The innovation work environment of high-tech SMEs in the USA and Canada

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This study examined the climate for innovation and creativity, and related outcome measures, in 31 Canadian and 11 US small-and medium-sized enterprises (SMEs), as assessed by 120 R&D engineers in those firms. Prior studies on the innovativeness of countries have been critical of Canadian firms compared to those in other industrialized countries. Our study tested whether differences existed between perceived climates, creativity and productivity of US and Canadian SMEs. The results indicated that the innovative climates and the perceptions of creativity and productivity of US and Canadian firms are very similar. Furthermore, the most important factors relating to creativity (Challenging Work and Organizational Encouragement) were the same for both the USA and Canada. Our conclusion is that support for innovation in Canadian SMEs is comparable with that of US SMEs. Differences in innovation measured at the national level can probably be attributed to other factors, such as industry structure and the degree of innovation in large firms.

Introduction

Traditionally, the competitive advantage of organizations depended upon such factors as size, brand name, and possession of assets. In recent years, the pattern has shifted to favor those organizations that can mobilize their technical skills, knowledge, and experience to innovate products, processes and services (Kay, 1993). Research on small- and medium-sized enterprises (SMEs) has shown that measures of success based on growth, profitability, and productivity are highly correlated with the emphasis that a firm places on innovation (Baldwin et al., 1994). In a subsequent study, Baldwin (2000) found that firms with a higher rate of product and process innovation are more likely to be in the category of newly-formed firms, which grow at a faster rate.

Successful new innovations are an important way for organizations to adapt to changes in the market, technology, and the competition. For example, new products created as a result of design, customization, and quality enhancements, help to capture and retain market share and improve the ultimate profitability of the firm (Souder and Sherman, 1994). In a world of shortened product life cycles, being able to replace products more quickly with better versions becomes an imperative to remain competitive (Stalk and Hout, 1990). Innovation to create new and improved products is also important to meet the changing needs and desires of customers.

Although new products are often viewed as the innovative output of a firm, not to be overlooked is the place of innovation in the manufacturing process. The ability to make something better and more cheaply can...
also create a competitive advantage for a firm. The Japanese dominance in automobiles and consumer electronics stems in large part from a consistent pattern of innovation in manufacturing processes (Womack et al., 1991). Thus, innovation of manufacturing processes is also an important source of the strategic competitiveness of a firm.

Innovations, both in products and processes, are important ingredients to the competitive success of a firm. The foundation for innovation is ideas, and employees are the ones who ultimately create, develop, and carry out ideas. Creative employees, who propose novel and useful ideas or procedures, provide the firm with the resources for subsequent development and possible implementation. Innovations, however, are created within the context of an organizational work climate. Innovation depends on a supportive and encouraging organization where creative ideas can emerge and be deployed effectively (Tidd et al., 1997).

This paper reports on a comparison study of the perceived work climate and outcome measures related to innovation in high-tech SMEs in the USA and Canada. SMEs are viewed as a major source of innovative products and processes in the global economy. At the same time, Canada has often been criticized as lagging in innovativeness, when compared with other developed countries. This study attempts to determine whether this criticism is the result of differences in organizational support for innovation, or whether it might be attributed to other factors, such as differences in industry structure. We begin by discussing the importance of SMEs in the innovation process, the relationship between organizational climate and innovation, and the prevailing view of innovation in Canada. Next, we describe the research question and methodology. Finally, we present and discuss the results, and describe the limitations and conclusions of the study.

SMEs

SMEs play an important role in the economy of many countries. Studies have shown that high-tech SMEs are important generators of economic growth (Bower, 1992; Jones-Evans and Kofsten, 1997). In Europe, SMEs employ the majority of the workforce – accounting for over 50% of manufacturing sales and almost two thirds of services (Mulhern, 1995). In Canada, SMEs have made significant contributions to net job creation and play an increasing large role in Canada’s GDP (Cyr, 1999). SMEs make up the majority of businesses in Canada, accounting for over 99% of the businesses. Over 50% of the worker payrolls in Canada are accounted for by SMEs (Report of the Standing Committee on Industry, 2000). SMEs do not have as great an impact on the economy of the USA, probably as a result of US firms being able to take greater advantage of economies of scale in its larger market. This latter finding is also observed in a few of the larger European countries, such as Germany. SMEs in the USA, however, are still recognized as a fertile source of innovative products and services.

SMEs enjoy a comparative advantage in innovation as compared with larger firms, due to their flexibility and ability to provide more rapid responses with a customer-oriented focus (Baldwin, 2000). This has led to their reputation for having a higher rate of productivity in new product development, as compared with their large firm counterparts. Cooper (1964) reported that large companies typically spend from three to ten times as much as small ones to develop a particular product. Acs and Audretsch (1988) found that SMEs have an innovation-per-employee ratio over six times that of larger firms. In a subsequent study, Audretsch (1995) found that SMEs produced more innovations per employee than larger firms in 14 of 18 industries studied. This has prompted many larger firms to set up smaller ‘skunk works’ type of facilities for innovating new products and processes. In a way these are designed to emulate SMEs.

Organizational work climate

One factor that might account for the success of SMEs in innovation is the climate within the firm. Organizational work climate is viewed as a worker’s perception and cognitive interpretation of the work environment. Climate is based on the signals individuals receive concerning organizational expectations for behavior. Employees use this information to construct their perceptions, and regulate their behavior. Amabile et al. (1996) found that management support, and encouragement mechanisms for creativity, differentiates between high and low innovative organizations. Their contention was that organizational efforts to develop processes, programs, structures and resources for facilitating creativity provide encouragement to employees by signaling the importance of innovation. Oldham and Cummings (1996) found that employees exhibited higher performance when their jobs were complex and when their supervisors were supportive and less controlling. A study by Scott and Bruce (1994) found evidence that innovative behavior is related to supervisor-subordinate relationship, support of innovation, and role expectations.

Organizational creativity mechanisms, such as the institution of formal procedures and resources to encourage novel approaches, were found to correlate positively with levels of innovative performance (Bharadwaj and Menon, 2000). In a study of SMEs in Finland, Kivimaki et al. (2000) identified active encouragement of initiatives and evaluation of performance as predictors of innovativeness. Coaching of employees in the new product development process
was found to be a critical factor for success of new products in the market (Stevens et al., 1999). A number of earlier studies also have suggested that a supportive organizational climate has a significant effect on the innovative performance of individuals (Feldman, 1988; Jain and Triandis, 1990; Nystrom, 1990; Souder, 1987). Looking from the negative perspective, organizational conditions were ranked just behind social conditions as the main barriers to innovation, in a study of Canadian businesses (Knight, 1996).

**Innovation in Canada**

Canada’s efforts and success in technological innovation in the high-tech industry have been under criticism, particularly when analyzed using macro-level indicators. Barrows (1992) reported that, compared with the other developed nations in the world, Canada has one of the lowest export to import ratios for high-tech goods (that is, well below 1.0). Rugman and D’Cruz (1991) reported that Canada lags behind other industrialized countries in obtaining patents, and in its ability to commercialize available technology. The Global Competitiveness Report (World Economic Forum, 1999), which rates countries according to a number of different factors, ranked Canada twenty-first in the category of ‘obtaining technology by pioneering their own products and processes’ and tenth in terms of absorbing new technology. Canada’s gross expenditure on R&D as a percentage of GDP was 1.6%, considerably below the OECD average, and about half that of the USA (World Economic Forum, 1999). In a comparison of G7 countries for the period 1992–97, Canadian businesses trail those in other countries in the categories of growth in patents filed and technology commercialization (Myers, 1998). Richie (1991) reported that manufacturing labor productivity growth, a measure of technological innovativeness in the manufacturing process, was inadequate to offset the increased wages and other costs, reducing Canada’s competitiveness compared to the USA. Porter (1991) concluded that, faced with limited pressures to upgrade and innovate, Canada has not invested in, created, or adopted the most advanced technologies, leading to one of the lowest increases in productivity growth of the G7 countries in recent years. In a study of large high-tech companies, Bommer and Jalajas (1996) found a significantly higher rate of organizational encouragement for US R&D professionals to pursue technical development than their Canadian counterparts.

Much of the basis for this criticism may stem from structural factors. Canada has a large proportion of natural resource companies, which historically have low rates of R&D industry wide. In addition, many enterprises are branch plants, with much of the R&D possibly performed in the country of the corporate headquarters (usually the USA). An important question to be addressed is whether these differences extend to firms that are not affected by these structural differences. In particular, are there differences in innovativeness between US and Canadian SMEs?

At the individual level, it has been suggested that differences in Canadian values and culture may contribute to these performance discrepancies. Canadians are sometimes seen as more ‘elitist, deferential, bureaucratic, state-oriented, collectivist, orderly and conservative’ (Thomas, 1993) when compared to Americans. Canadians are also seen as less aggressive, less innovative, and less risk taking than Americans (Lipset, 1988). The question remains as to whether these traits, if true, play out in the work environment of small- and medium-sized enterprises (SMEs).

**Research question**

Since SMEs represent such a vital part of Canada’s social and economic fabric, and since innovation is critical to their competitive success, it would seem important to shed more light on the factors contributing to, or diminishing, their ability to innovate. We do this by comparing firms in Canada with firms in the USA, a country that has typically been at the top of lists evaluating innovation performance. We begin by assessing whether there is a perceived difference in the creative and productive output of SMEs in each country. Our hypothesis is then,

**Null Hypothesis**: There is no difference in creativity and productivity between US and Canadian SMEs as perceived by R&D professionals working in these firms.

**Alternative Hypothesis**: There is a difference in perceived creativity and productivity between US and Canadian SMEs.

Our next question explores the climate for innovation. That is, what factors support innovation within firms, and what factors hinder innovation? Our paper focuses on the organizational work climate in which employees create and develop new ideas. We compared SMEs in the USA and Canada to ascertain the similarities and differences that might exist with regard to their innovative work climates. On the one hand, one might expect that as a result of the differences in Canadian historical roots, culture, and values, that the innovative climates in Canadian SMEs might be somewhat different than those of US SMEs. On the other hand, given the instant, information-rich world in which we work and live (including such influences as the Internet, competitiveness, and communication), one might expect that the innovative climates of
Canadian SMEs might be very similar to those of the USA. Our second hypothesis is,

**Null Hypothesis**: The innovative work climates of Canadian SMEs are the same as that of US SMEs as perceived by R&D professional working in these firms.

**Hypothesis 1**: The perceived innovative work climates of Canadian SMEs differ from that of the US SMEs.

If differences exist between the organizational climates supporting innovation in Canadian and US firms, it would be of interest to understand what the differences are and to begin to understand how these differences arise. The differences would provide benchmarking data for managers in both countries. These findings could be used by management to formulate action plans for their firms. These results could also prompt further studies into the cultural or management issues that might be the basis for understanding these differences.

If no differences are discerned, this would also be an important finding. This conclusion would negate some perceptions regarding the general innovative climate in Canada. It would focus the issue regarding innovation more squarely on the large multinational and natural resource companies. These findings might be of value to these types of firms in improving their innovative climate. Historically Canadian firms have found it more difficult to attract venture capital than their American counterpart (Lipset, 1988). If in fact the innovative climate of Canadian SMEs are very similar to US SMEs, their attractiveness for venture capital could improve.

**Survey instrument**

The primary survey instrument used was ‘KEYS: Assessing the Climate for Creativity’, published by the Center for Creative Leadership. The purpose of the questionnaire is to assess how well an organization fosters creativity and innovation by quantifying work environment factors. The instrument consists of 78 questions (four-point, Likert-type scale) to be completed by R&D employees. The questionnaire measures six dimensions that describe stimulants to innovation (Freedom, Challenging Work, Sufficient Resources, Supervisory Encouragement, Work Group Supports, and Organizational Encouragement), two dimensions that describe environmental obstacles to innovation (Organizational Impediments and Workload Pressure), and two dimensions that measure outcomes (Creativity and Productivity). A more complete description of each dimension appears in Appendix 1. The KEYS instrument has been found to have a high degree of validity and reliability as reported by Amabile et al. (1996).

**Participants**

The participants in the study were 120 R&D engineers (mean number of years of service = 8.5). There were 61 engineers employed in 31 Canadian firms in the Kanata region of Ontario, and 59 engineers employed in 11 US firms in Long Island, New York. All of the firms were from the high-tech industry. The firms chosen for this study produce goods in the Standard Industry Code (SIC) categories of 35F (office, computing, accounting machines), 36 (electrical measurement and distribution equipment), and 38A (engineering, measuring and controlling, and optical equipment). All of the firms represented were SMEs, corresponding to 50–500 employees. To obtain the responses, SME companies fitting the descriptions above were identified. Representatives of the firms were then contacted via phone to solicit their cooperation in allowing a visit to the firm. For those firms who responded positively, a graduate student visited the firm and distributed the surveys. Typically, the graduate student met individually or with a small group of R&D professionals while they completed the survey. In some cases, surveys were left with respondents at the firm and were retrieved within a week. A high percentage of firms (over 50%) contacted in Canada and the USA refused to cooperate in the study, citing that they were 'just too busy'. Of the firms that agreed to participate in our study, the response rate was 88%, yielding an overall response rate of 44%.

**Results**

The first hypothesis addressed whether a difference existed in the perceived creativity and productivity of Canadian and US firms. We found no difference between Canada (mean = 17.0) and the USA (mean = 16.6) on the measure of creativity ($t = 0.57, \text{n.s.}$). Furthermore, no difference was found between Canada (mean = 17.8) and the USA (mean = 17.2) on the productivity variable ($t = 1.17, \text{n.s.}$). These findings are contrary to those cited earlier that reported that Canada lagged behind the USA in innovation and productivity. As we will note again in the conclusions section, we did not measure directly creativity or productivity, only the R&D workers’ perceptions of their firms’ creativity and productivity. Our interest is in how workers view their environment and the influence it has on creativity and productivity.

The second hypothesis tested whether differences existed between Canada and the USA on those climate factors that contribute to or impede creativity. A multivariate analysis of variance (MANOVA) was run on the six stimuli and two obstacles to creativity variables to test for any differences between these two groups (USA and Canada). We found no significant
difference between Canada and the USA for these factors (Wilks' $\lambda = 0.295$). We also conducted individual $t$-tests on each variable, using Bonferroni corrections to eliminate multiple comparison biases, and achieved the same results. Table 1 depicts the group means (standard deviations), $t$ scores and $p$ levels for these tests.

A stepwise linear regression analysis was also performed regressing Creativity on the six variables measuring stimulants to creativity and two variables measuring impediments to creativity. The analysis was done separately for the Canadian and US respondents. For the Canadian group, the resulting independent variables were Organizational Encouragement ($\beta = 0.44, p < 0.001$), Challenging Work ($\beta = 0.44, p < 0.001$), and Workload Pressure ($\beta = -0.22, p < 0.01$). The $R^2$ for this model was 0.76. In the analysis of the US respondents, the resulting variables were Organizational Encouragement ($\beta = 0.33, p < 0.01$), Challenging Work ($\beta = 0.48, p < 0.001$) and Freedom ($\beta = 0.26, p < 0.05$). The $R^2$ for this model was 0.67. For both groups, the most important variables were Organizational Encouragement and Challenging Work. Of note, too, is the large $R^2$. Of course, all the variables come from the same instrument, and the survey was designed to predict creativity, but the size of the $R^2$ indicates that all the other variables found in other research on creativity likely contribute a smaller amount compared to those in the models tested here.

### Discussion

The results of this research are somewhat at variance with prior views regarding the general innovation climate in Canada, as discussed earlier in this paper. We found, for example, that Canadian R&D workers did not perceive their workgroups as less creative than US workers. A study by Baldwin and Hanel (2000) is consistent with this and provides insight into this issue. They found, overall, greater innovation in foreign-owned multinational enterprises in Canada, than in Canadian-owned firms in Canada. This would appear to negate the often cited argument that foreign-owned branch plants do not innovate in the host country (see Caves, 1971). However, when the sample was narrowed to SMEs in the chemical, mechanical, instruments, and electronics industry, Canadian firms outperformed their foreign-owned counterparts. In particular, Canadian-owned firms in this category with 101–500 employees (i.e. SMEs) outperformed their foreign-owned counterparts. These results, while not exactly comparable, tend to lend support that innovation is indeed higher for high-tech Canadian SMEs than for larger firms in other sectors of the economy.

A study using patents as a measure of innovation is also consistent with our findings. The US patenting rate is about four times higher than that of Canada in the computers and communications sector. However, if one looks at patents being issued per R&D worker, Canadian R&D workers appear to be as productive as those in other countries (Report of the Standing

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Table 1. Mean scores (standard deviations) and $t$ tests of each of the KEYS dimensions.

<table>
<thead>
<tr>
<th>KEYS dimensions</th>
<th>Canada$^1$</th>
<th>USA$^2$</th>
<th>$t$-scores for differences</th>
<th>$^*P$ level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Encouragement</td>
<td>43.0</td>
<td>39.8</td>
<td>2.42</td>
<td>0.17</td>
</tr>
<tr>
<td>Supervisory Encouragement</td>
<td>34.1</td>
<td>33.7</td>
<td>0.43</td>
<td>1.00</td>
</tr>
<tr>
<td>Work Group Supports</td>
<td>25.3</td>
<td>25.1</td>
<td>0.25</td>
<td>1.00</td>
</tr>
<tr>
<td>Freedom</td>
<td>11.5</td>
<td>11.3</td>
<td>0.74</td>
<td>1.00</td>
</tr>
<tr>
<td>Sufficient Resources</td>
<td>17.5</td>
<td>17.1</td>
<td>0.83</td>
<td>1.00</td>
</tr>
<tr>
<td>Challenging Work</td>
<td>14.4</td>
<td>14.3</td>
<td>0.13</td>
<td>1.00</td>
</tr>
<tr>
<td>Organizational Impediments</td>
<td>24.1</td>
<td>26.0</td>
<td>-1.87</td>
<td>0.64</td>
</tr>
<tr>
<td>Workload Pressure</td>
<td>12.1</td>
<td>12.9</td>
<td>-1.63</td>
<td>1.00</td>
</tr>
<tr>
<td>Creativity</td>
<td>17.0</td>
<td>16.6</td>
<td>0.57</td>
<td>1.00</td>
</tr>
<tr>
<td>Productivity</td>
<td>17.8</td>
<td>17.2</td>
<td>1.17</td>
<td>1.00</td>
</tr>
</tbody>
</table>

$^1n = 61$ (For some dimensions, $n$ was lower due to missing values.)

$^2n = 59$ (For some dimensions, $n$ was lower due to missing values.)

$^*P$ as protection for multiple testing Bonferroni adjusted probabilities (for ten separate tests) were used resulting in no significant differences.

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Committee on Industry, 2000). We believe that differences in SMEs regarding patenting activity between the USA and Canada are probably not significant. This is an area for future study.

Related to the criticisms of Canada’s innovativeness is the perceived lower rate of adoption of advanced technology versus the USA. Market size might have an effect on this discrepancy. In the USA automated equipment is essential for high-volume, low-cost production. For a smaller market, such as in Canada, product flexibility and reductions in setup times are of greater importance, often requiring less technology (Baldwin and Sabourin, 1998). Although this difference may exist for larger firms, we suspect it does not exist at the SME level.

Our study of the factors supporting and impeding the creative climate of firms found that in both countries Organizational Encouragement and Challenging Work were the two most important factors associated with creative output. Both of these factors involve the proactive efforts of management to affect the creativity of workers. Not surprisingly, Amabile et al. (1996) found that the KEYS scale (the one used in our study) could be used to discriminate between high-innovative and low-innovative projects. Damanpour (1987) argued that leadership support was important to successful adoption of innovations and Kivimaki et al. (2000) cited encouragement initiatives as important ingredients in enhancing innovation. Bharadwaj and Menon (2000) emphasized the role of management, when they concluded that it is not enough for an organization to hire creative people and expect innovative performance. They stress that managers must formalize creativity approaches and techniques in organizations to improve innovative output. In research on new entrant firms to an industry, in Canada, Baldwin (2000) pointed to the importance of human capital as a critical part of innovation strategy. He found that those SME firms that grew at a faster pace, placed an increased emphasis on creating and maintaining human resources.

Clearly, enhancing the innovativeness of firms is a difficult task. Rothwell (1977) pointed out that technological innovation is a complex technical/social/economic process involving an intricate web of interactions, both within and between the firm and its external environment. Innovation studies point to the pluralistic nature of the multiplicity of dimensions underlying the innovative process. As part of our analyses, we regressed the Creativity variable on the eight variables supporting and impeding creativity. The resulting high $R^2$s (0.77 for the Canadian sample, and 0.68 for the US sample) indicate that innovation as defined in this study is highly related to these ‘human resource’ stimulants (and impediments) to creativity. Many of the KEYS dimensions used in this study, such as sufficient resources, supervisory encouragement, work group support and organizational encourage-ment, are intimately related to human resource management issues.

Conclusions and limitations

Studies critical of the productivity and innovativeness of Canadian firms (as compared to US firms) may have based their conclusions on studies of larger firms (as compared to SMEs) or on firms in the natural resources industry. We did not find the differences in innovation and productivity often cited in those studies.

There are several implications from this study. Our findings suggest that the stimulant and obstacle variables used in this study are highly associated with innovation. The fact that these factors are, for the most part, within the control of managers should be reassuring with respect to making decisions and allocating resources to promote innovation.

Our findings also suggest innovation may not be as complex as others have suggested. A limited number of variables were highly correlated with creativity. Focusing on these variables will likely lead to some useful and enlightening studies in the future.

That Canadian SMEs do not suffer from lower innovativeness could also affect the funding for Canadian startup firms. Venture capital firms may be more likely to fund Canadian startups if there is a perception that they can be as innovative as US firms. Of course, many factors enter into a decision to fund a firm, but an image of innovativeness is clearly beneficial.

There were several limitations to note in our study. First, we encountered difficulty in getting some SMEs to participate in the study. The typical response of senior management contacted was that they were just too busy. However, once a firm agreed to participate, subjects were quite willing to cooperate by completing the survey. The response rates at both levels were quite similar for both the USA and Canada. Therefore, while our sample may not truly represent the typical R&D worker, we do not have any reason to believe that the respondents in the study would have a systematic bias toward reducing the differences between the USA and Canada.

As a result of the procedures used to collect the data (personal contact), our sample size was not large. Perhaps larger sample sizes would have shown more significant relationships. However, as a result of budgetary constraints, it was not possible to obtain larger sample results. We were also limited in the locations examined in our study. The samples were taken in a particular geographic region of Canada (Kanata, Ontario) and a particular region of the USA (Long Island, New York) as a convenience in collecting data. Perhaps a study done encompassing a greater geographical region might produce different
results. But, again, we have no reason to believe that our choices of location would lead to similarities that did not exist, in general, among US and Canadian firms.

Readers should be careful in generalizing these results to other industries. This study targeted primarily high-tech R&D/manufacturing SMEs. In addition, the survey was self reporting, and as with all self reports, there may be a difference between actual and reported behaviors.

Our study found that among R&D professionals in high-tech firms, there was little difference in the creative climates of US and Canadian SMEs. Future studies might use the KEYS instrument to compare the innovative performance and climate for larger companies. This could give a clearer picture as to whether Canada’s lower innovative rating is due more to industry structure issues or to differences in how larger firms innovate.

Future studies could also use the KEYS Instrument for measuring climate along with other objective measures of innovativeness and productivity for SMEs. This would assist in verifying whether the instrument is measuring tangible, creative outcomes or creative style. This study could also be expanded to include other geographic locations in the USA and Canada, to get a broader perspective on creative climate in SMEs in each country.

Acknowledgement

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References


### Appendix 1

#### Stimulants to creativity

1. Freedom: freedom in deciding what work to do or how to do it; a sense of control over one’s work. *Sample item*: ‘I have the freedom to decide how I am going to carry out my projects’.
2. Challenging Work: a sense of having to work hard on challenging tasks and important projects. *Sample item*: ‘I feel challenged by the work I am currently doing’.
3. Sufficient Resources: access to appropriate resources, including funds, materials, facilities, and information. *Sample item*: ‘Generally, I can get the resources I need for my work’.
4. Supervisory Encouragement: a supervisor who serves as a good work model, sets goals appropriately, supports the work group, values individual contributions, and shows confidence in the work group. *Sample item*: ‘My supervisor serves as a good work model’.
5. Work Group Supports: a diversely skilled work group in which people communicate well, are open to new ideas, constructively challenge each other’s work, trust and help each other, and feel committed to the work they are doing. *Sample item*: ‘There is free and open communication within my work group’.
6. Organizational Encouragement: an organizational culture that encourages creativity through the fair, constructive judgment of ideas, reward and recognition for creative work, mechanisms for developing new ideas, an active flow of ideas, and a shared vision of what the organization is trying to do. *Sample item*: ‘People are encouraged to solve problems creatively in this organization’.

#### Obstacles to creativity

1. Organizational Impediments: an organizational culture that impedes creativity through internal political problems, harsh criticism of new ideas, destructive internal competition, an avoidance of risk, and an overemphasis on the status quo. *Sample item*: ‘There are many political problems in this organization’.
2. Workload Pressure: extreme time pressures, unrealistic expectations for productivity, and distractions from creative work. *Sample item*: ‘I have too much work to do in too little time’.

#### Outcome dimensions

1. Creativity/Innovation: a creative organization or unit, where a great deal of creativity is called for and where people believe they actually produce creative work. *Sample item*: ‘My area of this organization is innovative’.
2. Productivity: an efficient, effective, and productive organization or unit. *Sample item*: ‘My area of this organization is effective’.