# 12 Networked organisations

## 12.1    Introduction

12.1.1    In Chapters 5 to 7 the basic principles underlying properties of interactive self-organisation were described and developed. In Chapter 8 some recent examples of applying these principles to organisational questions, such as the supermarket and the educational institution, were demonstrated. However, these cases were merely used to illustrate principles described in previous chapters; they did not attempt to reason how such principles could be applied to convert industrially structured organisations into networked organisations.

12.1.2    We will address this question in this chapter. However, we do not pretend to formulate a new, full-blown theory of organisation structure and organisation behaviour. We do, however, aim to reveal the principles which govern the creation or emergence of such organisations. We also will indicate the consequences these principles have for management. To achieve this objective, three key areas are considered:

- The enabling of meaningful interaction between human entities (employees and management) in the organisation;
- The way in which conditions for both learning and resulting proliferation can be shaped and guided towards meaningful goals for the whole organisation;
- Management influence and control, particularly with respect to the two pitfalls which have been described in Chapter 7.6-7.8. On the one hand the aspect of network connectivity, thereby managing the complexity of the solution landscape. On the other hand, the conditions of sufficient critical mass and 'driving power' from Axelrod's 'prisoner dilemma' theory to prevent the evolution of networked order from stagnating.

## 12.2    Professional motivation

**Self-organising properties are based on the self-interest of entities in a network. Organisationally, this relates to the company's employees. It is therefore necessary to understand the different mechanisms which govern self-interest. Three different drivers of professional behaviour in an organisation can be distinguished: know-how, ability and motivation.**

12.2.1    Whereas in procedural, hierarchical organisations its design is governed by Taylorian breakdown of functions, networked organisations are based on the principle of interactive, self-organising ability along lines of processes grouped in a hierarchy. As indicated in Chapters 5 to 8, self-organising properties are by no means automatic and require careful design of mechanisms and interaction models.

12.2.2    In general, one could say that professional behaviour will be the synthesis between what people know, what they are able to do and what they are willing to do[i] (see Figure 12-1). If employees have knowledge and motivation, but lack the ability to implement this knowledge, their ambition will not express itself in

real behaviour. Similarly, it is unlikely that, without motivation, know-how and ability will lead to corresponding behaviour.
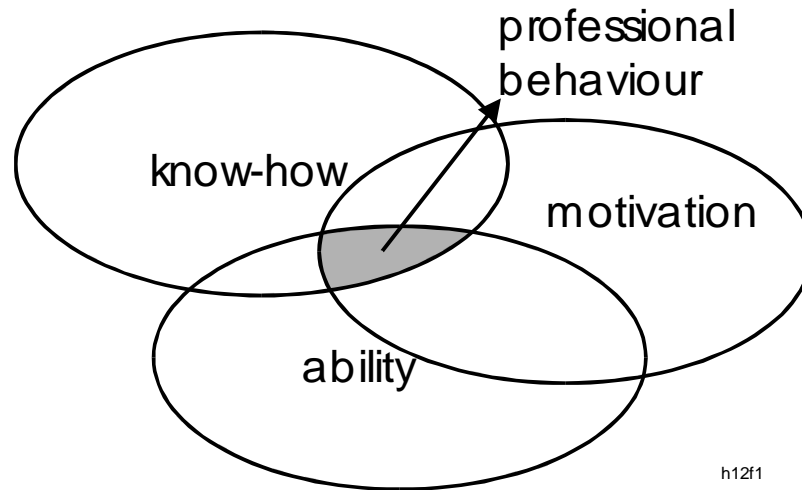


*Figure 12-1:     The drivers of professional behaviour*

12.2.3     If we return briefly to the description of the various phases of development as described in Chapter 3, we find that professional behaviour, in a capacity organisation, is driven largely by the knowledge of the craft. Usually, people employed by such organisations will find it very hard to behave in a way contrary to the available knowledge of the profession; unless stopped, they will generally aim to achieve the maximum possible in the craft. In this way engineers never stop developing, IT-specialists never stop improving programmes, and consultants will never stop giving better advice.

12.2.4     The prime root of professional behaviour in industrial organisations is quite different. As the craft is located in the technocracy of the company where the work instructions are designed, employees in the operational processes will be trained to execute these instructions. Although one could say that they are mostly forced by commands to do so, whether they like it or not, the majority of industrial organisations have got to the point where professional behaviour requires handbooks and training in order to evolve the professional behaviour of employees. Experience has taught us that it is very difficult to convince employees to change their behaviour without proper manuals and training

12.2.5     However, in mass-individualised companies know-how and ability will not suffice, as self-interest and motivation of employees become the dominant drivers for this professional behaviour. If only motivation were present, it could reveal a lack of ability or know-how, causing the need for education and training to improve these aspects of an employee. It is, however, practically impossible to create motivation just by education and training[ii].

12.2.6     Kim and Moon (1997) state that in the current era businesses must empower the individual employee to identify and fulfil the needs of individual customers without sacrificing the efficiency, effectiveness and low cost of a tightly controlled organisational structure. Hierarchical organisations are ill equipped to meet these goals simultaneously. In attempting to allow organisations to respond flexibly to the dynamic business environment, many companies commit the mistake of over-empowering or even eliminating control altogether. The

reason for this, Kim and Moon state, can be found in the belief of false dichotomies like 'low-cost/low-quality' vs. 'high-cost/high-quality', 'centralisation' vs. 'decentralisation', and 'control' vs. 'empowerment', that are still inherent in many businesses. The complex and changing competitive environment of today, however, belies the existence of such dichotomies. It requires companies to operate in 'the eye of paradox', in order to excel. This would not have been possible in the industrial age, but because of advances in information technology and work-flow-management systems businesses can now pursue the empowerment of individual employees and still retain control over the core work processes, objectives that are conflicting in an industrial structure.

## 12.3    Equivalencies

**The core of the problem of interactive self-organisation is to understand and manage the motivation of employees in such a way that it aligns with the interests of the other stakeholders in the company: the shareholders and the customers. In this sense the equivalence model is a coherent set of utility exchanges. The continuity of the coalition is critically dependent on the way in which these different utilities can be aligned to create a powerful common interest in the whole evolution of professional behaviour, and to what extent this is possible.**
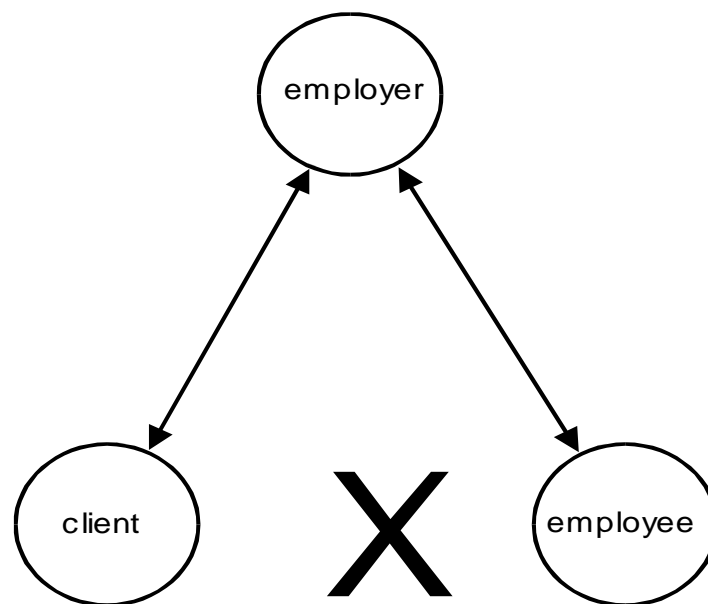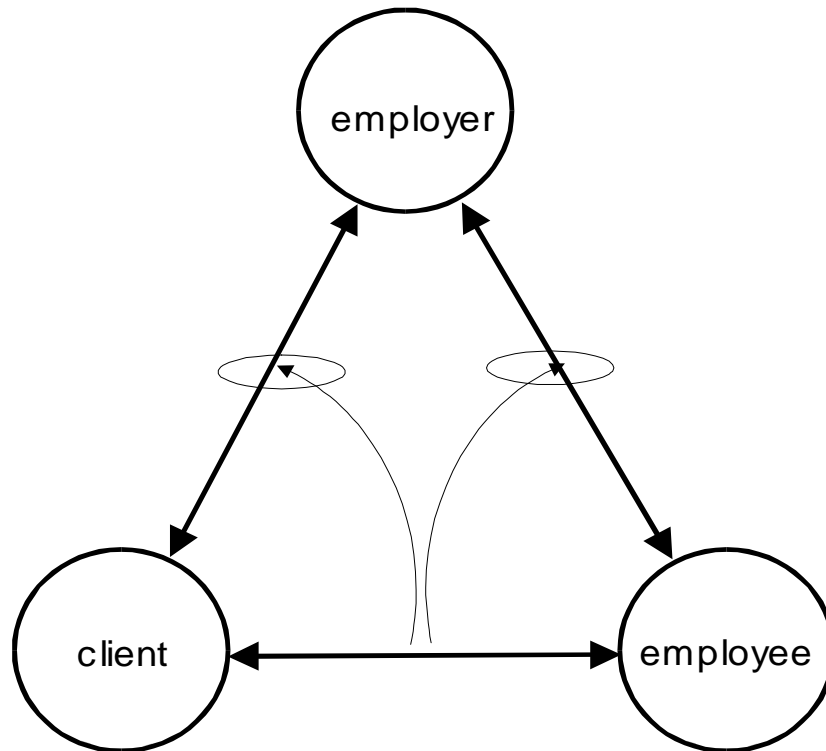


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*Figure 12-2:    The industrial equivalence model*

12.3.1    In Figure 12-2 the relationship between the stakeholders in an industrially organised company is depicted, in its purest form, as an archetype. The company as a system serves the needs of the customers and tries to achieve a maximum utility exchange with them. Employees are instructed procedurally to conduct certain tasks in order to create the customer utility. In its extreme form the relationship between customers and the company is a utility exchange mechanism, in which the exchange is based on the power of instruction and command. No real exchange of utility takes place between customers and

(most of) the employees. Consequently, customers see employees as an extension of the company; if a company fails to deliver the utility, customers would in most cases not blame the individual with whom they are dealing, but would consider this employee just as much victim of the failing delivery system as themselves. In the worst case, even when they are in physical contact with the customer, employees merely execute instructions. The extreme caricature of this behaviour is Kafka's expression of bureaucratic behaviour in the former plan economies.



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*Figure 12-3:    Meaningful relationships between stakeholders*

12.3.2   Under conditions of mass-individualisation, no set of instructions can be designed to meet the unpredictable customer requirements, and employees will have to obtain much more dominance over their own work processes. Therefore, empowerment is a consequence of the inability of a procedural organisation to design instructions and make manuals for every possible situation employees might face in relation to customer requirements. To make this work (see Figure 12-3) a meaningful relationship must be established between the customers and the employees themselves, or for that matter further up the chain, between employees in various stages of the process. Such relationships will only emerge if employees can make a difference in delivering the utility, or at least contribute to the quality of that utility. This is the aforementioned dominance argument. In order to achieve this, the industrial command and control chain that is based on power, has to be replaced by a mechanism which creates freedom for the employee while retaining the intention of the company to reach its strategic goals. Such a mechanism of interaction therefore creates an exchange process between the employee and the company, yielding financial value for the company, while creating perceived utility for the employee.

12.3.3 Zenger and Hesterly (1997) describe the trend in which new forms of organisations are emerging, of which small units and small firms (or 'molecular units') are the basic building blocks. The small size of these units provides, according to Zenger and Hesterly, unique possibilities of aligning individual pay and unit performance. They state this close link is possible because in a small unit individual performance is more easily observed and rewarded, and these units can deliver 'high-powered' incentives by simply rewarding individuals for firm performance, thus avoiding the cost of individual performance assessment. The incentives are deemed 'high-powered' because they are supposed to motivate higher efforts, and the development and leveraging of capabilities, routines and knowledge. This argument is very much in line with the traditional agency theory.

12.3.4 The traditional agent theory assumes that both value income positively, and that the agent is risk-averse The agents theory states that a principal (e.g. a manager), who out-sources a task to an agent (e.g. an employee), is faced with the problem of how to reward. The key question, then, is how the principal can motivate the agent to perform the task as well as possible. The agency theory makes two suggestions:

- Reward the agent on the basis of the performance delivered;
- Monitor the agent while he performs the task.

In practice, however, these prescriptions of the agency theory are hardly in use. Barkema states that it would be more productive to adjust the agency theory using insights from other disciplines, such as sociology.
He quotes Frey (1992):

> "The social exchange theory implies a contract between principal and agent, in which the principal 'gives' the agent trust, loyalty, and recognition, and the agent 'gives' back effort".

In this context, when the principal starts monitoring, he signals that he no longer trusts the agent. This implies breaking the implicit contract, to which the agent will react by reducing his effort. Added to the classic principal-agent model, this means that agents are motivated by the social exchange contract. Reward by monitoring will still have advantages (a stronger link between reward and performance); however, the disadvantages (breaking of the social contract) will probably be greater (Barkema, 1995).

12.3.5 With regard to motivation factors it is worth to distinguish here between so-called 'satisfiers' and 'dissatisfiers' (Herzberg, 1968). Dissatisfiers are elements that create irritation and dissatisfaction with the employee, and at best the company can try to keep such irritations to a minimum. Dissatisfiers are, as it were, negative motivators; they kill rather than create motivation. Therefore, if we aim to achieve a continuous process of improving utility for all stakeholders concerned, such a change can only be based on satisfiers. Attempts could be made (and have indeed been made) to express this satisfier-based exchange of utility between the employees and the company on financial incentives. Despite this, there is evidence that the effectiveness of such financial utility is short-lived and will, in the long run, undermine the freedom-of-choice principle of the employee, as 'golden ties' link the employee to the company.

12.3.6 Generally, there are four problems regarding the motivating effect of pay in our equivalence model;

- It emphasises the wrong relation: it reinforces the relation employer-employee instead of client-employee;
- It is not attached to the event (buying moment), but to some time-unit (e.g. monthly) with which the individual cannot identify;

- It does not recognise differences between employees (while pay-for-performance links the height of pay to performance differences, in general individual preference differences regarding the composition of the total reward, e.g. pay, education, recognition, etc. are hardly taken into account);
- It does not comprise emotional equivalents.

12.3.7    Satisfier-based motivation of employees is completely in line with the Maslow-type hierarchy, as it is increasingly based on perspective in professional and personal development. Therefore, in the relationship between the company and the employee, success in achieving customer utility should lead to reward in the form of professional and personal perspective.

12.3.8    An increasing base of literature suggests that employee commitment is the most important correlator with employee. O'Reilly and Chatman (1986) make clear that psychological attachment of an individual to the organisation provides a good measure for employee commitment. The basis for this psychological attachment can be threefold:

- Compliance, or instrumental involvement in exchange for specific, extrinsic rewards;
- Identification, or involvement based on the desire for affiliation;
- Internalisation, or involvement based on congruence between individual and organisational values.

12.3.9    There are many instances where organisations need individual members to perform above and beyond the call of duty for the benefit of the organisation. The motivational basis for such extra-role behaviour is likely to require more than simple compliance. In their study O'Reilly and Chatman prove that extra-role behaviour and - as a consequence of that - turnover is unrelated to compliance. Critical voluntary behaviour that is not specified by job descriptions appears to be largely a function of identification and internalisation.

12.3.10    Walton (1985) addresses the fundamental differences between 'control' and 'commitment' approaches to work force management. The traditional - or control-oriented - approach to work force management took shape during the early part of this century in response to the division of work into small, fixed jobs. Because of job standardisation and the pessimistic assumptions about worker's skill and motivation, the job definition and the targeted performance standards became based on the 'lowest common denominator'. At the heart of the traditional model is the wish to establish (structural/industrial) order, exercise control and achieve efficiency in the application of the work force; in this model employees are looked upon as a means for (and often as constraint to) achieving shareholder value.

12.3.11    However, a model that assumes low employee commitment and that is designed to deliver merely satisfying rather than outstanding performance simply cannot match the standards of excellence set by world-class competitors in today's markets. Trying to boost commitment in these circumstances is generally doomed to failure. Rather, a radically different approach to work force management is needed: the commitment strategy.

12.3.12    Instead of considering employees a means or a constraint to reach shareholder goals, the commitment model acknowledges claims of multiple stake-holders - owners, employees, customers, public - and addresses questions of 'equity' between these stake-holders. At the centre of this philosophy is a belief that eliciting employee commitment will lead to enhanced performance (cf.

Reichheld, 1996). Under the commitment strategy, performance expectations are high; they do not serve to define minimum standards, but to provide 'stretch objectives', to emphasise continuous improvement and to reflect the requirements of the marketplace. This requires individual responsibilities to change as conditions change (i.e. a broader job design), and the formation of teams which will be the organisational units accountable for performance.

12.3.13    Ghoshal and Bartlett (1997) discuss the failure of the traditional employment contract. In their view, employment contracts started off as an implicit exchange between employment security as provided by the company and employees' willingness to execute tasks allocated to them. This exchange relation took a more or less exploitative shape, but continued to work reasonably well in the old situation. However, this implicit employment contract has been broken in the last decades due to company 'resizing' operations, resulting in a 'hire-and-fire' situation governed by reciprocal opportunism and continuous spot contracting (cf. the prisoners' dilemma, in which the absence of mutual trust will lead players to the worst possible pay-offs).

12.3.14    To resolve this tension, Ghoshal and Bartlett propose a new form of implicit employment contract, in which employees take responsibility for 'best-in-class' performance and for engaging in the continuous process of learning needed to support this performance. In exchange, the company ensures not employees' dependence, as was the case in the old situation, but rather ensures the employee's employability by providing opportunities for continuous skill updating, providing a stimulating work climate, etc. The most important difference is that employees are no longer treated as a 'corporate asset' form that a 'return on investment' has to be appropriated, but rather as stakeholders versus whom the company has a moral obligation in return for their commitments. Ghoshal and Bartlett stress that this implicit contract is not an altruistic agreement to educate and develop people at company cost.

12.3.15    De Gilder, Van den Heuvel and Ellemers (1997) examine the question of what determines organisational commitment of employees. Drawing on previous research in Anglo-Saxon contexts, they establish that organisational commitment consists of affective, continuity and normative components. The affective component draws on emotional liaisons, which the individual employee has with the organisation. The continuity component refers to possible problems the employee might have in leaving the organisation, for instance because of difficulty of getting another job. The normative component is merely the moral standard of the individual employee: does he/she, for instance, value long-term loyalty? These components are in turn influenced by the employee's attitude towards the characteristics of task and job design, towards superiors and colleagues, towards the reward received, towards the characteristics of the organisation and the physical work conditions, and towards his own intention to leave. It turns out that the affective component is greatly influence by such factors. The normative component is also influenced by these factors, albeit at a lower level. It turns out that the continuity component is not at all influenced by these factors; it is an independent characteristic.

12.3.16    Whereas the employee, having obtained dominance in return for recognition, perspective and development opportunities, aligns with the value-creating interest of the company system, we touch upon the relationship between the employee and the (internal or external) customer. It is quite clear how customers would benefit from empowered employees helping to create the best utility for them, but this does not automatically imply a return in the utility exchange for the employee. Yet some form of exchange is required, as otherwise the basic mechanism for a self-organising coalition between

employees and customers cannot be achieved. Little is known, either in practice or in literature, about this balancing equivalent. In some situations, though (especially in service organisations where employees work in very close contact with the customer, sometimes even at the customer's premises), a strong social bond and association with the customer's interests emerges, sometimes to the extent that employees are prepared to sacrifice their employer's interests in order to benefit the customer. Apparently, recognition and appreciation in daily interaction provide a very strong emotional income component, which sometimes could well offset even the interests and utility exchange in the employer/employee situation. In this sense, satifiers provide 'emotional income'. It is an 'everyday'-income' when compared with financial incentives, which in time become more of a dissatisfier.

12.3.17     Reichheld (1993) states that high customer loyalty generates considerable economic benefits and to a large extent explains differences in profitability among competitors. These benefits start a chain of events: the possibility of higher employee salaries, boosting employee morale and commitment, which leads to higher employee loyalty and higher productivity, lower training costs, better knowledge and experience, and higher employee job satisfaction. This, in turn, leads to a better service to customers, who are then more inclined to stay loyal to the company: a self-reinforcing loyalty-based system. To develop such a system requires and understanding of the relationship between customer retention and employee loyalty.

> *"The longer employees stay with the company, the more familiar they become with the business, the more they learn and the more valuable they can be. Those employees who deal directly with customers day after day have a powerful effect on customer loyalty. Long-term employees can serve customers better than newcomers can; after all, the customer's contact with a company is through employees, not the top executives. It is with employees that the customer builds a bond of trust and expectations, and when those people leave, the bond is broken."*

12.3.18     Apart from this, employees will have to be given an incentive to stay. According to Reichheld, the companies that can be qualified as 'loyalty leaders' share their 'loyalty surplus' with employees as well as stockholders. To keep the best employees they provide incentive in the form of higher salaries, bonuses and commissions that align the employee's self-interest with the interests of the company. If employees are expected to be long-term, the company can justify investing more in them. It becomes worthwhile to train the employees in doing the right thing for the customer, which in turn leads to happier and more loyal customers. And the commitment to creating a loyalty-based system has spill-over effects. Employees take pride in delivering value to a customer time and again. Their satisfaction in contributing to a positive goal is another inducement to stay loyal to the company.

12.3.19     In an empirical survey, Peccei and Rosenthal (1997) tested a model of employee commitment to customer service. The major outcome was that commitment to customer service is primarily a non-calculative phenomenon, driven above all by affective, normative and altruistic concepts.

12.3.20     The rationale is as follows. Organisations strive to differentiate themselves on the basis of high-quality customer service. Customers' perceptions of services are highly affected by the nature of their interaction with the front-line staff. While in the past services were provided through standardisation of the service transaction, a modern concept of service quality entails flexibility, initiative and individualisation. As these are incompatible with bureaucratic structures, the attention shifts to employee commitment to customer service.

12.3.21    This employee commitment is manifested in behaviour, through affective, normative, calculative and seemingly altruistic action. In the case of affection-based forms of commitment to customer service, employees engage in continuous improvement and spend effort on behalf of customers because they like to do so; they find the activities involved satisfying and enjoyable in their own right. For the employee this commitment is a source of intrinsic satisfaction, and an end in itself. In the second case, customer service behaviour would be normatively driven, based on the employee's internalised service values and norms. Employees do their best out of an internalised sense of duty and moral obligation. In the calculative case, the underlying motivation is instrumental in the sense that the delivery of service quality is seen as a means to attain other valued goals, such as financial rewards, recognition, promotion, or job security. They exert themselves for the customers' sake, because the positive balance of costs and benefits involved. This relationship is mediated by the amount of 'upward hierarchical trust' that providing high quality customer service will be adequately rewarded by management. In the fourth case, the behaviour includes organisational commitment or the strength of an individual's affective, non-calculative attachment to the organisation as a basis of commitment to customer service. In this case, employees work for the sake of the organisation, behaving altruistically towards it; they do not work specifically for the customer. The above-mentioned approaches are not necessarily mutually exclusive.

12.3.22    Apart from these approaches, which they qualify as 'willingness variables', Peccei and Rosenthal also identify three categories of capacity variables: employee knowledge and competence, empowerment, and resource availability. Knowledge and competence refer to the understanding of what high quality service entails and how it can be best provided, and to the necessary competencies to actually provide these services. Empowerment is deemed important because narrowly defined routine jobs which involve standardised repetitive tasks subject to close supervision, severely limit the scope for innovation and experimentation on the job and afford little scope for employees to exercise their initiative and judgement when dealing with customers. Resource availability is about the adequacy of the resources needed to provide high-quality service and the job pressure in term of work place and workload.

12.3.23    The research model hypothesises that the willingness and capacity variables of the individual influence the employee's commitment to customer service. The most important result of the empirical research is that of the willingness variables, commitment to customer service is significantly influenced by affective, normative, and altruistic orientations to customer service. Calculative orientation to customer service was not found to be a significant predictor. This may be explained by the absence of direct financial incentives and rewards for customer service performance within the organisation. While non-financial rewards (approval, recognition) may also serve as strong incentives, these may often not be strong enough or visible enough related to customer service performance. Of the capacity variables, employee knowledge and competence were found to have a significant impact on commitment to customer service. A human resource implication would be that enhancing employee competence and understanding of customer service (learning) could be very stimulating to customer service commitment. Empowerment on the whole was only slightly significant, the component of job routinisation being however significantly negatively correlated with commitment to customer service. Of resource availability, the component of resource adequacy was only weakly correlated, while job pressure, on the other hand, was found to have a significant positive impact on commitment to customer service, instead of the hypothesised negative impact. A possible explanation would be that commitment to customer service implies and involves an intensification of work for the employee. In order

to satisfy customer requirements and provide high quality service, he or she may have to do more on the job.

12.3.24    For a description of equivalents between the organisation (employer) and the customer, we refer to Chapter 4.2, 7.2, 7.6, 7.7 and 9.4, addressing the interaction -topology governing the customer/company interface.
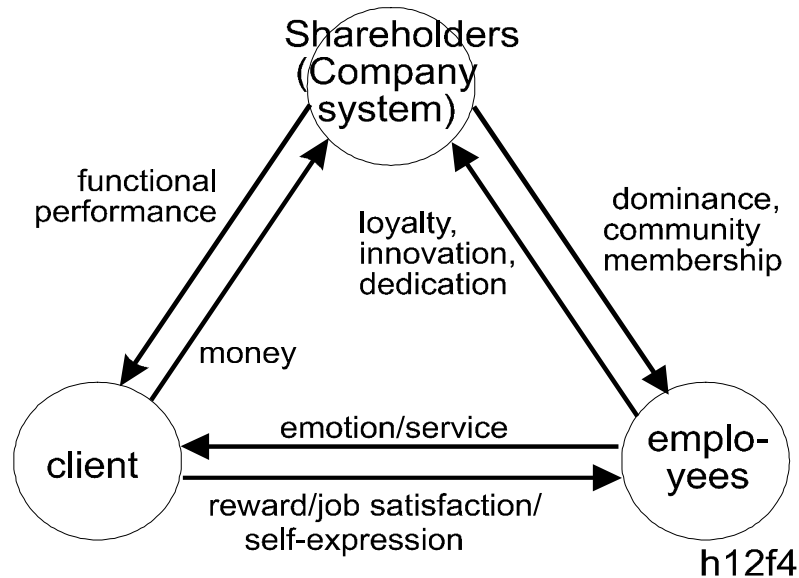


*Figure 12-4:     'The mass-individualised equivalence model'*

12.3.25    Bringing all of these elements together yields the equivalent exchange model as indicated in Figure 12-4. If we concentrate on the satisfier dimension (the dissatisfier dimension is not of interest if we are aiming for self-organising properties), the dominant exchange between customers and the company system (the shareholder interest) is the exchange of functional utility vs. price. Normally, the customer will understand perfectly that the money he pays for the utility he receives, goes to the company, not directly to the employees. The relationship between customers and employees is covered by the exchange of other utility dimensions, making the functional and emotional aspects of the utility dedicated and specific for the individual customer. In return, employees will expect required recognition directly from the customer. In the relationship between the company system and the employees, the employer will expect commitment and loyalty to the company's intentions and aspirations to create economic value. Incidentally, this relationship is increasingly sensitive to moral and ethical issues. A company which damages the environment might well expect that employees are not willing to align with its ambitions, even when this pollution contributes to the creation of economic value

12.3.26    In return for loyalty, the employee will require a degree of freedom and dominance in the execution of the work processes. Attempting to serve the customer, without any ability to act, will create strong dissatisfiers in the relationship between the employee and the customer. With their success in delivering customer utility within the context of the company ambition in mind, employees will be looking for utility in the form of emotional income and perspective in daily interaction with the company system structure.

## 12.4    Professional versus organisational learning

### The link between professional behaviour and organisational learning closely resembles Stacey's description of the double loop learning of new knowledge

12.4.1    Once we have reached the situation, in which there is a proper alignment of equivalencies with the ambitions of company, the central question becomes how to express meaning in terms of intention. In fact a network company creates meaning by two different mechanisms. The first mechanism is the layering processes, representing a different purpose in terms of the utility it creates for customers. A correct layering of processes means that each layer has a clear and unambiguous expression of customer utility, and is embedded in a hierarchy that has an increasing time-constant of dynamics further up the hierarchy (see Chapter 7.3). This layering is the initial step in this approach. Within such a process, the unambiguous expression of performance, as seen by the customer, is crucial. This guides the principal way in which the process will improve by finding ever more performing combinations between functional nodes in the process chain. This mechanism has already been described in Chapter 11, as it largely takes place within information systems and communications

12.4.2    More interesting, from the point of view of organisation in human behaviour, is the second mechanism: the performance improvement of the nodes, functional entities, by finding ever better combinations between the performance goal of the process and the cost and effort associated with them. At the level of the individual this process is governed by Stacey's (1993) double loop learning diagrams (see Figure 6-5, Chapter 6.9). In this respect it is not the left side of the diagram which is of interest, but particularly the right side, which causes the mental model of reality to change. It is these changes which enable groups of individuals to find better combinations between effort and performance. However, the right side loop causes effects of anxiety and disorientation and therefore will easily create negative incentives, dissatisfiers. These will effectively prevent groups of individuals from striving for new working methods in an effort to express their dominance. There are only two mechanisms to overcome this anxiety. One is to make the reward, in return for success, big enough to overcome these limitations. The other is that management controls anxiety and encourages experimentation.

12.4.3    Being caught in the trap between the anxiety that comes with making changes in current work practices, and a reward system (in terms of emotional and perspective benefits) that makes it attractive to find such methods, creates implicitly a hunger to learn from others. It is this eagerness to achieve a better performance without incurring the anxiety and risks of free experimentation, which drives the proliferation mechanism of knowledge throughout the organisation. In order to enable this it is required to have a smaller or large number of parallel and identical functional elements, each of them competing for a rewarding position in the relevant process and each of them experimenting and making the results available to the rest of the group. In this sense, evolving process performance at the level of the individual employees becomes a game. It is this notion of 'game' which is fundamental to the working of networked organisations, and games, in more than one sense, are fundamentally different from a centrally controlled, procedural hierarchy. A game offers rules, but no central authority that will issue instructions on what to do. A game knows both punishment and reward, encompassing the utilities exchanged. A game also implies finding the best way of applying the rules for one's own benefit; under

conditions of a non-zero sum game it enables all to benefit, rather than attain a situation in which one player wins and the other loses.
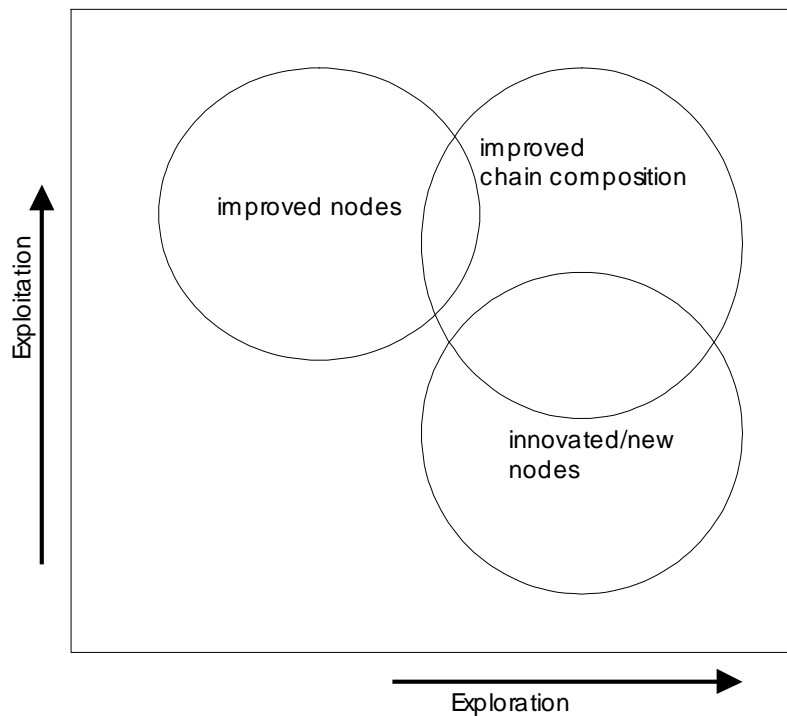


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*Figure 12-5:     Simultaneous exploration and exploitation'*

12.4.4     The game is, in fact, the metaphor combining March's exploitation vs. exploration as indicated in Figure 12-5. If we revisit this diagram, which shows the exploration dimension on the vertical axis and exploitation dimension on the horizontal axis. We can plot the various improvement mechanisms at the process level. Improvements of the nodes themselves will yield a better performance, in process terms, at lower cost; they are aimed predominantly at improving the exploitation dimension of the process. On the other hand exploration will endeavour to create totally new functional nodes, which might, if proven successful, become part of the process chains. The networked mechanisms build processing chains from the nodes, either by selecting improved nodes over those that are unable to improve their performance, or by experimenting with new innovative nodes. In this way it is possible to obtain exploitation and exploration at the same time, making companies sustainable, in the short term, by yielding superior economic performance, and in the long term by creating the adaptivity required to meet vastly changing external circumstances.

12.4.5     Rather than using a dichotomy of exploitation-exploration, Brown and Duguid (1991) distinguish between working, learning, and innovation. They also distinguish between canonical behaviour (as laid down in formal structures and procedures) and non-canonical behaviour. According to Brown and Duguid, ethnographic studies of workplace practices indicate that the ways people actually work usually differ fundamentally from the ways organisations describe that same work in manuals, training programmes, organisation charts and job descriptions. Their rationale is that this non-canonical behaviour fosters work efficiency and effectiveness, learning and innovation, whereas canonical

behaviour does not. In the canonical view, work practice is regarded as conservative and resistant to change, learning is considered as an activity separate from working, and innovation is seen as the disruptive but necessary imposition of change on the other two. In their article the authors demonstrate that in fact these three activities are interrelated and compatible, and thus complementary instead of conflicting.

12.4.6   In the field of working practices they argue that through heavy reliance on canonical descriptions of tasks, managers develop a conceptual outlook that cannot comprehend the importance of non-canonical practices. However, these non-canonical practices are highly relevant in day-to-day problem solving activities of 'shop floor' employees. To illustrate this non-canonical behaviour they provide an example as derived from Xerox (Orr, 1990), an anthropologist at this company.

## Example

**XEROX** (brief summary; source Brown and Duguid, 1991**)**

A Xerox repairman encountered a copier that displayed large amounts of error messages and crashed when tested. The error messages, however, had no relation with the nature of the crashes. This case fell immediately outside the directive training and documentation provided by the company, which tie errors to error codes. The repairman's experience was insufficient to solve the problem right away, and a company technical specialist was equally baffled. While they could have just replaced the machine by another, as company directives might suggest, they went for another option. They decided that solving the problem required constructing a coherent account of malfunction out of the incoherence of the data and documentation. To do this, they embarked on a long story-telling procedure. The machine, with its erratic behaviour, mixed with information from the user and memories from the technicians, provided essential ingredients for the composition of the story, this process being essentially one of diagnosis. Ultimately, these stories generated sufficient insight for diagnosis and repair. The story, from then on, is passed around, becoming part of the repertoire of all repairmen. The story, once in the possession of the community, can then be used - and further modified - in similar diagnostic sessions.

12.4.7   In the field of learning, theories of training as the transmission of explicit, abstract knowledge from the head of someone who knows to someone who does not in surroundings that exclude the complexities of practice and communities of practitioners, are under increasing attack. According to Brown and Duguid, learning theorists have rejected the transfer model, and developed a view of learning as social construction, putting knowledge in the context in which it has a meaning. Learners are acquiring not explicit formal 'expert knowledge', but the embodied ability to behave as community members. The central issue in learning is becoming a practitioner, not learning about practice. Because this process is inseparable from the work itself, learning should take place in the context of work, i.e. from a position on the periphery of practice.

> *"Canonical accounts of work are not only hard to apply and hard to learn. They are also hard to change. Yet the actual behaviour of communities-of-practice are constantly changing [...]."*

12.4.8   Many organisations, however, fail in changing and adapting because of their canonical systems that generate closure form the outside world. The best they can do is simply respond (albeit with great efficiency) to empirical observations of the environment. By contrast, the enacting organisation is proactive and highly interpretative. not only does it respond to its environment, but also, in a fundamental way, it creates many of the conditions to which it must respond. Innovation, in this view, is not simply a response to empirical observations of the environment, rather the source of innovation lies on the interface between an organisation and its environment. This process involves actively constructing a conceptual framework, imposing it on the environment, and reflecting on their interaction, paralleling the non-canonical community-of-practice behaviour as described above, ignoring precedent, rules, and traditional expectations. This behaviour leads to continuous development of new interpretations of the world, because it has a practical rather than formal connection to that world.

12.4.9   Brown and Duguid conclude that, in view of the above, a unified understanding of working, learning and innovating is potentially highly beneficial, allowing synergistic collaboration rather than a conflicting separation among workers, learners, and innovators.

12.4.10  Dixon (1997) draws on the analogy of hallway conversations to address the subject of organisational learning. Because these conversations are informal, creative and open-ended, they provide a rich metaphor for the way organisations build meaning. When learning is defined as the organisational process in which the meaning that guides the organisation's actions is constructed, according to Dixon three categories of meaning can be distinguished: private, accessible and collective.

12.4.11  Private meaning involves meaning as constructed by individuals. On the individual level, learning can and must take place, but it does not by itself generate organisational learning.

12.4.12  Accessible meaning is constructed among organisational members through dialogue. 'Hallways' are the places where collective meaning is created - in other words, meaning is not just exchanged, it is constructed in the dialogue between organisational members, and through the different constructs of meaning that each member brings to this dialogue. The meaning each organisational member articulates influences others. This does not necessarily lead to agreement, but certainly to cognisance. Out of this confluence of ideas,

new meaning develops - meaning that no one individual brought into it, and it is this construction of meaning that is organisational learning.

12.4.13 Collective meaning is held in common by all organisational members. This is a 'storeroom' of explicit meaning, as held in documents, policies, tacit beliefs, culture, etc. It is continually reinforcing itself through the interactions between organisational members. However, these interactions, as they are related to collective meaning and thus lacking differences in perspective, will not lead to organisational learning. That is: meaning is reinforced, but not created.

12.4.14 Metaphorical hallways have a number of important characteristics:
- *Discussion, not speeches:*
  hallways require organisational members to interact with each other by exchanging their data, conclusions, reasoning and questions with others, rather than by listening to speeches or presentations;
- *Egalitarian participation:*
  collective learning is more effective when organisational members talk with each other as equals rather than as disparate members of a hierarchy. Unless this is the case, it will be difficult for employees to challenge the ideas of those in higher positions;
- *Multiple perspectives:*
  differences foster collective learning, which means that we learn only when there is a discrepancy between our current thinking and some event or data that calls our current thinking into question;
- *Non-expert-based dialogue:*
  as in human systems meaning is constructed rather than discovered, expert answers, providing the one and only solution, become only one of the possible perspectives. Expert answers work only insofar as organisational problems are technical in nature. Human systems require ordinary people, thinking together, generating workable answers to organisational problems;
- *Participant-generated database:*
  each of the participants to the dialogue will bring to it the knowledge and understanding about their own processes and how these relate to the other parts of the organisation. Hallways bring together the primary sources of data, not reports from others;
- *Shared experience:*
  apart from being a source of ideas, hallways are also a shared experience of interaction for organisational members. Hallways are, by nature, temporary collective experiences, creating collective meaning, but also providing meaning for the individual participants;
- *Unpredictable outcomes:*
  the collective meaning that will be constructed is relatively unpredictable. The price to pay in human systems for the ability to construct the future to a large extent, is that the future will be less like a predictable, linear progression of the past.

12.4.15 In addition to this, Dixon stresses that it is also important to define what is not a 'hallway':

*"Any meeting in which one or a few people make presentations or speeches to many, including staff meetings and briefings, is not a hallway. A question-and-answer meeting in which top managers field questions from employees, whether in person or in teleconferencing, is not a hallway. Most management development programmes and professional conferences are not hallways; they are designed for individual, not collective, learning. Newsletters and reports that*

*disseminate information are not hallways. All of these may be necessary
to the functioning of the organisation, but they are not places in which
collective learning can take place."*

## 12.5    Evolution blockages

**There are two major reasons why learning and adaptation may not take place or come to a standstill [iii]**

- **Axelrod's prisoner's dilemma**
- **The risk of ending on a local maximum of the N/K solution landscape**

12.5.1    The sections above describe the general principles of achieving self-organising properties in human organisations. Yet, if all of these requirements are met, effective self-organising properties might still not achieved, for two problems which were already generally described in Chapter 7.

12.5.2    The first problem is Axelrod's sequential prisoner's dilemma, which governs the speed and adaptability of the organisation. In organisational terms it means that the anxiety arising from Stacey's right-hand learning loop might be so strong, compared to the benefits which arise from success, that the driving force behind the prisoner's dilemma is not strong enough to bring about the change. One of the underlying anxieties is fear of not obtaining the co-operation of the environment that is necessary to achieve the desired objectives. Frequency of success in trying new routes might be too low to sustain attempts to change, especially if the environment strongly adheres to its conventions. As individuals are predominantly focused on their personal survival, and TIT FOR TAT seems to be the most effective strategy to achieve co-operation in a hostile environment, TIT FOR TAT itself will cause agents who want to change, to rely no longer on co-operation. It is therefore mandatory to create sufficient difference between punishment and reward in driving changes for those who want to go into the new direction, or alternatively to secure sufficient critical mass to create the basis of co-operation required to make such work processes effective.

12.5.3    The second pitfall relates closely to Kaufmann's observations on solution topology and complexity of solution landscapes. His N/K model reflects the balance between the complexity of the problems the organisation can adapt to and the risk of ending at a local optimum. Networks, especially if they have a large number of nodes and are densely connected, and hence potentially capable to create a rich solution space, might easily strand on a local maximum. There are two principal ways of preventing this. The first one is by starting with small, sparsely connected networks which can only deal with a limited complexity of solutions, but which have less chance of becoming stuck on a local maximum. Once they have achieved the global maximum, the size and connection intensity could be increased in order to create the richness of solution space required by nature of the problem.

12.5.4    The other possibility is to create sufficient noise, or force a 'long jump' in the information base used by the group, in order to 'throw' them off their local maximum, hoping that with a lot of effort they will find their way to a new maximum. However, this creates a confused world and besides, being thrown back into the pit, having to climb the hill again, might not yield the sort of motivation required for sustained evolution. The preferred option, therefore, would be to gradually increase the size of the network and the interaction

density. For management this implies that one of the main parameters which control the evolution process is the management of connectivity in a network. It is there where the entropy measure, derived from communication patterns within the organisation, plays a role, enabling management to keep an eye on the level of order achieved in the network structure of the organisation. If the entropy measure is too low, one possibility would be to stimulate a higher level of connectivity, to increase the richness of the solution space. On the other hand, if the entropy becomes too high, management might reduce connectivity in order to bring the interaction back to a lower complexity level.

## 12.6    Related organisational theories

**In the course of time, several authors have introduced organisational concepts that show overlaps with this line of reasoning. Among these are:**

- **The holonic organisation;**
- **The fractal organisation;**
- **The sociotechnical systems view;**
- **The sociocratic method.**

### The holonic organisation

12.6.1    As the organisations have to deal with increasing complexity, problems of reliability and flexibility arise. According to Mathews (1996) this is largely due to organisational architectures emphasising centralisation and control. A solution to this problem of complexity is not to develop more sophisticated approaches to cope with this complexity, but in cutting back complexity at the source. This can be achieved by designing an architecture in which system order arises as an issue of co-ordination of semi-autonomous entities rather than centralised control over the atomic operations themselves. Mathews works out this solution through the concept of holonic organisational architectures.

12.6.2    The basic conceptual core of such an architecture is the holon: an autonomous, independent, intelligent operating entity, that is a system in itself, possibly containing sub-systems that can also be characterised as holons, and at the same time a sub-system of a broader systemic entity. The concept of the holon was coined by Arthur Koestler, one of the founding fathers of the holonic way of thinking, as 'a part that is also a whole' or 'a whole that is also a part'. The holonic structure consists of levels of holons, or super-systems, systems, sub-systems, sub-sub-systems, etc. It has four basic structural features:

- Holons are relatively autonomous; they possess internal coherence and integrity. At minimum, they are equipped with a model of the activity they are required to perform by the overarching system, and with the capacities for performing those activities;
- Holons are not expected to operate with absolute autonomy. However, they have some degree of system dependence, as systemic order (as opposed to control) is obtained through the coordinated activity of holons. Thus, holons are not expected to determine their tasks themselves - these are given by the overall systems design. But how they accomplish their tasks is entirely up to them;

- Holonic systems consist of holons at various levels. System integrity requires these holons to be structured along similar lines, so that there can be meaningful aggregation from level to level. This implies that holonic structures be self-similar, or recursive;
- The fourth feature results from the other three. In a holonic system, no part of the system will possess complete information about any other part. It is in this sense that holonic systems are 'complex', and that the 'whole' is larger than the sum of the 'parts' (or holons).

12.6.3    In a holonic system there is a triad of relations. First-order relations are those that exist within any particular holon. Second-order relations exist between holons at any particular level of the system, whereas third-order relations are those between holons at a particular level and the system as a whole. Holonic systems possess a number of generic and dynamic properties, each of which can be related to this triad of relations:

- *Centralisation and decentralisation of control*
  Holonic systems recognise that complete centralised control is impossible in any complex system, and is in any case brittle and subject to catastrophic failure. Therefore they ensure that control is shared between holons themselves, through their relative autonomy and a systemic coordinating mechanism which takes responsibility for steering the system as a whole;
- *Systemic reliability*
  This lies in the capacity of holonic systems to keep functioning, even if one or more individual holons may have broken down. It is the reliability of the total system that is at issue, rather than the operation of any particular holon;
- *Systemic flexibility*
  Systemic flexibility of holonic systems lies in their capacity to switch operations from one holon to another as the situation demands, or through individual holons themselves, switching their operations with minimal disturbance. This property is also known as 'modularity' - except that holons are 'intelligent' modules that can respond to signals in their own right;
- *Systemic responsiveness*
  The principal virtue of holonic systems lies in their flexibility and adaptability. Unlike centralised systems, which need to alter their entire internal structure in order to make even a small adaptation, holonic systems adapt through individual holons making mini-changes. It is the capacity to initiate changes at the holonic level, rather than waiting for a signal from a central controller, that provides the key to superior performance. In this way, the holonic architecture delivers flexibility by cutting through the source of so much organisational complexity (e.g. the multitude of control signals going up and down a hierarchy) and reducing it at the source;
- *Systemic learning*
  This is closely related to responsiveness. Learned responses at the holons themselves can be characterised as 'single-loop' learning, as this is what constitutes continuous improvement (albeit not by questioning the 'rules'). Second-order learning, at the inter-holonic level, involves a change in the rules followed by any holon, induced through its interactions with holons on the same level. Third-order learning, which involves changes in total system structure, such as generating new holonic entities or dismantling superseded holons, comes from interaction between the system as a whole and its holonic constituents. Both second-order and third-order learning can be characterised as 'double-loop' learning;

- *Organisational innovation*
  Ultimately, an organisation is not viable if it cannot renew itself as circumstances change. Traditional centralised systems, concerned with control, have to be created anew for each situation; they have no capacity for self-renewal as a continuous process. Holonic systems, on the other hand, are defined ultimately by such capacity for self-renewal, through the self-activity of their holonic constituents. Holons which have stopped performing can be disbanded, while new demands can be addressed by the formation of new holons.

12.6.4    The same architecture that is used to describe the holonic organisation can also be used, according to Mathews, as a prescription for design. This design follows three steps:

- Operations are allocated to the holons; this involves decision-making as to what the holons will do. This can only be decided in a top-down manner, keeping in mind the perspective of the whole system. Each holon should be provided with staff, skills and technical configuration to perform their work;
- After the top-down process of allocating tasks, a bottom-up process of allocating controls can be started. The holon itself will call for its required level of control, or self-management. This can be done by allocating as much control (self-management) as possible to individual holons, consistent with their skills, responsibilities and tools provided;
- Once an iterative loop of top-down allocation of tasks, and bottom-up allocation of controls has been accomplished, the required information flows can be designed. These will reflect the actual production or service flows that make up the organisation's work. Much of what is transmitted downwards will be process goals, formulated in general terms at the top level and then broken down into relevant process goals at each holonic level. Much of what is transmitted upwards is performance measures, aggregated at each level - so that the details of performance are kept within the relevant holonic level, and only useful summaries are passed on.

12.6.5    This whole process of organisational design is iterative, and can be expected to go around this three-step sequence many times before agreement is reached and the purpose of the system is widely understood.

## The fractal organisation

12.6.6    In his book 'Revolution der Unternehmenskultur: das fraktale Unternehmen' Warnecke (1993) puts forward a fractal-based model for organising production firms. The economic developments of the past hundred years have led to ever finer methods of organisation, in which economic and scientific factors reinforced each other. Now that information systems are becoming more advanced and data processing is going ever quicker, predictability and control are supposed to rise, especially when factories become fully automated. However, Warnecke states, this deterministic view of the world only applies in a very limited space. He refers to modern physics, where these limitations have long been recognised and non-linear and chaotic relationships are accepted as an important part of reality.

12.6.7    The fractal factory is a concept that tries to incorporate these ideas from other sciences into the field of business economics. The term 'fractal' itself is inherited from descriptions of organisms and natural constructions that can adapt to very

complex situations, using only a few different but continually repeating building blocks.

12.6.8     In the context of an organisation - or a factory - a fractal in Warnecke's definition is a self-acting organisational unit, of which the goals and performance can be described unambiguously. They are the primary constituents of the fractal organisation. Fractals have the following characteristics:

- They are self-resemblant, i.e. structure and entrepreneurial nature are essentially the same on every level (resembling the building blocks in nature). Just as in nature, however, fractals will never be exactly the same: there is room for differences;
- They are self-organising on operative, tactical as well as strategical levels. This ensures that implementation of good ideas from within the fractal will not be blocked by external forces;
- They are dynamic and vital, which means that they are living, intelligent structures that are able to adapt to changing environmental circumstances. This vitality preserves their capacities to generate profits and be competitive;
- They are very ordered, and can therefore integrate numerous aspects and cope with complex problems. They focus on their primary process, thereby greatly reducing the need for complex tasks and processing information. Warnecke adds that solving complexity through what he calls misuse of additional computer speed and processing power is dead wrong. As problems become more complex, ever more effort will be needed to solve them this way, which means that no real improvements will be made;
- Information and communication are of central importance to the fractal structure, because they tie together the different elements of this structure. It would be wrong to assume, however, that information exchange and communication will evolve automatically out of technically advanced information and communication systems. These systems often reinforce and 'cement' the existing structure, leaving little room for improvement;
- They have clear, interactively determined goals. Goals are generated through the interaction between the different fractals involved to deliver a certain performance. Goal consistency is assured by an 'inheritance' mechanism: the fractal's goal is interactively adjusted to the goals of overarching fractals. The closer the fractal is to operational processes, the more clear-cut the goals should be;
- The control of a fractal organisation resembles naval fleet navigation. In Warnecke's view, total decentralisation and market-like interactions within the company (as proposed for example in the 'bionic manufacturing' *model) cannot be considered the solution.*
  *"A company cannot, like an amoeba, be indefinitely split into fully self-containing living parts. Rather, a company resembles a highly organised living system, that cannot act meaningfully in the absence of some kind of central co-ordination. The strategic direction of a company is too important to be left to chance."*
  In the fractal organisation the strategic intent is defined centrally by a small 'navigating' fractal. Other fractals' goals are interactively adjusted to this overarching direction. Warnecke cautions, however, that this process is quite different from conventional 'budgeting rounds' and goal prescription. In other words: the navigating fractal defines the possibility space (top-down), whereas the fractals themselves fill in this space (bottom-up);
- They crucially depend on people. The fractal organisation delegates power and competencies to its employees instead of tying these up in

management and technostructure. It provides employees with free space, demanding more employee responsibility and more flexibility (risk) in return. It goes radically against the idea that people are a disturbing factor that should be 'automated away' as soon as possible. Warnecke thinks it is necessary to explicitly integrate people in all organisation activities, from physical production to administration and organisation;

- Their performances are measured on the level of the fractal. The fractal's performance is measured by the extent in which its goal has been reached, but this is always done on the level of the fractal as a whole, not on the level of individual employees. Through meaningful use of modern information the fractal's performance information can be made available instantaneously.

## The sociotechnical systems view

12.6.9     Kuipers and Van Amelsvoort (1990) provide a survey of the sociotechnical systems theory. Originating from the Human Relations movement, sociotechnical systems theory was first formulated in the 1950's, when Trist and Bamforth related 'technical systems' to 'social systems' in a British coal mine study. The sociotechnical systems theory was extensively developed in the Netherlands by among others De Sitter, Kuipers and Van Amelsvoort.

12.6.10     Sociotechnical systems theory regarded the organisation as an 'open system', interacting with its environment (Emery and Trist, 1960). The main motivation for further developing sociotechnical systems theory was the apparent failure of the Taylorian organisation principles, based on a division between thinking and working. According to the sociotechnical systems theory this division led to disintegration of the social system, and thus diminished system capabilities to adequately react on external disturbances. In order to prevent this from happening, an optimal balance had to be found between the technical system and the social system. The way this balance is shaped was found to heavily influence employee performance and productivity. In deliberately making choices in shaping this balance, it turned out to be unnecessary to translate mechanisation and technological advance into a stronger division of labour. By creating (semi) autonomous task groups it proved possible to preserve the social system while making optimal use of the technical system.

12.6.11     Sociotechnics as an integral organisation design theory was further developed by Kuipers and Van Amelsvoort (1990). Its goals are mainly in the fields of flexibility, product quality, production control, innovation capacity and quality of work life. The central concept is that of self-organising work groups, concentrating on a whole task cycle (within a production environment). The self-organising work group is the basic building block of the organisation. It can autonomously engage in contracts, it sets its own production goals, it internally takes care of production disturbances, it determines internal task division, it takes care of the external co-ordination with other groups, and it can autonomously hire employees.

12.6.12     Contrary to Taylorian design, the sociotechnical principle is based on the minimum possible division of labour. Sociotechnics is not equal to Human Relations, task enrichment and task rotation views, however. Kuipers and Van Amelsvoort state a number of important distinctions:

- Sociotechnics takes the group task, not the individual task as unity of design;
- Sociotechnics is not primarily focused on quality of work life, but also recognises the structural conditions determining the quality of the organisation. Quality of work life and quality of the organisation are inherently connected;
- Sociotechnics explicitly focuses on the structural and technical implications of its design principles for the organisation as a whole.

## The sociocratic method

12.6.13 Another related concept is the sociocratic method (see Romme and Reijmer, 1997). The sociocratic method started in the 1970's as a result of organisational experimenting Gerard Endenburg in his own company Endenburg Elektro-techniek in the Netherlands. The method is a forerunner of what is currently known as chaos and self-organisation. It recognises that the most important problems confronting both authoritarian and democratic organisation structures follow from the concept of central design and control. As power is concentrated in the top of the organisation, it will have to be transmitted down by giving instructions or delegation of authority, thereby limiting possibilities for self-organisation on lower organisation levels. This self-organisation on the basic hierarchical levels is necessary to maintain organisational adaptability (see also Romme and Witteloostuijn, 1996).

12.6.14 While the necessity of self-organisation is recognised, sociocratics states that for large organisations central steering and hierarchical structures will remain necessary. The problem to be solved, then, is how to reconcile central steering and hierarchy with self-organisation of decentral units. The sociocratic method claims to achieve this by replacing the order principle of central power by the principle of circular processes. In these processes, power can flow as easily up as down the hierarchy, thereby removing the central power problem. The concept of circular processes has been pioneered by Ackoff (1981; 1994), by Nonaka (1994) and by Endenburg (1990; 1992). It depends on four basic principles:

- Policy decisions are taken according to the 'no consent' principle (a decision can only be taken as nobody objects); executive decisions remain to be taken by line management;
- Over the hierarchical structure (which remains for executive decisions) a circular structure is imposed for policy decisions. A 'circle' is a functional work group, consisting of employees with a common goal, making decisions on the basis of 'no consent'. Every employee is part of at least one circle. Every circle incorporates a line manager who takes care of policy execution;
- Lower and higher circles are 'double coupled', i.e. the line manager and at least one elected representative from a lower circle also take part in decision making in the next higher circle;
- All persons within a circle, be it line managers, representatives, or whatever, are elected according to the 'no consent' principle.

12.6.15 While a circular structure is imposed, the original hierarchical structure is not fundamentally changed. This ensures that steering and control regarding policy execution are maintained, while also self-organisation and self-steering are realised. The principle of 'double coupling' ensures adequate policy tuning between levels and adequate policy support on each level.

### Conclusions regarding related organisational theories

12.6.16   In this paragraph the concepts of the holonic organisation, the fractal organisation, sociotechnical systems theory and the sociocratic method have been discussed. Each of these concepts has a number of overlaps with the concept of 'networked organisations'. However, there are a number of criticisms, too.

12.6.17   While the concept of holons comes very close to our notions of atomised structures, self-organisation, recursive simplicity, process goals, etc., we encounter a problem with respect to learning within the holonic system. The fact that according to Mathews it is possible to have double-loop learning within the system is based on some hidden assumption that the intelligence to change the system is internally available. As this intelligence does not come solely form the interaction between the holons, there must be some kind of 'super-holon' within the system that is smarter than the other holons. It is this idea that we strongly oppose to, because it leads to the conclusion that somewhere in the organisation there is an entity possessing knowledge on how the organisation should adapt to its environment. In other words, an entity that would be able to predict environmental change and design the organisation accordingly. As we assume the environment to be unpredictable and organisation design to be impossible, such knowledge will not be present in any entity within the organisation.

12.6.18   A second concept that comes quite close to that of networked organisations, is that of the fractal organisation or fractal factory. Here again we recognise notions of atomisation (a concept that also proves very useful in shaping recombinant supply chain processes), self-organisation, interaction, recursive simplicity, living structures, etc. In our view, however, Warnecke does not provide any real solution to the problem of managing such structures. The mechanism for goal setting through interaction between fractals remains rather vague.

12.6.19   While this process might work for individual fractals (which we do not believe), the questions remain how the company goals are determined. As these cannot be simply an aggregation of the individual fractals' goals, Warnecke falls back on more conventional concepts. Company goals are determined by a 'navigating fractal' operating through 'management by exception'. Moreover, in the structuring of organisational hierarchy, he falls back on a division between on the one hand performance defining and measuring functions ('Leistungsfunktionen', above in the organisation), and on the other hand value building functions ('Wertschöpfungsfunktionen', down in the organisation). With regard to navigation and management functions he further states that these remain to be developed:

> *"Navigations- und Steuerungsinstrumente für die Fraktale sind noch über bekannte Methoden hinaus zu entwickeln. Gegenwärtig ist ein erheblicher Aufbereitungsaufwand nötig."*

12.6.20   The sociotechnical systems theory also has a number of similarities to the networked order concept, such as the open systems point of view and of self-organisation within work groups. In some respects, however, it remains quite distant from networked order. To begin with, the joint social and technical systems focus makes it very much a concept of 'how to design an organisation'. We think, however, that for future organisations central design will simply be impossible. This 'design' objection mirrors in the conventionalism in thinking about how work should be arranged. While the autonomous task groups are

self-steering, the sociotechnical systems concept still focuses on functional or task-oriented design in the sense that the task group will be assigned a 'task' (not a process) and that this group will internally divide its 'tasks'. A last objection to the concept is that, in spite of the claim that is not only focused on the quality of work life, it remains very employee-centred, i.e. focused on the dominance of only one of the stakeholder groups.

12.6.21   The sociocratic method takes very much the same starting point as networked order, i.e. that becomes increasingly less possible to shape organisations through centralised design. There are a number of important differences in how the concepts are elaborated, however. Whereas in the networked order concept process execution is largely self-organising and management sets the goals and boundaries, the sociocratic method works exactly the other way round. On the one hand, it retains the functional hierarchy for executive processes, which we think will walk into the limitations of the industrial order principle. On the other hand, it envisages self-organisation with respect to the policy (or goals and boundaries). We believe this reflects a naïve trust in the goodness of people and in the idea that people will cooperate anyhow. The consequences of the 'no consent' principle might be disastrous when people decide to defect instead of cooperate. In this case, it might become impossible to take any policy decision at all. A further problem with respect to the sociocratic method is the double coupling argument. While in itself useful, it provides a very predetermined way of connecting the organisation network. In other words, the connectivity is still 'designed in', while we think the connectivity should be shaped (and changed) according to the environmental demands made to the system.

## 12.7   Management in the middle

**Management in networked companies is quite different from management in an industrial structure. In change programmes towards networked structures middle management gets 'stuck in the middle', both in quantitative terms as well as in qualitative terms.**

12.7.1   In previous sections we have discussed the various principles which underlie interactive self-organisation within the human processes of a company. It should be noted that these principles are not fully independent, in the sense that they obviously interfere with others like the marketing supply chain and information processes. Therefore, in the creation of such organisations these principles cannot be isolated from the shaping of the other processes as described in Chapters 9 to 11. In order to establish a link together with aspects of management arising therefrom, initially the formulation of goals and establishment of a hierarchy of processes, as described in Chapters 7.4 through 7.7, is relevant. Only by shaping this hierarchy, properly defining the corresponding processes and formulating unambiguous, outrageous targets which exploit the antagonism between the equivalencies, as envisaged by both company and customer, can coherence be established between corporate goals and processes.

12.7.2   Management is, amongst other things, about securing and governing the way in which both the customer and the company see how the equivalencies are translated into self-interest of the employees active in the processes concerned (see par. 12.2 a 12.3). However the evolution towards effective self-organisation might be hampered, either by problems with the appropriate level of connectivity

in the network, or problems caused by proliferation blockages which arise from an inadequate balance between critical mass and the punishment-and-reward system for example the positive and negative equivalencies as perceived by employees (see par. 12.4 and 12.5).

12.7.3    From this perspective, management in such companies will shift from issuing work instructions in a Taylorian labour division model, to shaping the exchange processes according to the above principles [iv]. Ghoshal and Bartlett (1997):

> *"The problem is that after decades serving as loyal implementers in a classic hierarchy, most employees do not have the attitudes, knowledge, or skills to allow them to take advantage of the new freedom made possible by such changes to the structure and systems. To allow these individuals to become real frontline entrepreneurs, companies must create a nurturing an supportive environment that develops the skills and builds the confidence of those being asked to take on this new role. Think about what is needed to prepare an animal raised in captivity for release back to nature. It takes skill, patience, and a lot of time. In contrast to some of the popular mythology (or wishful thinking) of instant empowerment and overnight success, our observations led us to conclude that radical transfers of responsibility and power without adequate coaching and support is both naïve and irresponsible. [...] The challenge is gradually to loosen and eventually to remove the boundaries, controls, and restrictions [...]."*

Or, as they describe it: a change from a context of constraint-compliance-contract-control to a context of stretch-support-trust-discipline.

12.7.4    Many of these issues relate to management attitudes and style. In networked organisations a manager becomes more like a gardener than a constructor or commander, which so typified the industrial organisation. In emotional terms, following Stacey's (1993) terminology, it requires management to shift from 'fatherhood' to 'motherhood', a change which many current managers will find difficult. In terms of interaction the interplay between management and employees changes in nature. Rather than entering questions and resolving problems, pretending to know all, the prime task of management becomes to challenge the existing performance cost situation and to create mechanisms which make it attractive, also at the level of the individual employee, to strive for better combinations. Management therefore concentrates more on influencing connectivity and equivalence mechanisms, than on directly steering and controlling resources.

12.7.5    The fast-changing, heterogeneous and unpredictable demands placed on corporations made the majority of companies realise that conventional strategy-structure adjustments were insufficient to address these demands. In their research, Ghoshal and Bartlett (1997) found that most companies were stumbling on the constraint that their managers were simply unable to adapt to the demands being placed on them. Or, as they quote one manager:

> *"trying to implement third-generation strategies through second-generation organisations run by first-generation managers."*

12.7.6    They describe the case of an old Westinghouse division, being stuck in conventional industrial thinking that was taken over by ABB. The radical decentralisation of resources and responsibilities that follows from ABB's business strategy had large consequences for the division's organisation. As it was restructured into profit centres all of a sudden managers who had thought of themselves primarily as engineers began to focus on market needs and became concerned about financial performance. They describe that the ABB

culture of committing people and stretching them to encourage individual initiative penetrated the entire organisation. In fact, this meant a rediscovery of what management should be.

12.7.7  Ghoshal and Bartlett further describe that especially for middle- and senior-level managers it is difficult to let go many of the controls that had previously defined their roles and provided them with their power and legitimacy. As controls and responsibilities are transferred to first-line managers, middle management often feel irrelevant. This is the reason why these management layers often become a barrier to the transformation process: "they become a 'layer of clay' in the organisation, blocking effective transfer of power down to the front lines and preventing the blossoming of new initiatives from below."

12.7.8  As already stated in Chapter 7.9 management in a networked organisation has to assume the role of a gardener, rather than a machine constructor. As a consequence, much less management will be required, since much of the energy needed to change and evolve processes will arise from the organisation itself, instead of being pushed into the organisation by managers. Just as the control of natural forces on a sailing boat requires much less energy than is required to propel the boat forward, the management intensity will be significantly less in networked companies than in the hierarchical companies as we have known them. It is here that one of the major stumbling blocks arises, as this over-capacity of management almost creates a Machiavellian roadblock towards change in the middle-management layers of a networked organisation. Just when they have reached a point in their career they have worked so hard for, many of them will no longer be needed, and they know it. They are like Macchiavelli's barons, and it is unrealistic to expect them to be the advocates of change. Many authors on organisational changes touch on the middle-management problem, and suggest ways to deal with it, and from an understanding of the nature and working of a networked organisation, their observations are right. Whether all solutions are compatible with the boundaries and mechanisms as described previously, especially with respect to serving self-interest in the utility exchange, is questionable[v].

## 12.8   Conclusions

12.8.1  This chapter has been concerned with the application of principles of networked order in the human organisation of companies and the business processes within these companies. Although not pretending to provide a complete new organisational theory, we have argued that creating interactive self-organisation implicates considerably more than just reducing management intensity. From a human perspective, interactive self-organisation involves a delicate set of relationships, which will only produce meaningful results for the entire company if three basic requirements are satisfied:

- A meaningful exchange between individual people within the organisation;
- Parallel learning and knowledge proliferation mechanisms that have a clear sense of purpose at each level in the process hierarchy throughout the organisation;
- Careful management of both network connectivity and the emergence of critical mass, combined with sufficient power of incentives in the equivalence-exchange mechanisms.

12.8.2  All these ingredients are required in order to create a meaningful, coherent and goal-orientated networked behaviour, enabling management to control

evolutionary speed and direction. The performance is not constructed, but is an emergent property of the organisation. It should therefore be noted that the change towards networked organisations is by necessity evolutionary. However, in order to achieve this evolution, the boundary conditions and underlying principles require a radical change in comparison to Taylorian principles. It could therefore be said that the move towards this type of organisation is a revolution of principles with an evolution of organisational development. Quite the contrary of what is generally happening in reorganisation, where underlying principles remain untouched and the organisational structure and the relationship between its various sub-components change discontinuously.

12.8.3    In their book on the individualised corporation, Ghoshal and Bartlett (1997) recognise much the same phase evolution as was described in Chapter 3. While the industrial model forced employees into a corporate mould defined by policies, systems and constraints, the current challenge lies in building organisations that are flexible enough to exploit the idiosyncratic knowledge and unique skills of each individual employee. It is therefore, they state that more profound 'metamorphic' change is needed. While large numbers of new concepts and ideas of running companies became available and were implemented in the 1980's and 1990's, most of these concepts failed to bring the expected success. One of the reasons for this failure is that rather than fixing the bureaucratic structures and systems that stifle individual and entrepreneurial initiative, companies decides to bypass them. As it is precisely this system that selects and reinforces conformity, and obedience, no management ideology or redesign effort will change the dominant pattern. Moreover, these concepts were mostly implemented as a series of random programmatic initiatives, when what is needed is a more fundamental systemic change. It is for much the same reason that Ghoshal and Bartlett's book does not provide quick-fix prescriptions or generals solutions, indicating that there is just no 'one best way'. Rather they provide a set of integrated principles regarding the individualised corporation:

- The ability to inspire individual creativity and initiative in all its people;
- The ability to link an leverage pockets of entrepreneurial activity and individual expertise by building an integrated process of organisational learning;
- The ability to continuously renew itself.

12.8.4    Besides this, they recognise and describe in their book many issues we addressed in this thesis:

- The company as a coalition of stakeholders;
- The importance of fairness and equity between stakeholders;
- The company a network of interacting agents;
- The importance of collective identity and shared ambitions;
- The exploration/exploitation dilemma;
- The human group as a powerful mechanisms for organisational learning;
- The importance of creating a continuous dynamic dis-equilibrium;
- The importance of challenging goals and stretch;
- The company as a collection of processes;
- The impossibilities of structural design of the organisation;
- The role of management as a coach.

12.8.5    With respect to how and where to start the process of changing a Taylorian organisation into an interactive self-organising structure, these observations raise a number of issues. This topic, the transformation process itself, is something that requires much more in-depth research and experimentation. For example, in the 'supermarket' case of Chapter 8, conducting such experiments

in one outlet is one thing, but doing this simultaneously in 650 places is a different matter. For a start, it would not be possible to condition the outside (supply) environment so that it would not interfere with internal processes at the outlet level, and it would almost certainly be impossible to resolve the problems which arise from the overnight 50% management decrease. The fact that an immense social problem emerges which has a direct impact on the equivalence model, makes clear that moving towards a future of interactive self-organisation is not in the interest of people within at least a substantial part of the organisation. In many cases, this in itself might prevent any evolution. Finally, whereas a large retail company might survive a short-term Russian-shop (see Chapter 8.3) situation in one location, on a nation-wide scale the situation would most certainly do so much damage to customer relationships that the arising problems might effectively prevent the company from even taking the first step. Therefore, the transformation issue itself is a question that should not be neglected, but falls largely outside the scope of this thesis. (see Chapter 13)

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[i] This apart form permission to do so, which involves the management. As we are interested here in the self-motivation aspects, we leave the permission aspect aside

[ii] This observation forces companies to rethink many of the educational and training programmes which are run as part of the change process. Under conditions of mass individualisation, not just meeting customer requirements, but also meeting the know-how and ability requirements of employees are becoming pull-driven and require profound changes in the way we structure such programmes.

[iii] The third common pitfall addresses the culture of the organisation. The culture of an organisation is difficult to define, although in principle one could say that it is the set of values and behavioural rules which seem to be generally accepted within the company as a standard for professional behaviour. This cultural identity, although a property of the collective and not of the individuals, has a very strong self-sustaining nature. It is not rare to find companies, in many cases without even recognising it, and long after the founder has died, adhering to the basic characteristics of the value and behavioural norms set by the founders. In this way it is very easy locate Ray Crock's basic opinions in the world-wide McDonalds organisation, to find the basic values and norms of the Heijn family still in Albert Heijn and to see the struggle of the Philips electronics company with the differences in view going back to the old days of Anton and Gerard Philips. Changing these fundamentals is probably not possible, and in this respect most culture-change programmes only change the expressing of the underlying values rather than the values themselves. It is possibly one of the main reasons why mergers fail as no synthesis, or common ground, can be found on which the two previously separate companies can co-exist. Similarly, if and when achieving the shareholder goals will cause the human organisations to violate the basic principles underlying the culture of the organisation, the defense reactions as a result of Stacey's right-hand circle will probably be too strong to be overcome by any utility. Given a relatively free choice, a massive drain of talent might be the result

[iv] This was already noted by Mary Parker Follett in the beginning of the century. She believed that co-ordination of work was best achieved by direct contact between the people responsible for making a decision, and that those people closest to the action should be able to make the best decisions. This meant, in fact, that first-line managers could best co-ordinate production tasks. According to Mary Parket Follett, extensive communication between workers and managers and involving workers in the decision-making would be required to optimise this co-ordination: "just because they tell workers to do something a certain way, managers cannot assume that the workers will do it."

[v] Nolan and Croson (1995) give an example of quite rigorous reduction of middle management intensity in their book 'Creative Destruction'