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Organizational Climate for Creativity and Innovation

Göran Ekvall

F.A. Institute, and University of Lund, Stockholm, Sweden

This article describes an instrument for measuring organizational structure and climate for creativity and innovation. Its application and validation in organizational settings is also described. Recommendations are made for using the instrument to develop interventions to promote organizational innovation.

THE CLIMATE METAPHOR

The scholarly literature on organizational climate reveals two main contradictions, one about ontological issues (Ekvall, 1987; Guion, 1973; Naylor, Pritchard, & Ilgen, 1985), the other about scope and inclusion (Ashforth, 1985). The first line of demarcation runs between those theorists who conceive of climate as a common perception arising from the interaction between the members of the organization (e.g. Schneider, 1975) and those for whom climate is an objective property of the organization (e.g. Forehand & Gilmer, 1964; Friedlander & Margulies, 1969). The second demarcation separates those authors who include values, norms, and belief systems in the climate concept and thus make it identical with organizational culture (e.g. Payne & Pugh, 1976) from those who make a distinction between climate and culture (e.g. Ashforth, 1985).

In the framework of this article, climate is regarded as an attribute of the organization, a conglomerate of attitudes, feelings, and behaviours which characterizes life in the organization, and exists independently of the perceptions and understandings of the members of the organization. This conception of climate implies that there is a certain degree of, say, trust and openness between the members, of commitment and motivation, of risk-taking mentality, etc. Climate is conceived as an organizational reality in an "objectivistic" sense (Ekvall, 1987). The framework also means that organizational climate is not identical to organizational culture. If climate, in this way of viewing it, is to be included in a culture model, it should be regarded as a manifestation of culture on what Schein (1985)

Requests for reprints should be addressed to Dr G. Ekvall, Flodavägen 8, 161 42 Bromma, Sweden.

has described as the level of "artefacts" including "visible and audible behavior patterns".

In the context of organizational processes climate plays the part of an intervening variable (Fig. 1) which affects the results of the operations of the organization. The climate has this moderating power because it influences organizational processes such as problem solving, decision making, communications, co-ordination, controlling, and psychological processes of learning, creating, motivation, and commitment. The organization has resources of different kinds—people, money, machines, etc.—which are used in its processes and operations. These operations result in effects of many kinds and on different levels of abstraction: high or low quality of products or services; radically new products or only small improvements in the old ones; high or low well-being among employees; commercial profit or loss. Climate exerts a strong influence on these outcomes. But the effects in turn influence both resources and climate. The causal picture becomes complicated. Good or bad circular movements are in action.

THE CREATIVE CLIMATE QUESTIONNAIRE (CCQ)

This instrument grew out of a research programme in Sweden during the 1980s concerning organizational conditions that stimulate or hamper creativity and innovation (Ekvall, 1990). It is a 50-item questionnaire

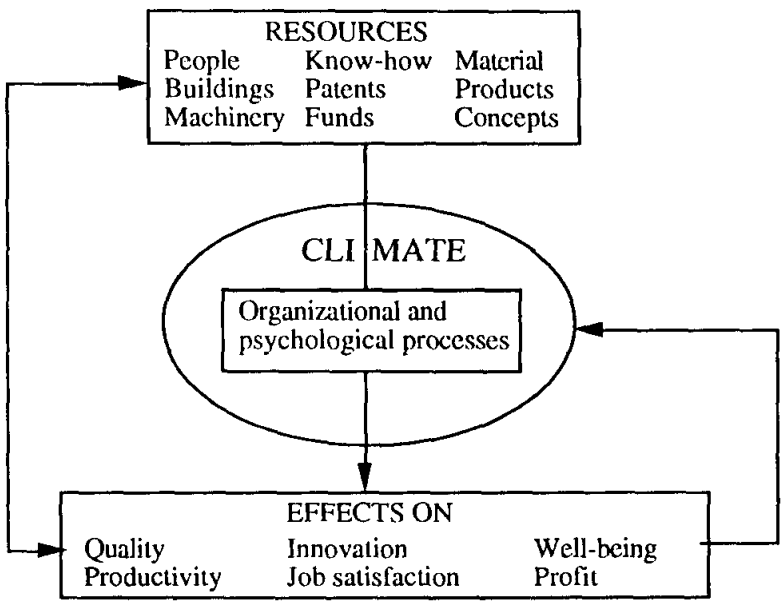

FIG. 1. Organizational climate as an intervening variable.

covering 10 dimensions of five items each. The dimensions are the results of several large-factor analytic studies. The item pool on which the questionnaire construction is based came from an interplay between theory, field research, and experiences of consultancy in organizational psychology. The 10 factors are as follows:

Challenge. The emotional involvement of the members of the organization in its operations and goals. A high-challenge climate is seen when the people are experiencing joy and meaningfulness in their job, and, therefore, they invest much energy. Low challenge means feelings of alienation and indifference; the common sentiment and attitude is apathy and lack of interest for the job and the organization.

Freedom. The independence in behaviour exerted by the people in the organization. In a climate with much of this kind of freedom people make contacts and give and receive information; discuss problems and alternatives; plan and take initiatives of different kinds; and make decisions. The opposite climate would include people who are passive, rule-bound and anxious to stay inside established boundaries.

Idea Support. The ways new ideas are treated. In a supportive climate, ideas and suggestions are received in an attentive and supportive way by bosses and workmates. People listen to each other and encourage initiatives. Possibilities for trying out new ideas are created. The atmosphere is constructive and positive. When idea support is low, the reflexive "no" prevails. Every suggestion is immediately refuted by a counter-argument. Fault finding and obstacle raising are the usual styles of responding to ideas.

Trust/Openness. The emotional safety in relationships. When there is a strong level of trust, everyone in the organization dares to put forward ideas and opinions. Initiatives can be taken without fear of reprisal and ridicule in case of failure. Communication is open and straightfoward. Where trust is missing, people are suspicious of each other and are wary of making expensive mistakes. They also are afraid of being exploited and robbed of their good ideas.

Dynamism/Liveliness. The eventfulness of life in the organization. In the highly dynamic situation, new things are happening all the time and alterations between ways of thinking about and handling issues often occur. There is a kind of psychological turbulence which is described by people in those organizations as "full speed", "go", "breakneck", "maelstrom", and the like. The opposite situation could be compared to a slow jog-trot with no surprises. There are no new projects; no different plans. Everything goes its usual way.

Playfulness/Humour. The spontaneity and ease that is displayed. A relaxed atmosphere with jokes and laughter characterizes the organization which is high in this dimension. The opposite climate is characterized by gravity and seriousness. The atmosphere is stiff, gloomy, and cumbrous. Jokes and laughter are regarded as improper.

Debates. The occurrence of encounters and clashes between viewpoints, ideas, and differing experiences and knowledge. In the debating organization many voices are heard and people are keen on putting forward their ideas. Where debates are missing, people follow authoritarian patterns without questioning.

Conflicts. The presence of personal and emotional tensions (in contrast to conflicts between ideas) in the organization. When the level of conflict is high, groups and single individuals dislike each other and the climate can be characterized by "warfare". Plots and traps are usual elements in the life of the organization. There is gossip and slander. In the opposite case, people behave in a more mature manner; they have psychological insight and control of impulses.

Risk Taking. The tolerance of uncertainty in the organization. In the high risk-taking case, decisions and actions are prompt and rapid, arising opportunities are taken and concrete experimentation is preferred to detailed investigation and analysis. In a risk-avoiding climate there is a cautious, hesitant mentality. People try to be on the "safe side". They decide "to sleep on the matter". They set up committees and they cover themselves in many ways before making a decision.

Idea Time. The amount of time people can use (and do use) for elaborating new ideas. In the high idea-time situation, possibilities exist to discuss and test impulses and fresh suggestions that are not planned or included in the task assignment; and people tend to use these possibilities. In the reverse case, every minute is booked and specified. The time pressure makes thinking outside the instructions and planned routines impossible.

Laurer (1994) has demonstrated that the 10 dimensions of the CCQ are theoretically supported in the creativity literature. Furthermore, the CCQ is grounded in some basic construction principles. First of all it is an organizational measure not an individual one. The respondent is addressed as an observer of life in the organization, asked to tell how people in the workplace usually behave. He/she is not to report about his/her own behaviour, nor communicate personal feelings. The questionnaire is thus not of the attitude or job-satisfaction type. There is no mention of "I" or

"me" in the items. A consequence of the "objectivistic" conception of climate is that the observer, the respondent, is requested to report on common behaviour not on common opinions. A typical item is phrased: "It is common here for people to use their own initiative." According to a "subjectivistic" view of climate this item would read: "Most people here think (or agree) that it is possible to use initiative here." The aggregation of the dimension scores of the respondents to an organization score is achieved by the mean score. This mean score is assumed to reflect the real climate, which in turn the individual member has to evaluate with his/her preferences and react to.

The observers, however, tend to perceive and rate the same behavioural regularities differently due to individual inclinations to overestimate or underestimate and to react positively or negatively. The aggregated climate score, the mean score of all the organizational members' ratings, contains these biases, but as they differ among the observers in direction and strength they counterbalance each other. The mean score can therefore be assumed to constitute a valid measure of the situational variation in climate terms, as defined previously, between organizations.

Reliability has been studied, as internal consistency of the dimension scales (coefficient alpha), on several differing samples. Table 1 shows the coefficients. These are reliability coefficients calculated on the individual level. They reveal the internal consistency and precision of the respondents' ratings of the dimensions. Satisfactory reliability in the single

TABLE 1
Cronbach's Alpha for Six Samples

	A	*B*	*C*	*D*	*E*	*F*	*Mean*
Challenge	0.83	0.81	0.81	0.85	0.80	0.80	0.82
Freedom	0.79	0.67	0.76	0.77	0.72	0.72	0.74
Idea support	0.90	0.88	0.90	0.91	0.85	0.87	0.89
Trust/openness	0.88	0.76	0.70	0.84	0.79	0.79	0.79
Dynamism/liveliness	0.84	0.76	0.82	0.89	0.67	0.77	0.79
Playfulness/humour	0.82	0.70	0.89	0.88	0.82	0.77	0.81
Debates	0.71	0.67	0.78	0.78	0.80	0.73	0.75
Conflicts	0.89	0.84	0.90	0.84	0.83	0.81	0.85
Risk taking	0.76	0.66	0.74	0.77	0.68	0.78	0.73
Idea time	0.76	0.78	0.77	0.84	0.76	0.78	0.78

A = 78 psychologists from 78 organizations (Sweden, Ekvall, 1988); B = 104 engineers from the same company (Sweden, Ekvall, 1988); C = 157 employees (different professions) from a senior high school (Sweden, Holmqvist, 1993); D = 230 engineers from 10 companies (Sweden, Schou, 1991); E = 202 employees in the service division of a multinational company (UK, Talbot, Cooper, & Barrow, 1992); F = 433 employees from six organizations (USA, Laurer, 1994).

observer's ratings warrants satisfactory reliability in the aggregated ratings, i.e. on the organizational level. Table 1 shows that all the 10 dimensions have an internal consistency that is generally seen to be acceptable for these types of measurements. Some of the scales have reliabilities on levels that are considered as high.

The stability aspect of the reliability of the CCQ has been illustrated in a longitudinal study of a product development project in a high-tech company (Ekvall, 1993). Thirty engineers worked in the project which lasted for three years. The climate was measured each third month with the CCQ, answered by all the engineers. As can be seen from Table 2 the climate scores (the mean scores for the participants) were very stable during a period running over four measurements, from the fourth to the seventh measure, during the second year of the project's life. This was the period when the innovation work was done. The targets were set, the resources were there, the roles and the organization of the work clear, and the engineers had to come to know each other quite well. And it was the period during which the basic design work was carried out. It was described by the project manager as the creative part of the product development process. After that period the work consisted of smaller adaptations, fewer refinements, and less documentation, and the climate curves went down somewhat during that period, except for Conflicts which rose.

The practical relevance and usefulness of the climate factors of the CCQ as tools for organizational diagnosis and treatment is confirmed by the widespread use of the CCQ in organizational and management development projects and programmes.

TABLE 2
Mean Scores in the CCQ Dimensions, Measurement 4 to 7
(Scale 0–3)

	Mean Scores			
	4	*5*	*6*	*7*
Challenge	2.37	2.38	2.36	2.36
Freedom	2.06	1.96	1.97	1.99
Idea support	1.80	1.83	1.86	1.80
Trust/openness	2.25	2.20	2.25	2.21
Dynamism/liveliness	2.14	2.28	2.25	2.25
Playfulness/humour	2.20	2.34	2.43	2.36
Debates	1.80	1.90	1.97	1.79
Conflicts	0.19	0.32	0.34	0.28
Risk taking	1.58	1.56	1.60	1.61
Idea time	1.42	1.35	1.43	1.51

CREATIVE CLIMATE AND INNOVATIVENESS

The model shown in Fig. 1 presumes that the climate exerts influences on processes that can bring innovative outcomes. Organizations identified as innovative in terms of products, services, methods, policies, etc. should accordingly differ in climate from deliberately conservative or unintentionally out-distanced organizations. Studies with the CCQ support this presumption.

Figure 2 presents a comparison between a group of 10 innovative organizations and a group of five stagnated organizations. "Organization" means here a small company or an independent division of a larger corporation with 100–200 employees. "Innovative" refers to product innovations. The 10 innovative organizations have been successful in developing new, profitable products and thereby secure their survival in the market. The five stagnated organizations needed renewal of their product programmes but had not tried or tried in a lame and futile manner. All employees or a representative sample answered the CCQ. The dots in the figure represent mean factor scores for the organizations in the two groups (Ekvall, 1989).

The mean differences are significant on the 0.05 level or better on all 10 climate dimensions, counted on all the individual ratings given by the participants of the innovative and the stagnated organizations.

Figure 3 shows results from the application of the CCQ in three subsidiaries of a large multinational corporation in the mechanical industry; one Swedish, one German, and one Spanish. The study was part of a corporate-wide programme for promoting innovativeness. The application of the questionnaire was carried out by consultants from the headquarters.

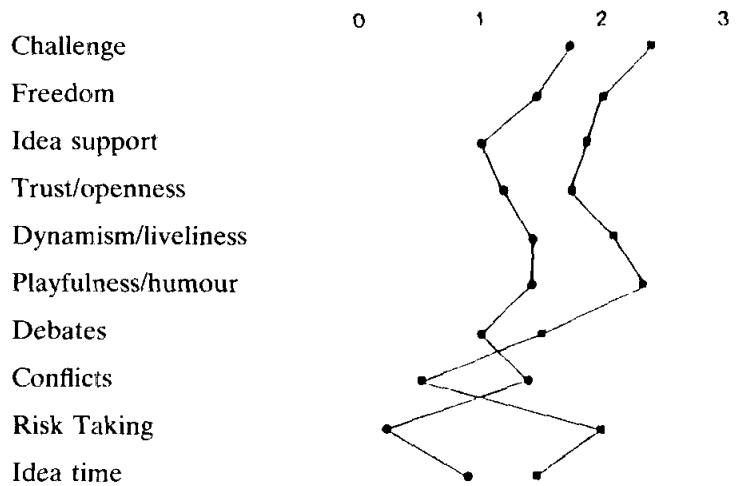

FIG. 2. Climate profiles in creative/innovative (■—■) and stagnated (●—●) organizations.

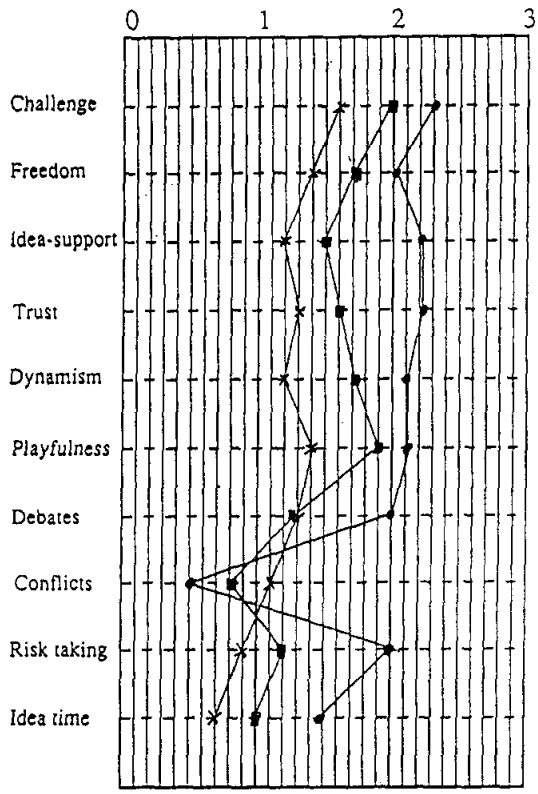

FIG. 3. Climate profiles for German (●—●), Swedish (■—■), and Spanish (×—×) subsidiaries of a multinational corporation.

All kinds of employees were represented in the samples—managers, white-collar, and blue-collar workers. The response rates were very high among managers and white-collar workers but quite low among the blue-collar employees. The top management group of the corporation's R&D function ranked the three companies regarding their innovative achievements. There was agreement in ranking the German company as number one, the Swedish as number two, and the Spanish as number three. Objective indications of innovativeness, such as number of patents and the activity level in the suggestion schemes, produced the same ranking.

The third study, the results of which are presented in Tables 3, 4, and 5 on p. 114, is different from the two described earlier. It does not, as the previous studies do, compare mean values of organizations based on present employees' perceptions and ratings. Instead it compares a group of persons' perceptions and memories of two kinds of organization: "innovative" and "stagnated" (Ekvall, 1983).

Forty-nine senior executives and training specialists from industry and public administration, who attended a management conference, were

asked to fill in a questionnaire during one of the conference sessions. This questionnaire had four parts: (a) a short version of the CCQ, scored as a "global" measure of creative climate; (b) a Likert-type scale concerning bureaucratic aspects of the organization, designated as "formalization"; (c) a Likert-scale with questions about the goal-clarity of the organizations; (d) a one-item scale about the educational and professional level of the staff, named professionalism.

The respondents answered the questionnaire twice. First the experiment leader read out a definition of the concept of "innovative organization". The participants were told that innovativeness in this context referred to the ability of an organization to adapt itself and its operations to new demands from its environment, perhaps by adopting new products or services, by altering old products or services, by discovering new markets and target groups, by changing methods of working, or by introducing new technologies and/or organizational structures. The opposite to an innovative organization was a "stagnating organization", i.e. one which despite an obvious need to change had not managed to make the necessary adjustments. Participants were then asked to think of the most innovative organization in which they had ever worked. They were encouraged to use their memories and to "move back" into the organization, which they then described with the help of the questionnaires now being handed out. When all this had been done, the questionnaires were collected and the whole procedure was repeated, this time with reference to the least innovative, i.e. the most stagnant, organization in which the participants had ever worked.

Correlations between all the variables included in the study were calculated according to the formula for product-moment coefficients.

The variable "organizational innovativeness" is dichotomous, since we had two groups of organizations: those regarded as innovative and those regarded as stagnant—both relatively speaking and within the respondent's experiential framework.

Significance tests were performed on the correlation coefficients. In some cases it seemed appropriate to assume the influence of a third variable behind a correlation. A partial correlation calculation was then performed (Ferguson, 1959), to see what correlation, if any, remained after this effect had been eliminated, and thus to check whether the established relation was internally valid. Tables 3, 4, and 5 show the results.

The results indicate that climate is the most crucial of these four organizational variables in regard to innovativeness. Formalization seems to have a suppressing effect. Goal clarity and professionalism might not have any significant effects of their own but still seem to have positive contributions as parts of or reinforcement of the creative climate.

In a study of this kind there are obvious threats to the validity of the results. The inescapable questions to ask are firstly: To what extent do the

results reflect real conditions in real organizations, "innovative" and "stagnated"? And secondly, Are they channelled through clear recollections or only vague memories supplemented with common notions of the nature of innovative organizations and their opposites, supplied by management books and journals (i.e. mental constructions with only weak links to the real organizations behind)? There are no reliable answers to these questions. But some characteristics of the primary data are in favour of validity. There is marked variation around the mean score in all variables, for both

TABLE 3
Correlations between the Organization Measures and the Innovation Capacity of the Organization; Point-biserial Coefficients

Organizational Variables	*Innovativeness*
Climate	0.81**
Formalization	−0.73**
Goal clarity	0.54**
Professionalism	0.41**

TABLE 4
Correlation between Organization Measures; Product-moment Coefficients

	Formalization	*Goal Clarity*	*Professionalism*
Climate	−0.68*	0.60**	0.36**
Formalization		−0.38**	−0.39**
Goal clarity			0.26*

TABLE 5
Partial Correlations between the Organization Variables and Innovative Capacity; the "Third" Variable in Parenthesis

	Innovativeness
Climate (goal clarity)	0.71**
Climate (formalization)	0.62**
Climate (professionalism)	0.78**
Goal clarity (climate)	0.11
Formalization (climate)	−0.42**
Professionalism (climate)	0.22*

In tables 3–5, the 5% significance level has been indicated by *; and a level of 1% or better by **.

"innovative" and "stagnated" organizations. For several respondents the differences between their ratings of the two types of organizations are quite small. Some "innovative" organizations have not got especially high scores on creative climate and some "stagnated" have not got especially low scores, which might indicate that the "most innovative" organization a respondent had worked with was not highly innovative and the "most stagnated" organization a respondent had experienced was not evidently stagnated. These features in the data would not have appeared if stereotypes of innovative and stagnated organizations had dominated the responses.

The fourth study makes a comprehensive organizational analysis of four divisions of a company producing chemicals for the paper and pulp and detergent industries (Ekvall, Arvonen, & Nyström, 1987). Each division had responsibility for its own product development, production, and sales. There were big differences between the divisions in respect to history and culture, strategies, structure, and leadership. The divisions are named B, VP, TS, and PK, reflecting their special product areas. They can be characterized as follows.

The B division was the oldest; it produced standardized, "mature" (in some cases "overmature") products, but was still making profit when the study was done. The strategy practised by the division management was conservative; efficient production of the established products, not risky, new projects. The management style was patriarchal and autocratic.

The VP division was a single-product business, which made good profits. The strategy had some innovative elements in the sense that development projects were run in co-operation with customers to find new applications for the product. The management style was of a systematic, rational, correct, fair-play kind; bureaucracy with a human face.

The TS division was a blend of a stable business with some established, profitable products and a project organization with quite a large programme for new product development. Some of these projects later became successful. The management style was participative, democratic, and supported innovation initiatives.

The PK division could be described, at the time of the study, as a large product development project that just previously had turned into an operating unit. The new product concept was at the stage of introduction into the market. Problems of both technical and marketing kinds appeared. The future of the product was an open question. The management style was of the entrepreneurial, risk-taking, pushing kind. Later the product concept became a tremendous success and is now sold world-wide.

PK and TS were the true innovative divisions as they were running successful product development work. B and VP were "positional", i.e. defending and strengthening their market positions for established, mature products but not being involved in development of new products.

Figure 4 presents climate scores for the four divisions.[1] These scores are the means on the CCQ-dimensions of ratings made by four staff members of the company's central personnel department. These four people served the divisions in matters of recruitment, selection, training, social welfare questions, and psycho-social work environment issues such as relations problems, conflict resolutions, and so on. They had intimate knowledge about the divisions and were no doubt in favourable situations to make valid ratings of the climate.

The two innovative divisions (TS and PK) differ considerably from the two positional (B and VP) in several climate dimensions; more Freedom, Dynamism, Playfulness, Debates, and Risk Taking. On none of the nine climate dimensions does a positional division show the highest possible score. There are, however, also differences bewteen the innovative divisions. PK has more Debates, Conflicts, and Risk Taking than TS, which on the other hand has more Freedom, Idea Support, and Trust. This divergence in climate between the innovative divisions reflects differences in management style.

The top manager of PK was a hard-driving, pushing intensive risk-taking entrepreneural character. It is well-known from the innovation literature that this kind of person gets things done, sometimes with outstanding results, but not always. It is also known that their go-ahead actions create tensions with co-workers, especially with those of a more analytical and investigative attitude and decision-making style. Because of the pushing and insensitive management style, differences in ideas ("debates" in CCQ terms) tend to be tinged with personal animosity; opposition turns into antagonism ("conflicts" in CCQ). The tensions tend to spread to become contradictions between groups of co-workers. This was exactly the situation at PK. Some co-workers raised doubts and objections to what they considered to be far too early and risky attempts to introduce the product concept onto the market. This resulted in difficult controversies. The researcher's interviews that followed the presentation of the climate study to the personnel indicated unequivocally that the intense debates on technical problems with the product concept were promoting creativity and innovation; but the personal conflicts on the marketing strategies were not—instead, they brought about hasty, aggressive, and power-based decisions and actions.

The TS division showed the most creative climate pattern of all, having

[1] Idea Time was not yet included in the CCQ when the study was done.

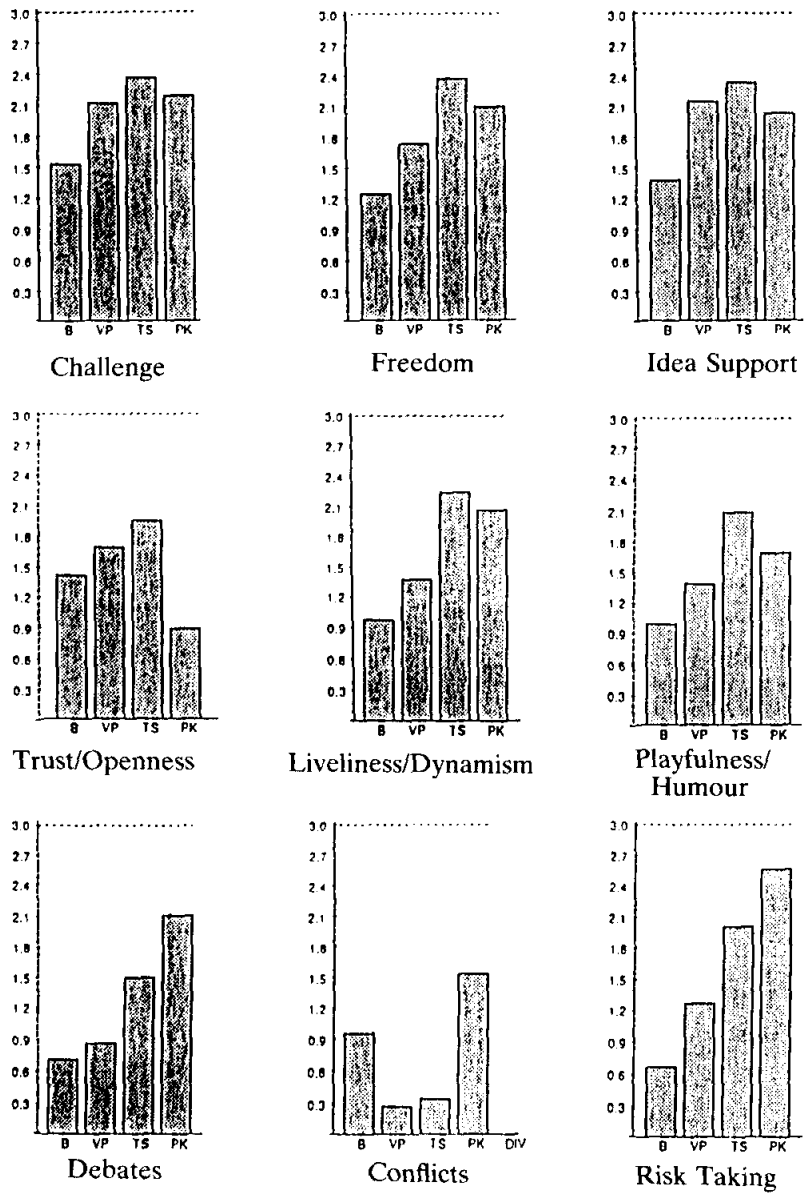

FIG. 4. Climate scores of four company divisions.

the highest score on six of the nine dimensions (Challenge, Freedom, Idea Support, Trust, Dynamism, Playfulness), the next highest score on two dimensions (Debates and Risk Taking), and a very low score on Conflicts. The supporting, participative leadership style of the division manager was the main cause of this "greenhouse climate" for creative ideas and initiatives. The manager had a distinct philosophy of innovation work: The project groups were staffed with people from all functions and had a broad span of experience. It was emphasized that employees should "love and care" for the old products, the new products, and the planned ones equally; all were part of the "product family". For the project leaders, their role was to accept the challenge to stimulate the analytical, systematic, critical members and the intuitive, divergent thinking ones to co-operate actively throughout the whole development process rather than each concentrate on separate phases.

LEADERSHIP AND CREATIVE CLIMATE

Laurer (1994) concludes in his thesis that the CCQ has "conceptual validity", that there is support in the literature on creativity for the 10 climate dimensions. This does not, however, guarantee that the CCQ covers all important aspects of the creative climate. Practitioners who use the CCQ in organizational development programmes have asked for a leadership dimension. It is true that the manager's attitudes and behaviour are important both as part of the climate and as a general influence on it. But the attitudes and behaviour of other members of the organization, e.g. informal leaders, personnel managers, experts of different kinds, "heroes", etc. are also important. The CCQ concept is a general measure of the creative climate, of the attitudes, behaviour, and feelings that are common in the organization, not an indication how some individuals or groups of people behave.

It is true that managers in most cases do have a strong influence on the climate, but in some cases other individuals or groups make more of a difference. In the study now presented the managers' impact was clear. The study was conducted at the public dental services in the Stockholm area (Ekvall, Frankenhaeuser, & Parr, 1995). This service organization consists of 92 clinics, of which 85 participated. Three professions are represented in the clinic's staff; dentists, hygienists, and nurses (assistants). Each clinic is led by a manager who is a dentist. The number of employees varies from about 10 to about 40.

Table 6 shows the correlations between three leadership style dimensions (change and development orientation, employee and relations orientation, and task and structure orientation) and climate dimensions. The scores on which the computations are made are the mean scores given by the em-

TABLE 6
Correlations (Product Moment Coefficients) between Leadership Style Dimensions and Climate Dimensions (N = 85 Dental Clinics)

	Change/ Development	*Employee/ Relations*	*Task/ Structure*
Challenge	0.50	0.42	0.16
Freedom	0.43	0.45	0.05
Idea support	0.73	0.65	0.33
Trust/openness	0.52	0.65	0.41
Liveliness/dynamism	0.63	0.49	0.23
Playfulness/humour	0.44	0.41	0.20
Debates	0.64	0.48	0.22
Conflicts	−0.32	−0.58	−0.28
Risk taking	0.69	0.49	0.27
Idea time	0.64	0.51	0.37

ployees both on the climate in the clinic and on the managers' leadership style. The number of observations on which the coefficients are based is, accordingly, 85.

These correlations reveal quite strong relations between leadership style and climate. It is only logical that the change/development-oriented leadership tends to show the strongest correlations with the climate variables as it is the creative and innovative aspects of the climate that are measured. It seems also logical that the employee/relations orientation of the leader has a stronger positive correlation with trust and a stronger negative correlation with conflicts. The quite low correlations between task/structure leadership orientation and most of the climate dimensions are no surprise in view of the complicated relations between bureaucracy, structure, and control on the one side, and creativity and innovation on the other (Ekvall, 1988, 1990, 1993).

ANTECEDENTS OF THE INNOVATIVE CLIMATE

Several organizational variables that have been treated as climate dimensions by some authors are, in the CCQ model, conceived as antecedents to climate, having influence on its development or deterioration. Besides leadership style, as described previously, the influence of some other variables on creative climate has been demonstrated in studies with the CCQ.

Organizational structure is one such dimension or rather a domain of dimensions. Structure variables studied in relation to the climate dimensions have been: Centralization, Formalization, Order and Clarity, and Goal Clarity.

- Centralization has been operationally defined by questions about top management control, one-way communications, and narrow delegation.
- Formalization has been defined as a strict, comprehensive, and imperative system of written rules, intricate decision procedures, and communications tied to the channels mapped out by the organization chart.
- Order and Clarity has mainly, as operationally defined in the referred studies, to do with unambiguous roles, requirements, instructions, responsibilities, schedules, and plans.
- Goal Clarity has been covered by questions about the existence of clear goals for the organization as a whole and for sub-units, and management's information and communicative attitude concerning visions, goals, and strategies.

The results of the different studies are converging. Centralization shows negative relations to all the climate dimensions except for Conflicts where there appear positive correlations, i.e. centralization brings conflicts. Strongly centralized decision systems thus are associated with climates that restrict creativity and innovation, an outcome of the studies that should not be a surprise to anybody familiar with the literature on innovation.

Formalization has similar effects on the creative climate to Centralization according to the results; negative correlations with the climate dimensions except Conflicts. The strongest negative correlation appears, as could be expected, with Freedom. This too, as in the case with Centralization, accords with established knowledge of the hampering effects of rigid bureaucracy on creativity. This could not be otherwise, as the object of bureaucratic principles is to achieve stability and standardization, and avoid flexibility and change.

With the more supporting and less constraining aspects or shapes of bureaucracy, here named Order and Clarity, things are different, and more complicated. This structure dimension shows significant positive correlations in all the studies with the climate dimensions Challenge, Idea Support, and Trust/Openness (strongest correlations) and significant negative correlations with Conflicts (i.e. it moderates conflicts). With Freedom the correlations are around zero. In some studies there are significant positive correlations with Risk Taking. There is, however, a tricky inference issue, because in the most comprehensive and rigorous study (Ekvall et al., 1987) the correlation with Risk Taking is significantly negative; strong Order and Clarity was perceived to restrict Risk Taking. In that study there were very big differences in Risk Taking between the organization units involved (see Fig. 4). There were also big differences in innovative strategies, which did not have similar strength in the other studies. A hypothesis in need of testing is that Order and Clarity in operations brings a climate that is favourable to incremental innovation (small step improvements of the

existing products and processes), but when it comes to radical innovation even this in many aspects favourable and necessary structural dimension might be hampering. If this is so—and much research and discourse on organization for innovation points to it—management in many cases has a hard lesson to learn; to realize that it might be necessary to loosen the strict control a bit and become a little less risk avoiding in order to develop a climate that favours the appearance of radical innovations.

Goal Clarity shows positive relationships with the creative climate in most of the studies and significant positive correlations with all the climate variables except Conflicts. But results in some studies cast doubt on the generally favourable effects of Goal Clarity on creative climate and the innovativeness of the organization; results that consist of zero-correlations between Goal Clarity and Risk Taking and some highly innovative organizations with creative climates (including high scores on CCQ Risk Taking) but with low goal clarity as perceived and rated by the employees. One inference could be that these organizations might be still more innovative, if they had clearer goals. Another inference, perhaps more daring, would be that the unclear goals were contributing to the climate that made radical innovation possible; allowed freedom for divergent experimentation and generated debates about goals and strategies. It is a well-known phenomenon that ambiguity is not threatening to highly creative people. On the contrary they become stimulated by it, they see possibilities in an unclear situation. But it is also known that people with above-average creative potentials, and with less self-confidence than highly creative people, often need frames and goal direction in order to realize their latent creativity.

DIVERGENCE IN SCOPE AND SIGNIFICANCE BETWEEN THE CREATIVE CLIMATE DIMENSIONS

Several of the dimensions of the CCQ are climate aspects with broader influence scope than creativity and innovation only. Challenge, Freedom, Trust, Playfulness, and low Conflicts can be expected to influence in a positive way such outcomes as productivity, quality, and well-being, besides innovation. But of course the optimal level may vary in regard to different outcome criteria. There can be too much Playfulness in some contexts in regard to, say, quality aims, or Freedom in regard to productivity.

Some of the other CCQ dimensions are more specially connected to creativity and innovation. Idea Support, Debates, Risk Taking, and Idea Time should be included in that group. Risk Taking shows in all studies up to date, the largest differences between innovative and stagnated organizations. But high Risk Taking, however important it is in innovation work,

is nevertheless out of place in some fields, say in the surgical ward or in the cockpit.

Risk Taking, Dynamism, Freedom, and Debates seem to be the climate dimensions that make the crucial difference between the creative climate that supports radical innovation and the creative climate that allows only incremental improvements. There is need for more of these climate aspects when big leaps are aimed at than when small step development is the innovation strategy.

CONCLUDING REMARKS

The term "climate" applied to social settings is a metaphor used to suggest likeness between psychosocial conditions in social contexts and weather conditions in geographical regions. We are supposed to see parallels between meteorological concepts such as warmth and cold, storm and calm, cloudy and sunny, and attributes of the social sphere.

Organizational climate as the term is used in the present article is conceived as an attribute of the organization, composed of behaviours, attitudes, and feelings, which are characteristic of life in the organization. The climate so defined can be described and assessed by the members of the organization or by outsiders who are familiar with the organization's interior life. The Creative Climate Questionnaire is based on these assumptions.

Studies with the CCQ prove that the climate dimensions assessed by the instrument make a difference between innovative and stagnated organizations and probably have causal relations to innovativeness as the model in Fig. 1 predicts. There are also indications that some of the dimensions are more important than others for radical innovation (as opposed to incremental improvement) to arise. Risk Taking, Dynamism, Freedom, and Debates might play such a differential role.

The creative climate as defined and measured by the CCQ has evident relations to several other organizational variables, some of which have been included in the climate concept by other authors, but are here conceived and treated as determining factors for the climate. The leadership style of the manager has in all studies so far shown substantial correlations with the climate dimensions. As it is the creative climate that is focused upon, it comes as no surprise that the change-oriented leadership style dimension consistently has shown the strongest correlations and that the task- and structure-oriented style usually shows weak or zero correlations, as the latter style includes both creativity-inhibiting and promoting elements. The conclusion should be that the climate to a fairly large extent is in the hands of the manager.

Centralization and formalization are the two structure variables that consistently show substantial negative correlations with the creative climate dimensions, except for Conflicts, where the correlations are positive, i.e. centralization and formalization tend to prepare the ground for conflicts. When a creative climate is aimed at, centralization and formalization should consequently be minimized.

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