

Following previous literature, we define trust as a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another (Rousseau et al., 1998). To trust is to make a leap of faith, to expect others to honor rather than betray trust. Trust, thereby, does not reduce risk per se in a situation, but reduces the perceived level of risk (Das and Teng, 2001).

Trust is a multidimensional construct. In one dimension trust can exist between two individuals, within groups of individuals, within a single organization and between organizations. The focus of this paper is the level of trust within a product development project conducted within a single firm. In a second dimension, trust can be of different qualitative types (Dietz and Hartog, 2006). In a well-cited framework, McAllister (1995) distinguishes between cognition-based trust and affect-based trust. Cognition-based trust is grounded in available knowledge and "good reasons". Cognition-based trust, thereby, is closely related to responsibility, reliability, competence and dependability. Moreover it also evolves over time as the trustor confirms the expectations of the trustee. Affect-based trust, on the other hand, is grounded in emotional bonds between individuals. Such trust is based on a genuine concern for the other party, a belief in the inherent value of a relationship.

A third dimension of trust concerns the content of the trust (Dietz and Hartog, 2006). In this paper, we follow the line of Sako (1992) and Das and Teng (2001) and focus specifically on this dimension by addressing the difference between competence trust versus goodwill trust. Competence trust is defined *as trust that the other party is capable to do what he or she promises* and is also referred to as ability (Mayer et al., 1995). Goodwill trust is defined as *trust in the moral integrity of the other party* (Ring and Van De Ven, 1994), and it also denotes the extent to which a partner is genuinely

interested in the other's welfare and will seek joint gain (Doney and Cannon, 1997). Goodwill trust is also referred to as benevolence and integrity (Mayer et al., 1995).

Trust has been found to be a key performance driver in product development projects. For example, Dayan et al. (2009) show that managerial trust can have a positive impact on product success, team learning and speed-to-market in product development settings. In studies of product development in collaboration between firms Bstieler (2006) argues that trust stimulates extra efforts and facilitates adaptive responses to unforeseen problems. Madhavan and Grover (1998) and Koskinen et al. (2003) show that trust in product development teams facilitates learning and knowledge transfer. The underlying argument in these studies is that trust facilitates coordination among project members and therefore improves product development work. A common limitation in these studies, however, is that the multidimensionality of trust is neglected. As a result, we know little about whether it is cognition-based trust and/or affect-based trust driving performance or if competence trust is more or less important than goodwill trust. In this paper, we address in particular differences between goodwill trust and competence trust and thereby partly address these limitations.

2.3. Systematic and explicit rules and structures as a basis for fostering trust within an organization

Much research has been devoted to identifying the sources of trust, i.e. to understanding how and why trust develops. In a thorough literature review, Dietz and Hartog (2006) identify three sources of trust: characteristics of the trustor; characteristics of the trustee; and characteristics of the relationship between the trustor and the trustee. In this study, we focus on the characteristics of the relationship between the trustor and the trustee. Within this line of research, earlier studies have identified trust as a result of *a process of interaction* between trustor and trustee (e.g., Axelrod, 1984; Lewicki and Bunker, 1996; Möllering, 2007; Nooteboom, 1996; Ring and Van De Ven, 1992, 1994; Zucker, 1986). That is, as trustor and trustee interact, over time they develop trust.

For example, Ring and Van De Ven (1992, 1994) argue that trust is a consequence of repeated action, when both parties uphold norms of equity. Axelrod (1984) uses an example drawn from soldiers in World War I who, over time, established the praxis of either "live and let live" or "kill and get killed". One reason the process of interaction results in trust is that interaction increases the ability of one person to *predict* and understand the actions of others (Lewicki and Bunker, 1996). Even if the other party proves untrustworthy, predictability increases trust because it enables the trustor to foresee when trust will be violated (Lewicki and Bunker, 1996). Over time and on the basis of predictability resulting from repeated interaction, cognition-based trust develops (McAllister, 1995). Another reason the process of interaction results in trust is because during interaction, individuals develop emotional bonds with one another. Thereby, affect-based trust also is fostered (McAllister, 1995). For such affect-based trust to be developed, however, some level of cognition-based trust may be necessary, or individuals would not continue their investment in the relationship (McAllister, 1995).

Therefore a central task for managers seeking to foster trust in product development projects is to manage the process of interaction so that it leads to trust. In this paper, we address that task in our first research question: *can systematic processes and structures foster a climate of trust in the organization*? Systematic (as opposed to trial-and-error) processes and explicit organizational rules and structures detail how and by whom work should be performed, and their goal is to reduce the variance associated with a task (Gilson et al., 2005; March, 1991). When processes and structures are systematized, they serve as a proxy of both past interaction and of future interaction. As such, their function is somewhat similar to that of a brand or reputation; they allow one person to make inferences about another person's trustworthiness without having to engage in repeated, direct interaction.

Being systematic thus increases the predictability of a certain process or structure. Systematic processes and structures should limit the trustee's leeway for being opportunistic, because opportunistic behavior is easer to observe. Also, systematic processes and structures should make it easier for the trustor to understand and predict the behavior of the trustee, leaving less room for misunderstandings and negative trust spirals. Therefore, systematic processes and structures should increase goodwill trust. Systematic processes and structures serve as a manual for action and interaction. Therefore, they should make it easier to act according to what in the organization is perceived as professional and thereby increase also competence trust. Similar arguments have been made in the literature on trust and control within organizations. For example, Sitkin and George (2005) note that managers can use control as a signal that they follow socially accepted practices and thereby build trust through control. Ferrin et al. (2007) argue that monitoring can increase cooperation and thereby also trust. Taken together, systematized processes and structures should therefore result both in goodwill trust and in competence trust.

In product development settings, the process for acquiring new knowledge is especially important (Arora and Gambardella, 1994; Davila, 2000; Holt, 1978; Horsmans, 1979). In this paper, we focus therefore on this process and argue that when it is systematized, and when organizational rules and structures are explicit, individuals' actions are more predictable. With that increased predictability both goodwill trust and competence trust increase within the product development team. Hereafter, in making this argument we use the term *systematic processes and structures* to describe *the processes for obtaining information that are systematic and organizational rules and structures that are explicit*.

Hypothesis 1a. Systematic processes and structures are positively related to competence trust.

Hypothesis 1b. Systematic processes and structures are positively related to goodwill trust.

2.4. Trust and creativity

The ability to be creative is fundamental in product development settings (Amabile et al., 1996; Heinze et al., 2009; Iwamura and Jog, 1991). Creativity is defined as *the production of novel and useful ideas* (Amabile et al., 1996). The second question this paper addresses is, therefore, *whether there is a link between trust and creativity in organizations*? In response we expect a positive link between *goodwill trust* and creativity for several reasons.

First, goodwill trust makes individuals more inclined to share knowledge (Koskinen et al., 2003; Madhavan and Grover, 1998), and knowledge sharing creates opportunities for creativity. Second, because product development activity is highly uncertain, bringing forward new ideas, i.e., being creative, can be risky. For example, it can expose a lack of knowledge, lack of structure or lack of a consistent plan for how product development work will be carried forward. We hypothesize that creativity in situations of uncertainty is possible only if individuals are confident that others will not exploit exposures of this kind. Most straightforwardly way, individuals will only be creative when they are confident that others will not laugh at seemingly foolish ideas. Trust in someone's goodwill creates an expectation that the other party will not purposely exploit vulnerability.

Hypothesis 2. Goodwill trust is positively related to creativity.

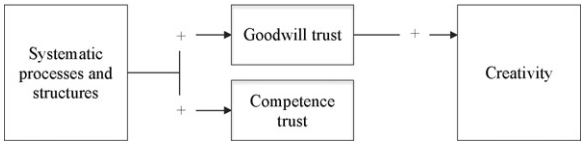

Fig. 1. Conceptual framework.

We do not expect, on the other hand, *competence trust*, to be linked to creativity. Trust in someone's competence creates confidence that the other party is capable. It does not, however, reduce the perceived risk of the other party laughing at seemingly foolish ideas. Therefore, bringing forward a creative suggestion is not less risky when competence trust is high.

2.5. The mediating effect of goodwill trust on the relationship between systematic processes and structures versus creativity

The main question we address in this paper is: can goodwill trust function as a mediating variable and so enable firms to combine systematic processes and structures with creativity? As stated in Section 2.1, it has been argued that firms balance the competitive tension between mitigating uncertainties and stimulating creativity. This proposed tradeoff between systematic processes and structures versus creativity has, however, not gone unchallenged. Feldman and Pentland (2003) argue, in a theoretical piece, that seemingly stable structures too are subject to incremental change. Gilson et al. (2005) show that a creative climate is most efficient when work processes are also standardized.

We follow the argument of these researchers (Feldman and Pentland, 2003; Gilson et al., 2005) and nuance the substitutive view of systematization versus creativity. We explicitly attend to goodwill trust, and first we suggest that systematic processes and structures can foster a trustful environment (H1a and H1b). Second, we suggest that goodwill trust fosters creativity (H2). Thus, the framework suggests a mediating role for goodwill trust in the relationship between systematic processes and structures and creativity.

Systematic processes and structures do not hamper creative thinking because they create a climate of goodwill trust in the organization. In such climates, individuals are more inclined to share knowledge (Koskinen et al., 2003; Madhavan and Grover, 1998). They are also confident that wild ideas are appreciated and will not be ridiculed. But, on the other hand, when processes are ad hoc, rules are vague and organizational structures unclear, behavior in the organization is less predictable and therefore goodwill trust is lower. Individuals can, in such organizations, be less concerned that the vulnerability exposed in a creative suggestion will be exploited.

Hypothesis 3. Goodwill trust will positively mediate the relationship between systematic processes and structures versus creativity.

The argument outlined in Hypotheses 1–3 is illustrated in Fig. 1, which makes clear that goodwill trust serves as a mediating link between systematic processes and structures versus creativity. Competence trust, on the other hand, is not linked to creativity.

3. Method

3.1. Sample

The study focuses on medium-sized (employing between 50 and 500 individuals) technology-based firms in Sweden. Technology-based firms were selected because they engage in product development activity. Medium-sized firms were selected for two reasons.

First, because the independent variable (systematic processes and structures) can be expected to vary in such firms. Whereas small firms are likely to rely on more informal processes, rules and structures, large firms are likely to be more formal. Medium-sized firms, on the other hand, can be expected to be less homogenous in the degree of systematization in the processes they employ and the degree of explicitness in their organizational rules and structures. Medium-sized firms thereby constitute a suitable sample for the study of how systematic processes and structures affect the dependent variables goodwill trust and creativity. The second reason for choosing medium-sized firms is that such firms are socially and economically important. Small and medium-sized firms represent 99% of all firms in the EU. They provide around 65 million jobs and contribute to entrepreneurship and innovation (EuropeanCommission, 2003).

In the first phase, using data from SCB (Statistics Sweden) we could identify firms employing between 50 and 500 individuals (i.e., medium-sized) with activity in one of the following five different sectors: plastics and industrial chemistry (22.5%), pharmacology (5.2%), electronics and communication equipment (22.1%), technology and architecture consultants (41.8%) and science (8.4%) with SNI-codes 20, 21, 27, 71 and 72. A total of 329 such firms were identified. The firms were private joint-stock firms. In the second phase, we identified six different manager positions in the firms that could be suitable respondents to the survey: R&D manager, technical manager, development manager, production manager, construction manager and managing director. To get the names and addresses to the positions we contacted the Swedish Posten (Nordic region's largest messaging and logistics operator). In total, the 329 firms revealed 780 positions, including names and addresses of these firms. Firms without one of these six positions were removed from the sample (control parameter). We also removed firms without industrial product development, which meant the exclusion of all architecture and technology consultants and some environmental engineering firms and research institutes. After applying these control parameters, the total number of firms included in the sample was reduced to 223.

3.2. Data collection

In the first stage, questionnaires were administered in May 2010, to the 223 medium-sized, technology-based firms included in the study. Written questionnaires were administered by regular post to identify respondents (R&D manager, development manager, technical manager, production manager, construction manager and managing director). An additional 31 firms (no response) were rejected at this point from the sample as they fell outside the sample frame. In most cases, that meant firms without R&D or product development activity. The total number of firms included in the sample was thus reduced to 192.

After three written reminders by and one telephone reminder, we received valid responses from 99 firms. This represents a response rate of 51.6%, a figure that compares favorably with mail surveys of small and medium-sized firms.

The questions used in this paper were part of a larger questionnaire examining the innovativeness of medium-sized, Swedish technology-based firms. The questionnaire and its introduction clearly stated that the overall concern was the effects of creativity management on the firm's innovativeness and performance. Additionally several of the sections contained questions concerning innovation performance, information sharing and strategic or organizational perspectives on product development.

Initially, we specifically addressed the survey to R&D managers and technical managers. If these particular positions did not exist in a given company, we broadened the search and also included the following titles: development manager, production manager,

construction manager and managing director. It is our firm belief that the respondents were aware that the questions were to be interpreted in the context of product development work. Yet as some of the questions are fairly broad we cannot fully ignore the risk that the respondents may interpret the questions in a broader context than product development. Most items were measured on 1–5 Likert-type scales. Secondary data, business data, on firms' business performance (year 2009), were gathered from a database (Bolagsinfo) at Chalmers University Library (lib.chalmers.se).

Table 1 presents the broad characteristics of the firms involved. Compared to the responding firms, those that had not responded to our survey have somewhat lower sales, profit margins and profits, but have larger total assets. Apart from this, the table reveals no significant differences between responding firms and non-responding firms.

Generally speaking, questionnaires tend to be weak on validity and strong on reliability. The artificiality of the survey format reduces validity, which is related to the strength of the conclusions or propositions. Cook and Campbell (1979) define validity as *the best available approximation to the truth or falsity of a given inference, proposition or conclusion*. Since managers' perceptions are difficult to capture in terms of dichotomies such as "agree/disagree," "support/oppose," "like/dislike," or on Likert scales of such dichotomies, the measures are only approximate indicators. Regardless of the sample size of the study and the correlations between items in the scale, the reliability of Likert scales drops if the number of options is reduced. The factorial validity (assessed by the percentage of variance explained) has the same behavior as reliability regardless of sample size and the correlation between items. Both reflective and formative measures may be associated with a particular construct (Fornell and Bookstein, 1982). Further, factor analysis assumes a reflective scale model and does not test for any alternative model for inter-item relation. The principal reason for selecting a reflective model over a formative model is that clusters of beliefs are generally inter-related. In classical test theory, scales are reflective measures (the items are assumed to reflect or manifest an underlying construct), so we have in our study chosen reflective scales.

Conway and Lance (2010) make recommendations for what reviewers and researchers should reasonably expect regarding common method bias. They believe it is reasonable to expect: (i) an argument for why self-reports are appropriate, (ii) construct validity evidence, (iii) lack of overlap in items for different constructs, and (iv) evidence that authors took proactive design steps to mitigate threats of method effects. They specifically do not recommend post hoc statistical control strategies because all have significant drawbacks and some have shown poor empirical results.

One corrective for the problem of common method bias is to send out the questionnaire to multiple respondents in each firm and then extract the average. Unfortunately, this was not a valid strategy for us as our study concerns medium-sized firms where typically only one person fits respondent criteria. Another approach to controlling common method bias is to apply statistical remedies (Cook and Campbell, 1979). One of the most widely used techniques is to apply the Harman's single factor test (Podsakoff et al., 2003). When using this test, all variables in the study are loaded into an explorative factor analysis. If (i) a single factor emerges from the factor analysis or (ii) one major factor accounts for the covariance among the measures, then common method bias is apparent. Harman's single factor's test was applied in this study (see Section 4.1 for results), and that test found no indications of common method bias in the data. Further, there are numerous well-established self-reported measures of different constructs, which have obtained construct validity evidence through both convergent and discriminant validation. In our study, which is a field study, we use the same scale (Likert scale 1–5) for all the items. We also argue that the risk for common method bias is reduced here because the questionnaire's different headings and sections produce overlap in different items.

3.3. Constructs and measures for investigation

The focus of this study is to understand the links and the interplay between four constructs: systematic processes and structures; goodwill trust; competence trust; and creativity. All measures consisted of Likert-type scales, from 1 (strongly disagree) to 5 (strongly agree). The choice of measures is selected from previous studies to fit with the theoretical definition of constructs. Table A.1 in the Appendix A summarizes theoretical definitions of constructs, all measures applied in the study as well as references to previous studies.

4. Analysis and results

The statistical analysis was conducted in five steps. First, a correlation analysis was applied to identify measures that are statistically significant. Second, a factor analysis was applied to test whether measures selected for each construct exhibited sufficient convergent and discriminating validity. Third, regression analysis was applied to test the link between systematic processes and structures and trust (H1a and H1b). Fourth, a regression analysis was applied to test the link between goodwill trust and creativity (H2). Fifth, Baron and Kenny's (1986) procedure was applied for testing the mediating effect of goodwill trust on the link between systematic processes and structures versus creativity (H3). Each step is described below.

4.1. Correlation analysis and factor analysis

Pearson correlation was applied to predict initial factorability. Correlations between the latent constructs is displayed in Table 2. For correlations between all the variables, see Appendix B (Table B.1).

The second step was factor analysis and test of latent variables for the four constructs in focus in our study. The first of these is *systematic processes and structures* (see Appendix C, Table C.1). Systematized (as opposed to trial-and-error) processes and explicit organizational rules and structures detail how and by whom work should be performed, and the goal of such rules and processes is to reduce the variance associated with a task (Gilson et al., 2005; March, 1991). Factor analysis revealed that this construct is constituted by three latent variables. A fourth latent variable was dropped from further analysis, as it is constituted by only one measure. The second construct in focus for our study is *goodwill trust*. Goodwill trust is constructed from one latent variable based on four measures (see Appendix D, Table D.1). The third is *competence trust*. Competence trust is constructed from one latent variable. A second variable was dropped as it consisted of one measure only (see Appendix E, Table E.1). The fourth construct in focus is *creativity*, specifically creative climate. Creativity is defined as *the production of novel and useful ideas* (Amabile et al., 1996). A climate refers to *behavioral patterns that emerge on a daily basis in the organizational environment* (Sundgren et al., 2005). Factor analysis revealed creativity to be constructed from one latent variable, based on six measures (see Appendix F, Table F.1).

4.2. Regression analyses

Regression analyses were applied to test relationships among the four constructs – systematic processes and structures, goodwill trust, competence trust, and creativity. Regression analyses are based on latent variables and latent variables are constructed from

Table 1
Means and frequencies of surveyed medium-sized high technology organizations over the 2010 period.

1. Sample and response rates: number of employees: 50–500

Firms
N (population): 223 — No valid firms[a]: 31
n (response): 99 — Response rate (%): 51.6
No response: 93

2. Business data – means and standard deviations:

	Sample			
	Response		No response	
	Mean	Std dev.	Mean	Std dev.
Sales[b]	551 920	644 009	464 150	592 523
Total assets[b]	427 120	519 202	562 770	1 497 100
Profit[b]	16 369	90 883	6431	167 922
Profit margin[c]	3.0	14.8	−1.59	33.6
Employment[d]	168.2	119.5	171.7	141.8
Age[e]	33.5	25.6	36.1	25.1
Branches[f]	3.3	1.8	3.3	1.6

3. Branch – frequencies (%)

	Sample	
	Response	No response
Industrial chemistry	28.3	21.5
Plastics industry	10.1	11.8
Pharmacology	6.1	8.6
Electronics/electrical industry	27.3	38.7
Science	15.1	8.6
Environmental engineering	13.1	10.8
Sum	100.0	100.0

[a] Control parameters.
[b] 1000 SEK.
[c] Percent.
[d] Number of employees.
[e] Years.
[f] Branch (six branches), different weightings (1–6).

aggregated means of underlying measures. Since all measures are expressed in Likert-type scales (1–5), there is no risk of aggregated means being affected by extreme values.

The third step in data analysis was to test the relationships between *systematic processes and structures* and *goodwill trust* and between *systematic processes and structures* and *competence trust*. We expected that an organization's being systematic would have a positive effect on trust within that organization (H1a and H1b), and in fact regression analysis did show a positive and significant relationship between systematic processes and structures and goodwill trust (see Table 3). The regression model is supported on the ***-level, i.e., a strong regression model. However, only one of the latent variables in the model is supported (*Organizational rules and structures are explicit*) and *systematized process for obtaining information* is nearly supported on the *-level. Hypothesis 1a therefore, is partly supported.

Regression analysis also showed a positive and significant relationship between systematic processes and structures and competence trust (see Table 4). This model is too supported on the ***-level. However, again only one of the latent variables (*Systematized process for obtaining information*) is supported on the **-level, and one variable is supported on the *-level (*Trial-and-error approach to obtaining information*). Therefore, Hypothesis 1b is also partly supported.

The fourth step in data analysis was to test the relationship between *trust* and *creativity*. We hypothesized that goodwill trust would have a positive effect on creativity (H2). We did not, however, expect competence trust to be linked to creativity. The results presented in Table 5 show that goodwill trust has a positive and significant effect on creativity; thus Hypothesis 2 is supported. As expected, competence trust is not significantly linked to creativity.

The fifth step in data analysis was to test the mediating effect of *goodwill trust* on the relationship between *systematic processes and structures* versus *creativity*. We hypothesized that systematic processes and structures relate positively to creativity in an organization because goodwill trust functions as a mediating variable (H3). We focused specifically on processes for obtaining information as such processes have proven to be particularly relevant in

Table 2
Correlations between the six latent variables.

	1.	2.	3.	4.	5.
1. Systematized process for obtaining information					
2. Organizational rules and structures are explicit	.215*				
3. Trial-and-error approach to obtaining information	.257*	.070			
4. Goodwill trust	.264**	.319**	.152		
5. Competence trust	.291**	.144	−.115	.290**	
6. Creativity	.246*	.286**	.176	.676**	.221*

** Correlation is significant (0.01-level), 2-tailed.
* Correlation is significant (0.05-level), 2-tailed.

Table 3
Regression analysis testing the relationship between systematic processes and structures and goodwill trust.

Model[a,b,c]	Standardized coefficients, Beta	*t*	Sig.
(Constant)		8.159	.000***
Systematized process for obtaining information	.192	1.858	.066
Organizational rules and structures are explicit	.238	2.377	.020*
Trial-and-error approach to obtaining information	.085	.846	.400

[a] Dependent variable: goodwill trust.
[b] Model summary: $R = .365$, adjusted R square = .133 and standard error of estimate = 2.070.
[c] The model: Sig. = .004*** (ANOVA).
* $p < 0.05$.
*** $p < 0.005$.

Table 4
Regression analysis testing the relationship between systematic processes and structures and competence trust.

Model[a,b,c]	Standardized coefficients, Beta	*t*	Sig.
(Constant)		3.956	.000***
Systematized process for obtaining information	.320	3.024	.003**
Organizational rules and structures are explicit	.116	1.130	.262
Trial-and-error approach to obtaining information	−.210	−2.032	.045*

[a] Dependent variable: competence trust.
[b] Model summary: $R = .369$, adjusted R square = .136 and standard error of estimate = 1.841.
[c] The model: Sig. = .005** (ANOVA).
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.005$.

Table 5
Regression analysis testing the relationship between creativity and goodwill trust and competence trust.

Model[a,b,c]	Standardized coefficients, Beta	*t*	Sig.
(Constant)		3.737	.000***
Goodwill trust	.666	8.272	.000***
Competence trust	.040	.490	.625

[a] Dependent variable: creativity.
[b] Model summary: $R = .678$, adjusted R square = .460 and standard error of estimate = 2.245.
[c] The model: Sig. = .000*** (ANOVA)
*** $p < 0.005$.

Table 6
Regression analysis testing the relationship creativity and systematic processes and structures.

Model[a,b,c]	Standardized coefficient, Beta	*t*	Sig.
(Constant)		8.956	.000***
Systematized process for obtaining information	.170	1.622	.108
Organizational rules and structures are explicit	.206	2.022	.046*
Trial-and-error approach to obtaining information	.119	1.159	.250

[a] Dependent variable: creativity.
[b] Model summary: $R = .341$, adjusted R square = .087 and standard error of estimate = 2.863.
[c] The model: Sig. = .011* (ANOVA).
* $p < 0.05$.
*** $p < 0.005$.

Table 7
Regression analysis testing the relationship between creativity, systematic processes and structures and goodwill trust.

Model[a,b,c]	Standardized coefficients, Beta	*t*	Sig.
(Constant)		3.111	.003***
Systematized process for obtaining information	.085	1.032	.305
Organizational rules and structures are explicit	.027	.328	.743
Trial-and-error approach to obtaining information	.066	.827	.411
Goodwill trust	.636	7.663	.000**

[a] Dependent variable: creativity.
[b] Model summary: $R = .684$, adjusted R square = .467 and standard error of estimate = 2.23454.
[c] The model: Sig. = .000*** (ANOVA).
** $p < 0.01$.
*** $p < 0.005$.

product development settings. Mediating effect was tested by using the procedure established by Baron and Kenny (1986), whereby goodwill trust functions as a mediator if four conditions are met: (1) *systematic processes and structures* affects *goodwill trust*; (2) *goodwill trust* affects *creativity*; (3) *systematic processes and structures* affect *creativity*; and (4) in the presence of *goodwill trust*, the effect of *systematic processes and structures* on *creativity* is reduced.

Conditions 1 and 2 are met (see Tables 3 and 5). Condition 3 is also met (see Table 6). The model is significant, although only at 0.011*. The only significant variable is *organizational rules and structures are well specified* (0.046*).

Condition 4 is also met (see Table 7). As illustrated in Table 7, goodwill trust fully mediates the effect of *systematic processes and structures* on *creativity*. When *goodwill trust* is introduced in the regression, the variable *organizational rules and structures are explicit* is not significant. Thereby, Hypothesis 3 is supported.

Although all hypotheses are supported, not all received the same degree of support. First, both regression models testing the relationship between goodwill trust and creativity (Tables 5 and 7) are significant at the .000***-level. In these models, goodwill trust is also significant at the .000***-level on creativity. However, Table 7 shows no significance for the relationship between creativity and systematic processes and structures, but because goodwill trust has a strong significance, the regression model as a whole is significant. Second, regarding *R*-square adjusted scores, there is a very small difference between Tables 5 and 7 (.460 and .467). However, in Table 3, the adjusted *R*-square is .133. A *R*-square of 1.0 indicates a perfect fit of a regression line's approximation of real data points, and consequently Tables 5 and 7 shows a better fit than Table 3. It is however difficult to directly compare two multiple regressions this way unless the same independent variables are used. Adding a new independent variable typically improves the *R*-square (at least a little), but this addition is an optimization that may reduce the contribution of another variable.

5. Discussion and implications

The main finding from our empirical study is that we provide support for goodwill trust being a mediating variable, enabling firms to combine systematic processes and structures with creativity. As such we can explain why systematic processes and structures does not necessarily crowd out creativity (e.g., Feldman

and Pentland, 2003; Gilson et al., 2005). Our finding is particularly relevant in light of the interest of scholars and managers to understand the fundamental enablers and barriers to successfully mitigate uncertainty and stimulate creativity in product development (e.g., Amabile et al., 1996; Clark and Fujimoto, 1991). Furthermore, we also build on the growing research on the importance of trust in an organizational setting (e.g., Rousseau et al., 1998), in general, and in product development in particular (e.g., Bstieler, 2006; Dayan et al., 2009; Koskinen et al., 2003; Madhavan and Grover, 1998). Our paper contributes to the understanding of why trust is important and how trust can be actively managed.

5.1. Theoretical implications

This study provides important implications for research on product development in general and on three specific areas of concern, which are all related to trust. Above all, it implies that trust can function as a mediating variable enabling firms to combine systematic processes and structures with creativity.

Concerning the relation between systemized processes and structures and trust, the data show that in organizations where the process for obtaining information is systematized and organizational rules and structures are explicit, trust is higher. This finding has two theoretical implications.

- First, it implies that trust can emerge beyond the point of individual interaction. Trust is commonly modeled as an outcome of a process of interaction (e.g., Axelrod, 1984; Lewicki and Bunker, 1996; Möllering, 2007; Nooteboom, 1996; Ring and Van De Ven, 1992, 1994; Zucker, 1986). Over time, individuals learn about each other's behavior and actions become more predictable. When predictability is high, trust is fostered. Our study identifies that systematization of processes and structures have the same effect: it increases predictability in the organization. When processes are systematized and rules and structures are explicit, then organizational employees know how to interact and with whom to interact. As such, systematic processes and structures increase predictability beyond the point of individual interaction and thereby contributes to trust within the organization.
- Second, we show how trust can actively be managed within an organization. We are able to do so by translating the abstract notion of predictable behavior into the tangible notion of systematized processes and structures. Because processes, rules and structures are (at least partly) the result of active management, trust also is (at least partly) the result of active management.

Concerning the relationship between trust and creativity, earlier studies has argued for a positive link (Bidault and Castello, 2009, 2010; Chen et al., 2008). Results, however, are less clear. In a study addressing social capital and creativity, Chen et al. (2008) hypothesized a positive relationship between trust and creativity. The result was positive, however, not significant. Bidault and Castello have also studied the link between trust and creativity in an experimental setting (2009) and, drawing from anecdotal evidence (2010), these authors conclude that there can be an optimum level of trust. Thus, with too much trust, creativity increases less or even declines.

In comparison to these studies we show a positive and significant relationship between goodwill trust and creativity, but no relationship between competence trust and creativity. As such, our finding supports the previously held assumption that trust inspires creativity. Furthermore, by distinguishing between goodwill trust and competence trust, we enrich the understanding why trust per se is not enough to inspire creativity, but that trust must be treated as a multidimensional construct.

Concerning goodwill trust being a mediating variable, that enables firms to combine systematic processes and structures with creativity, we find that systematic processes and structures does not necessarily crowd out creativity. Previous research has argued that well-known routines and rigid rules and structures will make individuals less willing and able to be creative (Amabile, 1998; Amabile and Conti, 1999). Systematic (as opposed to trial-and-error) processes and explicit organizational rules and structures detail how and by whom work should be performed, and their goal is to *reduce the variance* associated with the task (Gilson et al., 2005; March, 1991). Creativity, on the other hand, is about *enhancing variation* to optimize the fit between team efforts and outcomes (Gilson et al., 2005, p. 523). This fundamental distinction suggests the two are mutually exclusive and, in line with this substitutive view, Clark and Fujimoto (1991, p. 169) argue that product development requires an act of balancing between *control and freedom, precision and flexibility, individualism and teamwork*.

The findings in our study suggest that systematic processes and structures do not necessarily crowd out creativity, as such we add to the debate on product development being a balancing act between contradictions. Similar to our argument, Gilson et al. (2005) argue that creativity is most efficient when work processes are standardized. Furthermore, Feldman and Pentland (2003) argue that seemingly stable routines in an organization are subject to incremental change. Rules and routines are not only a result of top–down organization, but also of bottom–up organizing (Meyer and Rowan, 1977). As such, rules and routines change over time and can thus lead to creative outcomes. By introducing goodwill trust as a mediating variable, we contribute to this literature by offering an explanation as to why systematized processes and structures can result in creativity.

5.2. Managerial implications

For managers, the main implication of this paper is that we offer a realistic recommendation for how both uncertainties can be decreased and creativity encouraged. Our key argument is that by systematizing the process for obtaining information, and by making organizational rules and structures explicit, a climate of trust is fostered in the organization, thereby also increasing creativity. A common misunderstanding about trust is that it cannot actively be managed. It is argued that either we trust or we do not. An implication of this study is that trust is indeed an element that can actively be managed, particularly by creating systematic processes and explicit organizational rules and structures. Based on the results of our study, we offer the following four recommendations to managers, which we believe are particularly applicable for small and medium-sized firms.

1. Management needs to clearly document their product development process, including creating explicit rules and structures for how organizational work shall be done. More specifically it should be clear exactly how the process and sub-process are organized, who is responsible for each step in the process, which roles are needed in the process, how and when information need to be distributed in the organization, and whether there are phase-gates in the process (and if so when the phase-gates appear in the process).
2. Established processes need to be clearly communicated in R&D organizations. They should be viewed as an important prerequisite for being creative and something that adds value to the organization, and not as a (bureaucratic) requirement.
3. Management should create explicit organizational structures that facilitates action, for example by encouraging interaction between product development teams to disseminate learning through sharing experiences from completed projects to current project. Ideally, such interaction should result in specific

action points for current projects, enhancing the probability of a successful outcome of current projects.

4. Management should also communicate the importance of trust in the organization, both in words and actions. This could, for instance, be to explicitly celebrate both success and failure in projects and then quickly change the focus from the failure to what can actually be learnt from the failure. Was it due to technology, customer needs or the process of generating ideas, and what could have been done to prevent the failure? Management should encourage project members to give their view on project process and outcomes. By doing so, management show that they trust the competence of employees. Furthermore, management should create an atmosphere of goodwill trust, where employees are confident that ideas can be openly discussed.

Our final message to managers is that the importance of trust in product development cannot be underestimated. If trust is low, then there is no room for employees to break norms of working, introduce new ideas and develop the new solutions necessary for successful new products to be developed. Our four recommendations aim at creating a product development organization with a high level of trust among employees and managers.

5.3. Limitations and outlook

A few limitations of this study are worth noting. First, we have focused on systematized processes for obtaining information as such processes have been argued to be particularly valuable in product development settings. We encourage future studies to further investigate the relationship between and creativity in a broader range of processes and settings. We see the result of this study as a contribution to the understanding of why systematized processes and structures do not always crowd out creativity.

Other limitations refer to the challenges associated with researching trust. Trust is by nature an ambiguous and multidimensional concept; it has been argued that it is difficult to study trust with rigor (e.g., Blois, 1999). The ambiguity of trust has implications for the validity of our study. First, a single informant was used for all measures. Trust is inherently a phenomenon that exists between two actors: a trustor and a trustee. We have not been able to capture the interactive nature of trust by only addressing a single respondent. Second, data was used from a single point in time. Trust is a phenomenon that evolves over time, during a process of interaction. We have not been able to capture the evolving nature of trust in our study. Third, whereas we have acknowledged the distinction between competence trust and goodwill trust in our study, trust is a construct of more than two dimensions. We call for further research exploring the multidimensionality of trust, capturing trust-processes over time, looking at both the trustor and trustee and distinguishing also between affect-based trust and cognition-based trust. In particular, we encourage qualitative studies that allow for such more fine-grained investigations. Thus, there are great opportunities for future research into trust, particularly in the area of product development. Future insights will be relevant both in academia and practice because they may allow firms to create a higher level of trust thereby mitigating uncertainty and stimulating creativity.

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Appendix A.

See Table A.1.

Appendix B.

See Table B.1.

Appendix C.

See Table C.1.

Appendix D.

See Table D.1.

Appendix E.

See Table E.1.

Appendix F.

See Table F.1.

Table A.1
Measures applied in the study.

1. Systematic processes and structures
Theoretical definition: Systematized (as opposed to trial-and-error) processes and structures details how and by whom work should be performed, and their goal is to reduce the variance associated with the task (Gilson et al., 2005; March, 1991), as such systematized processes and structures are closely related to the work by Cooper (1992)
Comparable measures: (Gilson et al., 2005; Schulze and Hoegl, 2006, 2008)

Measures	Mean	Std.	Scale
1. Organizational rules are explicit and understandable	3.677	0.843	1–5
2. Importance of trial-and-error activities regarding new technology (reverse coded)	3.194	1.012	1–5
3. Importance of trial-and-error activities regarding customer needs (reverse coded)	2.552	0.893	1–5
4. Importance of trial-and-error activities and the process regarding new ideas (reverse coded)	2.660	0.877	1–5
5. Systematically studying knowledge regarding technology	3.143	0.908	1–5
6. Systematically studying knowledge regarding customer needs	3.134	0.964	1–5
7. Systematically studying knowledge regarding processes of new ideas	2.729	0.967	1–5
8. Systematically testing theoretical knowledge regarding customer needs	2.557	1.050	1–5
9. Documentation of processes	3.707	0.884	1–5
10. Importance of detailed descriptions (reports etc.) of customer needs	2.598	0.837	1–5
11. Explicit organization structure that facilitates action	3.768	0.946	1–5

2. Goodwill trust
Theoretical definition: Trust is defined as psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another (Rousseau et al., 1998). Goodwill trust is defined as trust in the moral integrity of the other party (Ring and Van De Ven, 1994) and also notes the extent to which a partner is genuinely interested in the other's welfare and will seek joint gain (Doney and Cannon, 1997). Goodwill trust is also referred to as benevolence and integrity (Mayer et al., 1995). Respondents were asked to rate the level of each measure within a specific product development project
Comparable measures: Measures are comparable, however not identical to previous studies (see Dietz and Hartog, 2006 for a literature review of trust measures)

Measures	Mean	Std.	Scale
12. Acceptance of constructive criticism/contradictions during project meetings	4.000	0.728	1–5
13. Atmosphere of support, trust and friendship	4.000	0.783	1–5
14. Basis of benevolence in the firm	4.143	0.746	1–5
15. Atmosphere of everyone doing his or her best	4.051	0.632	1–5

3. Competence trust
Theoretical definition: Trust is defined as psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another (Rousseau et al., 1998). Competence trust is defined as trust in that the other party is capable to do what he or she promises and is also referred to as ability (Mayer et al., 1995). Respondents were asked to rate the level of each measure within a specific product development project
Comparable measures: Measures are comparable, however not identical to previous studies (see Dietz and Hartog, 2006 for a litterature review of trust measures)

Measures			
16. The organization lacks adequate knowledge in one or several areas	3.2021	.169	1–5
17. There is enough resources for market expansion	3.111	1.039	1–5
18. There is no problem getting new bank loans	3.821	1.229	1–5

4. Creativity
Theoretical definition: Creativity is defined as the production of novel and useful ideas (Amabile et al., 1996). A climate refers to behavioral patterns that emerge on a daily basis in the organizational environment (Sundgren et al., 2005)
Comparable measures: (Ekvall and Ryhammar, 1999)

Measures	Mean	Std.	Scale
19. In our firm there is a positive climate and new ideas are encouraged	4.172	0.756	1–5
20. The firm allows different solutions to different problems	4.343	0.702	1–5
21. The atmosphere in the firm combines seriousity and humor	4.255	0.693	1–5
22. Ideas, knowledge and experience are important in projects	3.727	0.767	1–5
23. The atmosphere in the firm is dynamic	3.717	0.821	1–5
24. Project meetings are important for creation of new ideas	3.394	0.793	1–5

Table B.1
Correlation matrix between the variables in the study.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
Systematic processes and structures																							
1. In our firm there are expl. and underst. rules																							
2. Impor. of trial-and-error act regard new tech	−.022																						
3. Impor. of trial-and-error act regard customer needs	.141	.403**																					
4. Impor. of trial-and-error act and new ideas	.138	.457**	.387**																				
5. System studying knowledge regarding tech	.155	.093	.173	.187																			
6. System studying knowledge regard cust. needs	.168	−.046	.180	.085	.491**																		
7. System studying knowledge regard new ideas	.082	.184	.183	.371**	.402**	.492**																	
8. System test our knowledge regard cust. needs	.213*	.025	.240*	.041	.281**	.316**	.359**																
9. Documentation of processes	.296**	−.119	−.113	−.003	.334**	.289**	.076	.029															
10. Impor of detailed desc. of cust. needs	.213*	−.002	.224*	.056	.414**	.454**	.398**	.340**	.220*														
11. Expl. org. struc. that facilitates action	.647**	.037	.078	.061	.135	.242*	.060	.150	.321**	.136													
Goodwill trust																							
12. Constr. criti/contradi during project meetings	.150	.139	.073	−.120	.388**	.195	.052	.089	.222*	.130	.163												
13. An atmosp. of support, friendship and trust	.325**	.199	.113	.173	.191	.264**	.207*	−.051	.207*	.016	.179	.304**											
14. Basis of benevolence	.319**	−.078	.131	.118	.243*	.364**	.188	.049	.236*	.017	.077	.321**	.570**										
15. Everyone is doing his or her best in our firm	.340**	.000	.171	.101	.185	.312**	.208*	.081	.211*	.000	.260**	.290**	.524**	.640**									
Competence trust																							
16. Not adequate knoweledge in one or several areas	−.130	.148	−.007	.050	.107	−.066	−.012	−.016	.117	.013	−.169	−.012	−.033	−.118	−.071								
17. In our firm there is res. for mark expan.	.228	−.274**	−.108	.081	.235*	.244*	.216*	.104	.214*	.208*	.151	.081	.151	.233*	.196	−.170							
18. No prob. getting new bank loans	.039	−.154	−.055	−.066	.248*	.277*	.132	.018	.330**	.178	.050	.265**	.176	.176	.175	.010	.494**						
Creativity																							
19. Aposclim and new ideas are enc.	.216*	.174	.207	.096	.266**	.157	.199	.219*	−.046	.165	.170	.407**	.345**	.269**	.328**	−.063	.118	.169					
20. The firm allows different solution to different problems	.207*	.077	−.115	.027	.115	.163	.187	.087	.213*	.120	.244**	.299**	.409**	.200*	.335*	−.408	.003	.077	.407**				
21. The atmosphere in the firm com serious and humor	.126	.167	.150	.113	.153	.068	.125	−.018	.086	.081	.029	.306**	.440**	.441**	.373**	−.001	.128	.138	.463**	.281**			
22. Ideas, knowl. and experience are imp in proj.	.067	.147	.211*	−.008	.025	.105	.229*	.148	−.119	−.023	.278**	.256*	.221*	.193	.368**	.005	−.064	.151	.345**	.233*	.187		
23. The atmosphere in the firm is dynamic	.368**	.145	.050	.291**	.322**	.144	.079	−.010	.293**	.051	.309**	.341**	.445**	.375**	.350**	.007	.085	.192	.473**	.347**	.486**	.200*	
24. Project meet are import for creat. of new ideas	.055	−.062	.045	.014	.308**	.217*	.197	.054	.166	.106	−.067	.477**	.263**	.375**	.353**	−.120	.169	.333**	.311**	.268**	.262**	.262**	.330**

** Correlation is significant (0.01-level), 2-tailed.
* Correlation is significant (0.05-level), 2-tailed.

Table C.1
Factor analysis[a,b,c]: "Systematic processes and structures" divided into four factors.

Factors	1.	2.	3.	4.
Factor names	Systematized process for obtaining information (α^d = .760)	Organizational rules and structures are explicit information (α = .783)	Trial-and-error approach to obtaining (α = .671)	(α^e)
System studying knowledge reg. cust. needs	.708			
Impor. of detailed descrip. of cust. needs	.691			
System studying knowledge reg. new ideas	.629			
System studying knowledge reg. tech	.625			
System test our the knowledge reg. cust. needs	.480			
In our firm there are expl. and underst. rules		.823		
In our firm this is an expl. org. struc. that fac. act		.766		
Impor. of trial-and-error act and new ideas			.721	
Impor. of trial-and-error act reg. new tech			.648	
Impor. of trial-and-error act reg. cust needs			.531	
Documentation of processes				.526

[a] Rotated factor matrix.
[b] Factor loadings below 0.300 are not included in the table.
[c] Cumulative variance 50.68%.
[d] α (Cronbach α) > 0.50.
[e] Only one variable (not included in the analysis).

Table D.1
Factor analysis[a,b,c]: "Goodwill trust".

Factors	1.
Factors name	Goodwill trust (α^d = .756)
In our firm there is a basis of benevolence	.826
Everyone is doing his or her best in our firm	.760
In our firm there is an atmos of supp etc.	.698
Constr. criti/contradi during proj. meetings	.400

[a] Factor matrix (just one factor).
[b] Factor loadings below 0.300 are not included in the table.
[c] Cumulative variance 47.69%.
[d] α (Cronbach α) > 0.50.

Table E.1
Factor analysis[a,b,c]: "Competence trust".

Factors	1.	2.
Factor names	Competence trust (α^d = .656)	(α^e)
In our firm there is no prob. gett. new bank loans	.731	
In our firm there is enough res. for mark expansion	.709	
Our firm has not adequ. know. in one or sev. areas		.444

[a] Factor matrix (just one factor).
[b] Factor loadings below 0.300 are not included in the table.
[c] Cumulative variance 44.67%.
[d] α (Cronbach α) > 0.50.
[e] Only one variable (not included in the analysis).

Table F.1
Factor analysis[a,b,c]: "Creativity".

Factors	1.
Factor names	Creativity (α^d = .739)
In our firm there is a positive climate and new ideas are encouraged	.783
The atmosphere in the firm is dynamic	.738
The atmosphere in the firm combines seriousity and humor	.698
The firm allows different solutions to different problems	.632
Project meetings are important for creation of new ideas	.583
Ideas, knowledge and experience are important in projects	.508

[a] Factor matrix (just one factor).
[b] Factor loadings below 0.300 are not included in the table.
[c] Cumulative variance 44.04%.
[d] (Cronbach α) > 0.50.

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