

Do personal characteristics and cultural values that promote innovation, quality, and efficiency compete or complement each other?

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Summary This study examines whether the same personal and contextual characteristics that enhance innovation could also contribute to quality and efficiency. Three hundred and forty-nine engineers and technicians in 21 units of a large R&D company participated in the study. Using CFA and HLM models, we demonstrated that people have the ability to both be creative and pay attention to detail, and that an innovative culture does not necessarily compete with a culture of quality and efficiency. Yet, to reach innovative performance creative people need to take the initiative in promoting their ideas, with the possible corresponding price of low performance quality. Copyright © 2004 John Wiley & Sons, Ltd.

Introduction

To be competitive in the global market, organizations must continuously develop innovative and high-quality products and services, plus deliver them on time and at a lower cost than their competitors. Therefore, today's employees are required to be creative, yet also conform to rules and standards, and work efficiently to meet time and budget constraints. Creativity is often perceived to be incongruent with conformity and attention to detail (Kirton, 1976, 1980, 1994; Kirton & De Ciantis, 1986; Levitt, 2002; Rogers, 1959; Hayes & Allinson, 1988, 1994; Myers & Briggs, 1976; Mumford & Gustafson, 1988; Schuler & Jackson, 1987). Yet, these latter two characteristics would appear to be the human characteristics that ensure that employees maintain high quality standards. Hence, creativity per se may be dysfunctional to performance outcomes that require conformity and attention to detail.

Furthermore, creativity is not synonymous with innovation. Rather 'Innovation is the successful implementation of creative ideas by an organization' (Amabile, 2000, p. 332). This definition distinguishes between the generation of new ideas and their implementation (West, 2002). While creativity is the dominant factor, one also has to demonstrate a high level of initiative to bring ideas to the implementation stage (Amabile, 2000; Kanter, 1988; Mumford & Gustafson, 1988; Van de Ven, 1986). *One*

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objective of the present study was to identify the personal characteristics that influence innovation, quality, and efficiency, and to test the differential effects of these characteristics on the three performance outcomes.

Our second objective involved the organizational level, where, in parallel to the demands made on the individual level, the presence of three cultural values—innovation, attention to detail, and outcome orientation—come into play. Their existence or absence reflects the importance given by the organization to the performance outcomes of innovation, quality, and efficiency, respectively (O'Reilly, Chatman, & Caldwell, 1991). Taking a system approach, Schuler and Jackson (1987) proposed that the human resource management strategies in organizations should support these three competitive performance outcomes.

Trade-off relationships may occur between the cultural value of innovation, which allows 'rule infringements,' and the cultural value that promotes quality, which advocates 'strict rules.' Similarly, innovation and efficiency may compete with each other (Quinn & Rohrbaugh, 1983): 'When creativity is under the gun, it usually ends up getting killed' (Amabile, Hadley, & Kramer, 2002). Therefore, the drawback of innovation may be that it competes with the importance given to the cultural values that promote quality and efficiency. Hence, the *second objective* of the present study was to test whether the cultural dimensions that promote innovation, quality, and efficiency compete or complement each other.

The effect of individual characteristics on performance depends on the work context. In some cases, the work context may inhibit the impact of individual characteristics, whereas in others it facilitates their effect on behavior (Schneider, 1975; Michel, 1977). The Fit Model (Schneider, 1975, 2001) proposes that individuals actualize their potential when the organizational culture is congruent with their own work values, interests, and capabilities. For example, a culture that promotes innovation is one that allows the most creative employees to manifest their creativity in their performance. According to the Fit Model, innovative performance is the product of both cultural and personal characteristics that nurture innovation (Scott & Bruce, 1994). Similarly, performance quality is the product of individual characteristics congruent with a quality-oriented culture, and efficiency is the product of an outcome-oriented culture combined with individual characteristics that affect efficiency. However, lack of congruence between creative people and their work context may inhibit their innovative performance. Furthermore, in contexts that emphasize quality and efficiency, creativity may be detrimental to the attainment of these performance outcomes because quality requires rule adherence, rather than rule breaking, and efficiency requires keeping to time and budget constraints rather than spending time and resources on trying out new ideas (Holly & Gyskiewicz, 1993; Oldham & Cummings, 1996; Levitt, 2002; Kirton, 1976).

The *third objective* of this study was to test for the effect of the person by situation fit on performance outcomes.

Literature Review and Hypotheses Development

Personal characteristics and performance outcomes

Creativity is the personal characteristic that is most clearly associated with innovation. Creativity is defined as the production of novel ideas that are useful and appropriate to a given situation (Amabile, 1983). A large body of literature has focused on identifying the personal characteristics, cognitive styles, and other attributes associated with creative achievement (see Scott & Bruce, 1994; Amabile,

1983, 1996, 2000; Woodman, Sawyer, & Griffin, 1993; Kirton, 1976; Oldham & Cummings, 1996; Tierney, Farmer, & Graen, 1999).

Cognitive styles are recognized as core characteristics of employee creativity (Kirton, 1976; Scott & Bruce, 1994; Tierney et al., 1999; Amabile, 1988; Woodman et al., 1993). 'Cognitive style is a person's preferred way of gathering, processing, and evaluating information. It influences how people scan their environment for information, how they organize and interpret this information, and how they integrate their interpretations into the mental model and subjective theories that guide their actions' (Hayes & Allinson, 1998, p. 850).

Using the cognitive style approach, Kirton (1976) developed the Kirton Adaptor-Innovator Inventory (KAI theory), which proposes that individuals can be located on a continuum ranging from Adaptation style to Innovation style. *Adaptors* are characterized as pre-cautious, reliable, efficient, methodological, disciplined, and conforming. They reduce problems by introducing improvements that increase efficiency and maintain maximal continuity and stability. In addition, these individuals are able to maintain a high level of accuracy in detailed work over a prolonged period of time. On the other hand, *innovators* do things 'differently,' and they prefer breakthroughs to improvement. Innovators are very original but seem to be undisciplined, impractical, unsteady, and incapable of adhering to detailed work. The differences between innovators and adaptors have often been assessed by three personal characteristics: originality and idea creation; conformity to rules and group norms; and efficiency, which is about paying attention to detail, and thoroughness (Kirton, 1976; Janssen, DeVries, & Conzjnsen, 1998). The efficiency construct as measured by the KAI scale (Kirton, 1976) consists of five items that reflect attention to detail (i.e., 'is thorough, masters all details painstakingly, enjoys detailed work'). Therefore we labeled this factor as 'attention-to-detail.'

The research literature is inconclusive with respect to the relationships between these three characteristics. Exploratory factor analyses conducted by numerous researchers revealed a three-factor structure (Bobic, Davis, & Cunningham, 1999; Foxall & Hackett, 1992; Kirton & De Ciantis, 1986; Taylor, 1989). Yet, Kirton (1976) aggregated these three factors into one continuum with two poles. Other researchers used Kirton's one continuous scale (KAI) in their studies (Buttner & Gryskiewicz, 1993; Chan, 1996; Janssen, DeVeris, & Cozjnsen, 1998; Tierney et al., 1999). However, some researchers argued that the summation of the three scores into one global score has had the effect of masking potentially important differences in terms of the underlying characteristics and, therefore, they have treated them as three independent factors (Jabri, 1991; Taylor, 1989). The distinction between the three characteristics is also relevant for testing their differential effects on various performance outcomes. Aggregating them into one score would mask their differential effects.

In line with the research literature we hypothesize:

Hypothesis 1: Creativity, conformity, and attention-to-detail are distinct yet interrelated dimensions of cognitive style (a three-factor model will have a better fit to the data than a one-factor model consisting of all three variables).

In order to confirm Hypothesis 1 we propose to compare a one-factor model to a three-factor model using confirmatory factor analysis.

Personal characteristics and innovative performance

Creativity is a necessary precursor for innovation (Amabile, 1983, 2000). It pertains to the generation of new and valued ideas that often reflect a broad shift in perspective and reorientation of existing practices. Implementation of these ideas requires major changes in organizational structures or processes (Damanpour, 1991; Kirton, 1976; Chan, 1996; Foxall & Hackett, 1992; Scott & Bruce,

1994; West, 2002). The combination of creativity and its implementation leads to innovation. The implementation of a new idea often implies taking the initiative to execute the idea (Amabile, 2000; Kanter, 1988; Mumford & Gustafson, 1988; Van de Ven, 1986). Creative people have many ideas but sometimes have little business-like follow-through, and no initiative to make the right kind of effort to help their ideas get heard and tried (Levitt, 2002). 'Personal initiative is a behavior syndrome resulting in an individual's taking an active and self-starting approach to work and going beyond what is formally required in a given job' (Frese, Kring, Soose, & Zemple, 1996, p. 38). Implementing new ideas may often encounter obstacles and resistance from others. However, initiative means that one deals with these obstacles actively and persistently (Frese, Fay, Hilburger, Leng, & Tag, 1997). Therefore, creativity by itself may be a necessary, but not sufficient, condition for innovation.

We therefore hypothesize:

Hypothesis 2: The effect of creativity on innovative performance is moderated by initiative: Highly creative people will reach high levels of innovative performance when they score high rather than low on initiative.

Personal characteristics and performance quality

Creativity and initiative enhance innovation, but it is not clear whether they affect performance quality. While innovation is about breaking the rules and pushing the envelope, quality requires adherence to rules or standards. Products and services that are the outcome of high-level quality performance are reliable, stable, exhibit minimal variation, have no defects, and completely meet their respective standards and specifications (Cole, 1999; Brunsson, Jacobsson, & Associates, 2000). Meeting specifications requires thoroughness and addressing all the little details (Cole, 1999; Kirton, 1976). Reliable and standardized production with minimal variation can be achieved only when employees conform and adhere to the existing rules. However, a quality-focused environment is not favorable to all employees, as people differ in their preference for paying attention-to-detail, and complying with rules (Chan, 1996; Kirton, 1994). We hypothesize:

Hypothesis 3: Employees who score high on attention-to-detail and conformity will reach higher quality performance levels than those who score low on these characteristics.

Personal characteristics and efficiency

Efficiency is the third performance dimension that is crucial for the success of organizations. Efficiency is often assessed by performance criteria of keeping work on schedule and within budget (Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1988). It is best predicted by conscientiousness—one of 'the big five' factors (Barrick & Mount, 1991). Conscientious employees are typically competent, dutiful, self-disciplined, and achievement striving (Costa & McCrae, 1992). The dominant characteristic of work-related conscientiousness is the will to achieve (Judge, Martocchio, & Thoresen, 1997). While conscientiousness seems to also be relevant to performance quality, it has mostly been associated with productivity, measured by quantity and speed (Barrick & Mount, 1991). Highly conscientious employees who reach high productivity levels must be attuned to deadlines and budget constraints. Therefore, we hypothesize:

Hypothesis 4: The work performance of highly conscientious employees will be more efficient than that of employees with low conscientiousness.

Organizational culture

Organizational culture is a set of beliefs and values shared by members of the same organization, which influence their behaviors (Schein, 1996, 1999; O'Reilly et al., 1991). This culture reflects a common way of thinking, which drives a common way of developing, manufacturing, and marketing a product. The culture is about sustainability. 'A company can design a great product, build it flawlessly, market it inventively, and deliver it to the market quickly. But to do that year after year is a function of culture' (Goffee & Gareth, 1998, p. 19). Designing a great product and marketing it inventively is the mark of an innovative culture; producing it flawlessly will be accomplished by a quality-oriented culture that emphasizes adherence to rules and attention-to-detail; fast delivery of the product to the market becomes possible when the cultural values endorse a strong outcome orientation. Organizational culture contributes to the competitive advantage of companies because it cannot be easily copied (Barney, 1988).

The organizational culture's strength depends on the level of homogeneity in members' perceptions and beliefs, or on the degree of variability in employees' perceptions of the organizational values and endorsed practices. A recent study demonstrated that consensus about the service climate moderated the relationships between employees' rating of service climate and customers' perceptions of the quality of service. Strong relationships were found in more homogeneous cultures (Schneider, Salvaggio, & Subirats, 2002).

The dimensions for assessing values and behavioral norms vary across studies. Nevertheless, the cultural values of innovation, quality performance, risk-taking, and perfectionism repeatedly appear as measures of organizational culture (Rousseau, 1990; O'Reilly et al., 1991).

The cultural value of innovation

Extensive research has recently been conducted on the culture of innovation. Dimensions such as high autonomy, risk-taking, tolerance of mistakes, and low bureaucracy were found to be the most prevalent characteristics of a culture of innovation (Brown & Eisenhardt, 1998; O'Reilly et al., 1991; Scott & Bruce, 1994; van de Ven, Polley, Garud, & Venkataraman, 1999). Innovation can be both incremental and transformational (Weick, 2000); it can relate to administrative or technological issues and to both core and peripheral acts (Damanpour, 1991). An innovative culture reflects a learning orientation (Amabile, 1996; Glynn, 1996) that facilitates inventiveness (Cohen & Levinthal, 1990) combined with the pursuit of new and prospective knowledge (Levinthal & March, 1993). Innovative performance outcomes are more likely to occur when innovative behavior is rewarded, and when the organizational culture supports innovation (West, 2002).

Quality-oriented culture

Emphasis on the quality of products and services has increased with the establishment of the ISO 9000 quality standard (1987). The major requirements of ISO 9000 are that organizations develop and implement a set of routines and procedures for product design, manufacturing, delivery, service, and support. Standardization assures that all customers get the same product or service as promised (Cole, 1999; Brunsson, Jacobsson & Associates, 2000). A culture that supports quality implementation is one that emphasizes standardization, reliability, conformity to rules and procedures, and attention-to-detail (Detert, Schroeder, & Mauriel, 2000; Garvin, 1988; Prahalad & Krishnan, 1999).

Efficiency focused culture

Organizational efficiency is often measured by meeting budget and time constraints. A culture that emphasizes efficiency and productivity is outcome-oriented (O'Reilly et al., 1991), stressing goals, feedback, and incentives (Pritchard et al., 1988). This organizational culture emphasizes the

importance of getting things done, on-time delivery of products and services, and maintaining a pace faster than that of competitors, while simultaneously controlling operation costs (Amabile, Hadley, & Kramer, 2002; Lewis, Welsh, Dehler, & Green, 2002).

The interrelationship among the cultural dimensions that support innovation, quality, and efficiency

The literature is inconsistent regarding the relationships between the three cultural dimensions that promote innovation, quality, and efficiency. One approach identifies a *trade-off* between a culture emphasizing innovation, and one emphasizing attention-to-detail. For example, Quinn and Rohrbaugh (1983) and Douglas and Judge (2001) defined the relationship as one of *polarity* between two extremes: autonomy, which leads to innovation, and control, which emphasizes attention-to-detail and procedures. Innovation has also been found to compete with efficiency (Amabile et al., 2002; Quinn & Rohrbaugh, 1983). However, in certain conditions time pressures can spur innovation (Amabile et al., 2002).

A second approach viewed these cultural values as three independent dimensions. In a factor analysis of eight dimensions of organizational culture, innovation, attention-to-detail, and outcome orientation appeared as three independent factors (O'Reilly et al., 1991).

A third approach emphasizes the need to balance the preservation of existing knowledge and the creation of new knowledge. According to this approach, the survival of organizations in a competitive environment depends on their exploitation of existing knowledge—that is, the existing rules, routines, and standards, and on exploration, which is the creation of innovative knowledge (Cohen & Levinthal, 1990; Levinthal & March, 1993). According to the balanced approach the central dilemma of current businesses is how to achieve adaptive innovation and consistent execution. This dilemma can be resolved by balancing the strictness vital for meeting budgets and schedules with a flexibility that ensures proper conditions for innovation (Argote, 1999; Brown & Eisenhardt, 1997, 1998).

The trade-off approach evolved in a context of quality performance and error prevention (Douglas & Judge, 2001), whereas the latter two approaches were developed in a context where innovative performance serves as a vehicle for sustainable organizational competitiveness. We contend that all three cultural characteristics are needed in order to gain a competitive advantage (Brown & Eisenhardt, 1997; Schuler & Jackson, 1987). We hypothesize:

Hypothesis 5: The cultural characteristics of innovation, attention-to-detail, and outcome orientation are distinct yet interrelated dimensions of organizational culture (a three-factor model will have a better fit to the data than a one-factor model consisting of all three variables).

The person–culture fit

The proposition that ‘the people make the place’ (Schneider, 1987) implies that people with particular personal attributes are attracted to organizations that match their characteristics. The Person–Environment Fit Theory derives from two basic assumptions (Van Vianen, 2000): (a) that human behavior is a function of the person and the environment; and (b) that the person and the environment need to be compatible (Kristof, 1996). Numerous studies have demonstrated that high congruence between persons and situations results in high satisfaction, commitment, and psychological well-being (Chatman, 1991; Taris & Feij, 2001; Holton, Lee, & Tidd, 2002), as well as in low turnover and low stress (Chatman, 1991; O'Reilly et al., 1991; Tranberg, Slane, & Ekeberg, 1993; Van Vianen, 2000). People with certain personality profiles were attracted to certain organizational types more than to others (Lievens, Decaestecker, Coetsier, & Geirnaert, 2001; Schneider, Smith, Taylor, & Fleenor, 1998). It was also found that an innovative culture moderated the relationship between creativity and

performance (Amabile, 2000; Schneider, 1975). A study that investigated the fit between cognitive styles of engineers in R&D and work context demands for adaptive and innovative style demonstrated that lack of fit between cognitive styles and contextual demands was significantly related to turnover (Chan, 1996).

The fit model suggests that creative people may not reach high levels of innovation when the cultural context does not champion it. The research suggests that creative people would rather have someone else work out the details and implement their ideas (Levitt, 2002). Thus, idea creation without action orientation may not result in high performance.

In the present study, we are particularly interested in the personal characteristics that influence performance innovation, quality, and efficiency, and the way they interact with the respective cultural values of innovation, attention-to-detail, and outcome orientation, to impact on performance outcomes. Therefore, we hypothesize:

Hypothesis 6: Organizational cultural values will moderate the effects of personal characteristics on performance: We expect the highest performance levels when the personal characteristics complement the organizational cultural values and related performance outcomes.

Hypothesis 6.1: Creativity and initiative, and their interaction, will lead to the highest level of innovative performance in a culture of high innovation.

Hypothesis 6.2: Conformity and attention-to-detail will lead to the highest level of performance quality in a culture that emphasizes attention-to-detail.

Hypothesis 6.3: Conscientiousness will lead to the highest level of efficient performance in a culture that emphasizes outcome orientation.

Organizational Context

The Company

This study was conducted in a large R&D organization ($n = 5000$) that develops but also manufactures advanced technologies in the fields of microelectronics, communications, acoustics, and, electromagnetics. Its R&D focuses on state-of-the-art solutions to meet the most challenging demands by combining interdisciplinary knowledge and technologies into sophisticated and complex systems. It has a highly advanced R&D center. The organization has been a major pioneer in its field, advancing new ideas and technologies for more than 30 years with remarkable success. Its annual sales are about \$700 million, in more than 30 countries. Through earlier talks with several managers in this organization, who collaborated with us on previous research, the subject of innovation was identified as an important research topic, and shaped the research proposal on innovation, quality, and efficiency, which we submitted to the organization. Managers on all organizational levels were highly cooperative, shared their knowledge and insight about the issue, and contributed a lot to the shaping of the measures, and the data collection. The CEO of this organization is highly interested in how to promote innovation in the organization, and he gave his support to the study. At the end of the study we prepared a research report to the company, including recommendations on how to advance innovation, while at the same time maintaining the company's high standards of quality

and efficiency. We also prepared PowerPoint presentations and had several meetings in which we presented the outcomes of our research to middle and high-level managers.

Time

The data was collected during the third quarter of 2002. Although this was a period of recession in the high-tech sector, this company was not affected by it.

Method

Sample

Participants were 349 engineers and technicians in 21 units of the R&D and Engineering Division of a large R&D company ($n = 5000$) that develops sophisticated electronic equipment. Unit size ranged between seven and 29 employees. The 21 units differed in the core engineering expertise needed for the technology executed within them, such as computer engineering, physics, and mechanical engineering. Seventy-nine per cent of the participants were men, the average age was 39 years, and the average length of employment with the organization (hereafter called tenure) was 11 years.

Measures

Demographic variables

We assessed age, gender, tenure, and education as control variables.

Personal characteristics

A 12-item questionnaire (see Appendix 1), based on Kirton (1976), assessed creativity, attention-to-detail, and conformity to group and rules, using a 7-point Likert-type scale ranging from 1 'strongly disagree' to 7 'strongly agree.' In addition, a questionnaire consisting of eight items assessed initiative (Frese et al., 1997), and two sub-dimensions of conscientiousness (NEO PI-R scale; Costa & McCrae, 1992), using a 7-point Likert scale ranging from 1 'strongly disagree' to 7 'strongly agree.' The following items assessed initiative: 'I am determined to fulfill my ideas;' 'I initiate ways to actualize new ideas;' 'I am known as a fanatical devotee;' 'I am able to take an idea and turn it in to a project.' The Cronbach's alpha coefficient was 0.81.

Out of six sub-dimensions of the conscientiousness construct we chose the two sub-dimensions of self-discipline and achievement striving, which are the most relevant for predicting efficient performance: 'I try to excel in everything I do;' 'I determine my pace of work in order to accomplish the tasks on time;' 'I work hard to fulfill my objectives;' 'I am self-disciplined.' The Cronbach's alpha coefficient was 0.74.

Organizational culture

A questionnaire consisting of 13 items (based on O'Reilly et al., 1991) assessed the cultural values of innovation, attention-to-detail, and outcome orientation, based on existing scales in the literature, using a 7-point Likert-type scale ranging from 1 'strongly disagree' to 7 'strongly agree'.

The following are examples of items that assessed the three cultural values: Innovation—'In my unit we look for new and fresh ways to deal with problems;' 'I am not afraid to take technical risks;'

'New ideas are not suppressed, even in stages in which their value is unclear.' Attention-to-detail—'Generate error-free work specifications;' 'Work is properly inspected before completion.' Outcome orientation—'Schedules are met;' 'Budget constraints are met.'

Individual performance

A performance appraisal questionnaire consisting of 15 items assessed individual performance in terms of innovation, quality, and efficiency, using a 7-point Likert-type scale ranging from 1 'strongly disagree' to 7 'strongly agree.' The questionnaire consisted of three subscales corresponding to innovation, quality, and efficient performance. The following are examples of items used: Innovation—'Innovative in research and development;' 'Finds unusual solutions;' 'Implements new ideas.' Quality—'Thorough in work;' 'Adheres to rules;' 'Does not cut corners.' Efficiency—'Attends to matters of efficiency and saving;' 'Keeps planned schedule.'

Procedure

First, we conducted 20 unstructured interviews, with 20 employees and managers, to learn about their perceptions of innovation, quality, and efficiency in their units. The interviews served for validating that the questionnaire we developed was meaningful in their context. The questionnaire assessed both personal and organizational characteristics. Upon completion of the questionnaire development we administered it to a small group of eight employees to verify the clarity of the items.

Employees from each unit filled out the questionnaire at their weekly unit meeting, rendering a response rate of almost 100 per cent among those who participated in the meeting and approximately 85 per cent of the total number of employees. Next, we asked the unit managers to fill out performance appraisal questionnaires for each one of the participants. Seventeen of the 21 unit managers responded. The other four managers felt uncomfortable disclosing the evaluations, citing respect of employee privacy as their reason.

Data analysis

To test Hypotheses 1 and 5 we used confirmatory factor analyses. For Hypothesis 1, confirmatory factor analysis using structural equation modeling served to test our proposed structure of distinct yet interrelated dimensions of creativity, conformity, and attention-to-detail, as opposed to one continuum. Confirmatory factor analysis tests the fit of the model to the data. First, we tested the three-factor model, allowing the three attributes to covary. Then, we compared this model to a nested alternative of one factor by setting a covariation between the three variables equal to one, representing one continuum (Bentler, 1995; Lewis, Welsh, Dehler, & Green, 2002). To test Hypotheses 2, 3, 4, 6.1, 6.2, and 6.3, we implemented *Hierarchical Linear Models* (HLM) that take into consideration the nested structure of individuals within organizational units (Bryk & Raudenbush, 1992; Hofman, 1997; Kidwell, Mossholder, & Bennett, 1997). These models (presented in Table 2) explain the effects of the individual characteristics on performance while taking into account the random effect of the unit to which the individual belongs. A significant unit effect means that differences between units affect individual performance. Variables such as potential differences between supervisors in performance evaluation, unit technology, and unit size are controlled by the random unit factor.

Our multi-level models consisted of data from both the individual and unit levels. Personal characteristics and measures of performance appraisal were assessed at the individual level; cultural values were assessed at the individual level with respect to unit culture, and were aggregated to the unit level

by calculating for each unit the mean scores of the three cultural values (innovation, attention-to-detail, and outcome orientation). We tested for the homogeneity of responses at the unit level by calculating the Rwg coefficients of homogeneity in each unit, for each one of the three cultural values. The coefficients of homogeneity ranged from 0.77 to 0.97 using the null-uniform distribution. This justified our aggregation to the unit level. We assigned to each individual his/her unit scores on the cultural values. The analyses were conducted at the individual level, and tested for the effects of individual characteristics and cultural values on individual performance. Using HLM allowed us to take into consideration the unit-level effects.

Results

The factor structure of personal characteristics

Confirmatory factor analysis served for constructing the factor structure of creativity, attention-to-detail, and conformity, and yielded an acceptable fit level ($\chi^2 = 250.41$, d.f. = 59, goodness-of-fit index (GFI) = 0.89, comparative fit index (CFI) = 0.87, root-mean-square error of approximation (RMSEA) = 0.09). Bollen (1989, p. 274) suggested that fit indices as low as 0.85 are considered to be 'reasonable' for models opening new directions in a substantive field. Item loadings were significant ($p < 0.01$). (See items and factor loadings in Appendix 1.) To compare between Kirton's one-factor model and our three distinct factors model (Hypothesis 1), we compared our model to a nested alternative of one factor. We developed a nested model by setting a covariation between the three variables that equaled one, representing one continuum (Lewis et al., 2002). This one-factor model yielded a poor fit ($\chi^2 = 780.09$, d.f. = 54, GFI = 0.70, CFI = 0.50, RMSEA = 0.19). A chi-squared difference test showed that the fit of the nested model was significantly worse than that of our three-factor model ($\Delta\chi^2 = 529.68$, d.f. = 2, $p < 0.001$). Thus, our findings provide evidence that the cognitive styles of creativity, attention-to-detail, and conformity are three distinct factors, as opposed to one continuum. Factor covariation was significant between attention-to-detail and creativity (0.32), and between attention-to-detail and conformity (0.42); however, the covariation between creativity and conformity was not significant (0.03). Thus these findings support Hypothesis 1 that the three personal characteristics are distinct yet interrelated dimensions.

The factor structure of the cultural values

Confirmatory factor analysis, which served for constructing the factor structure of the three cultural dimensions of innovation, attention-to-detail, and outcome orientation, yielded an acceptable fit level ($\chi^2 = 241.55$, d.f. = 70, GFI = 0.90, CFI = 0.90, RMSEA = 0.08). To test Hypothesis 5 we compared the three-factor model to both a one-factor and two-factor models. In the two-factor model innovation served as one factor and attention-to-detail and outcome orientation were aggregated to one factor as they had the highest correlation (Lewis et al., 2002). We first developed a nested one-factor model by setting a covariation between the three variables that equaled one, representing one continuum (Lewis et al., 2002). This one-factor model yielded a poor fit ($\chi^2 = 708.12$, d.f. = 65, GFI = 0.71, CFI = 0.62, RMSEA = 0.17). In addition the two-factor model yielded a lower fit than that of the three-factor model. Chi-squared difference tests showed that the fit of the one-factor and the two-factor models was significantly lower than that of the three-factor model ($\Delta\chi^2 = 466.57$, d.f. = 2, $p < 0.001$, $\Delta\chi^2 = 466.57$, d.f. = 2, $p < 0.001$ respectively). Item loadings were significant ($p < 0.05$).

Factor covariation was significant between attention-to-detail and innovation (0.39), between attention-to-detail and outcome orientation (0.60), and between outcome orientation and innovation (0.37). Thus, in line with Hypothesis 5, our findings provided evidence that the cultural characteristics of innovation, attention-to-detail, and outcome orientation are three distinct, yet related factors.

Descriptive statistics

The means, standard deviations, and intercorrelations among the research variables are summarized in Table 1. The range of responses was high, covering the full range of the Likert scale (1 to 7).

The intercorrelations in Table 1 demonstrated that the correlation between creativity and initiative was quite high (0.62). Yet, it did not reach the level of 0.8–0.9 where a multicollinearity problem eliminates testing for interactions (Kennedy, 1984, p. 131).

The effects of personal characteristics, and their interactions with the cultural dimensions on performance outcomes

Innovative performance

Hypothesis 2 tested the main effects of personal characteristics and creativity by initiative interaction on innovative performance. In addition, Hypothesis 6.1 tested for the interaction effect of personal characteristics and innovative culture on innovative performance. These effects were tested by Model 1 (see Table 2), which consisted of the following variables: demographics, unit level, personal characteristics, cultural values, and the interactions that were hypothesized. The demographics and unit levels served as control variables. Unit level had a marginally significant effect ($p < 0.10$), and gender exerted significant influence ($p < 0.05$), with men being more innovative than women. In line with Hypotheses 2 and 6.1, we found that there were significant interaction effects between creativity and initiative, and between creativity and innovative culture. Employees who scored high on both creativity and initiative obtained the highest scores of innovative performance. In contrast, creative employees with low initiative obtained lower scores of innovative performance, similar to non-creative employees (see Figure 1). The interaction between creativity and innovative culture demonstrated (Figure 2(a)) that creative employees who worked in an innovative culture reached higher levels of innovative performance than creative employees in a low innovative culture. We note that there was a positive correlation between creativity and innovative performance (see Table 1). Nevertheless, in Model 1, in the presence of the two interaction effects of creativity with initiative and with innovative culture, the effect sign of creativity as such was negative. This effect should not be interpreted by itself because it corrects for the high impact of the interaction effect. Hence, creativity should be interpreted as part of the interactions (Hosmer & Lemeshow, 2000).

In addition, there was a significant interaction effect between initiative and innovative culture showing (Figure 2(b)) that initiative mattered when culture did not support innovation. In that case only those with high initiative reached high levels of innovative performance. In a highly innovative culture, employees with high and low levels of initiative reached the same level of innovative performance.

Given the two significant interactions of creativity by innovative culture, and initiative by innovative culture, the three-way interaction of creativity by initiative by innovative culture did not have an additional significant effect.

There were no other significant effects on innovation.

Table 1. Mean, standard deviation, and correlation among the variables

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	1.20	0.40														
2. Age	38.77	11.18	-0.07													
3. Education	3.12	1.00	0.07	0.01												
4. Tenure	10.81	10.48	-0.09	0.80***	-0.15**											
<i>Personal characteristics</i>																
5. Conformity	5.03	0.89	-0.01	-0.06	-0.28**	-0.03										
6. Attention-to-detail	5.59	0.78	0.00	0.18**	-0.18**	0.16**	0.38**									
7. Creativity	5.38	0.97	-0.27**	0.04	-0.02	-0.02	0.07	0.28**								
8. Conscientiousness	5.8	0.80	0.03	-0.09	-0.19**	-0.07	0.43**	0.48**	0.31**							
9. Initiative	4.81	1	-0.18*	-0.02	-0.05	-0.02	0.08	0.31**	0.62**	0.43**						
<i>Culture</i>																
10. Innovation	4.72	0.91	-0.01	-0.10	0.04	-0.15**	0.05	0.03	-0.01	0.02	0.03					
11. Attention-to-detail	5.22	0.81	-0.03	0.04	-0.05	0.07	0.09	0.09	0.04	0.10	0.02	0.25**				
12. Outcome orientation	4.98	0.92	-0.04	-0.08	-0.05	-0.05	0.08	0.04	0.13*	0.10	0.14*	0.36**	0.47**			
<i>Performance</i>																
13. Innovation	4.52	1.28	-0.26**	0.10	0.07	0.12	-0.21**	-0.12	0.22**	-0.06	0.23**	0.06	0.02	0.16*		
14. Quality	5.42	0.96	-0.05	0.07	0.00	0.11	0.04	0.15*	-0.04	0.10	0.06	0.04	0.02	0.04	0.39**	
15. Efficiency	5.07	0.98	-0.05	-0.08	-0.13	0.03	0.00	0.04	-0.02	0.20**	0.13	0.06	0.04	0.07	0.52**	0.59**

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

For gender: 1 = male, 2 = female.

For education: 1 = high school; 2 = technician; 3 = B.A.; 4 = M.A.; 5 = PhD.

Table 2. Result of hierarchical model testing the effect of personal characteristics and culture on performance of innovation, quality and efficiency

	Innovation Model 1	Quality Model 2	Efficiency Model 3
N	204	204	204
	Estimate (SE)	Estimate (SE)	Estimate (SE)
Unit	0.28 (0.16)[†]	0.32 (0.16)*	0.05 (0.14)
Intercept	12.00 (6.00)	-12.21 (9.17)	-0.51 (17.01)
Age	0.00 (0.01)	0.00 (0.01)	-0.04 (0.02)[†]
Gender	-0.44 (0.21)*	-0.08 (0.16)*	0.15 (0.34)
Education	0.15 (0.09)	0.09 (0.07)	-0.08 (0.14)
Tenure	0.00 (0.01)	-0.00 (0.01)	0.03 (0.02)
Conformity	-0.17 (0.11)	3.16 (1.52)*	0.15 (0.17)
Attention-to-detail	-0.18 (0.12)	-0.23 (1.43)	-0.47 (0.20)*
Creativity	-3.78 (1.20)**	-0.18 (0.09)**	-0.11 (0.18)
Conscientiousness	-0.13 (0.13)	0.04 (0.09)	0.80 (2.87)
Initiative	1.38 (1.18)	0.14 (0.09)	0.38 (0.20)[†]
Culture—innovation	-0.89 (1.11)	0.04 (0.40)	0.57 (0.37)
Culture—attention-to-detail	0.18 (0.61)	2.92 (1.74)[†]	6.80 (3.47)[†]
Culture—outcome orientation	0.45 (0.49)	0.20 (0.48)	-6.60 (3.03)*
Creativity × initiative	0.23 (0.07)***		
Culture—innovation × creativity	0.59 (0.24)*		
Culture—innovation × initiative	-0.51 (0.24)*		
Culture—attention-to-detail × personal attention-to-detail		0.06 (0.27)	
Culture—attention-to-detail × conformity		-0.59 (0.28)*	
Culture—outcome orientation × conscientiousness			1.22 (0.52)*
Culture—attention-to-detail × conscientiousness			-1.26 (0.59)*

[†] $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Performance quality

Hypotheses 3 and 6.2 tested the main effects of the personal characteristics of conformity and attention-to-detail on *performance quality*, and their interaction effects with the cultural dimension of attention-to-detail. The results, as presented in Model 2, Table 2, partially supported our hypothesis, demonstrating a significant and positive effect of conformity on quality performance, and a positive effect of the cultural value of attention-to-detail on quality performance. Furthermore, there was a

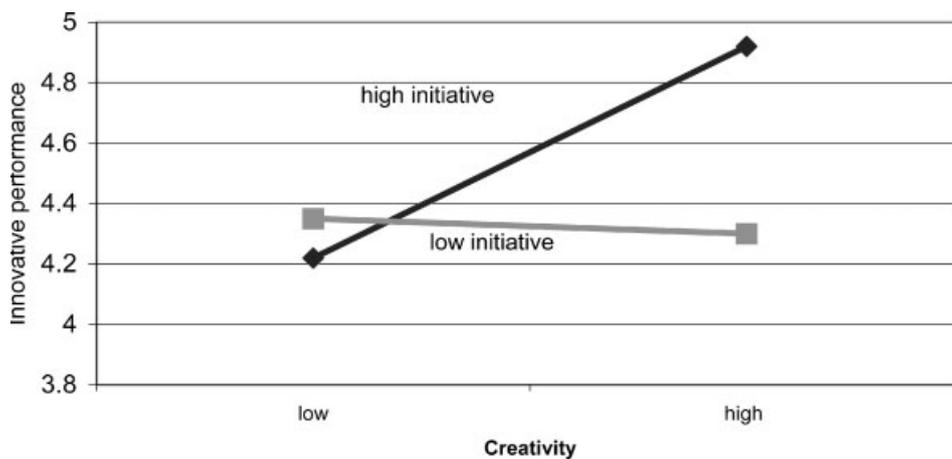


Figure 1. Interaction between creativity and initiative

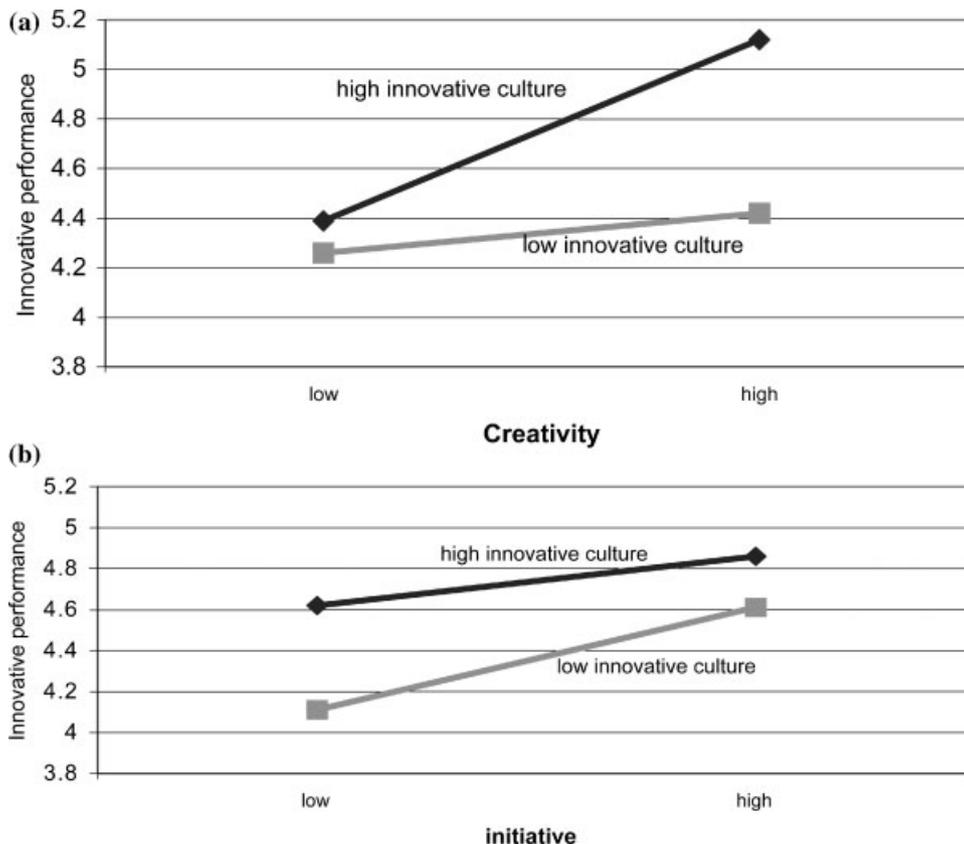


Figure 2. (a) Interaction between creativity and culture of innovation (b) Interaction between initiative and culture of innovation

significant interaction effect between conformity and the cultural value of attention-to-detail (Figure 3). In a high attention-to-detail culture there were no clear differences between high and low conformists. Yet, in a low attention-to-detail culture high conformists obtained significantly higher quality scores than low conformists. It seems that some structure, as conveyed by the cultural value of high attention-to-detail, is needed to enable low conformists to obtain high quality performance.

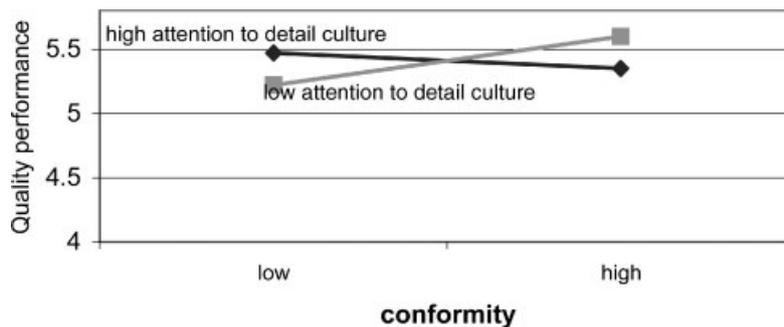


Figure 3. Interaction between conformity and culture of attention-to-detail

In contrast to our hypothesis, the cognitive style of attention-to-detail by itself did not affect performance quality. Creativity had a significantly negative effect on quality performance. There was a significant unit effect on performance quality, but no other significant main or interaction effects.

Performance efficiency

Hypothesis 4 tested the main effect of conscientiousness on performance efficiency, and Hypothesis 6.3 tested for the interaction between conscientiousness and an outcome-oriented culture. As expected, there was a significant interaction effect of conscientiousness with outcome-oriented culture on efficiency (Figure 4(a)). The most efficient employees were those who scored high on conscientiousness and worked in a culture emphasizing outcome orientation. Yet, in Model 3, in the presence of the two interaction effects of conscientiousness with outcome orientation, and with attention-to-detail, the effect sign of an outcome-oriented culture as such was negative. This impact need not be interpreted by itself, but rather, it should be interpreted as part of the interaction effect (Hosmer & Lemeshow, 2000).

In addition, there was a second significant interaction that was not expected, between conscientiousness and the cultural value of attention-to-detail (Figure 4(b)). In a culture of low attention-to-detail,

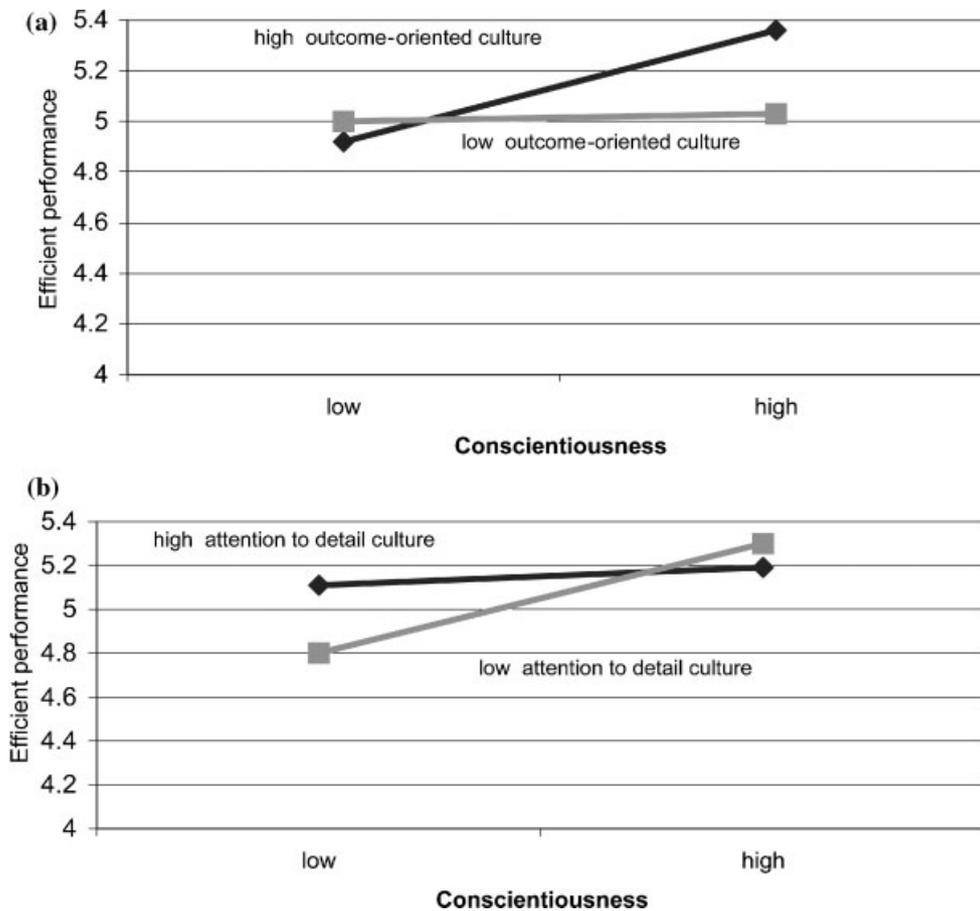


Figure 4. (a) Interaction between conscientiousness and culture of outcome orientation (b) Interaction between conscientiousness and culture of attention-to-detail

there were significant differences in the efficiency levels of high versus low conscientious employees, with the latter achieving lower efficiency levels. In a culture of high attention-to-detail, conscientiousness did not differentiate between low and high efficiency. Again, in a weak situation (low attention-to-detail), unlike a strong situation, personal characteristics manifested themselves in performance. There were no other significant interactions.

Unlike Hypothesis 4 conscientiousness by itself did not significantly impact on efficiency in the presence of its two significant interactions with the cultural dimensions of outcome, orientation and attention-to-detail. Although we did not expect any additional effects, we found that initiative had a positive effect, and personal attention-to-detail had a negative effect on efficiency. Of the demographic variables, age had a significant negative effect on efficiency, with young employees being more efficient than older ones.

The organizational unit

The organizational unit exhibited significant effects in the models that explained innovation (Model 1) and quality (Model 2) performance ($p < 0.10$, and 0.05 respectively). This means that performance scores were affected not only by personal and cultural characteristics, but also by specific characteristics of the employee's unit, including potential differences between performance evaluations by unit managers. However, the effects of personal characteristics and their interactions with culture were significant over and above the unit effects. There was no unit effect on efficiency, suggesting that the meaning of meeting schedule and budget constraints is unified across units.

Discussion

This is one of the few empirical studies (if not the only one) that tests whether personal and cultural factors that are constructive in the promotion of innovation are destructive as regards achieving high quality and efficiency.

The present design of the study allowed us to identify the complementary versus competing nature of personal and cultural characteristics (Hypotheses 1 and 5) and, in addition, to test their complementary versus competing effects on three performance outcomes: innovation, quality, and efficiency (Hypotheses 2, 3, 4, and 6). The study pointed at the positive effect of creativity on innovation when combined with initiative and a culture of innovation, and at the negative effect of creativity on performance quality. It also pointed at the negative effect on efficiency of personal attention-to-detail. The methodology we used controlled for the unit effect by testing the personal and cultural effects on individual performance as nested within their organizational units.

Furthermore, the research literature summarizes two separate lines of research on innovation. One line of research focuses on the individual level, looking at the personal characteristics that enhance and inhibit creativity (Amabile, 2000; Scott & Bruce, 1994; Mumford & Gustafson, 1988; Oldham & Cummings, 1996). The second research track looked at the organizational level, studying the organizational factors that enhance and hinder innovation (Brown & Eisenhardt, 1997, 1998; Damanpour, 1991). The present study examines both personal and organizational factors that enhance or hinder innovation, while at the same time examining the factors that contribute to quality and efficiency.

The interplay between innovation and other organizational outcomes, and between the individual and organizational factors that influence them, enabled us to explore the dark and bright sides of innovation.

Personal characteristics and cultural values: competing versus complementary relationships

In recent years, the importance of innovation has been highlighted, overshadowing the other two performance outcomes of quality and efficiency. Nevertheless organizations need to continue to maintain high levels of quality and efficiency, alongside an environment of innovation, in order to compete in the global market (Prahalad & Krishnan, 1999). Very little research has simultaneously and empirically examined the three outcomes, their interrelationships, and their explanatory factors. On the conceptual level, there has been no clear conclusion concerning the interrelationships between the cultural values of innovation, attention-to-detail, and outcome orientation, and their effects on innovation, quality, and efficiency performance. Some researchers have argued for competing relationships between cultural values that lead to innovation, quality, and efficiency (Quinn & Rohrbaugh, 1983; Douglas & Judge, 2001), while others proposed that they complement each other or need to be balanced (Schuler & Jackson, 1987; Brown & Eiesenhardt, 1997, 1998).

In the following section we discuss how this study helps clarify the interrelationships between creativity, conformity, and attention-to-detail on the individual level and their impact on the various performance outcomes, and between innovation, attention-to-detail, and outcome orientation on the organizational culture level and performance outcomes.

The individual level

This study sheds light on the complementary versus competing relationships between the three cognitive styles. Confirmatory factor analysis demonstrated that creativity (Kirton's terminology: 'idea generation'), attention-to-detail (Kirton's efficiency), and conformity were three separate factors, with positive correlations between them. The three-factor model had a significantly better fit to the data than the one factor model. This means that people have the ability to be highly creative and also to pay attention to detail. In this study, 30 per cent of the participants scored high (above the median) on both creativity and attention-to-detail. Our findings support previous research demonstrating three distinct factors (Taylor, 1989). However, this is the only study that demonstrated, in confirmatory factor analysis, that the model fits the data. Keeping the three factors separate from each other enabled us to test their unique effect on the performance outcomes of innovation, quality, and efficiency.

The lack of trade-off relationships between creativity and the two other characteristics has some positive implications. Creative persons, it would appear, are not necessarily people who are unable to pay attention to detail. People may have both characteristics in their pool of personal resources (Kanfer, 1990; Kahneman, 1973).

The cultural level

At the cultural level we examined the interrelationship between innovation, attention-to-detail, and outcome orientation. At this level, too, we identified three separate factors. The confirmatory factor analysis demonstrated a good fit of the three-factor model to the data. Our findings supported the complementary approach: that the three cultural values do not compete with each other; that they can coexist (O'Reilly et al., 1991; Schuler & Jackson, 1987): and that organizations may use different combinations of these three cultural values to support their business strategies (Schuler & Jackson, 1987).

Performance outcomes of innovation, quality and efficiency, and their explanatory factors

The three performance outcomes positively correlated with each other, indicating that employees who score high on one dimension tend to score high on the two other dimensions. Yet, personal and cultural characteristics had differential effects on the three performance outcomes.

Innovative performance

As expected, innovative performance was significantly affected by three interactions: creativity and initiative, creativity and innovative culture, and initiative and innovative culture. The impact of the interaction between creativity and initiative supported the conceptualization of innovation as consisting of both creativity and its implementation. Ours is, perhaps, the first study that empirically supports the distinction between creativity and innovation, demonstrating that creativity by itself is not enough for innovative performance. People need to take the initiative to implement their ideas in order to transform them into a valuable product (Levitt, 2002). Our findings revealed the limitation of creativity, which by itself may not result in innovation.

Furthermore, there was a significant interaction effect of creativity and innovative culture. Innovative culture encourages employees to search for new ways of dealing with problems, taking risks, and exploring their ideas even when their outcome value is not clear (Amabile, 2000; Scott & Bruce, 1994). The interaction effect between creativity and innovative culture demonstrated that creative ideas transform into innovation in a culture that supports innovation. In a culture that does not support innovation there were no differences between creative and non-creative people in their innovative performance. The dependence of creativity on the cultural context points at another limitation that hinders creative people from becoming innovative. Our findings support the model of person-organization fit (Schneider, 1987; Van Vianen, 2000; Kristof, 1996). The interaction between initiative and culture further supported the fit model. The finding demonstrated that when the culture was not innovative only high-initiative people reached high levels of innovation, while in an innovative culture there were no significant differences between high and low levels of initiative. The implication of this finding is that in a culture that supports innovation new ideas are considered without efforts having to be invested to promote them.

Quality performance

As expected, conformity had a positive effect on performance quality, and there was a significant interaction effect of conformity with a culture of attention-to-detail. Conformity is about adherence to rules and to group norms. Conformity is essential if rules are to be maintained and performance standards that lead to high quality are to be followed. The interaction of conformity with a culture of attention-to-detail showed that differences in performance quality between high and low conformists were clearly observed in a culture of low attention-to-detail. Yet, in a structured environment of high attention-to-detail, where non-conformists had clear guidelines, there was no difference between high and low conformists in their performance quality. This finding supports Michel's (1977) theory of weak and strong situations. A culture of low attention-to-detail represents a weak situation where there is no clear structure that tells employees how much attention to allocate to task details. Hence, non-conformists, who tend to deviate from existing rules, performed worse than conformists when the cultural value of attention-to-detail was low.

We found that creativity had a significant negative effect on performance quality. This finding points at the *dark side of creativity*, suggesting that creative people are less likely to perform well when the task requires accuracy, and adherence to rules. We suggest that a distinction should be made between the ability to be creative and pay attention to detail and the implementation. Capabilities, according to Kanfer's theory of motivation (1990), are part of an individual's pool of limited resources. Individuals allocate these resources to their task on the basis of distal and proximal motivational forces. The distal forces are influenced by the expected utilities that a person might have from performing the task. The proximal forces are the goals that are shaped by the expected utilities, and direct the resources to the task itself, to off-task, and to self-regulation activities (Kanfer, 1990). We propose that while people may have the capability to be creative, and also be attentive to details and rules, they may

have different utilities when allocating their attention to the creative aspect of the task, versus allocating attention to the task details, rules, and standards. It seems that creative people are more highly motivated to allocate their creativity resources to the innovative aspect of their task, and less motivated to allocate their attention resources to the quality aspect of their task. Therefore, at the implementation stage, creativity positively affects innovation, given high initiative and a culture that supports innovation, but it negatively affects performance quality. This negative effect of creativity on quality reflects the dark side of creativity.

Performance efficiency

In agreement with our hypothesis, the interaction between conscientiousness and outcome orientation yielded a positive effect on performance efficiency. In line with the person–organization fit model (Schneider, 1987; Van Vianen, 2000; Kristof, 1996), a culture that promotes outcome orientation is a fertile environment for conscientious employees. The most efficient employees were those who scored high on conscientiousness and worked in an outcome-oriented culture.

Though we did not expect any other interaction, we found that conscientiousness interacted with the cultural value of attention-to-detail and that this interaction had a negative effect on efficiency. Again, the interaction of a personal characteristic with the culture of attention-to-detail supports Michel's (1977) theory of weak and strong situations. In the strong situation of high attention-to-detail there is a clear structure that directs employees exactly how to act, and therefore conscientiousness is less significant for performance. Yet, in the weak situation of low attention-to-detail, low-conscientious employees, who lacked a structured environment, performed less efficiently than highly conscientious employees, and less efficiently than in the high-attention-to-detail culture. Thus, the culture of attention helped the less conscientious employees achieve high efficiency.

Attention-to-detail as a personal characteristic had a negative main effect on efficiency. Paying attention to detail is time consuming, while efficient performance is about fast processing of products and services. The finding showed that people who tend to invest time and energy in their task details pay the price for not meeting deadlines. It is similar to the case of speed–accuracy trade-off, demonstrating that paying attention to accuracy competes with performance speed (Campbell, 1988; Erez, 1990). Previous research has demonstrated that motivational factors affect the resource allocation strategy to various task components (Erez, Gopher, & Arzi, 1990). It seems that people who are motivated to pay attention to detail allocate more resources to this aspect of their task, paying the price of low speed and efficiency. This finding further supports our distinction between capabilities and their implementation, demonstrating that one may have the ability to pay attention to detail and to conscientiously perform a task, yet simultaneously be motivated to focus more on only one aspect of the task than on other task components.

Initiative had a positive main effect on efficiency performance, as it also had a positive effect on innovation. Employees who demonstrated high initiative were motivated to 'move things forward' and to ensure their actualization, and hence reached high efficiency levels as well as high levels of innovation.

The person–environment fit and the strong/weak situation (Michel, 1977) models apparently advance individual performance in a quite different way. That is, individuals need some characteristics congruent to cultural values in order to actualize their potential (as in the case of creativity by innovation, and conscientiousness by outcome orientation). Yet, for other characteristics individuals need strong cultural values in order to prevent them from performance loss (as in the case of low conformists and a high-attention-to-detail culture, and low-conscientious employees and a high-attention-to-detail culture). Future research should sort out for which personal characteristics a person–environment fit or strong cultural values are demanded.

Conclusions

The study enabled us to see the bright and dark sides of creativity and innovation. On the bright side, this study demonstrated that creativity leads to innovation. Creativity, it was found, does not necessarily preclude attention-to-detail and conformity. People can maintain the balance of being creative and paying attention to detail. The study also showed that an innovative culture does not necessarily compete with a culture of quality and efficiency, and companies may maintain a balance between all three dimensions. In fact, a culture of attention- to-detail was conducive to performance quality when interacting with conformity as a personal characteristic, and it was also complementary to efficiency when interacting with conscientiousness. Innovative performance does not impede quality and efficiency, and in fact these three performance outcomes were positively correlated. Being creative does not necessarily contradict being efficient, as there is no relationship between creativity and efficiency.

On the dark side we found that creativity is not enough for achieving innovative performance. Initiative is a necessary condition for creativity to affect innovation. Moreover, creative people are not always highly innovative. Their innovative performance depends on the organizational culture in which they operate. Creative people implement their ideas and produce innovative products when working in an environment that supports innovation. Yet, when the organizational culture does not support innovation, creative people do not reach high levels of innovation. Furthermore, creative people may pay the price of poor quality. Although they may have the capabilities to be both creative and pay attention-to-detail, they are motivated to allocate their resources to the creative aspect of their task rather than to the task component that requires attention-to-detail and adherence to rules and standards. In addition, although creativity does not rule out efficiency, it does not contribute to efficiency. Thus, other personal characteristics become important for the attainment of performance quality and efficiency. Conformity is important for reaching high performance quality, and conscientiousness is necessary for maintaining high levels of work efficiency. Of all the personal characteristics, initiative was the one that contributed both to innovation and efficiency, in both cases by helping to move things forward.

Unit effect

Our HLM methodology allowed for testing the unit effect. There were significant unit effects on two performance models—innovation and quality—but not on efficiency. Following a personal conversation with the CEO, we found that there were unmeasured differences between the units with respect to core technology, and task requirements in terms of innovation and quality. These differences might have influenced the importance given by the unit managers to innovative and quality performances. However, the personal characteristics and their interactions with culture were significant over and above the unit effects. There was no unit effect on efficiency, suggesting that the pressure to meet time and budget constraints were similar in all units.

Limitations and Future Research

Although we collected data in 21 different units, they were all in one organization. This may be a limitation, yet, on the other hand, conducting the study in one organization helped avoid potentially

confounding factors, such as type of industry, resources, and markets (Pritchard et al., 1988; Mukherjee, Lapre', & Wassenhove, 1998). Future studies, to be conducted in more than one organization, would strengthen the generalization of the present findings.

Initiative was the personal characteristic that affected both innovation and efficiency. However, it has not been studied extensively. Future research should pay more attention to initiative as a personal characteristic, and to the organizational culture that facilitates personal initiative in organizations.

This paper focused on individual performance, using performance evaluations. Nevertheless, the competitiveness of organizations is not simply the sum of individual performances. Future research should focus on performance at the unit and organizational levels. Such a study should consider team resources in terms of its members' characteristics, and examine the interactions in various team compositions and within various organizational cultures as they affect team performance. At the unit/team level, objective performance measures could serve to assess team performance.

Elevating the research to the team level brings in new variables that might affect team innovation, performance quality, and efficiency, such as team learning, team reflexivity, and interpersonal processes. Unit structural characteristics such as the type of technology should also be taken into consideration, in addition to cultural effects.

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Appendix 1. Confirmatory Factor Analysis: Cognitive Style

Items	Standardized coefficients
<i>Conformity</i>	
I try not to oppose team members	0.58
I adapt myself to the system	0.76
I adhere to accepted rules in my area of work	0.82
I avoid cutting corners	0.59
<i>Attention-to-detail</i>	
Thorough when solving problems	0.67
Addresses small details needed to perform the task	0.77
Performs the task precisely over a long time	0.78
Good in tasks that require dealing with details	0.68
<i>Creativity</i>	
I have a lot of creative ideas	0.53
I prefer tasks that enable me to think creatively	0.79
Innovative	0.80
I like to do things in an original way	0.71

$N = 349$.