Dialogue for Emergent Order
An empirical study of the development of the organisational mind
in a Dutch manufacturing firm

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Abstract

This paper contains an empirical study about the introduction of dialogue as a new mode of communication in a Dutch capital-equipment manufacturing firm. The goal of the project is to increase levels of self-organisation, self-reference, and self-transcendence in the company. Over a period of one single year three plenary workshops introduced managers into the concepts of Chaos and Dialogue, and seven training sessions were held to let management experience dialogue in small groups, in order to develop some basic competences for using it. All interventions were carried out by an external consultant.

The research is assessing the effects of dialogue on individual attitudes and personal initiative behaviour. Basically, it was set up as an evaluation study, carried out by the authors. On the basis of observations and conversations with managers during some initial dialogue sessions, existing behavioural patterns were identified. These served as an operational definition of the company’s dominant culture at the start of the change project. Also, desired behavioural patterns were phrased on the basis of literature about a new point of view called Chaos. These served as an operational definition of the new culture. Finally, some items about personal initiatives were added. These three sets of behavioural patterns were used to develop a questionnaire that was administered three times over a period of one single year. Two groups of managers who were actually involved in the dialogue training served as experimental groups, while two groups of employees who did not get any training served as control groups. Questionnaire data were analysed using statistical Q- and R-analyses, and the results were interpreted and tested against six hypotheses which were based on the theoretical framework. To add more context, open interviews were held with individual managers and employees of both the experimental and control groups.

This paper reports in detail on the results of one experimental and one control group. The results indicate that for both the experimental and control group the old organisational mind - that was primarily based on control values - is fading away. At the same time a new organisational mind - based on chaordic values - develops in the experimental group as an effect of the intervention, but lacks to develop in the control group.

This study sheds some light on the efficacy of the use of dialogue as a new mode of communication in creating holonic capacity, so that an enterprise is better able to thrive in Far-From-Equilibrium conditions.

Key words: Chaos and complexity, chaordic systems thinking, organisational transformation, holonic potential, organisational mind
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1. Introduction: Theoretical Orientation and Justification

Organisational transformation using the Chaos lens; main theoretical concepts: Chaordic Systems Thinking (five properties); Wilber’s Quadrants: exterior versus interior; holonic capacity: the potential to change from within; organisational mind: the thinking of the collective.

Nowadays, not only the environment of organisations is changing rapidly - continuously and unpredictably – but also organisations themselves are confronted with turbulence. Periods of relative stability, in which the behaviour of systems is predictable, are alternated by periods of instability, characterised by unpredictability and uncontrollability.

A way to survive is by tapping the interior potential, which gives organisations the ability to transform by itself to a higher level of coherence. In this new state of order the organisation is able to see through its complexity more effectively. It is assumed that in periods of instability, enterprises should rely on the innovative character and creativity of its employees. Old control paradigms - for example cost reduction - are of less use under these circumstances and an organisation may seek for smarter ways of dealing with instability.

The Chaos metaphor recognises that systems are complex, dynamical and non-linear, in which chaos and order co-exist. This is expressed in the notions ‘chaord’ and ‘chaordic system’ (c.f. Hock, 1996; The Chaordic Alliance, 1999). A chaordic system is “a complex and dynamical arrangement of connections between elements forming a unified whole the behaviour of which is both unpredictable (chaotic) and patterned (orderly)... simultaneously. Chaos then is the science of such chaotic and orderly, that is ‘chaordic’ entities” (Fitzgerald, 1997a, p. 1). By this definition, almost any system ranging from complex to simple can be considered chaordic. However, in this paper we will refer to any system designed (rather than natural) to sustain itself in an optimal dynamical balance in Far-From-Equilibrium (FFE) situations. Chaordic Systems Thinking (CST) is a way of thinking and subsequently, an approach to designing a complex organisational system that recognises the enterprise not as a fixed structure, but as ‘flow’ (Van Eijnatten & Fitzgerald, 1998; Van Eijnatten & Hoogerwerf, 2000). It offers new concepts in order to deal with uncontrollability, uncertainty and complexity in an enterprise.
Chaordic systems are characterised by five core properties (c.f. Fitzgerald, 1996a/b; 1999):

1. **Consciousness.** The essential ground state of an enterprise is mind, not matter. Reality is anything one thinks. There is no matter without an act of mind.
2. **Connectivity.** Chaos verifies that the enterprise is both whole and part. No part can exist independently of the whole, nor can any whole be sustained separately from its parts. Each part is by itself a whole and this whole is part of a bigger whole.
3. **Indeterminacy.** Chaos points out that in the dynamical complexity of an enterprise, every event is both cause and effect. Because of this complexity, the future is principally unknowable in advance. There is only now in which the ‘past’ presents itself by memory, and the ‘future’ exists as vision.
4. **Dissipation.** Enterprises are dissipative systems engaging in a cycle of both destruction and creation. They continuously ‘fall apart’ and then grow back together again, each time in a novel new form, unguided by the past.
5. **Emergence.** Enterprises strive toward ascending levels of coherence and complexity, made possible by capacities for self-organisation, self-reference, and self-transcendence.

These five properties together form a single indivisible conceptual whole. Consciousness enables an enterprise to ‘jump’ to a higher form of complexity and coherence. Emergents can develop within an enterprise under the influence of the organisational consciousness, the organisational mind or ‘orgmind’ for short. These emergents can help the organisation not to dissipate in a period of instability - the state of Far-From-Equilibrium - but to emerge to a higher level of complexity and coherence.

As already stated above, one of the central features of *Chaordic Systems Thinking (CST)* is the concept of ‘holons’. Holons or whole/parts are entities that are both wholes and parts of ever-greater wholes, simultaneously and at all times. Holons are both autonomous and dependent structures at the same time. Holons emerge, that is they evolve to higher orders of whole/partness by virtue of four fundamental capacities possessed by each (Wilber, 1996). Holons are able to generate ‘emergents’ - novel qualities of the whole not present in the parts – because they are inherently self-organising, self-referencing, self-iterating and self-adapting. Holons emerge holarchically (develop greater depth), transcend and include their predecessors (preserve its component parts while going beyond the limitations of each), and holons know their worlds according to the terms and limitations of their core identity. Holons dissipate: They are always subject to falling apart because they fail to leap, or when they become unbalanced (the wholeness dominates and represses its partness, or the parts refuses responsibility for other than itself). Damaging or destroying of any holarchical level will result in damage or destruction of all higher levels. Although the higher level is more significant, the lower holon is more fundamental. Holons and holarchies are characterised by differentiation (generation of variety) and integration (generation of coherence). There is no such thing as ‘whole’ whole holon (all autonomy is autonomy-in-relationship). Every holon possesses both an interior essence as well as the exterior surface it presents to the world. The adjective ‘holonic’ is used to indicate the ‘both…and’ character of entities (both whole and part, both social and technical, both surface and depth, both order and chaos, both content and process, both exterior and interior, both structure and culture, both feasible and desirable, both design and development, both objective and subjective).

Another important CST concept is ‘attractor’. An attractor is a condition that forces a holon to repeat its typical pattern of behaviour, not always in exactly the same way, but every time within clear and specified boundaries. It acts as a sort of magnet, that imposes the holon to repeat the behavioural pattern over and over again.

Not all holons are equal: One whole/part is distinguished from another by the relative degree to which it taps its ‘holonic capacity’ (Fitzgerald & Van Eijnatten, 1998). The higher a holon climbs the ladder of knowing or consciousness, the greater its ability to apprehend reality. Holonic capacity is the holons’ ability to operate with greater mindfulness, expanded
awareness, ‘control- and response-ability’ (Fitzgerald & Van Eijnatten, 1998). Control-ability is the degree to which a holon is able to influence future events, and response-ability is the ability to respond to FFE conditions. The organisational mind - the sum total of beliefs, assumptions, premises, values, and conclusions mostly tacit members of an organisational system hold commonly as truth - is the ‘container’ of the holonic capacity of an organisation.

Chaos suggests that by developing holonic capacity, an enterprise is able to see ‘the window of opportunity’ when arriving at ‘the edge of chaos’. Only then, an enterprise is able to leap to a higher order of coherence - a new stable dynamic that is however more complex and more effective - and therefore escaping dissipation. When the organisational mind is developed in such a way, an enterprise is able to transform itself - from within - into a totally new form, which can grasp the pace of our changing world. An organisation seen as a holon possesses both an exterior surface as well as an interior essence (Wilber, 1996). Our attention is focused on the exterior, most of the time. By ‘exterior’ we mean any objectifiable entity or process that can be described by empirical observations, making use of our five senses or their extensions (the ‘IT’ in Figure 1). The ‘interior’ consists of processes that can’t be studied using our five senses. Let us summarise that with the term ‘thinking process’ (the ‘I’ and ‘WE’ in Figure 1). Both the interior and exterior have individual and collective dimensions. A holon consists therefore of four quadrants, see Figure 1. Chaos is meant to re-unite the interior with the exterior, on both the individual and collective levels.

As Wilber (1996) explains, the exterior of the individual can be described by, for instance, tasks and forms of behaviour. The exterior of the collective can be seen as the noticeable structures and patterns of behaviour of groups in an organisation. Both quadrants are about facts, propositional truth, and functional fit. The interior of the individual is characterised by emotions, thoughts, and feelings, which is indicated by ‘individual mind’. This quadrant is about consciousness, subjectivity and truthfulness. When individual thoughts are exchanged and shared with other individuals, the result may be a collective world view or commonly shared meaning. This is the interior of the collective that is indicated by organisational culture or organisational mind. This quadrant is about mutual understanding, cultural fit, and justness. It is worth noting that Wilber is giving each individual quadrant its unique scientific validity claim, see Figure 1.

Where ‘Sociotech’ may be quite helpful to develop the exterior (Van Eijnatten 1993; 2002), ‘Dialogue’ can be used to develop the interior of the individual and the collective (Ellinor & Gerard, 1998). One might think of dialogue as a stream of meaning flowing among and through a group of people, out of which might emerge some new understanding (Gerard & Ellinor, 1999). Dialogue moves beyond any one individual’s understanding, to make explicit and build collective meaning and vision. A typical dialogue process slows down the sequence of the following mental activities, so that we can become aware of them: Reception of data, interpretations (perceptions), assumptions and conclusions. These four stages are usually carried out in an instant. We have learned to see our assumptions as the truth, without testing so. Dialogue explores the four different stages explicitly with the aim to
identify our assumptions, those things that are assumed or thought to be. By learning how to identify or recognise our assumptions, we are able to identify inconsistencies.

There are three steps in a typical dialogue process: public reflection, meaning-seeking inquiry and open advocacy. In public reflection a person is speaking out in public about a specific process, to better understand the meaning and dynamics of it. Listening is the key to interpretation and perception and other persons in the group are supposed to carefully listen to the public reflection. In meaning-seeking inquiry other members of the group ask for the assumptions behind the thinking. It is about understanding where thoughts come from and by inquiry you get a better understanding of what the other is saying. In open advocacy a group member is presenting his or her thinking and asks for feedback from the other group members so that everybody can learn from it. Advocacy means expressing what you think, speaking from a point of view.

Where a discussion is aimed at a material end result (plan, measure, decision), a typical dialogue combines pieces into a whole with no intended goal or end result. Dialogue is aimed at the understanding of consciousness with the intention to develop shared meaning in the whole and to become aware of well-established inefficient thought patterns. With the use of dialogue an organisation can develop its mind. The practice of dialogue creates community and transforms the organisational culture (Gerard & Teurfs, 2000). Through ongoing practice with dialogue, participants learn how to interact with each other differently. Interaction skills are shaped, which leads to behavioural transformation. The more often groups practice, dialogue sets up the conditions of community. The atmosphere within the group changes which leads to experiential transformation. As group members experience the effects of dialogue, a profound shift takes place at the belief and attitude levels. Attitudes of rigid individualism change into attitudes of collaboration and partnership. Dialogue produces attitudinal transformation.

In this study we evaluate the effects of dialogue: Are there any changes in individual attitudes that are indicative of changes in the patterns of behaviour of individuals and groups as a result of the dialogue training sessions.

2. Company’s Change History and Synopsis of the Action Research

Description of the firm, history of organisational renewal; synopsis of the action research project; description of the type of intervention: introduction of dialogue; goal of the intervention: change the dominant way of interaction; research question: Is the thinking of individuals and groups changed by introducing dialogue?

The Dutch manufacturing firm in this study is world market leader in their industry. The company that has a history of 25 years, employs 500 people in The Netherlands (750 world wide), while 95 % of its turnover is delivered outside The Netherlands. Although it is specialised in tailor-made complex processing systems, it also delivers single machines. Its product portfolio contains 250 functions and 2,500 variants. The company is very active in product innovation. Its market share is 60%. The company has an American subsidiary with nearly the same product portfolio, that employs 250 people, and is serving both the North and South American markets. It has its own departments for research and development, marketing, sales, production, and service.

For many years now, the company has played a leading role in developing and manufacturing processing equipment and systems. A market-oriented approach, quick response to change, innovative engineering and the application of strict quality standards are
the basis for this market leadership world wide. The Dutch company and its American sister-company form part of a Dutch concern, which operates at international level and has an annual turnover of well over 3 billion Dutch Guilders. First and foremost, this means continuity, but also expert knowledge of many disciplines, such as product development, finance, sales support, service and production.

Sociotechnical Systems Thinking for Organisational Renewal of the Firm

The company suffered a large number of problems in the Eighties: i.e., long throughput times, low product quality, poor planning, low motivation of the personnel, lack of both product and volume flexibility, and too many supervisors and technical staff. The company decided to start a sociotechnical re-design trajectory. Organisational renewal activities actually started in 1988 with a pilot test of a self-managed team in Parts Production. Two years later, in 1990, self-managed teams were implemented in Parts Production, following a process called ‘parallelisation of product order flows’, on the basis of the identification of product families. Also, the physical lay-out was changed accordingly. In 1992, self-managed teams were introduced in the assembly, stock and shipping departments of the company. Also, the central planning was transformed, and both Parts Production and Assembly were fused into a Production department. Assembly also started to work in parallel streams and self-managed teams. The quality department was brought under the responsibility of the new Production department.

In the beginning of the Nineties, in Parts Production multi-disciplinary staff groups were formed, in which planning, stock control, maintenance, logistics, and hard- and software improvements were grouped to form self-managed teams. These so-called ‘operational groups’ developed the computer programs for the CNC machines, designed all sorts of tools and were engaged in planning activities. In order to support further renewal work, and to help the production teams with structural problems and technology investment decisions, and with the development of production and quality norms, a so-called ‘structural group’ was created, in 1991.

The implementation of the self-managed teams proved to be a very intensive and time-consuming process. Workers were trained to execute multiple tasks and roles, and were taught all sorts of technical, social and administrative skills (for instance, problem analysis and discussing techniques, writing reports and doing presentations, chairing meetings, etc.). In 1993, a start was made with improving quality by defining so-called ‘star roles’ in Production. Star roles are temporary responsibilities of selected team members to coordinate and communicate information about problems and improvements concerning specific aspects between teams (maximum five aspects, i.e., logistics, work place, personnel, quality, and technical issues). Team members who perform star roles have the authority, but not the responsibility, to control the aspect-related process. Doing so, they relate self-managed teams to each other.

In order to improve quality, in two teams performance indicators - for efficiency, safety, quality, time management, multi-skill level, and economical use of resources - were developed by the team members themselves. After a successful pilot phase, the system was introduced in all production teams, in 1993. Each team got its own budget. An annual award was introduced for the team that was performing best on these performance indicators. In 1994, a project was initiated to improve office work. The idea was to transform the administrative organisation from a functional to a process-oriented structure. The aim was to reduce the integral cost prize by 10 % within five years. In 1995, self-managed teams were introduced in Sales and Installation, and in the Parts and Service processes. In order to improve coordination between self-managed teams, management started to think about
company-wide performance indicators. This proved to be a difficult objective. A feasibility study remained inconclusive. From 1996 onwards, the role of team coordinator rotated among team members, because the individual self-managed teams developed too much autonomy.

In 1996, organisational renewal started in Research and Development by transforming the design- and product development departments into a newly formed Systems Group. Two parallel-development teams were created, and added to the existing organisation, to develop new products. Parallel-development teams are multi-disciplinary product creation teams, consisting of a small core team that stays during the whole project, and a peripheral group of temporary team members, who come and go during the course of the project. Parallel-development teams do have a team leader. Because they were very successful, the company decided to set up parallel-development teams for each new product-creation project.

Also, in 1996, a series of company-wide dialogue sessions were organised, in order to develop the organisational mind. The sessions were organised to stimulate deliberations about common problems, and to start developing integral solutions, using the tacit knowledge of all staff members. One of the ideas was to develop measures of performance that went beyond the departmental level, and to invest in company-wide improvements. In 1997, all departments started to develop those kinds of measures. In 1997, the development of strategic management indicators was initiated, and mission statements were both articulated and communicated in the organisation concerning, for instance, ‘customer care’. Performance indicators were developed in the Sales and Installation processes, using nearly the same approach as was originally used in Production. Also, a structural group was formed to support the two teams serving the Sales and Installation processes and the three district groups of sales engineers. In 1998, four dedicated projects were carried out to improve specific performances within the company. One had to do with getting rid of overdue developmental work; another one aimed at becoming more accurate in product deliveries. A third was concerned with technical optimisation of products. The last one was about improving both product-order inputs and product-order specifications. Also, the company started a dedicated knowledge-management project in 1998.

Since 1988 the company has been restructuring its production processes, by using the Dutch approach of Integral Organisational Renewal (Van Eijnatten, 1993; De Sitter, 1994; Van Eijnatten & Van der Zwaan, 1999). Functional departments were changed into self-managed teams. During this change process, special attention was paid to interdepartmental relationships. A main characteristic of this decade of organisational renewal is, that the company never copied exactly any standard approach. They have not followed blindly the rules and regulations of the sociotechnical theory, nor any advises of consultants, without looking first into the desirability of the intended overall effects. The management has discussed these issues over and over again, following intensive consultations with the workers to learn their responses. Considerable amounts of time were spent to discuss all details of both the contents, the processes, and the phasing of change. The company’s management also has been very active in constantly stimulating and supporting the renewal process. During the whole course of the project, large amounts of money were invested in additional training of the personnel. Also, many dialogues were organised off-site, in conference centers, and measures were taken to guarantee equal opportunities for all personnel to participate in the dialogue, carefully preventing any blocking of the communications by differences in status or function. As mentioned before, the company hired a number of (process) consultants to support its renewal trajectory. However, these consultants only were allowed to train the personnel or to prepare for decisions. Self-Design by Knowledge Transfer proved to be a very powerful means to let managers and workers develop their own action strategies. The
company’s management team never abdicated responsibility, and took all strategic decisions themselves!

Another main characteristic of the development process is, that change always was incremental: That means that renewal activities were carried out step by step. Although renewal measures were carefully planned and management tried to avoid unintended consequences by using an integral perspective, there was no overall master plan to change the whole company, at the same time! Although implementation was carefully timed by the management and very much dependent on the readiness of the workers, every next move was in a way a surprise. It was not the normative aspect of sociotechnical theory that was the trigger for change, but the developmental stage of the organisational mind! The pace and depth of the new culture development were decisive for the company’s management team for deciding ‘if and when’ a next measure was to be implemented. They ‘felt it’, so to speak, when the time was right. The development of the organisational mind was found far more important than actually implementing new work structures according to plan.

A third central aspect of organisational renewal in this company is the so-called ‘ad hoc’- or ‘anticipating’ approach to change. At any arbitrary point in the ten years transition period, there has been no single master plan for a long-term strategic development of the firm. The management team only was pointing into the direction where to go with the company. There never has been an overall strategy how to reach that point. In order to start moving into the desired direction, each time only one single course of action was selected and discussed, and finally implemented. After a certain period of time, the effects were evaluated against the intended direction, and corrective action was taken if the activity was diagnosed to have gone off course. A major consequence of this ‘ad hoc’ way of working was, that the path the organisational renewal process took in the company was far from ‘straight forward’; on the contrary, it showed all sorts of detours and strange bends and curves.

Another negative aspect of the company’s organisational renewal process was, that a proportion of the workers were still somewhat reluctant to start new change efforts, as they did not yet consider change as a normal daily work routine. Maybe this is caused by the fact that a certain percentage of the personnel is hired from temping agencies, to keep up with the actual changing work demands. Also, management is a bit disappointed about the percentage of workers that is really taking personal initiatives.

Due to the use of Integral Organisational Renewal, the firm’s structures and processes have been developed over time. These activities resulted in major benefits over the years.

Some hard figures

- Successful change from ‘Assemble-to-Order’ to ‘Make-to-Order’ production regime,
- Throughput times of Production reduced by 65%,
- Costs associated with insufficient quality of products (rejects, etc.) reduced by 50 %,
- Ratio of indirect/direct labour costs lowered by 30 %,
- Set-up times in Production reduced by at least 20 %,
- Task times reduced by 5 %.

Some ‘Soft’ Figures

- Significantly improved market position,
- Increased controllability of business processes,
- Improved quality of quotation and order specification,
- Equal pre- and post-calculations of orders (usually showing a difference of 2-3 %),
- Very low turnover of personnel (less than 5 %),
- Strong team spirit and high involvement of production personnel,
- High commitment and increase in internal flexibility.
Ten years of experience with integral organisational renewal enabled the company to keep its position as a market leader. However, for reasons of consolidating this valuable position in the years to come, the company is looking for both substantial and prolonged organisational transformation. This seems only feasible when change is no longer initiated by management, but is prompted from within by the employees themselves, who are enabled by management to use their intuitions and tacit knowledge, whenever they choose to.

Chaordic Systems Thinking for Organisational Renewal of the Firm

In 1999, Chaordic thinking and dialogue were adopted by the management to guide the firm towards organisational transformation. Over a period of one single year three plenary workshops were held to introduce the management in Chaos concepts, and seven consecutive workshops were held to let management actually experience dialogue in small groups, and to develop some basic competences for using it. These interventions were carried out by an external consultant.

The company project as a whole was set up as action research (Reason & Bradbury (Eds.), 2001), in which consultants, managers and researchers intensely interacted and collaborated. The company project started September 1999, with the inauguration of a change management team consisting of seven managers (three of them members of the company’s Management Team; four middle managers). The consultant introduced them into Chaos concepts, and trained them to use dialogue during several sessions in the period September-December 1999.

In February 2000, three technical problem-solving project teams were given the same kind of training, while the change management team got additional dialogue training. In May 2000, both the change management team and the technical problem-solving project teams were trained in emergent leadership roles. In September 2000, all teams participated in a Vision Conference with the main goal to create shared vision among the participants. Individual visions were shared by using dialogue in small and large groups. In September three new teams were introduced into Chaos and Dialogue as well. Another Vision Conference followed in November 2000 with the same group of people, focused on obstructions within the company to fulfill personal visions, and possible actions to take.

The company project does not have any pre-planned end date; it is expected to last for several years. However, the research project did have a fixed duration, and lasted for 15 months from the beginning of the company project. In this paper only the first 9 months of the research project are reported in detail (January 2000-September 2000).

3. Method

General Research Model

The basic orientation in this study is ‘action research’. One of the central features of action research is a change strategy in which the researcher is actively collaborating with internal and external stakeholders in an organisation, in order to co-create changes into a desired direction (Reason & Bradbury (Eds.) (2001). Because of this ambition the action researcher faces a basic dilemma: Evaluation research easily can lose its independent stance (Dijkstra & Van Eijnatten, 1999). Therefore, the design of such an evaluation study should be of indisputable high quality. Because in action research the familiar methodological framework of independent and dependent variables is not applicable, we use an action model instead,
which specifies why and how effects will appear. We want to know why (theoretical justification) and how (under which conditions, and by using which kind of implementation rules) the actual intervention is effective. For those aims, we use two distinct methodological mechanisms: 1) The 'Module of Justification', which gives a justification of the theoretical and practical grounds on the basis of which effects of the intervention are predicted or expected; and 2) The 'Module of Intervention', which specifies the totality of rules and recipes for the planning and high-quality technical execution of the interventions (c.f. Dijkstra & Van Eijnatten, 1999).

In the theoretical orientation paragraph of this paper we have already specified the module of justification: The introduction of dialogue as a main mode of communication will change the culture of the company. Dialogue is particularly used to check tacitly held assumptions, with the effect that personal initiatives of both individuals and groups will be enhanced. An evaluation of the intervention module will be presented elsewhere (Van Eijnatten & Van Galen, 2001).

In this paper we focus on an empirical test of the justification module: Are there any changes in individual attitudes that are indicative of changes in the patterns of behaviour of individuals and groups as a result of the intervention (dialogue training).

Two assumptions are made: a) The interior of individuals – ‘individual mind’, i.e., the sum total of beliefs, assumptions, and values an individual holds commonly as truth - is reflected in and can be inferred from the measurement of individual attitudes; and b) The interior of groups - ‘organisational mind’, i.e., the sum total of beliefs, assumptions, and values members of an organisation hold commonly as truth - can be tapped by an analysis of group consensus.

The evaluation research was designed as a longitudinal study, roughly spanning a period of 15 months (January 2000-April 2001). A quasi-experimental design was used, in which several experimental and control groups were distinguished.

Research Design

Methods of Data Collection

The following two data collection techniques were used:

- Questionnaires to be completed by all members of both the experimental and control groups, in January 2000, April 2000, September 2000, and April 2001,

P.M.: In this paper only the research spanning the period January 2000-September 2000 is reported.

Research Sample, Experimental and Control Groups

For this evaluation research a total of 33 company employees was selected as follows. All organisational members who were to be involved in the change project in February 2000, were selected (whole population). Also, we selected five single individuals from different levels and sectors who were expected not to be involved in this phase of the change project. And we selected an existing working group from the service sector of the company, which was not involved in this phase of the change project.
In the design of the evaluation research, the following four research units were formed who serve as experimental and control groups in a longitudinal approach:

- **Group I**: This research unit equals the official change management team, consisting of seven managers. This group functions as an experimental group throughout the study (January 2000, April 2000, September 2000, and April 2001).
- **Group II**: This research unit consists of all 14 managers from the three technical problem-solving project teams who are not participating in the change management team. This group functions as a control group in January 2000, and as an experimental group for the rest of the study (April 2000, September 2000, and April 2001).
- **Group III**: This research unit consists of five separate individuals from different sectors who were not to be involved in the dialogue training. This group serves as a control group in this longitudinal study (January 2000, April 2000, September 2000, and April 2001).
- **Group IV**: This research unit consists of seven individuals of an existing work group in the company. This group serves as a control group in January 2000, April 2000, and September 2000.

In January 2000, group I has had one series of dialogue training sessions, group II, III, and IV have not had any. In April 2000, group I has had two and group II has had one series of dialogue training sessions, group III and IV have not had any. In September 2000, group I has had four series of dialogue training sessions, group II has had two, group III and IV have not had any. In April 2001, group I has had six series of dialogue training sessions, group II has had four, group III and IV have not had any.

**Design of the Questionnaire**

The questionnaire contains a total of 137 items that ask for the respondent’s opinion (Lickert-scale type): 60 items ask about patterns of Existing Behaviour (EB), 70 items ask about patterns of Desired Behaviour (DB), and 7 items ask about Personal Initiatives (PI).

The design of the questionnaire was done on the basis of both theory and practice: The items about EB were developed on the basis of observations during a series of dialogue sessions with experimental group I in the period September-December 1999. The 60 items were grouped into five clusters: General (4 items), decision making (12 items), working in projects (8 items), working in groups (12 items), and organisational culture (24 items).

The items about DB were developed on the basis of literature, as practical operationalisations of the five chaordic principles (c.f. Fitzgerald, 1996). The 70 items were grouped into five clusters: Consciousness (17 items), connectivity (18 items), indeterminacy (14 items), dissipation (13 items), and emergence (8 items).

The items about PI were taken from literature. The seven items represent an existing scale, see Frese *et al.* (1997).

Another part of the evaluation research consisted of a series of 11 open interviews with a selected number of individuals. These interviews were designed as open unstructured.

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*a* In September 2000 three persons of this research unit started a dialogue training, and they were exchanged by three persons with similar positions and working areas in the company.

*b* In September 2000 this group consists of eight individuals; it changed its composition: Two persons started a dialogue training, and they were exchanged by three new persons from the same work team.
conversations. The respondents were asked to reflect on the changes in behavioural patterns that they might have observed since the start of the culture change project. Respondents were asked to evaluate themselves as well as their colleagues. An interview lasted for approximately one hour. A short written summary was produced and fed back to the respondents in order to check for any flaws in the details.

Methods of Data Analysis

The analysis is mainly what is called Q-type analysis. Q methodology has as its striking practical quality that correlation (or, more generally, similarity or agreement) between subjects over variables is studied, instead of variable structures over subjects (or, more generally, research units). The latter approach is called R-type analysis; it is the conventional, most frequently used and best-known methodological procedure in empirical research (Green 1978: 403-407). By using the terms Q-type or Q-focus we make clear that we just use the way of looking at things that is known from Q methodology, and not apply conventional Q-sort methodology in the strict sense of a research paradigm that pretends to yield fundamentally different types of results from ‘R technique’ (Brown, 1986; McKeown et al., 1988). Q-sort is a designation that is closely connected to the core point of the method in the latter conventional form, where data are obtained by requiring each person to rate a group of statements according to their relative ‘significance’ by sorting a pre-determined number of cards at numerical scale positions, to obtain a near-normal distribution.

However, the model, as a way of looking at things can be applied regardless of one’s understanding of the philosophical foundation and even less dependent on one’s appreciation of this foundation. “Q methodology is a bundle of loosely related devices that can be separately adopted or rejected”; one is “likely to pick up several ideas worthy of more rigorous thought” (Cronbach & Gleser, 1954). Green (1978: 403-405; 423-426) and Nunnally (1967: 544-558) share these criticisms on the basis of multivariate statistical arguments. Kerlinger (1972) shares Cronbach and Gleser’s general argument about serious limitations and questionable features but he is milder in his way of putting it and he acknowledges that Q methodology has a valuable contribution to make.

In this paper, by the Q-type focus we mean studying similarity or agreement between subjects over statements. Similarity corresponds to the theoretical concept of Q-Consensus that we use to indicate agreement between persons about statements, which describe existing and desired patterns of behaviour. In this project we understand Gamma as a measure of similarity. In that way, we avoid statistical and methodological practices that are criticised in conventional Q-sort research on good grounds by recognized experts, particularly analysis of variance and factor analysis based on near-normal distributions (Cronbach & Gleser, 1954; Green, 1978; Dijkstra, 1999).

In our case, in the perspective of Q-type analysis, consensus primarily refers to a level of agreement, for example, the mean of the coefficients of association (Gamma) within a group of people. We call this kind of consensus ‘Q-Consensus’. Furthermore, the hypotheses refer also to the dispersion around a given level of agreement, for example, the standard deviation of the Gammas within a group of people, or the development of this statistic over a period of time.

\[\text{In general, Gamma is a measure of association between variables on the ordinal level of measurement. In our case, Gamma is interpreted as an indication of similarity. It is preferred over Cohen’s Kappa or conventional correlation, which also could have served as measures of similarity. The reason is the character of our ordinal data; correlation is not appropriate, whereas Kappa concentrates on the diagonal (see appendix 1). However, for ordinal variables similarity is more than just the evaluation of the observations on the diagonal.}\]
Apart from Q-type analysis, in our paper consensus has a second meaning, namely the dispersion of scores per statement. We call this kind of consensus ‘R-Consensus’. This is - in the above terminology - R-type analysis (analysis of variables over subjects). Of course this dispersion is also related to a level: the mean, modus or central tendency of a distribution of scores per variable. In this case, as a measure of dispersion or R-Consensus, we introduce the statistic RCS that is related to the standard deviation, since the mean and standard deviation itself of the scores of few people on ordinal scales have no meaning. Again, both the development of central tendency and dispersion over a period of time can be studied. In Table 1 we explain this definition of R-Consensus in more detail.

### Table 1: R-Consensus as a Measure of Dispersion

Table 1 about here

From the point of view of measurement theory, the variance of an ordinal variable is at least questionable, if not meaningless, even if n is large enough. The above definition of R-Consensus, however, should not be conceived of as a (not permitted) measure of dispersion. It is a statistic that expresses weighted disagreement between subjects, by squaring differences between their ordinal scores. Therefore, the interpretation is direct and simple.

*An important advantage of this definition of consensus is that it can be related to absolute minimum and maximum outcomes. Particularly for a small n, where with certainty the variance of ordinal scores does not make sense and should not be used, this definition allows for a classification of group consensus as strong, medium or weak, or the absence of consensus.*

### Research Hypotheses

Six research hypotheses have been developed. The first hypothesis is that all research units will show Q- and R-Consensus about Existing Behaviour (EB) patterns at the beginning of the project. More precisely, the Q- and R-Consensus are about the actual presence of this behaviour. Dispersions are expected to be low: The patterns are recognisable uniformly as the company’s dominant culture. Because the members of Group I already have had initial dialogue sessions back in 1999, it is probable that their Q- and R-Consensus may be a little bit lower because their behaviour has already started to change. Dispersions in this group are expected to be moderate, because of the different pace change takes in the distinct individuals.

- **H1a**: Group I (experimental group) shows high to moderate Consensus (with moderate dispersions) with respect to EB (behaviour is present) at the start of the change project,
- **H1b**: Group II (control group) shows high Q- and R-Consensus (with low dispersions) with respect to EB (behaviour is present) at the start of the change project,
- **H1c**: Group III (control group) shows high Q- and R-Consensus (with low dispersions) with respect to EB (behaviour is present) at the start of the change project,
- **H1d**: Group IV (control group) shows high Q- and R-Consensus (with low dispersions) with respect to EB (behaviour is present) at the start of the change project.

The second hypothesis is that all research units will show low Q- and R-Consensus about patterns of Desired Behaviour (DB) and of Personal Initiatives (PI) at the start of the project. Because Group I already has had dialogue training back in 1999, it is probable that the Q- and
R-Consensus about DB and PI may be a little bit higher than in the control group, because the members’ attitudes already have started to change into that direction. However, dispersions may vary considerably among individuals in both experimental and control groups, because they have not developed a strong routine in dialogue about DB yet, and the behaviour is not yet part of the company culture.

- H2a: Group I (experimental group) shows low to moderate Q- and R-Consensus (with moderate dispersions) with respect to DB and PI at the start of the change project.
- H2b: Group II (control group) shows low Q- and R-Consensus (with moderate dispersions) with respect to DB and PI at the start of the change project.
- H2c: Group III (control group) shows low Q- and R-Consensus (with moderate dispersions) with respect to DB and PI at the start of the change project.
- H2d: Group IV (control group) shows low Q- and R-Consensus (with moderate dispersions) with respect to DB and PI at the start of the change project.

At the end of the project, it is expected that, again, all research units will show Q- and R-Consensus about patterns of Existing Behaviour (EB), but this time the consensus will be about the actual absence of EB patterns. It is expected that the behaviour of many respondents has changed, and that the organisation as a system has developed itself because of a multitude of external causes, so that the dominant behavioural patterns, existing in the company at the end of 1999, definitely have ceased to exist. For the initial experimental groups the dispersion will be low because their members have dialogued well enough to know each other’s thinking with respect to EB. For the control group and for the experimental groups that were involved later in the change project, the dispersions with respect to EB may be moderate, due to differences in individual development and less experience with dialogue.

- H3a: Group I (experimental group) shows high Q- and R-Consensus (with low dispersions) with respect to EB (behaviour is absent) at the end of the change project.
- H3b: Group II (experimental group) shows high Q- and R-Consensus (with moderate dispersions) with respect to EB (behaviour is absent) at the end of the change project.
- H3c: Group III (control group) shows high Q- and R-Consensus (with moderate dispersions) with respect to EB (behaviour is absent) at the end of the change project.
- H3d: Group IV (control group) shows high Q- and R-Consensus (with moderate dispersions) with respect to EB (behaviour is absent) at the end of the change project.

It is also expected that at the end of the project all experimental groups will show high Q- and R-Consensus about patterns of Desired Behaviour (DB) and of Personal Initiatives (PI) behaviour. More precisely, the consensus is about the actual presence of DB and PI. With prolonged dialogue training, lower dispersions are to be expected. Because the control groups have not got that kind of training, it is expected that these groups show low to moderate Q- and R-Consensus, with moderate dispersions.

- H4a: Group I (experimental group) shows high Q- and R-Consensus (with low dispersions) with respect to DB (behaviour is present), and with respect to PI (mean is moderate to high, the standard deviation is low) at the end of the change project.
- H4b: Group II (experimental group) shows high Q- and R-Consensus (with low dispersions) with respect to DB (behaviour is present), and with respect to PI (mean is moderate to high, the standard deviation is low) at the end of the change project.
- H4c: Group III (control group) shows moderate Q- and R-Consensus (with moderate dispersions) with respect to DB and PI (behaviour is present), and with respect to PI (mean is moderate, as is the standard deviation) at the end of the change project.
- H4d: Group IV (control group) shows moderate Q- and R-Consensus (with moderate dispersions) with respect to DB and PI (behaviour is present), PI (mean is moderate to high, the standard deviation is low) at the end of the change project.
The problem with the third and fourth hypotheses is that it is impossible to know at what time the expected effects of the dialogue training will become visible. It may be the case in April 2000, or in April 2001, or far beyond that date. Also, there may be a time lag in the developments of the respective experimental groups because of the actual number and timing of their dialogue sessions. Therefore, we think that the expected path the consensus measures will take over time, will differ for distinct research units, see figure 2.

Figure 2: Expected Development of Consensus Measures in Experimental and Control Groups

We also want to specify the intermediate situation, where the development process will be on its way. It is expected that the experimental groups will show low Q- and R-Consensus with respect to Existing Behaviour (EB), behaviour is absent, with moderate to high dispersions, because the pace of change is different and change takes different paths in distinct sectors of the company. The control groups are expected to show moderate Q- and R-Consensus (EB is still present, but fades away with time), with moderate to high dispersions.

- H5a: Group I (experimental group) shows low Q- and R-Consensus (high dispersion) with respect to EB (behaviour is absent/present) at intermediate stages of the change project,
- H5b: Group II (experimental group) shows low Q- and R-Consensus (moderate to high dispersion) with respect to EB (behaviour is absent/present) at intermediate stages of the change project,
- H5c: Group III (control group) shows moderate Q- and R-Consensus (moderate to high dispersion) with respect to EB (behaviour is present) at intermediate stages of the change project,
- H5d: Group IV (control group) shows moderate Q- and R-Consensus (moderate to high dispersion) with respect to EB (behaviour is present) at intermediate stages of the change project.

With respect to patterns of Desired Behaviour (DB) and of Personal Initiatives (PI) both experimental and control groups will show moderate Q- and R-Consensus (DB and PI are present), with low to moderate dispersions. For the experimental groups the Q- and R-Consensus will be higher than for the control groups.

- H6a: Group I (experimental group) shows moderate to high Q- and R-Consensus (low to moderate dispersion) with respect to DB (behaviour is present), and with respect to PI (mean is moderate, as is the standard deviation) at intermediate stages of the change project,
- H6b: Group II (experimental group) shows moderate to high Q- and R-Consensus (low to moderate dispersion) with respect to DB and (behaviour is present), and with respect to PI (mean is moderate, as is the standard deviation) at intermediate stages of the change project,
- H6c: Group III (control group) shows moderate Q- and R-Consensus (low to moderate dispersion) with respect to DB (behaviour is present), and with respect to PI (mean is moderate, as is the standard deviation), at intermediate stages of the change project,
- H6d: Group IV (control group) shows moderate Q- and R-Consensus (low to moderate dispersion) with respect to DB (behaviour is present), and with respect to PI (mean is moderate, as is the standard deviation), at intermediate stages of the change project.

Full Program of Data Analysis

Quantitative Analyses
The complete program for the quantitative analysis of the questionnaire data is as follows:

- **Cross-sectional and longitudinal comparisons of experimental and control groups in January 2000, April 2000, September 2000, and April 2001:** Analysis of Q-Consensus among the respondents in the four research units I to IV, over items of EB and DB, using similarities (Q-focus) and Gamma as a measure of similarity.

- **Longitudinal comparison of experimental groups over the period of January 2000-April 2001 (measurements taken in January 2000, April 2000, September 2000, and April 2001):** Analysis of R-Consensus between respondents in the four different research units I to IV, on individual items of EB and DB, using the above-described statistic for consensus between respondents on an ordinal variable.

- **Cross-sectional and longitudinal analyses of experimental and control groups in January 2000, April 2000, September 2000, and April 2001:** Analysis of differences in Personal Initiatives within and between the four research units I to IV, using mean and standard deviation of the PI scale as statistics (also R analysis).

P.M.: In this paper only the research spanning the period January 2000-September 2000 will be reported. At the same time, only results will be presented with respect to experimental group I and control group IV.

**Qualitative Analysis**

In June/July 2000, unstructured interviews were held with ten members of both the experimental and control groups. The interviewees were randomly selected from each group, to guarantee variety with the least number of people. Open interviews were conducted with three members of group I, three members of group II, two members of group III and one member of group IV. Three interviewees were members of the company’s management team. Additionally, the general manager of the firm was interviewed. The same people, except the three members of the management team and the general manager, were interviewed in April 2001 as well.

In June/July 2000, they were focusing on perceived personal changes, perceived changes in the teams and perceived changes in the rest of the organisation. The interviews with members of group III and IV (control groups) focused on perceived general changes and on personal opinions about the change process. The interview with the general manager focused on perceived changes in the management team. The results of the interviews were fed back to the interviewees to make adjustments if necessary. The interviews were analysed per group on 1) direct effects of using dialogue; 2) changes in work caused by the change process; 3) changes in the individuals themselves; and 4) characteristics of the current change process in comparison with the change process in the past.

4. **Results and Data Analysis**

**Results of the Quantitative Analysis: Q-Consensus about EB and DB**

As said before, instead of focusing on the total program of analysis, we decided to present in this paper the longitudinal and cross-sectional comparisons between experimental group I and control group IV only, in order to illustrate how Q-focus analysis is working. These two research units are actual teams in the company: Group I is the change management team, and
group IV is an existing work team of employees in the service sector of the company. Both groups consist of 7 people.

We have analysed all parts of the questionnaire - patterns of Existing Behaviour (EB), of Desired Behaviour (DB), and of Personal Initiatives (PI) - at three different moments in time: January 2000, April 2000, and September 2000. The results of the Q-focus analyses are shown in Table 2a and 2b.

*Table 2: Q-Consensus and Personal Initiatives: Longitudinal and cross-sectional comparisons between experimental (I) and control (IV) group*

| Table 2 about here |

With respect to patterns of Existing Behaviour (EB) the experimental group (I) shows moderate to high Q-Consensus in January 2000 (with low dispersion). Q-Consensus is lower in April 2000 and significantly lower in September 2000, with moderate dispersions. This is in full accordance with research hypotheses H1a and H5a, suggesting that the change process is not finished yet, but is developing at an intermediate stage.

With respect to patterns of Desired Behaviour (DB) the experimental group (I) shows moderate to high Q-Consensus in January 2000 (with low dispersion). Q-Consensus is significantly higher in April 2000, and significantly lower again in September 2000, returning to the same level as in January (with low dispersion). This is not in accordance with research hypotheses H2a and H6a.

With respect to patterns of Existing Behaviour (EB) the control group (IV) shows moderate Q-Consensus in January 2000 (with low dispersion). Q-Consensus is lower in April 2000 and significantly lower in September 2000 (with moderate to high dispersion). This is in accordance with research hypotheses H1d and H5d, suggesting that the change process is at an intermediate stage.

With respect to patterns of Desired Behaviour (DB) the control group (IV) shows moderate to low Q-Consensus in January 2000 (with low dispersion). Q-Consensus is significantly higher in April 2000, and again lower in September 2000, returning to nearly the same level as in January (with low dispersions). The level of Q-Consensus is in accordance with research hypotheses H2d and H6d, the dispersions are lower than expected.

With respect to Personal Initiatives (PI) the experimental group (I) perceives moderate to high initiatives in January 2000 (with low dispersion). Personal Initiatives stay at the same levels in April 2000 and September 2000 (with low to moderate dispersions). This is in accordance with research hypotheses H1d and H5d.

With respect to Personal Initiatives (PI) the control group (IV) perceives moderate initiatives in January 2000 (with low dispersion). Personal Initiatives stay at the same levels in April 2000 and September 2000 (with low to moderate dispersions). This is in accordance with research hypotheses H2d and H6d.

To summarise the results of the Q-focus analysis, EB patterns are in accordance with the hypotheses. That means that for both the experimental and control group Q-Consensus is decreasing over the research period, and dispersions are increasing, as expected. Initially, Q-Consensus about DB patterns are in accordance with the hypotheses (increased in April
2000), but the drops in September 2000 for both the experimental and control groups were not predicted, neither are the low dispersions. The constant high level of PI patterns for experimental and control group also contradicts the hypotheses.

**Results of the Quantitative Analysis: R-Consensus about EB and DB**

In addition to the Q-Consensus analysis in which the similarities between subjects over variables were analysed (overall group consensus), an analysis of R-Consensus was carried out to explore the actual contents of the consensus (both present and absent behaviour). Here, the connection becomes clear between Q- and R-analysis. Q-Consensus (similarity between subjects) is brought about by variables on which R-Consensus is high (differences in scores are small). On the other hand, statements with low R-Consensus (large differences in scores per item) do not contribute to Q-Consensus. In the following the consensus over individual statements for the experimental and control groups is characterised with respect to patterns of Existing Behaviour (EB) and of Desired Behaviour (DB) in January, April, and September 2000. In the analysis the items are coded so that a low mean indicates the absence of a behavioural pattern, and a high mean indicates the presence of a behavioural pattern. Mean = mean of the scores per item; msq = mean sum of squared score differences per item (R-Consensus statistic, see Table 1). From the definition of msq it follows that by implication msq is extremely low if mean is extremely high (near 5) or mean is extremely low (near 1). However, moderate means can have a small msq (high consensus), but also a large msq (no consensus at all). Therefore, moderate means should be interpreted in the light of the size of msq. In the following, only the highlights of the R-analyses are reported. The reader who wants to see the details is kindly referred to Appendix 2 of this paper.

In January 2000, Experimental Group I does not show much consensus at all about themes of Existing Behaviour. On the contrary, there is dissensus about all EB themes. Members of experimental group I only agree or disagree on a handful of items with respect to company culture (agreement on high protestant work ethic, disagreement on rewarding of initiatives and on lack of loyalty shown towards the mother company). In April and September 2000, this consensus further crumbles away.

For Control Group IV the R-analysis shows almost the same results: There is only agreement on the high protestant work ethic in January 2000, which has disappeared in April 2000, and September 2000. For both the experimental and control group there is no single set of items grouped as an EB theme on which members within these two teams agree or disagree with one another. And even the few glimmers of consensus detected on the level of individual content issues in January 2000 have faded away in April 2000, and September 2000.

In January 2000, Experimental Group I shows consensus about several themes of Desired Behaviour. More specifically, it concerns some specific elements of chaordic aspects which should be increased (Consciousness: giving compliments, encouraging creativity; Connectivity: talking without conclusions; Emergence: solving problems yourself), or which should stay the same (Consciousness: allowing mistakes, societal services; Connectivity: respect the competitor; Indeterminacy: experiment instead of control; Dissipation: discretion to experiment). It is worth noting that in January 2000 there is no dissensus at all about any chaordic characteristics, whatsoever. In April 2000, consensus about chaordic aspects that should be increased or stay the same has steadily grown in experimental group I (more aspects: Indeterminacy and Dissipation; and more individual elements: for instance, Increase: giving compliments, taking time to think deeply, listening to each other, thinking in both...and
solutions, having multiple solutions, changing before it is time; Stay the same: being proud of company and product, allowing mistakes, contacts with customer, respecting the environment, knowing what tomorrow will bring, paying attention to training). In September 2000, the number of chaordic aspects and elements that should be increased or stay the same has dropped again (less elements of Consciousness and Connectivity to be increased; less chaordic aspects to stay the same - no Indeterminacy, no Emergence). In April 2000, experimental group I does not show consensus on two elements of Connectivity: Closing a meeting without a solution, and discussing during a meeting. In September 2000 an element of Indeterminacy is added to that list: Knowing what tomorrow will bring.

For Control Group IV the R-analysis shows quite different results: In both January 2000, April 2000, and September 2000, Control Group IV shows the following elements of chaordic aspects that should be increased (in January 2000: Connectivity: solving problems by communication; Indeterminacy: thinking in both...and solutions; Dissipation: paying attention to weak signals; in April: Connectivity: taking time to think deeply, solving problems by communication; Dissipation: changing before it is time, valuing new ideas; and in September 2000: Connectivity: solving problems by communication). Over time, in control group IV consensus builds that more chaordic aspects and elements should stay the same (in January 2000: Consciousness: allowing mistakes; Connectivity: ideas are common property; Emergence: paying attention to training; in April 2000: Consciousness: being proud of company and product; Dissipation: giving coincidence a chance; in September 2000: Consciousness: societal service, knowing how others think; Connectivity: respect the competitor, paying attention to mutual relationships; Indeterminacy: not controlling developments; Dissipation: deciding yourself about new products, discretion to experiment; Emergence: solving problems yourself). In control group IV consensus does not mean that chaordic aspects or elements should be decreased in January 2000 and April 2000, except for one single element of Emergence (do what a manager tells you) in September 2000. It is worth noting that in control group IV there is no dissensus at all about desired behaviour patterns in April 2000 and September 2000.

For all further details of the R-analysis (mean and msq) the reader is kindly referred to Appendix 2 of this paper.

Results of the R-Analysis of PI

The results of an R-analysis carried out on the items of the Personal Initiatives (PI) Scale are shown in Table 2c. For both the Experimental Group I and Control Group IV the mean of PI scores is moderate to low with moderate dispersions, which means that Personal Initiatives in both groups are perceived as being moderate to high. No significant differences were found within or between the experimental and control groups in January, April and September 2000. Personal Initiatives for both the experimental and control groups, as perceived by its members, stayed at the same moderate to high levels in the period January 2000 till September 2000. A check on the psychometric quality of the PI scale, for the data of January 2000, resulted in good scale characteristics (Cronbach’s alpha = .90; item-rest correlations: mean .70; range .60 - .82).

Results of the Qualitative Analysis

The statements of the interviewees, given to us in June/July 2000, are arranged according to the experimental and control groups the respondents belong to:
• **Group I:** The three interviewed members of this group state that due to the dialogue training sessions they have become more direct and open to others. They realised that the words which are actually spoken not always represent what someone literally means, and therefore they search for the real meaning behind one’s sayings. Interviewees report that they are more honest to others, and also take a more vulnerable position themselves. They feel that it is better accepted to criticise and to be criticised.

Respondents say that their colleagues in the change management team behave differently than before. Also, they report that they have got to know each other better, and deeper understand the respective work contexts. They have gained more insights in the knowledge and competences of others. Their patterns of behaviour are different in such a way that it feels easier, and that there is more focus on structural issues instead of operational matters. The managers realised that it is impossible to control everything, so they have started to experiment with letting go and coaching of their employees.

The new approach challenged them to reflect on their own behaviour and thinking, although some ineffective patterns are still present within the team. Respondents state that it is important to work from a vision. They have started to act more on gut feeling, keep more distance, and can easier delegate responsibilities than before.

Interviewees roughly characterise the change process in the past as dominated by ‘quick-and-dirty’ result-oriented projects. The new change process takes far more time, is more focused on the interior, and builds a real basis for self-organisation. However, the number of persons participating in both the old and the new processes is limited, and no workers from the shop floor are involved yet. The previous change process was entirely led by the management team, the new project is coordinated by a dedicated change group, consisting of both persons of top and middle management.

• **Group IV:** The single interviewee of this group states that he has heard about the project. After some inquiry, he understood that the new change process has to do with more attention for people. He experiences that managers have actually changed and are listening more deeply to their employees. What he perceives is that, nowadays, all participants in a meeting can make a contribution and that it is allowed to correct people. The negative effect is the direct approach of this method of communication: Personal confrontations are painful. He experiences that managers who are involved in the change process have actually changed, and are listening more deeply to their employees. They also act differently in a meeting: They accept criticism, they let other people speak out, they are more patient and more open.

The interviewee states that he knows the past change process very well, which was focused on team performance. The change projects that have been executed in the last few years have not resulted in many improvements. Then and now, there are potential obstructions to the change process, like the implementation of an Enterprise Resource Planning information system, and severe operational pressures caused by the market. That’s why many initiatives got stalled in the past. In order to solve that problem, more focus on the whole, more time to reflect, and more coaching are needed.

5. **Conclusions**

Over the research period (January-September 2000) experimental group I shows a sharply decreasing consensus about patterns of Existing Behaviour. The Q-type analysis indicates that although in January the consensus about EB is moderate to high, there is a slight decrease
between January and April, and a significant decrease between April and September. The R-type analysis reveals that the consensus in January is primarily about specific aspects of the company culture (high work loads, desire to work hard, and action-oriented attitude), while there is considerable dissensus about most other EB patterns: Decision making, working in projects, working in groups, and other aspect of the company culture. Since the items in these categories cover different aspects, it seems that the dissensus about EB further increases in April and September. This is in accordance with research hypotheses H1a and H5a, supposing that the change process for this group is at an intermediate stage.

Over the research period experimental group I shows a high and prolonged consensus about patterns of Desired Behaviour (Mean Gamma = .50). Although the level of consensus is highest in April, the Q-type analysis shows that there is no increase between January and September. The R-type analysis reveals that the general attitude is that DB patterns should be increased or stay the same. In January this tendency is weakest (only for a few single items of Consciousness, Connectivity and Emergence), in April and September this is the case for much more items, and for all five chaordic properties: Consciousness, Connectivity, Indeterminacy, Dissipation and Emergence. Because the items cover different aspects, it seems that consensus about DB clearly increases, because more new aspects enter into this category of statements. This is in accordance with research hypothesis H4a, supposing that the change process for this group is at an end stage.

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Over the research period control group IV shows a sharply decreasing consensus about patterns of Existing Behaviour. The Q-type analysis indicates that although in January the consensus about EB is moderate, there is a decrease between January and April, and a further decrease between April and September. The R-type analysis reveals that the consensus in January is primarily about specific aspects of the Company culture (high work loads, desire to work hard), while there is considerable dissensus about most other EB patterns: Decision making, working in projects, working in groups, and company culture. Because the items cover different aspects, the dissensus about EB seems to increase further in both April and September, because more new aspects enter into this category of statements. This is in accordance with research hypothesis H2a, supposing that the change process for this group is at an intermediate stage.

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With respect to Personal Initiatives there is no differentiation at all between the experimental and control group, or any development in time. For all respondents Personal Initiatives are perceived to be moderate to high, with moderate variances. This is in accordance with research hypotheses H6a en H6d, supposing that the groups are at an end stage.

The qualitative data fully support the above conclusions for both the experimental and control group.

What can be concluded with respect to the development of the organisational mind in the light of the expected effects of the intervention? In the case of experimental group I there is a fading away of the old organisational mind, which is based on distrust and control values. At the same time, there is the emergence of a new organisational mind, based on chaordic properties or values. In the control group the old organisational mind is also fading away, but
there is no emergence of any new organisational mind. This is a clear contrast between the two groups.

The development of the organisational mind seems to have nothing to do with Personal Initiatives, because PI is a constant for both the experimental and control groups over the research period.

6. Discussion

Exterior versus interior; quantitative versus qualitative analysis of data; the time factor in the study; suggestions for further research.

The research reported in this paper shows some special characteristics. First, it attempts to investigate interior changes of individuals in groups. This so called ‘organisational mind’ is ‘measured’ by tapping individual attitudes about complex behaviour patterns, which are treated as attractors. Second, its design is emphasizing the holistic character of organisations, and keeps the research units intact as much as possible, by using both quantitative (Q-type analysis) and qualitative measures (open interviews) that focus on the consensus among persons, not on separate or isolated variables. Third, the time factor plays an important role in this study. Therefore, a longitudinal approach was used.

Interior Changes as Effects of Dialogue

In terms of dialogue experimental group I has got much experience. This is true not only in terms of training - i.e., the number of dialogue sessions facilitated by the consultant - but also in terms of time of actual exposure to it during normal working hours. This research unit - that actually equaled the company’s change management team, consisting of both top and middle managers - experienced many intensive dialogue episodes during ordinary meetings, in which members managed in going deeper into assumptions behind their thinking. So they are very well equipped to serve as an experimental group in this study. The control group consists of a team of employees, who did not have any experience with dialogue at all. So, they are equally suited to play their role in the research as a control group. Although the composition of the control group changed in September 2000, it is not plausible to believe that this has influenced the results significantly, because all members are from the same working group who stayed dialogue-naïve during the whole research period from January till September 2000.

The results show clear contrasts in patterns of Desired Behaviour between the experimental and control group. Although complete proof is impossible to get, there are strong indications that the change in attitudes is an effect of the dialogue training.

Looking at the details of the Q-type analysis, it is remarkable that there is a higher Q-Consensus about patterns of Desired Behaviour in April than there is in September for both the experimental and control group. Possibly, in case of the experimental group, this is a recency effect attributable to the start of the new project, or a Hawthorne effect for both the experimental and control group because of the administering of the questionnaire. Looking at the details of the R-analysis, there are hardly any elements of Desired Behaviour the experimental and control group would like to decrease. This could be an instance of social desirability.
In this research we have found additional support for our ‘Module of Justification’: We found changes in individual attitudes that are indicative of changes in the patterns of behaviour of individuals and groups as a result of the intervention (dialogue training).

It should be noted, that the measurements reported in this paper are only a small subset of the total number of data that was collected during the research project. Other analyses will be reported elsewhere.

Q-Type Analysis

In the quantitative section we choose Q-type analysis as the basic approach for two reasons. First, because this comes closest to the idea of consensus between persons over statements, and secondly, because from a practical point of view, using conventional R-type analysis was excluded by the disproportion between subjects and variables. In R-type, variables are examined over a multiple of persons, certainly in construct development. But we have a multiple of variables over persons. Therefore, from a methodological point of view, an exclusively R-type approach would have required already existing standard attitude instruments. Moreover, most likely the operational idea of consensus should have been revised. However, R-type analysis can be used in addition to Q-type analysis, as we have demonstrated in this paper.

In retrospect, in our opinion the combination of Q-type and R-type analysis has proven to be fruitful. A Q-type approach is methodologically appropriate because the main focus in the project is on similarity, as the empirical manifestation of the concept of consensus in (verbal, self-reported) behaviour within and between groups and changes over a period of time. The way we used R-type analysis to specify the contents of consensus (consensus or dissensus on what, exactly?) demonstrates that R-type has an indispensable supplementary function in Q-type analysis.

We repeat that we used Q-type analysis as a way of looking at things, and did not practice the Q-sort method in the strict sense of sorting a pre-determined number of cards at numerical scale positions, followed by factor analysis of the resulting near-normal distributions.

The Time Factor in This Study

A far as time is concerned, we stated before in this paper that we could not specify in advance in what particular stage of development the project was evolving during the research period. Because the experimental group actually started the change process already in September 1999, some effects of the dialogue training sessions have been detected already at the start of the research. On the basis of the test of the research hypotheses one may argue that the project is near its end stage, at least as far as the experimental group is concerned.

From the test of the hypotheses it may be abducted that patterns of Existing and of Desired Behaviour follow different speeds of development: Although they do not disappear completely, EB patterns seem to become extinct at a slower rate than DB patterns seem to develop. However, it should be noted that the phrasing of the questionnaire item response alternatives was different for EB and DB. In case of EB, the assignment was to evaluate the correctness of a statement about existing behaviour; in case of DB respondents were asked to indicate their wish whether desired behaviour should increase or decrease. So, in the case of EB consensus is about actual presence or absence of ‘old’ behaviour as perceived by the respondents, and in the case of DB consensus is about the wish to develop ‘new’ behaviour. On the basis of the questionnaire results only it could well be that DB patterns are dreamed of,
not being actually present, yet. However, the results of the interviews clearly indicate that DB behaviour patterns are actually shown in practice.

Some Suggestions for Further Research

Instead of giving any suggestions for further research, we want to focus on the finishing of the current research project. The program for analysis has only just started. First and foremost, we want to analyse the April 2001 questionnaire and interview data of experimental group I and control group IV, in order to see if the reported changes will consolidate. Next, we want to fully analyse the available data of experimental group II and control group III, in order to assess both indications and contra-indication for any developments in the old and new organisational minds. And last but not least, we want to analyse the circumstantial amounts of qualitative research data that document the change process in a minute way. By doing so, we want to accomplish two goals: To further specify and evaluate the ‘Module of Intervention’: Dialogue training for managers and workers in a manufacturing firm; and to expand the ‘Module of Justification’: Under which conditions, and by using what kind of implementation rules is dialogue training effective to develop the organisational mind of a manufacturing company?

Notes

1 Definitions

“By Chaord, I mean any self-organising, adaptive, nonlinear, complex organism, organisation or community, whether physical, biological or social, the behaviour of which harmoniously blends characteristics of both order and chaos. Briefly stated, a chaord is any chaotically-ordered complex. Loosely translated to social organisations, it would mean the harmoniously blending of intellectual and experiential learning” (Hock, 1996).

Chaord: “1) Any autocatalytic, self-regulating, adaptive, nonlinear, complex organism, organisation, or system, whether physical, biological or social, the behaviour of which harmoniously exhibits characteristics of both order and chaos; 2) An entity whose behaviour exhibits patterns and probabilities not governed or explained by the behaviour of its parts; 3) The fundamental organising principle of nature and evolution” (The Chaordic Alliance, 1998).

Chaordic: “1) Anything simultaneously orderly and chaotic; 2) Patterned in a way dominated neither by order nor chaos; 3) Existing in the phase between order and chaos” (The Chaordic Alliance, 1998).

A Chaordic System is “a complex and dynamical arrangement of connections between elements forming a unified whole the behaviour of which is both unpredictable (chaotic) and patterned (orderly)... simultaneously. Chaos then is the science of such chaotic and orderly, that is ‘chaordic’ entities found in abundance throughout the universe” (Fitzgerald, 1997b, p. 1). By this definition, almost any system in the universe ranging from the complex to the simple can be considered chaordic. However, we will refer to any system designed to sustain itself (rather than natural) in an optimal dynamical balance in what millennial science refers to as Far-From-Equilibrium (Van Eijnatten & Fitzgerald, 1998).

Chaordic Systems Thinking (CST) is “a lens, a way of thinking, and subsequently an approach to designing a complex organisational system that recognises the enterprise not as a fixed structure, but as ‘flow’; a dynamical process passing from one attractor basin to the next in an incessant journey toward the ‘edge of chaos’ (Van Eijnatten & Fitzgerald, 1998).

‘Chaord®’ and ‘Chaordic®’ are registered trademarks of the Chaordic Alliance: http://www.chaordic.com
References


Dijkstra, L., & Eijnatten, F.M. van (1999). Over het structureren van bedrijfskundig onderzoek (About the design of research in industrial engineering and management science). In: Riemsdijk, M.J. van (Ed.), *Dilemma’s in de bedrijfskundige wetenschap (Dilemmas in industrial engineering and management science)* (pp. 83-100). Assen: Van Gorcum (Dutch language).


Figure 1: The Four Faces of an Organisation Seen as a Holon, after Wilber (1996)

Legenda: -> Dimension of development  VC = Validity Claim
Table 1: R-Consensus as a Measure of Dispersion, Dijkstra (2001)

The argument concerning this measure of dispersion of scores per statement (R-Consensus) that we use, goes as follows (Dijkstra 2001):

For ordinal scores $x_1, ..., x_n$ by $n$ judges, a measure of consensus RCS between the judges can be defined as the mean squared difference between their scores:

$$RCS = \frac{2\sum_{i=1}^{n-1} \sum_{j=i+1}^{n} (x_i - x_j)^2}{n(n-1)}$$

RCS is related to the variance of the scores by the function $RCS = \frac{2n}{n-1} \times \text{variance}$. This can be demonstrated as follows:

Change left and right sides; add $n\sum_{i=1}^{n} x_i^2$ to both:

$$n\sum_{i=1}^{n} x_i^2 - \sum_{i=1}^{n} x_i^2 - 2\sum_{i=1}^{n-1} \sum_{j=i+1}^{n} x_i x_j = n\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2$$

so that

$$\sum_{i=1}^{n-1} \sum_{j=i+1}^{n} (x_i - x_j)^2 = n\sum_{i=1}^{n} (x_i - \bar{x})^2$$.

Multiply both sides by $\frac{2}{n(n-1)}$:

$$\frac{2\sum_{i=1}^{n-1} \sum_{j=i+1}^{n} (x_i - x_j)^2}{n(n-1)} = \frac{2n\sum_{i=1}^{n} (x_i - \bar{x})^2}{n(n-1)}$$, and

$$\frac{2\sum_{i=1}^{n-1} \sum_{j=i+1}^{n} (x_i - x_j)^2}{n(n-1)} = \frac{2n}{n-1} \times \sum_{i=1}^{n} (x_i - \bar{x})^2$$.
Figure 2: Expected Development of Consensus Measures in Experimental and Control Groups

Legenda: EB = Patterns of Existing Behaviour; DB = Patterns of Desired Behaviour; PI = Personal Initiatives
= dispersion; e = experimental group; c = control group
$t_o$ = start of the project; $t_n$ = end of the project; $t_x$ = intermediate stage
+ = behaviour pattern is present; -- = behaviour pattern is absent
Table 2: Q-Consensus and Personal Initiatives: Longitudinal and cross-sectional comparisons between experimental (I) and control (IV) group

Legenda: EB = patterns of Existing Behaviour; DB = patterns of Desired Behaviour; PI = Personal Initiatives
J = January 2000; A = April 2000; S = September 2000; Sdev = Standard deviation
G = Gamma; df = degrees of freedom; * = sign. 5% one sided; ** = sign. 1% one sided

2a. Patterns of Existing Behaviour (EB), Q-Consensus Analysis

<table>
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EB: Number of questionnaire items: 60

2b. Patterns of Desired Behaviour (DB), Q-Consensus Analysis

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DB: Number of questionnaire items: 70

2c. Personal Initiatives (PI), R-analysis

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PI-scale: 7 items; range of scores 7 - 35; maximum PI = 7; minimum PI = 35
Cronbach’s alpha = .90; item-rest correlations: mean .70; range .60 -.82 (J)

No significant differences (t-test) were found between groups I and IV, or within groups in JAS
Why gamma as a measure of agreement?

Suppose 3 judges A, B and C have scored 18 objects as follows:

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Disagreement:

|   | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 29 |

n1 | 3 | 2 | 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 9 |

n2 | 1 | 1 | 3 | 2 | 1 | 2 | 1 | 1 |   |   |   |   |   |   |   |   |   |   | 12 |

n3 | 1 | 1 | 3 | 2 | 1 | 2 | 1 | 1 | 1 |   |   |   |   |   |   |   |   |   | 13 |

n4 |   | 1 | 1 | 3 | 2 | 1 | 2 | 1 | 1 | 1 |   |   |   |   |   |   |   |   | 12 |

n5 |   |   |   |   |   |   |   |   |   |   | 1 | 1 | 3 | 2 | 1 | 1 |   |   |   | 8 |

\[ 9(12 + 13 + 12 + 8) + 12(13 + 12 + 8) + 13(12 + 8) + 12 \times 8 = 1157 \]

\[
\begin{align*}
\text{A} & \quad \text{B} \\
1 & 2 & 1 \\
2 & 1 & 2 & 1 \\
3 & 1 & 2 & 1 \\
4 & 1 & 2 & 1 \\
5 & 1 & 2 \\
\end{align*}
\]

\[ \text{Gamma} = .93 \]

\[
\begin{align*}
\text{C} & \quad \text{A} \\
1 & 2 & 1 \\
2 & 1 & 2 & 1 \\
3 & 1 & 2 & 1 \\
4 & 1 & 2 & 1 \\
5 & 1 & 1 \\
\end{align*}
\]

\[ \text{Gamma} = .85 \]

\[
\begin{align*}
\text{B} & \quad \text{C} \\
1 & 2 & 1 \\
2 & 1 & 1 & 2 \\
3 & 1 & 1 & 3 \\
4 & 1 & 1 & 2 \\
5 & 1 & 1 \\
\end{align*}
\]

\[ \text{Gamma} = .72 \]

\[ \text{Krippendorff’s } \alpha = 1 - \frac{18 \times 3 - 1}{3 - 1} \times \frac{29}{1157} = .336 \]

(Krippendorff’s \( \alpha \) is a generalisation of Cohen’s kappa for more than two judges).

On an ordinal level of measurement, the judges show strong associations, but Krippendorff’s \( \alpha \) shows the absence of agreement. With associations of this level of strength, \( \alpha \) even decreases if the number of judges increase.

Krippendorff’s \( \alpha \) only considers exactly equal scores. If the scores represent different categories, this is correct. However, if they are ordinal scores, \( \alpha \) underestimates the strength of the resemblance. In that case Gamma is a better measure of agreement.
APPENDIX 2

Results of the Quantitative Analysis: R-Consensus about EB and DB

**** Experimental group I is best characterised by the following:

**EB - Experimental group I, January 2000:** The following specific patterns of Existing Behaviour - said to be present - contribute most to the experimental group I consensus in January 2000:

*Company culture*
- Making jokes is ok in our company (mean = 4.86; msq = .29),
- We are very much action oriented (mean = 4.86; msq = .29),
- We love hard work (mean = 4.86; msq = .29),
- The work load of most employees is high (mean = 4.14; msq = .29),
- In case of illness work is easily taken over by colleagues (mean = 4.14; msq = .29).

**EB - Experimental group I, January 2000:** The following specific patterns of Existing Behaviour - said to be absent - contribute most to the experimental group I consensus in January 2000:

*Company culture*
- The relationship with the mother company is good (mean = 2.00; msq = .00),
- Initiatives are punished by management (mean = 1.29; msq = .48).

**EB - Experimental group I, January 2000:** The following specific patterns of Existing Behaviour - said to be neutral - contribute most to the experimental group I consensus in January 2000:
- None.

**EB - Experimental group I, January 2000:** About the following specific patterns of Existing Behaviour experimental group I does not have consensus at all in January 2000:

*General*
- We criticise a new idea heavily (msq = 2.95),

*Decision making*
- During meetings coaches do other things (msq = 2.48),
- Decisions are ‘precooked’ by management (msq = 3.62),
- In general the quality of discussions is high (msq = 2.48),
- We hardly care of the quality of our meetings (msq = 2.48),
- Only dominant persons talk during meetings (msq = 2.48),

*Working in projects*
- Deadlines hardly ever got passed (msq = 2.95),

*Working in groups*
- If you do something wrong, you will not be asked again (msq = 2.57),
- Hot disputes harm personal relationships (msq = 2.57),
- Management often is very dominant (msq = 2.57),
- Employees don’t utter their wishes in a group (msq = 3.14),

*Company culture*
- We are a real engineering company (msq = 3.62),
- Our company has a lot of rules and procedures (msq = 3.81),
- Contacts with customers is the focus of our attention in the whole company (msq = 4.95),
- In our company the emphasis is on technology, not on people (msq = 2.48),
- It is not a custom to say ‘no’ to a request of a manager (msq = 2.57),
- When a customer calls, that is priority, and all other work stops (msq = 2.48),
- Other persons ideas are conviscated and used as own ideas (msq = 2.95).

**EB - Experimental group I, April 2000:** The following specific patterns of Existing Behaviour - said to be present - contribute most to the experimental group I consensus in April 2000:

*Company culture*
- In case of illness work is easily taken over by colleagues (mean = 4.14; msq = .29).
EB - Experimental group I, April 2000: The following specific patterns of Existing Behaviour - said to be absent - contribute most to the experimental group I consensus in April 2000:

**Working in groups**
- Usually, managers don’t listen to the ideas of their employees (mean = 1.86; msq = .29),
- Initiatives are punished by management (mean = 1.71; msq = .48).

**Company culture**
- None.

EB - Experimental group I, April 2000: The following specific patterns of Existing Behaviour - said to be neutral - contribute most to the experimental group I consensus in April 2000:

- None.

EB - Experimental group I, April 2000: About the following specific Existing Behaviour patterns experimental group I does not have consensus at all in April 2000:

**General**
- We criticise a new idea heavily (msq = 2.67),

**Decision making**
- Decisions are prepared in a secret group (msq = 2.95),
- In the last ten minutes of a meeting we take over-hasty decisions (msq = 3.24),
- **Working in projects**
  - We clearly agree on who is responsible for a particular project (msq = 2.57),
  - Often, the same people pull forward projects (msq = 3.14),
  - When the deadline approaches, real work is done on a project (msq = 3.24),

**Working in groups**
- If you do something wrong, you will not be asked again (msq = 2.57),
- New employees are absorbed quickly in a group (msq = 3.14),
- In meetings people want to excel (msq = 3.14),
- Employees hardly ever take a leading role in a group (msq = 4.00),

**Company culture**
- Contacts with customers is the focus of our attention in the whole company (msq = 2.67),
- The future of our company is clear to everybody (msq = 2.67).

EB - Experimental group I, September 2000: The following specific patterns of Existing Behaviour - said to be present - contribute most to the experimental group I consensus in September 2000:

**Working in projects**
- We clearly agree on who is responsible for a particular project (mean = 4.14; msq = .29),

**Company culture**
- In case of illness work is easily taken over by colleagues (mean = 4.14; msq = .29).

EB - Experimental group I, September 2000: The following specific patterns of Existing Behaviour - said to be absent - contribute most to the experimental group I consensus in September 2000:

- None.

EB - Experimental group I, September 2000: The following specific patterns of Existing Behaviour - said to be neutral - contribute most to the experimental group I consensus in September 2000:

- None.

EB - Experimental group I, September 2000: About the following specific patterns of Existing Behaviour experimental group I does not have consensus at all in September 2000:

**General**
- Participating is multiple teams lowers the enthusiasm to work in a team (msq = 4.00),
- It is more pleasant to work on your own than working in a team (msq = 2.67),
- Taking a break is more important than finishing a job (msq = 6.48),
- We criticise a new idea heavily (msq = 6.00),

**Decision making**
- During meetings coaches do other things (msq = 3.81),
- In general the quality of discussions is high (msq = 2.67),

**Working in projects**
• None.

Working in groups
• In general, management does not trust the employees (msq = 3.62),
• Employees hardly ever take a leading role in a group (msq = 2.48),

Company culture
• We are very action oriented (msq = 2.67),
• We have a male culture (msq = 4.29),
• It is allowed to make mistakes (msq = 3.14),
• Our company has a lot of rules and procedures (msq = 2.48),
• Our company has a personal culture (msq = 4.57),
• The work load of most employees is high (msq = 3.24),
• We love hard work (msq = 4.29),
• In our company you need permission of a coach for nearly everything (msq = 2.48),
• A joke is ok in our company (msq = 5.62),
• Contacts with customers is the focus of our attention in the whole company (msq = 5.24),
• The relation with the mother company is good (msq = 2.57),
• It is not a custom to say ‘no’ to a request of a manager (msq = 2.95),
• When a customer calls, that is priority, and all other work stops (msq = 3.81),
• Other persons ideas are conviscated and used as own ideas (msq = 2.67).

DB - Experimental group I, January 2000: The following specific patterns of Desired Behaviour - wanted to be increased - contribute most to the experimental group I consensus in January 2000:

Consciousness
• Giving compliments (mean = 4.14, msq = .29),
• Encouraging creativity (mean = 4.14, msq = .29),

Connectivity
• Talking with each other without taking decisions (mean = 4.29, msq = .48),

Indeterminacy
• None,

Dissipation
• None,

Emergence
• Solving problems yourself (mean = 4.14, msq = .29).

DB - Experimental group I, January 2000: The following specific patterns of Desired Behaviour - wanted to be decreased - contribute most to the experimental group I consensus in January 2000:

• None.

DB - Experimental group I, January 2000: The following specific patterns of Desired Behaviour - wanted to stay the same - contribute most to the experimental group I consensus in January 2000:

Consciousness
• Allowing to make mistakes (mean = 3.14; msq = .29),
• Contributing to the societal development op the region (mean = 3.14; msq = .29),

Connectivity
• Appreciating the competitor (mean = 2.86, msq = .29),

Indeterminacy
• Not controlling any development (mean = 3.29, msq = .48),
• Trying out things we want, immediately (mean = 3.29, msq = .48),

Dissipation
• Having to ask permission before trying out something (mean = 2.71, msq = .48),

Emergence
• None.

DB - Experimental group I, January 2000: About the following specific patterns of Desired Behaviour the experimental group I does not have consensus at all in January 2000:

Consciousness
• None,
Connectivity
- Talking with people from other departments (msq = 4.29),

Indeterminacy
- None.

Dissipation
- Working with contradictions (msq = 2.95),

Emergence
- None.

**DB - Experimental group I, April 2000:** The following specific patterns of Desired Behaviour - wanted to be **increased** - contribute most to the experimental group I consensus in April 2000:

Consciousness
- Paying attention to humans (mean = 4.00; msq = .00),
- Stressing soft aspects (mean = 4.14; msq = .29),
- Giving compliments (mean = 4.29, msq = .48),
- Knowing from each other how we think (mean = 4.29 msq = .48),

Connectivity
- Taking time to think deeply about a problem (mean = 4.00, msq = .00),
- Listening to each other without any judgements (mean = 4.14, msq = .29),
- Listening to each other (mean = 4.14, msq = .29),
- Thinking globally, acting locally (mean = 4.29, msq = .48),

Indeterminacy
- Having multiple solutions for a single problem (mean = 4.00, msq = .00),
- Thinking in both...and solutions (mean = 4.00, msq = .00),

Dissipation
- Changing before it is time (mean = 4.14, msq = .29),

Emergence
- Solving problems yourself (mean = 4.14, msq = .29).

**DB - Experimental group I, April 2000:** The following specific patterns of Desired Behaviour - wanted to be **decreased** - contribute most to the experimental group I consensus in April 2000:
- None.

**DB - Experimental group I, April 2000:** The following specific patterns of Desired Behaviour - wanted to **stay the same** - contribute most to the experimental group I consensus in April 2000:

Consciousness
- Contributing to the societal development op the region (mean = 3.14; msq = .29),
- Being proud of the product (mean = 3.14, msq = .29),
- Being proud of the company (mean = 3.29, msq = .48),
- Allowing to make mistakes (mean = 3.43; msq = .57),

Connectivity
- Having contacts with the customer (mean = 3.29, msq = .48),
- Respecting the environment (mean = 3.29, msq = .48),
- Communicating with everybody in the company (mean = 3.29, msq = .48),

Indeterminacy
- Trying out things we want, immediately (mean = 3.14, msq = .29),
- Knowing what tomorrow will bring (mean = 3.29, msq = .48),
- Spending time on planning (mean = 3.29, msq = .48),

Dissipation
- Deciding yourself about new products (mean = 3.14, msq = .29),

Emergence
- Paying attention to training (mean = 3.29 msq = .48).

**DB - Experimental group I, April 2000:** About the following specific patterns of Desired Behaviour the experimental group I does not have consensus at all in April 2000:

Consciousness
- None,
Connectivity
• Closing a meeting with a solution (msq = 2.64),
• Discussing during a meeting (msq = 2.86),

Indeterminacy
• None,

Dissipation
• None,

Emergence
• None.

**DB - Experimental group I, September 2000:** The following specific patterns of Desired Behaviour - wanted to be increased - contribute most to the experimental group I consensus in September 2000:

**Consciousness**
• Paying attention to humans (mean = 4.14; msq = .29),
• Knowing from each other how we think (mean = 4.71, msq = .48),
• Stressing soft aspects (mean = 4.29; msq = .48),

**Connectivity**
• Listening to each other (mean = 4.71, msq = .48),
• Listening to each other without any judgements (mean = 4.71, msq = .48),

**Indeterminacy**
• Rules are there to be changed (mean = 4.14, msq = .29),

**Dissipation**
• Working with contradictions (mean = 4.00, msq = .00),
• Paying attention to weak signals (mean = 4.14, msq = .29),
• Valuing new ideas (mean = 4.14, msq = .29),
• Nourishing employees with different opinions (mean = 4.29, msq = .48),

**Emergence**
• Solving problems yourself (mean = 4.00, msq = .00),
• Encouraging initiatives by team coaches (mean = 4.14, msq = .29),
• Reflecting on your own behaviour (mean = 4.29, msq = .48).

**DB - Experimental group I, September 2000:** The following specific patterns of Desired Behaviour - wanted to be decreased - contribute most to the experimental group I consensus in September 2000:
• None.

**DB - Experimental group I, September 2000:** The following specific patterns of Desired Behaviour - wanted to stay the same - contribute most to the experimental group I consensus in September 2000:

**Consciousness**
• Allowing to make mistakes (mean = 3.29; msq = .48),
• Contributing to the societal development of the region (mean = 3.29; msq = .48),

**Connectivity**
• Appreciating the competitor (mean = 3.14, msq = .29),

**Indeterminacy**
• None,

**Dissipation**
• Deciding yourself about new products (mean = 2.86, msq = .29).

**Emergence**
• None.

**DB - Experimental group I, September 2000:** About the following specific patterns of Desired Behaviour the experimental group I does not have consensus at all in September 2000:

**Consciousness**
• None,

**Connectivity**
• Closing a meeting with a solution (msq = 2.48),
• Discussing during a meeting (msq = 3.14),

**Indeterminacy**
Knowing what tomorrow will bring (msq = 2.48),

Dissipation
None.

Emergence
None.

**** Control group IV is best characterised by the following:

EB - Control group IV, January 2000: The following specific patterns of Existing Behaviour - said to be present - contribute most to the control group IV consensus in January 2000:

Company culture
- We love hard work (mean = 4.17; msq = .33),
- The work load of most employees is high (mean = 4.17; msq = .33),
- A customer’s call is our priority, so all other work comes to halt (mean = 4.29; msq = .48).

EB - Control group IV, January 2000: The following specific patterns of Existing Behaviour - said to be absent - contribute most to the control group IV consensus in January 2000:
- None.

EB - Control group IV, January 2000: The following specific patterns of Existing Behaviour - said to be neutral - contribute most to the control group IV consensus in January 2000:

Decision making
- In general the quality of discussions is high (mean = 2.86; msq = .29).

EB - Control group IV, January 2000: About the following specific patterns of Existing Behaviour control group IV does not have consensus at all in January 2000:

General
- None.

Decision making
- In the last ten minutes of a meeting we take over-hasty decisions (msq = 2.95),
- In meetings the conclusion is often known in advance (msq = 2.48),
- During meetings coaches do other things (msq = 2.48),
- During meetings we talk about everything except important business (msq = 2.48),
- We hardly care of the quality of our meetings (msq = 3.14),
- Only dominant persons talk during meetings (msq = 3.33),

Working in projects
- Only a few people can take up the responsibility for a project (msq = 2.57),

Working in groups
- Usually, managers don’t listen to the ideas of their employees (msq = 3.14),
- Management often is very dominant (msq = 3.14),
- Employees hardly ever take a leading role in a group (msq = 4.00),
- Employees don’t utter their wishes in a group (msq = 3.90),

Company culture
- Initiatives are punished by management (msq = 2.40),
- It is allowed to make mistakes (msq = 5.13),
- Praising each other in public is not a custom in our company (msq = 4.80),
- Our company has a personal culture (msq = 3.73),
- A joke is ok in our company (msq = 2.73).

EB - Control group IV, April 2000: The following specific patterns of Existing Behaviour - said to be present - contribute most to the control group IV consensus in April 2000:

Company culture
- Praising each other in public is not a custom here (mean = 4.29; msq = .48).
EB - Control group IV, April 2000: The following specific patterns of Existing Behaviour - said to be absent - contribute most to the control group IV consensus in April 2000:
- None.

EB - Control group IV, April 2000: The following specific patterns of Existing Behaviour - said to be neutral - contribute most to the control group IV consensus in April 2000:
- None.

EB - Control group IV, April 2000: About the following specific patterns of Existing Behaviour control group IV does not have consensus at all in April 2000:

General
- Participating is multiple teams lowers the enthusiasm to work in a team (msq = 2.95),
- We criticise a new idea heavily (msq = 3.81),

Decision making
- Decisions are prepared in a secret group (msq = 3.90),
- In the last ten minutes of a meeting we take over-hasty decisions (msq = 4.95),
- In meetings the conclusion is often known in advance (msq = 5.33),
- Often, management forces things through in a meeting (msq = 3.81),
- During meetings coaches do other things (msq = 3.90),
- During meetings we talk about everything except important business (msq = 3.24),
- Only dominant persons talk during meetings (msq = 3.62),

Working in projects
- We clearly agree on who is responsible for a particular project (msq = 2.48),

Working in groups
- The contacts between departments run smoothly (msq = 3.81),
- Usually, managers don’t listen to the ideas of their employees (msq = 3.33),
- Employees hardly ever take a leading role in a group (msq = 3.62),
- Employees don’t utter their wishes in a group (msq = 2.48),

Company culture
- Initiatives are punished by management (msq = 3.33),
- It is allowed to make mistakes (msq = 2.57),
- Our company has a lot of rules and procedures (msq = 2.67),
- Creativity is rewarded in our company (msq = 2.67).

EB - Control group IV, September 2000: The following specific patterns of Existing Behaviour - said to be present - contribute most to the control group IV consensus in September 2000:
- None.

EB - Control group IV, September 2000: The following specific patterns of Existing Behaviour - said to be absent - contribute most to the control group IV consensus in September 2000:
- None.

EB - Control group IV, September 2000: The following specific patterns of Existing Behaviour - said to be neutral - contribute most to the control group IV consensus in September 2000:

Working in groups
- The management uses the employees’ competences well (mean = 2.75; msq = .43).

EB - Control group IV, September 2000: About the following specific patterns of Existing Behaviour control group IV does not have consensus at all in September 2000:

General
- Participating is multiple teams lowers the enthusiasm to work in a team (msq = 2.82),
- It is more pleasant to work on your own than working in a team (msq = 4.00),
- We criticise a new idea heavily (msq = 3.68),

Decision making
- In the last ten minutes of a meeting we take over-hasty decisions (msq = 2.25),
- During meetings coaches do other things (msq = 2.86),
- At the end of a meeting there is hardly any evaluation of the process (msq = 2.25),
• During meetings we talk about everything except important business (msq = 4.54),
• We hardly care of the quality of our meetings (msq = 3.29),
• Only dominant persons talk during meetings (msq = 3.43),

Working in projects
• There are only a few people who take on the responsibility of a project (msq = 2.25),

Working in groups
• New employees are absorbed quickly in a group (msq = 2.71),
• Employees don’t utter their wishes in a group (msq = 4.54),

Company culture
• We have a male culture (msq = 3.29),
• It is allowed to make mistakes (msq = 2.54),
• Contacts with customers gets attention in the whole company (msq = 2.71),
• The future of our company is clear to everybody (msq = 3.29),
• In case of illness work is easily taken over by colleagues (msq = 4.43).

DB - Control group IV, January 2000: The following specific patterns of Desired Behaviour - wanted to be increased - contribute most to the control group IV consensus in January 2000:

Consciousness
• None.
Connectivity
• Solving problem by communicating well (mean = 4.29; msq = .48),
Indeterminacy
• Thinking in both…and solutions (mean = 4.14, msq = .29),
Dissipation
• Paying attention to weak signals (mean = 4.14, msq = .29),
Emergence
• None.

DB - Control group IV, January 2000: The following specific patterns of Desired Behaviour - wanted to be decreased - contribute most to the control group IV consensus in January 2000:
• None.

DB - Control group IV, January 2000: The following specific patterns of Desired Behaviour - wanted to stay the same - contribute most to the control group IV consensus in January 2000:

Consciousness
• Allowing to make mistakes (mean = 2.71; msq = .48),
Connectivity
• Ideas are common property (mean = 3.40; msq = .48),
Indeterminacy
• None,
Dissipation
• None,
Emergence
• Paying attention to training (mean = 3.29, msq = .48).

DB - Control group IV, January 2000: About the following specific patterns of Desired Behaviour the control group IV does not have consensus at all in January 2000:

Consciousness
• Contributing to the societal development of the region (msq = 2.73),
Connectivity
• Drawing departmental boundaries (msq = 3.80),
Indeterminacy
• Keeping your stance always (msq = 2.95),
• Not determining meeting roles in advance (msq = 2.95),
Dissipation
• None,
Emergence
None.

**DB - Control group IV, April 2000:** The following specific patterns of Desired Behaviour - wanted to be increased - contribute most to the control group IV consensus in April 2000:

- **Consciousness**
  - None.
- **Connectivity**
  - Taking time to think deeply about a problem (mean = 4.29, msq = .48),
  - Solving problems by communicating well (mean = 4.00, msq = .00),
- **Indeterminacy**
  - None.
- **Dissipation**
  - Changing before it is time (mean = 4.00, msq = .00),
  - Changing things when we wish that (mean = 4.14, msq = .29),
  - Valuing new ideas (mean = 4.29, msq = .48),
- **Emergence**
  - None.

**DB - Control group IV, April 2000:** The following specific patterns of Desired Behaviour - wanted to be decreased - contribute most to the control group IV consensus in April 2000:

- None.

**DB - Control group IV, April 2000:** The following specific patterns of Desired Behaviour - wanted to stay the same - contribute most to the control group IV consensus in April 2000:

- **Consciousness**
  - Being proud of the company (mean = 3.14, msq = .29),
  - Being proud of the product (mean = 3.14, msq = .29),
- **Connectivity**
  - None.
- **Indeterminacy**
  - None.
- **Dissipation**
  - Giving coincidence a chance (mean = 3.14, msq = .29),
- **Emergence**
  - None.

**DB - Control group IV, April 2000:** About the following specific patterns of Desired Behaviour the control group IV does not have consensus at all in April 2000:

- **Consciousness**
  - None.
- **Connectivity**
  - None.
- **Indeterminacy**
  - None.
- **Dissipation**
  - None.
- **Emergence**
  - None.

**DB Control group IV, September 2000:** The following specific patterns of Desired Behaviour - wanted to be increased - contribute most to the control group IV consensus in September 2000:

- **Consciousness**
  - None.
- **Connectivity**
  - Solving problems by communicating well (mean = 4.00, msq = .00),
- **Indeterminacy**
  - None.
Dissipation
• None.

Emergence
• None.

**DB - Control group IV, September 2000:** The following specific patterns of Desired Behaviour - wanted to be decreased - contribute most to the control group IV consensus in September 2000:

**Consciousness**
• None.

**Connectivity**
• None.

**Indeterminacy**
• None.

**Dissipation**
• None.

**Emergence**
• Just do what managers tell you (mean = 2.00, msq = .00).

**DB group IV, September 2000:** The following specific patterns of Desired Behaviour - wanted to stay the same - contribute most to the control group IV consensus in September 2000:

**Consciousness**
• Contributing to the societal development of the region (mean = 3.13; msq = .25),
• Knowing from each other how we think (mean = 3.25, msq = .43),

**Connectivity**
• Appreciating the competitor (mean = 3.25, msq = .43),
• Paying attention to employee’s mutual relationships (mean = 3.25, msq = .43),

**Indeterminacy**
• Not controlling any development (mean = 2.75, msq = .43),

**Dissipation**
• Deciding yourself about new products (mean = 3.00, msq = .00),
• Having to ask permission before trying out something (mean = 2.75, msq = .43),

**Emergence**
• Solving problems yourself (mean = 3.25, msq = .43).

**DB - Control group IV, September 2000:** About the following specific patterns of Desired Behaviour the control group IV does not have consensus at all in September 2000:

**Consciousness**
• None.

**Connectivity**
• None.

**Indeterminacy**
• None.

**Dissipation**
• None.

**Emergence**
• None.

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