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**Strategic control systems in action:
managers' use of information devices
in creational and institutionalising work**

by

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In recent years, the number of managerial processes and information devices with a claim to strategic importance has increased significantly, while the environments in which they are working have become increasingly chaotic and unpredictable. This paper sets out to increase the level of understanding with respect to Strategic Control Systems (SCS) by mapping and discussing strategically important managerial processes and information devices – and the links between the two phenomena – as experienced by a corporation in the midst of radical strategic change in a chaotic setting. The study shows that the creational dimension of managerial work was the principal source from which the realised strategies sprang, and that the most important information device in this work was the organisation per se. The creational dimension of managerial work was further supported by ad hoc, fragmented information devices which were detached from the corporation's intended strategy. The patterns emanating from the creational dimension were institutionalised through strategy-based, integrated control systems and some other means. The systems appeared to be more of an end result than the starting point for strategic work.

1. Introduction

The managerial processes and information devices of SCS are multidimensional. These days, managers' traditional formulation, implementation and control of strategies (Ackoff, 1970, Anthony et al., 1989) make up only some of many dimensions of managerial work which may be decisive to patterns of organisational action. Other such dimensions may be related to product development (Brown and Eisenhardt, 1995), manufacturing (Kotha and Orne, 1989), service (Heskett et al., 1997), marketing (Lambin, 1997, Christopher et al., 1991), or other parts of the value chain. In much the same way, the financial (Otley et al., 1995, Giglioni and Bedeian, 1974) and non-financial control systems (Simons, 2000, Brech, 1965) which underpin the traditional managerial process, constitute only some of many information devices which may exert decisive influence on the realised strategy of an organisation. For instance, there is a wide array of information devices which claim to be strategically decisive and which have been developed to support the management of product development (Ansari et al., 1997, Monden, 1995, Hertenstein and Platt, 2001), quality (Juran, 1988, Feigenbaum, 1956, British Standard 6143, 1992), time (Stalk and Hout, 1990, Hum and Sim, 1996), service (Fitzgerald et al., 1991), and marketing (Lilien

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and Rangaswamy, 1998). In such situations, where SCS appears to be all-encompassing (and thus inconsequential? Lorange et al., 1986), it is important that work continues to delimit and raise awareness with regard to the dimensions of managerial processes and information devices of SCS, as well as the links between the two phenomena (Mintzberg, 1994, Ittner and Larcker, 2001).

In 4tel, the creational dimension of managerial strategic work was highly important (table 1). The company's chaotic environment with its many ambiguous, complex and changing patterns, accommodated innumerable potential product technologies, manufacturing technologies, customers, and other elements which are normally associated with SCS. The managers' challenge was to interact with the unfolding patterns in order to effectuate elements that were favourable to themselves and their company. This work consisted of a subjective enactment process in which managers trusted their profound human qualities, a process during which it was essential to be positioned in the centre of the industry's prevailing patterns. The most significant information device was the actual organisation: by involving themselves with the operative activities that made up the organisation, the managers exposed themselves to the patterns and players that formed the industry, thus enabling themselves to exert influence. This creational work was supported by information systems and sources embedded in the organisation, whose qualities generally reflected the qualities of the creational dimension of managerial work: they were ad hoc, fragmented, and detached from the company's intended strategy.

	Creational dimension	Institutional dimension
Managerial process	Human interaction Profound human qualities Creative	Formal relationships Structures Institutionalising
Information devices	Operative dialogues Systems/sources were: Detached from intended strategy Fragmented Ad hoc	Formal dialogues Systems were: Based on intended strategy Integrated Institutionalised

Table 1 The properties of the managerial processes and information devices[1].

A number of the dimensions of the managerial processes and information devices often associated with SCS were at work in the company, primarily serving as vehicles

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[1] The table dichotomises the managerial processes and information devices of SCS. As demonstrated in this paper, the two dimensions are in no way unconnected; they are in fact intertwined. Nevertheless, the dimensions are useful in that they focus on different aspects of managerial work, and they provide insight into the relationship between these aspects and the information devices of SCS.

of institutionalisation. The company made use of a traditional and formal process in which managers formulated, implemented and controlled strategies. Additionally, a formal process was employed for managing the product development. In these processes, managers were using strategy-based and integrated financial and non-financial control systems, as well as systems for controlling project time and resources. These processes and systems represented formal structures which were an intrinsic part of the organisation - structures which delimited and arranged patterns emerging from the creational dimension, and which put the managers in a position to interact with and institutionalise desirable patterns.

This paper will elaborate on the various dimensions of managerial processes and information devices of SCS. In Section 2 we will see that while the literature provides detailed, wide-ranging descriptions of this subject, the creational dimension of SCS has so far received little attention from researchers. The empirical part of the paper focuses on the creational dimension of SCS, which in itself is valuable in that creation is an important source of, and an intrinsic part of, organisational patterns. Also, the introduction of this dimension changes the terms of reference for understanding the discipline's conventional processes and information devices. The empirical part will explain the methodology and context of the study before describing the two dimensions of managerial work, and the associations between them and the information devices. In conclusion, the paper will discuss the empirical findings and some of the consequences for further research.

2. Approaches to SCS

In recent years, the managerial processes and information devices of SCS have become increasingly multi-dimensional. The review below will attempt to provide an empirically focused, up-to-date overview of these dimensions (see Dent, 1990, and Langfield-Smith, 1997, for earlier reviews). Theoretically oriented studies will not be discussed, not because these works are considered to be of little importance, quite the opposite – topics such as economics (Bromwich, 1990, Zimmerman, 2001), game theory (Brandenburger and Nalebuff, 1995, Young, 1998), and agency theory (Lambert, 2001) represent important contributions to SCS, yet these perspectives fall beyond the scope of this paper.

Managerial processes of SCS

Managers' formulation, implementation and control of strategies have traditionally made up important dimensions of SCS (figure 1, part A). The basic idea has been that managers can formulate a strategic logic through conscious, rational and purposeful analyses of their company and its context, and that they can use control systems to implement and control the logic (see e.g. Ackoff, 1970, Anthony et al., 1989).

Consequently, the process is designed for managers to develop and program intended strategies. However, more recent studies show there may be a wider range of applications; the process can also be used to influence emerging strategies (figure 1, part B). The most forward exponent of this view has been Simons, who carried out a number of studies (1987, 1990, 1991, 1994) showing that managers were continually involved in strategic dialogues, discussing strategic plans, assumptions and underpinnings. During these dialogues, managers were using selected control systems interactively, thus turning the attention and energy of the organisation towards its most important strategic uncertainties. The consequential organisational exploration generated new insight, ideas and dialogue throughout the organisation, and this process shaped the managers' strategic dialogue and control.
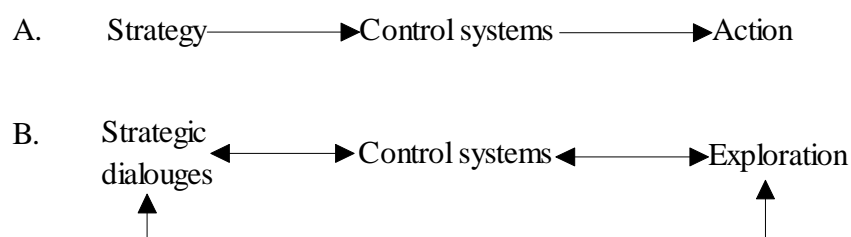

Figure 1 The traditional and Simons' approach to managerial processes of SCS.

Over the last decade, literature on SCS has increasingly recognised that patterns of organisational action can originate from a number of heterogeneous processes, internal and external, and managers carry the primary responsibility for interacting with and influencing this wide array of potential sources of realised strategies (Lorange et al., 1986, Mintzberg, 1973, 1994). The various sources accommodate different activities and logics which make up specific contingencies for management, and SCS currently include a number of parallel managerial processes with different qualities (Mouritsen, 1999, Marginson, 1999). For instance, internal and external operative processes have proved to be of potential strategic importance, and managers can, by interacting directly with these processes, gain insight into, and influence, strategically decisive factors (Mintzberg and Waters, 1982). This means that the strategically most significant managerial processes may well be integrated with the everyday control of dimensions such as product development (Brown and Eisenhardt, 1997), quality (Wruck and Jensen, 1994) and customer relations (Kohli and Jaworski, 1990), as in the traditional or expanded process illustrated in figure 1.

Information devices of SCS

The various managerial processes of SCS require different information devices (Simons, 1995, Neely, 1998). If we start with the traditional approach, it is evident

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from figure 1, part A, that this is based on, and intertwined with, control systems. Traditionally, these have been cybernetic and financially oriented (Otley et al., 1995, Giglioni and Bedeian, 1974), but in recent years, the contents of the systems have been substantially extended, and a number of control systems have emerged which are based on the idea that systems should measure all dimensions of strategic relevance (Kaplan and Norton, 1992, Lynch and Cross, 1991, Fitzgerald et al., 1991, Neely, 1998). The systems highlight the link between intended strategies and measurement systems, and accentuate that such systems should expose strategic dimensions as well as the connection between them to make managers realise which factors they should influence in order to increase the company's competitive advantage. These strategy-based and integrated systems are in widespread use (Silk, 1998, Olsen, 1999), and they have generic qualities in the sense that they are used in many types of organisations, such as corporations (Olve et al., 1999), local government (Kloot and Martin, 2000), and not-for-profit associations (Kaplan and Norton, 2001).

In parallel with the emergence of new approaches to managerial processes of SCS, the control systems normally associated with SCS have been supplemented by a number of other information systems. In the same way that the managerial processes of SCS currently include many more than the traditional management process, e.g. those relating to operative activities, SCS now include a number of information systems in addition to the strategy-based and integrated control systems. Many of these relate to internal and external aspects of a corporation's operative processes, such as product development, quality, time, productivity, customers, suppliers, and competitors (Nixon, 1998, Hertenstein and Platt, 2001, Monden and Hamada, 1991, Carr and Ng, 1995, Mouritsen and Bekke, 1999, Laitinen, 2002, Guilding, 1999, Bruns and McKinnon, 1993, Wouters et al., 1999). This development reflects the fact that the traditional dividing lines within SCS – where the strategic and operative levels have been two opposite managerial poles reflecting the corporation's hierarchical organisation (Anthony et al., 1989) – may be illusory, perhaps even misleading (Otley, 1994, Marginson, 1999).

The multiple dimensions of the managerial processes and information devices of SCS reflect the fact that managers are positioned in the centre of, and continuously need to interact with, a large number of processes and systems, and it is fully possible that the most important information device is the actual interaction and dialogue (Jönsson, 1998, Haas and Kleingeld, 1999). This means that dialogue serves not only as input or an extension to structured processes and systems which are intrinsic parts of operations as well as managerial work; they are also independent activities used by managers to respond to and initiate an overwhelming and continuous flow of processes and information, in which they keep continually updated by taking part in current, specific and well-defined activities, and where work may just as well be characterised by brevity, variety and fragmentation as structure and systems (Mintzberg, 1973, Carlson, 1951).

Two tacit dimensions of SCS: creation and institutionalisation

The managerial processes and information devices of SCS described above may be artefacts that envelop two more profound dimensions of this phenomenon: the creational and the institutional dimensions. These dimensions are intrinsic and important parts of organisations, which is shown by works within disciplines such as strategy (Krogh et al., 1994, Mintzberg and McHugh, 1985), management (Zaleznik, 1977, Kotter, 1990), organisational learning (Crossan et al., 1999, Argyris and Schön, 1978, March, 1991), and economics (Schumpeter, 1942). By their nature, these dimensions are more tacit and intractable than the managerial processes and information systems described above, which are generally well structured, logical and observable. Nevertheless, there is a certain pool of knowledge with regard to the creational and institutional dimensions of SCS, partly because relevant research has been carried out within other subject areas, such as creativity research (see e.g. Amabile, 1996, for an overview), and partly because a certain amount of research has looked into the two dimensions in a SCS context, albeit the institutional dimension has received the most attention.

The creational dimension of SCS relates to creativity as well as innovation. Creativity refers to the generation of novel ideas which are appropriate to the current situation (Stein, 1953, Unsworth, 2001). For creativity to effect changes in organisational patterns, practical outcomes are required through the introduction of an innovation (West and Farr, 1990, Cummings and Oldham, 1997, Norton, 2002). According to Simons (1995), the managers' strategic dialogues are important parts of this work, and by interactively making use of selected control systems in these dialogues, managers may in Simons' opinion, fuel and focus an organisation's creative and innovative processes. One problem attached to this argument is its presumption that creative and innovative processes are manager-anchored and that managers are in a position to influence such processes by using various control systems (Gray, 1990). In practise, creativity and innovation may spring from any part of an organisation, without the involvement of managers, and with no opportunity for managers or others to see which processes are most strategically important before an innovation has been realised (West and Farr, 1990, Mintzberg and McHugh, 1985, Casti, 1994, Miller and Friesen, 1984).

At the core of the institutional dimension of SCS, we find the cultivation and consolidation of organisational patterns. An institution may be defined as a set of "shared rules and typifications that identify categories of social actors and their appropriate activities or relationships" (Barley and Tolbert, 1997), and the institutionalising strategic work of managers involve the cultivation and consolidation of intersubjective views regarding different types of actors within and around a corporation, the relationships between these actors, and which activities are appropriate for which actors. Such views envelop managers as well as organisations (Selznick, 1957, Berger and Luckmann, 1967), and their embeddedness make

managers run the risk of acting as institutional puppets (Granlund, 2001, DiMaggio and Powell, 1983). There are normally limitations attached to managerial compliance with the institutional context, and most managers interact with and tries actively to influence and consolidate selected patterns (Pfeffer and Salancik, 1978). This managerial work is supported by various control systems which reflect the institutional context (Richardson, 1987, Brunsson, 1989), provide a structured perspective for cultivating and consolidating emerging and existing patterns of organisational action (Hedberg and Jönsson, 1978), and mediate between actions and institutions (Burns and Scapens, 2000).

3. Methodology

There is a long series of heterogeneous managerial processes and information devices which claim to be of strategic importance. There is consequently ample access to ideas about what are the key dimensions of SCS. Paradoxically however, it has been pointed out that there is only limited knowledge available about what SCS really is (Mintzberg, 1994, Dent, 1990). A clear a priori restriction on variables, relationships and theories thus carry a risk that studies would fail to embrace the most important processes and devices of SCS (cf. Eisenhardt, 1989).

In the current study, SCS were mapped by means of an inductive and descriptive process. The empirical focus was limited to strategically significant managerial processes and information devices, and concepts and descriptions emerged in the intersection between the narratives imparted by managers and their staff, the data collected from a number of other sources, and the researchers' work to analyse and understand the interviewees and the collected data.

The interviews were conducted over the period May 1999 - December 2000. A total of 21 people were interviewed, of whom 17 were managers and 4 were working as controllers or held similar positions within different company divisions. The entire senior management (the President, the Vice President, plus the heads of the various divisions, 8 in total) were interviewed, and in addition, 9 managers from the next managerial level were interviewed. Some of the interviewees were interviewed more than once, and e-mails and telephone calls were used to wind up loose ends and obtain additional information as necessary. Each interview lasted for 1.5 - 4 hours. In total, more than 30 meetings were held between the researcher and representatives of the company. Interviews with controllers were primarily intended to obtain factual information about the company and were conducted prior to the manager interviews. The manager interviews were open-ended, and even if the themes varied according to the interviewee's position and background, the following three questions formed a point of departure for all of them:

- What factors are strategically important to your area of responsibility?
- How does the strategic work take place?
- What information and control systems are available, and how are they used in the strategic work?

In line with Spradley (1979), various types of field notes were used. During the interviews, the interviewer concentrated on writing condensed accounts of the managers' narratives, endeavouring to use their own language. Immediately after each interview, an expanded account was written up, elaborating on the topics in the condensed accounts. In addition, provisional records of analyses and interpretations were kept on an ongoing basis. Due to the sensitive nature of the questions, no tape recorder was used.

In parallel with the interviews, data was gathered from a number of other sources of evidence, covering the period 1998-2000 (see Appendix 1 for further details). The company's archives and documents were examined, and special attention was given to minutes of management meetings, strategy development and deployment documents, and to all control and evaluation documentation. The relevant annual reports were also studied. In addition, the group's web page, two traditional newspapers and one Internet-based newspaper were monitored, and in June 2000 one week was spent studying the business from within - observing activities, taking part in the natter, having lunch with the staff, and spending time in the corporate library.

The content of this paper gradually emerged through the "between methods" triangulation (Denzin, 1978:302) of the managers' narratives and data from other sources of evidence, and the application of different perspectives. At the start of the project, it was considered important to acquire as much data as possible about the company and its SCS; nevertheless the interviews generated a need for further data and necessitated the use of other perspectives. The data collection process consequently turned into an iterative process, switching between interviews, reviews of other internal and external sources of evidence, and analytical deliberations intended to make sense of the collected data. In the last part of the project (end of 2000), a provisional version of the project end report was presented to the company's Financial Director and Quality Manager, and the ensuing discussion resulted in a number of changes to be incorporated in the report. The updated version was then submitted and presented to the senior management, provoking a lively debate which indicated broad consensus that the report reflected the managers' experiences from the period 1998-2000.

The final outcome of the study is a description of SCS within one particular company, with the inevitable accompanying risk of idiosyncratic findings and a need to check the external validity. However, the validity of the concepts used in the study was heightened by the fact that the researcher was scrutinised by "reality" just as much as vice versa, and consequently depended on using concepts which were meaningful in

the studied context (Czarniawska, 1998). Also, the triangulation of multiple data sources means that the concepts are based on a rich array of methods rather than being a product of the chosen method (Webb et al., 1966, Jick, 1979). The reliability of the study was enhanced by field notes which enable us to track and review what happened in the field, and by the ample access to other sources of evidence (Appendix 1).

4. The company and its environment: a world of chaos

4tel, the company at the empirical centre of this paper, started out in the telecom industry and experienced a chaotic environment while going through major strategic changes. During the 3-year study period the company's environment was characterised by the fact that the telecom industry was being internationalised, while digitalisation and the use of IP[2] technologies meant that the telecom, IT and media industries were about to converge. These developments gave rise to high expectations of future growth and profitability, and ample access to capital fuelled the changes and restructuring of the environment. These major strategic changes in 4tel's environment meant that the company was required to transform its business: it was made a separate subsidiary after demerging from the dominant Norwegian telecom company, Telenor, in May 1998. In 1999 it became part of one of the largest listed computer companies in Norway, EDB Business Partner. In the course of the 3-year study period the company was internationalised and moved from being a sole supplier of software to Telenor to becoming an international supplier of sophisticated software to telecommunication companies. During the late part of the study period, the company employed approximately 900 staff[3], and in addition to their activities in Norway, they were running businesses in Philadelphia, Denver and San Diego in the US, and in Dublin and Paris (see Appendix 2 for further details on the organisation).

4tel and its environment encompassed innumerable dimensions in continual change, and the competitive situation could turn around extremely fast, as exemplified by the developments in the stock market during the last half of the study period. From the beginning of June 1999 till the peak was reached in March 2000, the share price of EDB Business Partner increased by more than six times its base value, only to fall back to approximately half its all-time high. The most boisterous fluctuations took place in the beginning of 2000, when IT shares were hyped and willing investors were virtually queuing up. According to analysts, the volatile situation was to a large extent caused by the changing value of 4tel. During the period of IT hype at the beginning of 2000, 4tel's estimated value peaked at NOK 10 bn, yet immediately before and after the hype, its market value would normally hover between NOK 2.5 and NOK 4 bn. This development provided an opportunity to raise capital for buying competitors and

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[2] Internet Protocols.
[3] At the start of the study period the staff was just over 600, a considerable proportion of which were temporary (the proportion hovered round 20% throughout the study period).

acquiring competence or customers (for examples, see Karvè, 2000), and consequently change the competitive setting radically.

Thanks to the fact that so many dimensions were in a process of continual and rapid change, 4tel and its environment became blurred, unclear entities, and dimensions and categorisations could change from being strategically significant to being irrelevant or even misleading from one moment to the next. This is illustrated by the experiences relayed by the CRM manager:

> "When it comes to 4Cast and Customer Identifier, it's often quite difficult to identify competitors as there are blurred dividing lines between different technologies, systems and suppliers. To a certain extent, this is a general problem within the business, one of the reasons being that content providers and suppliers of transmission are in the process of converging".

> "In-house IT departments are quite often competitors, because they like to develop systems such as 4cast. ...... On occasions we have presented solutions to potential customers only to find that they were in fact competitors who implemented the solutions themselves".

These quotes illustrate the complexity of the study's context. 4tel and its environment encompassed numerous heterogeneous dimensions, and there were blurred dividing lines between important dimensions such as competitors, suppliers, technologies and systems. Also, the quotes illustrate the fact that the context was in a process of rapid change, and players could go from being customers to being competitors from one moment to the next.

5. The managerial processes - the creation and institutionalisation of reality

The complex and continually changing context meant that 4tel's managers were faced with virtually boundless numbers of potential strategic dimensions and industrial configurations, and the enactment of this context formed the very core of the managers' strategic work. In this process, 4tel's managers gave focus to, developed and tested selected and changing patterns through the interaction with the various players they surrounded themselves with:

> "Acquiring strategically valuable information is largely a social skill. In my daily interaction with customers, partners, employees, owners and others, I develop a gut feeling for what is strategically important. I take these feelings and intuitive ideas further and test them through my internal and external networks" (the President, describing how strategies are formed).

This enactment was a subjective process in which contextual patterns were continually explored and exploited according to the personal characteristics of the managers, other players, and their interactions. The shifting focus and perspectives that were used to get to grips with the context were rooted in networks and profound qualities of interacting human beings (cf. gut feeling). Rational and analytic methods, which are often associated with strategic processes, were of little significance:

> "In our current phase, the number of dimensions and the levels of complexity and uncertainty are so high that we are rarely in a position to use rational tools and decision-making processes in or strategic work" (President).

Subjective enactment gave meaning to, and largely formed, the underlying and apparently more objective reality. Factors like technical infrastructure, protocols, ownership and customers were never neutral devices with particular properties and effects. Instead, they constituted parts of larger and complex transitional patterns which were assigned meanings through the interactive interpretation between managers and other players, and this interpretive act often formed the underlying patterns. For example, during the IT hype in the spring of 2000, IP expertise was considered a strategically decisive factor. Gradually, this subjective interpretation was institutionalised and appeared for a while as an objective truth. This represented an opportunity to acquire capital which could be used to shape the industry.

The subjective enactment process was decisive to the competitive landscape and 4tel's strategic position. Through this process, the great number of details which constituted potential strategic decisive factors, were given meaning. Managers were fully aware of the interpretative act's potential for forming the underlying reality, and the various market players were continually struggling to identify factors they could use to institutionalise competitive structures and rules which would work in their favour:

> "The really difficult challenge is to reveal and convert the decisive patterns of the environment" (Vice President).

The creative and strategic opportunities varied with the significance of the subjective enactment process. While subjective enactment was essential, opportunities were abundant. This was particularly apparent in periods where myriads of competitive dimensions were constantly changing – and in 4tel's case this state of affairs was predominant throughout the study period. Opportunities were expected to gradually become more restricted over the next few years, as the structure and rules of the competitive environment, and thus the subjective enactment process, were in the process of becoming institutionalised:

> "At present, 4tel's environment is characterised by rapidly changing technology, players and rules. In the course of the next 3-4 years, large parts

of the markets we're in will have consolidated. The most important strategic decisions will have to be made before it's too late. Once the rules of the game are clear, the windows will be closed" (President).

The creative aspects of 4tel's managerial work were intertwined with, and dependent on, the process of institutionalisation. In the subjective enactment process, creative meanings and actions kept emerging from the interaction between different players. However, the scope for creative meanings and actions became increasingly restricted as the context became increasingly institutionalised. This institutionalisation could come about in a variety of ways, for instance through the emergence of distinct structures and rules in the competitive game; through the development of clear and intersubjective views with respect to different roles such as suppliers, partners, customers, and owners; through a clarification of the power structure; or through a clarification of the different technologies' significance. Creativity thus materialised through the gradual institutionalisation of the competitive context and position, and the institutionalisation of one competitive framework, brought about the exclusion of others.

6. The information devices - from creation to institutionalisation

Information usually constitutes the heart and bone of any organisation, and 4tel was no exception. Throughout the managerial processes - which encapsulated a creational dimension in which meanings and actions were attached to contextual patterns through subjective enactment, and an institutional dimension in which the competitive context and position gradually materialised - a number of information devices were key variables. Table 2 groups the devices in three different categories - dialogue, information systems and sources, and control systems – and lists the internal and external vehicles of each category. Of course, the table is not exhaustive, but reflects the managers' response when asked how they used available information devices in their strategic work.

Categories	Internal	External
Dialogue	Dialogue between managers Dialogue with employees Staff appraisal interviews[4] Management meetings	Dialogue with customers Dialogue with partners Dialogue with owners Dialogue with consultants Conferences, seminars, trade fairs
Information systems/ sources	Research reports Radar Case reviews Intranet Competence plans	RFP Internet Journals Analyses and reports
Control systems	BEST4tel Agresso "Home-made" systems Project management systems	BEST4tel

Table 2 The information devices of SCS.

The various devices listed in table 2 represent a wide range of highly different properties (e.g. compare dialogue to control systems), and their functions and usage in the two dimensions of managerial work varied accordingly. This can be illustrated by the Head of CCB's comments on a recently developed system based on the ideas of balanced scorecards (BEST4tel):

> "The managers' role is to mould the activities which BEST4tel tries to depict. We do this by living with the players around us, not by living with the system. Through this interaction good managers develop a holistic understanding of the company and its environment. In BEST4tel we have tried to express this understanding through an idealised picture. Our staff may use this to understand 4tel's strategy, and how they may contribute".

This quote suggests that there are systematic relationships between the information devices listed in table 2 and the creational and institutional dimensions of managerial work. The Head of CCB accentuates that managers mould their contexts through living with other players, while the resulting patterns are depicted and consolidated by means of BEST4tel. This indicates an association between dialogue and the creational dimension, and a corresponding association between control systems and the

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[4] Interestingly, the equivalent Norwegian term – medarbeidersamtaler - stresses the dialogue between managers and their subordinates rather than the appraisal aspect of such interviews.

institutional dimension. To gain further insight, we will need to explore the properties of the various information devices and how they relate to the creation and institutionalisation of reality.

The information devices and the creational dimension

In 4tel, creativity and information unfolded through everyday operative activities, and the creation of reality was so closely associated with the information vehicles that the managers generally did not distinguish between the two. They were normally described as two sides to the same coin, and the managers frequently referred to them under joint headings:

> "It's important to live with operative, everyday activities. You have to get your hands dirty to acquire the experience and knowledge you need to develop the strategy on an on-going basis." (Head of CCB).

> "Retrieving and processing information on a daily basis is important. Managers and staff continually interact with the market, and through this interaction they acquire knowledge about the market and how to best utilise the company's capabilities" (Vice President).

> "To a great extent, strategies are developed and implemented through our day-to-day, operative work. I have only limited capacity to keep up with all the changes that take place outside 4tel, but capture many of them by focusing on my employees" (Head of NM).

> "The strategy is formed on the basis of market analyses, information about customers, competitors and developments within the telecom market. This information is primarily obtained through operative work" (Head of SP).

These quotes reveal that managers were taking part in operative activities, and when they were exposed to and interacted with changing players and operative patterns, the reality was created through a dialectical process between information and action. The Vice President illustrates this point when she describes how she formed her organisation through an iterative process in which her information and messages produced actions and reactions, and by constantly adapting information to different responses, new organisational patterns emerged:

> "Internal changes are achieved by generating enthusiasm, which provides an opportunity for adaptive dialogue where the message is repeated over and over again while being adapted and changed depending on the course of the process" (Vice President).

Operative patterns were realised as 4tel's managers interacted with a plethora of other players, and numerous channels were employed with random as well as systematic features (see table 2). In addition to their dialogues with other 4tel executives, the managers emphasised the importance of their exchanges with employees, customers, partners, and owners. Consultants were hired on a regular basis, particularly if there was a special need for information about the market and what other players were doing (e.g. competitors). Dialogue was generally achieved through face-to-face meetings, telephone conversations and e-mail exchanges, but new tools kept appearing which erased the traditional dividing lines between different channels (e.g. different types of multimedia terminals). Many of the dialogues were of an incidental nature, arising from everyday activities, but some were part of a deliberate system. External dialogue was systematised through regular routine meeting points, particularly at conferences, seminars, and trade fairs. Internally, dialogue was systematised through the annual staff appraisal interviews and management meetings.

The sources of 4tel's prevailing patterns were inherent in the rich and multidimensional interaction between the company's managers and other players. The company was formed through networks and interactions, and consequently it was of decisive importance to be positioned at the centre of and interacting with the key players and patterns of the competitive context. This was a recurring theme in conversations with 4tel managers, and the topic turned up in a range of different connections and guises:

> "The most important success criterion is that we're able to achieve early contact with potential customers, and whether the social relationships between customers and 4tel work well" (Head of Sales and Marketing, describing the sales process).

> "Changes and innovations in CRM are best generated by exposing as many staff as possible to the market. Through direct contact with the opportunities and restrictions inherent in our environment, they will learn, be motivated and find opportunities to exploit CRM's innovative capabilities" (Head of CRM).

> "There is a need for more and better structured information about markets and competitors. This applies not only to Business Consulting, but to all of 4tel. It may well be that buying this information is the most effective option, for instance by taking on new staff, or by hiring consultants or partners" (Head of BC).

The sources of prevailing patterns, and consequently the substance of 4tel, were never static phenomena – they were ever-evolving. Managers in 4tel and other companies recognised the importance of networks and interaction, and thus ensured that management and staff were constantly taking part in and exposed to changing

constellations and players, seeking to track down relationships which would provide access to important patterns. There was fierce competition for these relationships, and it was normal for companies to invest considerable resources in order to establish them, for instance by accepting loss-making orders in order to gain access to customers, paying out high transfer fees and salaries, or by expending resources on consultants, partners or takeovers.

The information devices - from creation to institutionalisation

Going from chaos to the creation and institutionalisation of a competitive context and position which favoured 4tel, demanded mobilisation of profound human qualities. This process could be managed only through dialogues and networking, yet these efforts were supported by a wide array of information systems/sources. On a regular basis, generally once a month, BC prepared research reports for the management, usually focusing on analyses of markets and competitors, trends in information technology, or the development of telecom business models. Also, the managers used a number of devices to capture and retain signals and experiences from the market: requests for proposals (RFP) was used to reveal developments such as emerging customer needs and technologies, and the Radar information system was used to gather and report information about the company's customers. In addition, some of the managers carried out case reviews, in which they reviewed the course of events in a case (typically, a case would be the work undertaken to capture an important customer), trying to extract the lesson to be learnt. Furthermore, the managers used sources like Internet, Intranet, journals (e.g. Billing World), and various analyses and reports (e.g. telecom reports drawn up by the EU). Also, they used the corporate competence plans, which described the company's existing competence and what actions would be implemented to provide further competence.

Some of the devices listed in table 2 were not associated with the creation of reality, but were described as institutionalising tools. These were primarily tools which traditionally have been found at the very centre of this paper's subject: control systems. In 4tel, these consisted of the system that was based on balanced scorecard (BEST4tel), the company's conventional control system (Agresso), a number of "home-made" systems developed to cover local idiosyncratic information requirements (often based on Agresso reports), and various project management systems (the most widely used system was called Project Management Workbench). It was intuitively evident to the 4tel managers that these systems were not particularly good for creating changes and that their role was rather one of institutionalisation:

> "Systems like BEST4tel and Agresso are primarily suited for planning and evaluating activities. If I want to bring about changes, I communicate directly. This may be done informally, through e-mails or meetings" (intermediate CCB manager).

"When you try to make and introductory sale, enthusiasm and dialogue are essential ingredients, and you need to ensure that your message is continually adjusted to the response. The system-generated reports are not capable of doing this, and you don't walk around with them on you" (Vice President).

Control systems like BEST4tel and Agresso contributed to the institutionalisation of reality by delimiting and arranging the context to which the managers continually had to relate. BEST4tel provided a hierarchical structure which for each of 4tel's units first described an overall vision, then the strategic objectives, key success factors, selected measures and vital activities for four prioritised areas, i.e. key performance results, customer results, processes and development enablers (see Appendix 3). Agresso was also based on a hierarchical structure, but this was a conventional system which generated reports on budgeted and actual costs, revenues and key figures for the various 4tel units. Through their hierarchical structures the two systems defined the formal relationships between various actors within 4tel, particularly in terms of who reported to managers at different levels and therefore to a greater degree interacted with them. The two systems also defined what should be reported and in what form. In this way the systems delimited and arranged 4tel's networks and information flows, and the resulting structures were appreciated by the company's managers:

"The development of strategy and control systems is an important part of my job. They constitute an essential framework and structure for the employees' work, and the structure gives me an opportunity to interact with the whole organisation" (President).

The 4tel managers' institutionalising activities were carried out within the control systems' structures. The structures made the organisational and contextual constructs visible, and this explicit construction constituted a framework which placed managers at the centre of important networks and information flows. They used this position to cultivate and consolidate selected aspects of the manifest reality:

"Systems like BEST4tel and Agresso are suited for reinforcing messages which to some extent have already been accepted. I do this by stressing system-generated reports if and when the opportunity arises, for instance during management meetings" (Vice President).

7. The links between the formal and tacit dimensions of managerial work

SCS literature normally describes managerial processes as being structured, logical and explicit (cf. the above paragraph on managerial processes in section 2). In 4tel, a

number of the processes that were at work, did in fact have these qualities. The two that were most often considered to be of strategic significance, were the traditional management process and a process designed to manage product development projects (P^3). Below is a description of the connection between these two formal managerial processes and the creational and institutionalisational dimensions of managerial work.

The traditional managerial process and the two tacit dimensions

In 4tel, the most important formal process was a traditional procedure during which the management formulated, implemented and controlled strategic ideas. The senior management first developed the company's intended strategy - a process which typically took place at summits during the first quarter of every year. This strategy was subsequently deployed throughout the organisation through an process in which managers on the level immediately beneath the Heads of Division met up with the senior management to develop the vision, strategic objectives, key success factors, selected measures and vital activities (cf. BEST4tel) for their respective divisions. The outcome of this process later formed a basis for similar processes on lower levels of the hierarchy. Finally, the managers controlled the strategy by planning and evaluating the organisation's activities. This was a permanent item on the agenda at regular management meetings (cf. Appendix 1). The management considered the nature of all three phases of this formal process – i.e. strategy development, deployment, and control – to be, primarily, institutionalisational:

> "The formal strategy development is important. The process contributes to systemising and modelling the strategic work and the company's strategy, while providing an opportunity for inter-managerial dialogue and interaction. The strategy deployment is also very important. This process allows our employees to influence 4tel's strategy, and to gain insight they need to see how they can help the company attain its goals. The formal strategic work forms a backdrop and generates a framework for me to work within. Still, 4tel's context is in continual change, and it's important to exploit the opportunities that arise" (President).

This quote illustrates the fact that the traditional managerial process was, primarily, an institutionalising activity. The first phase of the process - strategy development - constituted an arena for the company's strategy to be systemised and modelled, and consequently institutionalised, in the corporate management. During the second phase - deployment - managers gave staff an opportunity to take part in the work to develop the intended strategy further. Nevertheless, the underlying aim was to enhance the employees' understanding of the intended strategy's inherent framework and premises, and to increase their appreciation of how they could best make their contribution within this framework. The outcomes from the first two phases were reflected in the company's control systems, and during the third phase, managers met

regularly (see Appendix 1) and followed up the structures and patterns embodied in the control systems.

To a certain extent, the traditional managerial process was also associated with the creational dimension of SCS. The process implied that 4tel's managers met at regular intervals, and even if different meetings carried different nametags (strategy development, deployment, and control), this was not a clear-cut instrumental process in which the tags dictated the agenda. Managers considered the meetings to offer an opportunity for talks with other managers, and the deliberations reflected not only the meeting's nametag, but also the managers' views on what were important topics of discussion. Thus the meetings were not purely about systemising and modelling the corporate strategy or the development and follow-up of staff frameworks; to a certain extent, they accommodated explorative, creative and innovative processes as well.

P^3 and the two tacit dimensions

At an ideological level, P^3 was a creational device which was "... designed to increase the number of innovations" (Telenor, 1996:6)[5]. The method implied that processes for generating new ideas were established, and new ideas (for completely new products or for transforming existing systems into new products) had to pass through three different gates if they were to result in marketable products. The purpose of the first gate was to decide which ideas the company should progress and analyse, the purpose of the second gate was to decide whether to invest in the development of a proposed product, whereas the purpose of the last gate was to decide whether a product was ready for sale, and to approve the marketing plan. The process was comprehensive and included a number of procedures and aids described in various handbooks (see Appendix 1). To prepare for each gate, documentation had to be drawn up for all ideas and product proposals (the documentation requirements increased with each gate).

Attempts were made to use the method as a practical creational device, and the projects concerned were often extensive and strategically important. One of the projects carried out during the study period, and which largely involved the company's senior management, set out to assess more than 100 systems. The process described above was used to identify and sift the products of the company. Experience showed that P^3's ideological and formal functions were different from those observed on a practical level:

> "This method is good in that it provides a structure and a framework for product development and product management. Our experience tells us that

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[5] The three Ps are abbreviations for Portfolio management, Product development, and Product management. The method was originally developed for Telenor, but was utilised as a foundation for 4tel's product development. This section provides a general outline of its usage within 4tel.

it's ill suited for generating innovations and ideas, as it's too "academic" for that" (Head of CCB).

"The P^3 exercises are too academic, and we've found that it's better to put things into play, like if we cooperate with one or more customers (Financial Director).

Experience from 4tel indicates that in practice, P^3 worked as an institutionalising device. The most important sources of creativity and innovation were inherent in the interaction between players within and outwith 4tel, and P^3 – with its comprehensive procedures and structures – was not designed to deal with these interactions. Also, experience from 4tel indicates that the method per se not contributed to creative and innovative work. Nevertheless, P^3 was useful in that it worked as an institution, providing structures and frameworks for product development and product management.

8. Discussion

This paper set out to increase our level of understanding with respect to SCS by mapping and discussing strategically important managerial processes and information devices, as well as the links between the two phenomena. The object of study is a corporation in the midst of radical strategic change in a chaotic setting, as exemplified by the blurred nature of the dividing lines between competitors and potential customers, and by the fact that managers often found it difficult to identify who were what.

The study shows that the creation of the context was an important aspect of 4tel's managerial work, and that this creational process was inherent in the managers' day-to-day interaction with other players. In their interaction with players such as customers, partners, staff, and owners, the managers made use of profound human qualities like feelings, intuition, and subjectivity to give focus to, develop and test various contextual patterns. This interaction shaped the various players' views and actions on an ongoing basis, and – consequently – it also shaped 4tel and its competitive environment. This process meant it was essential to be positioned at the centre of the operative patterns which were unfolding within the context. In general, managers obtained information through their operative dialogues with various internal and external players, dialogues which tended to be incidental in nature, occurring as part of everyday activities. However, dialogues were to some extent systemised through events such as conferences, seminars, trade fairs, staff appraisal interviews, and management meetings.

The managers' work to create the context was supported by a number of different information systems and sources. The properties of these systems reflected the

shifting internal and external patterns, the fact that the managers were working in a fragmented setting where they were in continual interaction with changing players, and that managers constantly needed up-to-date information about events and trends, generally before these had developed sufficiently to be categorised and arranged in comprehensive structures. The systems and sources of information employed were thus disintegrated and related to specific incidents (e.g. research reports and case reviews) or players (e.g. RFP and Radar), or they constituted general sources of information (e.g. journals and reports) or tools for retrieving and communicating all types of information (e.g. Internet and Intranet). None of these systems or sources of information were linked to the company's intended strategy.

The fact that strategic dialogues appeared to form the very core of the managers' creational work, endorses the importance that literature has assigned to such dialogues in recent years. However, the dialogues took on different roles and were supported by different information systems and sources than those highlighted in SCS literature. In 4tel, dialogues were not primarily a tool for developing strategic intentions and for shaping the organisation by means of strategy-based and integrated control systems, nor were they a tool for turning the organisation's attention towards the strategically most important uncertainties through interactive use of selected control systems. Rather, the strategic dialogues were a means for managers, through direct interaction with other players, to utilise the entire range of their personal qualities in their efforts to understand and influence the premises of tomorrow's organisation. This work was supported by strategy-detached and fragmented information systems and sources which were dedicated to, or suitable for, providing information about potentially interesting events or players within or outwith the organisation.

Rational tools and decision-making processes in general, and the control systems usually associated with SCS in particular, were of little importance to the creational dimension of the managerial work. This was the case for the conventional control system (Agresso) as well as the balanced scorecard-inspired BEST4tel. One important reason why these tools played such minor parts in the managers' creational work was that their properties – their categories, relationships and comprehensive structures – appeared to be negatively correlated to the managers' opportunities to influence the company's strategic context and position. These opportunities were most abundant when the context was chaotic, while innumerable competitive dimensions, players and relationships were unclear and ambiguous, in a process of change. Once the strategic context had got the qualities required for it to be presented through the company's control systems, most of the strategic options had vanished. To put it in the President's words: "Once the rules of the game are clear, the windows will be closed".

In 4tel, the traditional management process and control systems appeared to be more of an end result than the starting point for strategic work. Various roles (suppliers, customers, partners etc.), power structures, technologies and other strategically important constructs emerged from the managers' interaction with other players, and

the resulting categories and structures embodied the strategy that was in the process of being realised, while being reflected in the company's control systems and traditional management process. The traditional belief that managers are able to formulate strategic ideas and make use of control systems to shape organisational patterns, was thus reversed: the most important patterns emerged from the interaction between managers and other players, whereupon these patterns were modelled and made visible by means of the structures and intended strategy of the company's control systems and traditional management process.

This study confirms earlier studies which describe control systems – and the traditional formulation, implementation and control – as institutionalisational devices. The control systems' structures were inherent in the organisation, and with their categories and relationships they represented a framework which reflected the established patterns of the company and its environment. This framework constituted a cornerstone in 4tel's institutional structure in that it delimited and arranged the company's networks and information flows, thus enveloping, and providing opportunities for, the managers' institutionalising activities. The traditional management process represented an extension of the framework, in which managers in interaction with the company's staff primarily systemised, developed and followed up the organisation's established patterns. However, to a certain extent this process also included explorative, creative and innovative activities.

The study shows that managers make use of a variety of processes and systems in their institutionalising work. Hierarchical processes and systems can serve as vehicles for this work (cf. the traditional management process, BEST4tel and Agresso), but processes and systems which are often described as local, creative and innovative devices, may also be useful tools. The 4tel managers were involved with P^3, which on a rhetorical and formal level was a tool designed for the company's creative and innovative product development processes. On a practical level this method proved to be working as a product development institution by providing useful structures and frameworks for such processes. This illustrates the fact that several institutionalising work processes were carried out simultaneously, on a number of hierarchical levels and through multiple systems.

9. Conclusions and further research

This paper's most important contribution is the insight it provides into the creative and innovative aspects of managers' strategic work, and the information devices utilised. The paper also shows that our understanding of the creational dimension of SCS carries implications for our perception of the discipline's traditional management process and control systems. Below is a summary of some important findings of the paper, and an outline of some implications for future research.

1. Creativity was rooted in profound qualities of interacting human beings.

Creativity research has traditionally focused on uncovering the qualities of creative personalities (such as Nobel prize winners), and it is only recently that the link between creativity and context has been emphasised (Amabile, 1996). In 4tel, creativity originated from the managers' interaction with their context, which offered a virtually countless number of strategic options. This indicates not only that future research on creative strategic work and information should include the context, it also indicates that creativity may appertain to the managers' relationships and ability to capture existing ideas of the environment, rather than their ability to actually generate novel ideas.

2. The organisation itself was the most important information device in creational work.

4tel was surrounded by countless strategic patterns in constant change, and it was qualities of the organisation itself that positioned managers in relation to these patterns and thus was decisive to their ability to keep informed. For example, 4tel's networks of customers and partners were essential to the managers' chances of acquiring strategically important information. Consequently, future research on information devices of SCS should emphasise not only information systems, but also other corporate aspects which may be essential for obtaining important information.

3. Strategy-detached, fragmented, and ad hoc information systems and sources supported creational work.

The information that was most relevant to the creational dimension of the managers' strategic work was related to matters that would shape tomorrow's intended strategy, but were ahead of the one employed today. The most useful information systems and sources in this respect, were generally of an ad hoc nature, fragmented, and detached from the intended strategy. Future research should provide further insight into which information devices are most useful to the creational dimension of SCS, and how these devices are being used. For example, 4tel's managers used special devices to review information about operative events of strategic significance (cf. case reviews), and future studies should seek to provide further knowledge of how such devices are being used in the managers' strategic work.

4. The control systems' properties were negatively correlated to the number of strategic options.

According to conventional wisdom on SCS, managers' attention should be positively correlated to the magnitude of reported figures (e.g. the greater the variance between the budget and actual results, the greater the attention). In 4tel, the creational work carried out by managers was about making small things big, about being sensitive to

the important details of the context, about grasping the future strategic significance of patterns in and around the company while they were still embryonic, so that the managers could capitalise on them before others recognised the openings. As the dimensions, relationships and structures of the context became more distinct, and the chances of reproducing and controlling them by means of control systems increased, the company's strategic options decreased in number.

5. The traditional SCS tools were more of an end result than the starting point for the strategic work.

The first stage of 4tel's strategic work was not one of company managers developing strategic ideas about the future – ideas which at a later stage could be put into practice by means of the company's control systems. Rather, ideas and actions emerged from the creational dimension of the managerial work, and the resulting categories and structures were reflected in the control systems and traditional management process. This does not imply that these were insignificant tools, quite the contrary; the study shows they were important to the institutional dimension of the managerial work. However, this illustrates the point that in order to understand SCS, it is important we understand the empirical connection between various information devices and the different dimensions of managerial work.

Unobtrusive data

Key documents from the company's archives

Minutes of management meetings. 4tel was set up as an independent company in May 1998, and from this point until mid 1999, managers met once a week. Minutes were kept of all meetings. In the second half of 1999 and throughout 2000 management meetings were held on a monthly basis, and minutes were kept of all meetings. Weekly status meetings were also held in this period (partly as phone conferences), some of which were minuted in the second half of 1999, none of which were minuted in 2000.

Strategy development documents. Number of participants, procedures, and topics varied from year to year over the three-year period, and this was reflected in the documentation. The agendas for the strategy development meetings constituted the most significant documentation, with the summaries of results and conclusions. These summaries were often recorded in the form of key words for use at the meetings. In addition, there were presentation transparencies, strategic analyses, summaries of internal evaluations and surveys (e.g. EFQM surveys and interviews with the senior management conducted in preparation for the meetings), and some other documentation. The strategy that was developed, was described in "Business plan for EDB 4tel 1999-2003", which was studied with the corresponding document for the 2000-2003 period.

Strategy deployment material. The deployment process was headed by a number of facilitators from the company's staff, and the most important documentation was the transparencies used by these facilitators as they were heading the deployment work.

Documents relating to budgets and evaluation. Miscellaneous documents relating to budget preparations, such as the budget manual and various documents explaining the budget structure and performance targets for the various parts of the company; selected evaluation reports generated by the accounting system for the various parts of the company. The information available in the BEST4tel system was reviewed.

P^3 material.
Telenor's handbook for ideas and innovations (1996).
Telenor's product development handbook. Vol. 1 – Principles and processes (1996).
Telenor's product development handbook. Vol. 2 – Prospectus guide (1996).
Telenor's product development handbook. Appendix (1996).

Portfolio management and product management handbook (1996).
Telenor's methods for portfolio management and product management analysis (1996).
Miscellaneous transparencies and notes from the process.

Miscellaneous reports. E.g. at regular intervals the consultancy part of the company submitted a research report to the management. These reports were generally about analyses of markets and competitors, technology trends (IT), and business models within the telecom sector. Also, reports drawn up in connection with various development projects constituted significant documentation.

Public documents

Televerket, annual reports for the 1980-1993 period

Telenor, annual reports for the 1994 - 1999 period.

Telenor R&D, annual reports on research achievements for the period 1995 - 1999.

EDB Business Partner, annual report for 1999.

External media
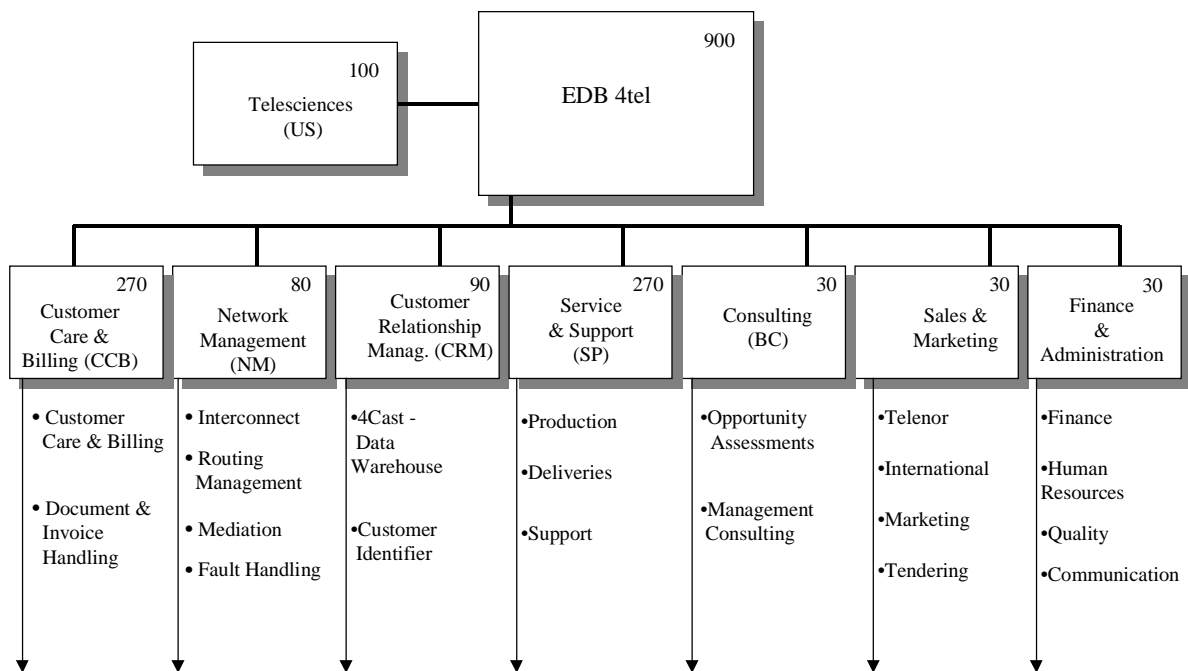
Http://www.edb.com. The group's home page, which describes the group and its subsidiaries. In addition, it contains news and press releases sent out by the group.

Http://www.nettavisen.no

Aftenposten (traditional newspaper)

Dagens Næringsliv (traditional newspaper)

The structure and products of EDB4tel

	100 Telesciences (US)		900 EDB 4tel			

270 Customer Care & Billing (CCB)	80 Network Management (NM)	90 Customer Relationship Manag. (CRM)	270 Service & Support (SP)	30 Consulting (BC)	30 Sales & Marketing	30 Finance & Administration
• Customer Care & Billing • Document & Invoice Handling	• Interconnect • Routing Management • Mediation • Fault Handling	•4Cast - Data Warehouse •Customer Identifier	•Production •Deliveries •Support	•Opportunity Assessments •Management Consulting	•Telenor •International •Marketing •Tendering	•Finance •Human Resources •Quality •Communication

The figures to the top right of every box are estimates of staff numbers. The figures include permanent as well as temporary staff. Some of the most important products and services are listed under each division. During the study period, Telesciences never constituted a separate division.

The structure of BEST4tel
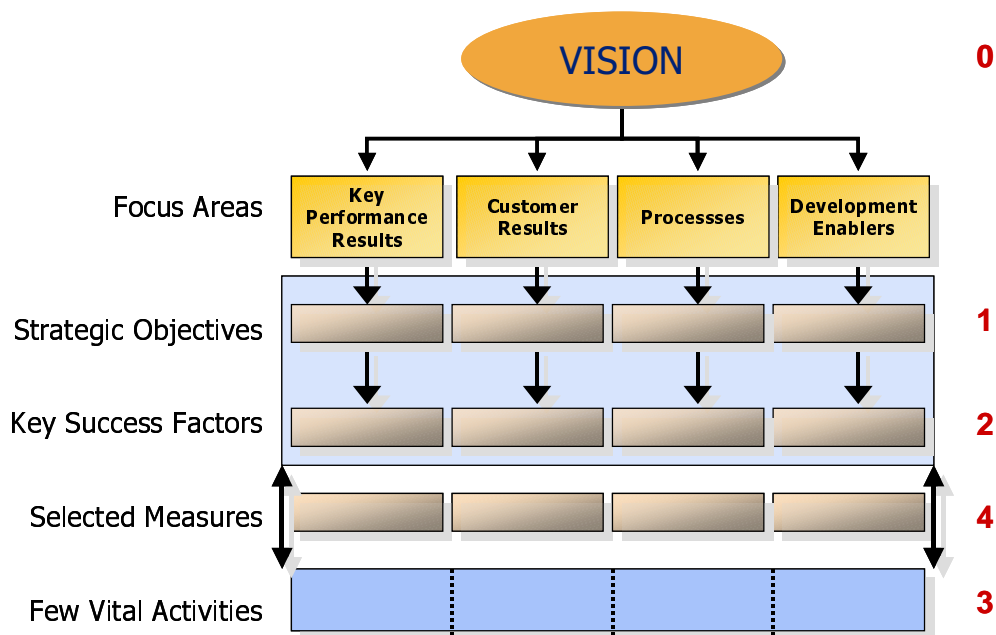
The system was employed throughout the corporate hierarchy, i.e. on company, division, department and team levels. The content on each level was based on the outcomes generated by the level immediately above. For instance, CCB based their statements on outcomes generated at company level, and their vision was phrased: "Creating Core Business for Telecom". An example of a strategic CCB objective within the area of "key performance results" was to "increase revenue to NOK X bn and profits to NOK Y bn by 2003" (the figures are confidential). One of the key success factors for reaching this target was to "obtain sustainable revenue from new customers". A certain number of operational measures were defined for this factor.

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